



RAFIK HARIRI UNIVERSITY

Higher Education as it should be

Undergraduate Catalog

2016–2017

Mechref, Lebanon

Notice

Information in this catalog applies to the academic year 2016-17 as of September 1, 2016. The University reserves the right to make changes in programs, course offerings, academic requirements, and teaching staff as deemed to be in the best interest of students without prior notice.

This catalog has been drafted to conform to the related Lebanese laws and Directorate of Higher Education (DoHE) rules and regulations. In the event of a contradiction, the Lebanese laws and DoHE rules and regulations take precedence.

Student Responsibility for Catalog Information

Students are responsible for reading, understanding and adhering to the information in this catalog. Failure to comply with the stated university, college and program regulations will not exempt students from the ramifications of their ignorance and the penalties that may incur.

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MESSAGE FROM THE PRESIDENT

Higher education (HE) is in transition. Being a bridge to a better future, higher education institutions (HEI) need continuous maintenance to prevent sudden collapse. While demographic, social, and economic factors are at play in determining the future of HE, the plethora of technology tools in particular is driving HEIs to undergo fundamental structural changes. Technology, totally embraced by the generation that is born in its midst, is influencing almost every vital university function and experience: management of resources, design of the classroom, purpose of the library, life on campus, planning of space, modes of communication between students and instructors, teaching methods, learning styles, modes of knowledge attainment, and so on.

The fast pace of these changes, exacerbated by the high cost of integrating technology, changing public perceptions about quality education, growing number of HEI and knowledge providers, shrinking conventional markets for graduates, ineffective accountability measures, and the narrowing window to make important decisions leave HE planners perplexed. To keep pace and hopefully stay ahead of the competition requires wisdom, tenacity, and new thinking. Claims of quality education, stories of past successes, magical ads and spirited slogans are no longer adequate for people to beat a path to an institution's door. At a time our communities are becoming unrecognizable distant fragments of unforgiving reality, threatening what is essentially human, we say to our students that their presence here at RHU is an opportunity to decode the rapidly changing world around them, imagine a future they dream of and cultivate pathways to reach it. In the midst of tumultuous changes and challenges that threaten the existence of our society as we know it, we hope after having earned a degree, our students would be convinced that RHU was truly the "unforgettable choice" they made, where: the aim is symbiotic with the hopes of the nation; the purpose is clear – nurturing hopes and shaping dreams; the outcome that matters most is students' success; and the learning experience prepares for a lifetime of meanings.

Riad Chedid

BOARD OF TRUSTEES

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HE Charles Rizk
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Prof. Riad Chedid, Rafik Hariri University

ACADEMIC CALENDAR 2016-2017

Fall Semester 2015-2016

Jul 11-13	Orientation and Registration / New Students Fall 2016
Aug 1-15	Payment of Fall 2016 Tuition and Fees
Jul 6-8	Eid El Fitr/ Holiday*
Aug 29	Classes Begin
Aug 30-31	Drop and Add Period
Sep 11-13	Eid Al-Adha/ Holiday*
Oct 2	Hijra New Year / Holiday*
Oct 11	Ashoura Day / Holiday*
Oct 31-Nov 4	Advising Week / Spring 2017 for Continuing students
Nov 1	Founder's Day
Nov 7-11	Registration Week / Spring 2017 for Continuing student
Nov 9	Last Day to Withdraw from Courses
Nov 22	Independence Day / Holiday
Nov 30-Dec 1	Orientation and Registration / New Students Spring 2017
Dec 9	Last Day of Classes
Dec 12-13	Reading Period
Dec 14-20	Final Examinations Period
Dec 21- Jan 4	Payment of Spring 2017 Tuition and Fees
Dec 11	Prophet's Birthday/ Holiday*
Dec 25	Christmas / Holiday
Jan 1	New Year / Holiday

Spring Semester 2015-2016

Jan 6	Armenian Christmas / Holiday
Jan 9	Classes Begin
Jan 10-12	Drop and Add Period
Feb 9	Saint Maroon's Day / Holiday
Feb 14	H.E.P.M Rafik Al Hariri Commemoration Day
Mar 13-17	Advising Week / Summer–Fall 2017 for Continuing student
Mar 20-24	Registration Week / Summer –Fall 2017 for Continuing student
Mar 22	Last Day to Withdraw from Courses
Mar 25	Annunciation Day / Holiday
Apr 14-17	Easter / Latin & Greek Orthodox Holiday
Apr 21	Last Day of Classes
Apr 21	Fall 2017 Financial Aid Applications Submission Deadline
Apr 24-25	Reading Period

Apr 26-May 3	Final Examinations Period
May 4- May 18	Payment of Summer 2017 Tuition and Fees
May 1	Labor's Day/ Holiday
May 24	Commencement Exercise

Summer Semester 2015-2016

May 29	Classes and Co-op Work Experience Begin
May 30	Drop and Add Period
Jun 25-27	Eid El Fitr/ Holiday*
July 6	Last Day to Withdraw from Courses / Co-op
July 20	Classes and Co-op Work Experience End
July 24-25	Final Examinations Period

* Tentative dates pending moon sightings. The calendar shall be updated in due time to reflect changes in public and religious holidays.

DIRECTORY

	Location	Extension
Admissions Office	I 107	405/406/407
Bookstore	Block I	753
Central Laboratories	D 102B	554
College of Business Administration	G 101J	301
College of Engineering	C 103	501
College of Arts	F 105K	201
College of Sciences and Information Systems	I 201	701
Communication and Alumni Relations	I 101, I 102	755/754
Dorm Supervisor	A 112	112
Dean of Student Affairs	I 125	770
Directorate for Quality Assurance and Institutional Advancement	I 219	783/799
Finance Department	Block E	424/416/418
Graduate Studies and Research	Block B	611
Gymnasium	Block G	330
Health Clinic	I 119	751
Help Desk	Block G	333
Human Resources	I 103	787/786
IT Service Department	Block G	333/334
Library	Block E	434/435
Media Center	I 101-102	755/754
Operator	Block E	0
President's Office	Block E	441/442
Purchasing and Procurement Department	I 111, I 112	743/744
Registrar's Office	B 102	615/616
Store	Block I	752
Student Affairs Office	I 104	777
Support Services Department	I 110	740/741
Vice President for Academic Affairs	Block E	404
Vice President for Development and Information Technology	Block E	403
Vice President for Finance & Administrative Affairs	Block E	402

THE UNIVERSITY

Overview

UNIVERSITY ADMINISTRATION

Riad Chedid, President

Ahmad Smaili, Vice President for Academic Affairs

Hisham Kobrosli, Vice President for Development and Information Technology

Najib Arabi, Vice President for Finance and Administrative Affairs

Board of Deans

Ahmad Smaili, VP for Academic Affairs

Jamil Hammoud, Dean – College of Business Administration

Hisham Basha, Dean – College of Engineering

Mohamad Al Ladan, Dean – College of Sciences and Information Systems

Mohamad Diab, Dean of Students

Hiam Loutfi, Chair – Languages and Humanities Department

Admission

Zeina Tannir, Director

Central Laboratories

Samir Berjaoui, Director

Communication and Alumni Relations

Rafal Tabaa Khayat, Director

Finance Department

Manhal Bou Karoum, Director

Human Resources Department

Dorrah Naboulsi, Manager

Information Technology

Wassim Mallah, Assistant Director

Library

Jamal Tabbara, Director

Quality Assurance, Institutional Effectiveness and Improvement

Toufic Hijazi, Director

Registrar

Nidal Khalaf, Registrar

Student Affairs

Mohamad Diab, Dean of Student Affairs

Support Services Department

Ahmad SabeH Ayoun, Director

THE UNIVERSITY

History

The establishment of an educational institution, accessible financially and geographically to all, was a pressing dream for His Excellency Prime Minister Rafik Hariri. In the early 1980s, PM Hariri chose Kfarfalous, an area between the South, Bekaa, and the mountains, to be the location for establishing a hospital and a university in collaboration with the University of Saint Joseph. However, the 1982 Israeli invasion led to the virtual destruction of the university and the theft of its equipment.

In 1984, the dream took a different turn with the establishment of the Rafik Hariri Foundation, a non-profit organization whose major goal was to provide the Lebanese youth with a chance for higher education in local and international universities. Around 33,000 Lebanese students benefited from the University Loan Program of the Rafik Hariri Foundation, and pursued their education in Lebanon, Europe, North Africa, and North America.

The end of the civil war in Lebanon led the Rafik Hariri Foundation to revive the dream of establishing an affordable, accessible university. The undertaking of such a project required the help of experts from a country that had made great strides in the field of education. Although several educationally advanced countries were considered, experts from Canada were eventually chosen for this collaboration. The programs of study at Rafik Hariri University were developed in association with a number of Canadian institutions, including the Canadian Bureau of International Education, the Canadian International Development Agency, Capilano University and Memorial University.

Rafik Hariri University, whose aim is to provide affordable, high quality education and to supply knowledgeable and competent graduates to meet Lebanese and regional job market demands, became a reality and opened its doors for the first time on September 15, 1999, with the College of Business Administration, according to Presidential Decree 1947. It opened with a student population of 75. After its Colleges of Engineering and Science and Information Systems were established, RHU was granted university status on June 19, 2006, by Decree Number 17192.

Vision

RHU envisions becoming a beacon of knowledge, a brand for academic distinction and a force of meaningful transformation by fostering a culture of quality, instituting authentic learning conditions, and supporting purposeful research to advance knowledge and nurture leaders capable of driving development and contributing to the enrichment of the community - immediate and beyond.

Mission

RHU shall: institute a culture of quality by committing to due process, academic excellence and hard-work; set up learning conditions conducive to farming dreams, stimulating imagination and cultivating passion to forever learn; instill the values of responsible behavior, tolerance, and freedom of self-expression and thought; and align learning outcomes with emergent community needs to ultimately transcend students' potential, possibilities, and contribution beyond time and distance.

Values

When it comes to values, we do not merely pay lip service. We are indeed deeply committed to a number of core values that we uphold and fulfill:

Shared Governance. Enable all RHU constituents to participate in shaping the provision of quality higher education.

Excellence. Offer a meaningful contribution to the development of knowledge and promoting excellence in teaching and administrative support.

Integrity. Operate with fairness, honesty, openness and the highest ethical standards to sustain a community of trust.

Diversity and Tolerance. Create a community that advocates and promotes diversity and tolerance as a priority of academic and civic life.

Community Service. Show commitment to serving our community through responding to the needs and concerns of all stakeholders.

Purposeful Learning. Engage students in a learning experience congruent with the dreams of individuals and the needs of the community.

Location and Climate

RHU is located in Mechref, Damour, 20 kilometers south of Beirut. The campus sits on a hill overlooking the Mediterranean Sea, above the Mechref Village, a residential project with altitudes ranging from 30 to 560 meters above sea level. The climate is moderately cold from December to March and moderately hot from June to September.

The 54,000-m² campus has nine main buildings. Seven buildings are used for educational purposes, one for the administration, and one for faculty and student residences.

The lush greenness of the RHU campus creates a refreshing ambience and provides further incentive for students to pursue their academic goals. The green lawns provide ample space for students to study, relax, or socialize. The mosaic of blue, green, and white – a blue sky, green lawns, and white buildings – of the RHU campus is itself splendor.

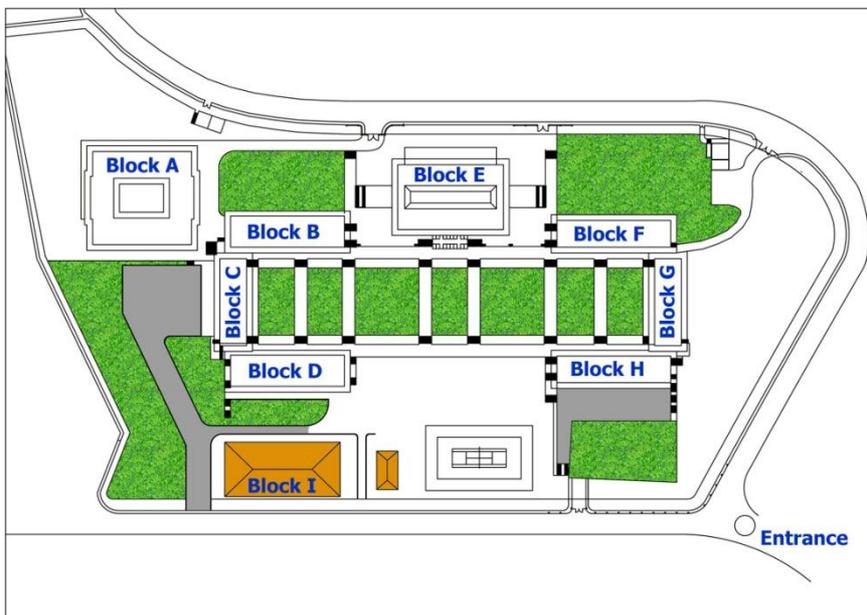
Directions and Map

From Beirut

Take the Beirut Saida Highway south (towards Saida)
Take the Damour main exit (towards Deir Al-Qamar)
Go left on the roundabout (follow the Mechref Village road sign)
Drive for 300 meters
Take a right at the Mechref Village main gate
Follow the RHU signs leading to Campus

From Saida

Take the Beirut Saida Highway north (towards Beirut)
Take the Damour main exit (towards Deir Al-Qamar)
Go left on the roundabout (follow the Mechref Village road sign)
Drive for 300 meters
Take a right at the Mechref Village main gate
Follow the RHU signs leading to Campus



Map of the RHU Campus

ACADEMIC PROGRAMS AND DEGREES

RHU offers more than 20 accredited programs in its four colleges. A summary of the programs offered, degree awarded, and number of credits required to complete a degree is given below.

Program	Degree	Credits
College of Arts		
Education	BA	93
Journalism – Media and Digital Communication	BA	93
English Language	BA	93
Teaching Diploma	TD	21
Freshman Arts		30
Freshman Science		30
College of Business Administration		
Accounting	BBA	99
Business Information Technology Management	BBA	99
Management	BBA	99
Marketing	BBA	99
Human Resources Management	BBA	99
Marketing and Advertising	BBA	99
Finance and Banking	BBA	99
MBA – General Track	MBA	36
MBA – Oil and Gas Management	MBA	36
College of Engineering		
Electrical Engineering	BS, BE, MS	114, 147, 48*
Computer and Communications Engineering	BS, BE, MS	114, 147, 48*
Biomedical Engineering	BS, BE, MS	114, 147, 48*
Mechanical Engineering	BS, BE, MS	114, 147, 48*
Mechatronics Engineering	BS, BE, MS	114, 147, 48*
Civil and Environmental Engineering	BS, BE, MS	114, 147, 48*
College of Sciences and Information Systems		
Computer Science	BS	93
Health Information Systems	BS	99
Graphic Design	BS	111
Interior Design	BA	111

* 48 credits beyond the BS degree requirements for thesis track option or 51 credits for non-thesis track option. Holders of a BE degree are required to take, in addition to any required background courses, 15 more credits (thesis track option) or 18 more credits (non-thesis track) to complete the MS degree requirements.

The language of instruction is English and all programs include 30 credits of general education courses.

ADMISSION

Zeina Tannir, Director of the Admissions Office

Sawsan Sheikh Younes, Associate Director of the Admissions Office

Block I, Ground Floor, Room # 106

00 961 5 603090; Ext 405/406/407

www.rhu.edu.lb/admission

The Admissions Office at RHU manages all admission related functions. The spectrum of responsibilities include: managing admission applications; developing, maintaining and implementing admissions policies and procedures; working closely with the academic units and University committees on admission issues; continuously engaging with prospective students by helping them complete their application dossier, responding to their inquiries and supporting them in making informative academic choices, and informing them of the admission decision and related stipulations; managing enrollment campaigns and meetings with school principals, parents and community leaders; preparing and updating admission materials; participating in the organization of students' open-day and orientation programs; and generating admission statistics and reports.

Applications for admission may be submitted via mail, email, or in person. Admission is granted on competitive basis. Early admission may be granted to students with strong scholastic high school record. For details on admission requirements, application deadlines, procedures and fees to various University programs please refer to the Admission section in this catalog or visit www.rhu.edu.lb/admission/.

Undergraduate Admission

General Information

Rafik Hariri University admits academically qualified and morally sound students irrespective of their national origin, color, gender, religion or disability. Applicants who submit completed application forms and all supporting materials to the Admissions Office by the specified deadlines are usually notified of decisions within four weeks after completing the application file. Early admission is granted to outstanding students as evidenced by their high school achievements.

Fulfilling the following admission requirements does not guarantee admission to a program. These requirements represent a threshold for including the application in the competition pool. Admission is competitive and subject to availability of spaces in the desired program.

The following stipulations pertain to admission to the undergraduate programs. Admission requirements to graduate studies are found in the Graduate Studies section of this catalog.

Admission Requirements

Every applicant to RHU must satisfy the following basic requirements: (1) attained the prerequisite education for the program of interest; (2) has not been expelled from another institution for academic or misconduct reasons; (3) completed and submitted the application form and all application materials to the Admissions Office by the stated deadlines and paid the application fee of 100,000 L.L.; (4) all required documents are certified and received by the application deadline; and (5) Photocopies of passport and residence permit (for non-Lebanese Applicants).

Student may register courses after completing all the admission requirements.

Academic Preparation

To be admitted, the student must have completed at least 12 years of schooling prior to joining the University and provide proof of English language competency as detailed below.

Lebanese Baccalaureate. Students who hold a Lebanese High School Certificate may be admitted to a desired undergraduate program according to the requirements specified in the following table.

College	Baccalaureate Study Track
College of Arts	General and Life Sciences, Humanities and Literature, Economics
Business Administration	General and Life Sciences, Humanities and Literature ¹ , Economics
Engineering	General and Life Sciences, Economics ²
College of Sciences and Information Systems	General and Life Sciences, Economics ² , Humanities and Literature ³

¹ Humanities and Literature track students must take one remedial Math course as prerequisite to joining Business Administration program.

² Economic track students must take four remedial courses, two Math and two Physics, as prerequisite to joining any program offered by the College of Engineering or two remedial Math courses, as prerequisite to joining any program offered by the College of Science and Informations Systems.

³ Humanities and Literature track students can enroll in the Graphic Design and Interior Design majors.

Lebanese Technical Baccalaureate. Students who hold a Technical Baccalaureate Certificate may pursue a degree in a major that corresponds to the technical degree area of specialization as stipulated by the Lebanese Ministry of Higher Education Decree # 779/M/2013. The student must complete the remedial courses specified in the table below.

College/Major	Course Category (# credits)
<ul style="list-style-type: none"> Journalism – Media and digital Communication Education 	<ul style="list-style-type: none"> Sociology (3 credits) Philosophy or Psychology (3 credits)
Business Administration (all majors)	<ul style="list-style-type: none"> Mathematics (3 credits) Statistics (3 credits) Economics (3 credits)
<ul style="list-style-type: none"> Engineering (all majors) Computer Science 	<ul style="list-style-type: none"> Mathematics (6 credits) Physics (3 credits) Chemistry (3 credits)

Foreign Secondary Level Certificate. Holder of a foreign certificate that is equivalent to the Lebanese Official High School diploma, such as the Official Secondary Certificates from Arab Countries, French Baccalaureate, International Baccalaureate and the German Abitur may enroll in an appropriate program provided that the certificate is validated by the Ministry of Education.

High School Diploma. Student who holds a High School Diploma (American system) may be admitted to the freshman program if the following conditions are met: (1) The student has completed 12 years of study; (2) the certificate is recognized by the public authorities in the country of origin; and (3) certified copy of the permission to join the Freshman Program from the Equivalence Committee of the Lebanese Ministry of Higher Education.

General Certificate of Education (GCE). An applicant with a British Certificate may be admitted to the freshman program if he/she has completed 5 Ordinary Level courses and one Advanced Level and has completed 12 years of study. Applicants with A-levels who have completed a minimum of three subjects at the Ordinary Level in addition to two subjects at the Advanced Level or four Advanced Supplementary subjects (AS) excluding languages can be admitted to the sophomore program.

Placement Exams

Students are required to provide evidence of English Language competency and college level skills in key areas corresponding to the major they wish to pursue. This evidence may be in the form of submitting standardized test scores such as TOFEL, SAT, etc. or by taking the RHU placement exams as indicated in the table below. Depending on their performance, students may be required to take remedial courses to improve their competencies and prepare them to the rigor of related college level courses.

College/Major	Placement Exam
Arts	<ul style="list-style-type: none"> English
Business Administration	<ul style="list-style-type: none"> Mathematics English
Engineering*	<ul style="list-style-type: none"> Mathematics

	<ul style="list-style-type: none"> • Physics • English
Science and information Systems*	<ul style="list-style-type: none"> • English • Mathematics (CS, and HIS) or Aptitude test (GD and ID)

* Holders of the Lebanese Baccalaureate or its equivalent may be exempted from taking the Mathematics and/or Physics Placement Exam, depending on the official baccalaureate scores on those subjects in addition to their school performance.

English Language Proficiency Requirements

English is the language of instruction in all programs offered at RHU. Applicants must therefore demonstrate English language proficiency by passing the RHU English Entrance Exam or by achieving a minimum score on Standardized English competency exams as follows: 557 on the Institutional TOEFL (ITP), 83 in the Internet Based TOEFL (IBT), 380 on the Writing section of the old SAT I, 22 on the Writing section of the new SAT I or 6.5 on the academic IELTS. Students who fail to attain the requisite score will be required to enroll in the Intensive English Program (IEP) to achieve the necessary English proficiency. The IEP consists of four levels and the student is placed in the appropriate level based on the English proficiency examination score.

RHU recognizes an Institutional TOEFL score to be valid for one year from the date the test was taken. However, an International TOEFL score, IBT score, SAT I (writing section), and IELTS score are valid for two years.

Applicants may choose to sit in for the RHU administered TOEFL or may contact the AMIDEAST Office in Beirut (Solidere District, Riad Solh Street, Bazerkan Building– Tel: 01/989901) to register for the TOEFL or SAT Exams. When registering for TOEFL, SAT I and SAT II, applicants must specify the RHU code 4438 in order for the results to be sent to the RHU Admissions Office.

Application Procedure

Prospective students may submit applications via one of the following methods.

Apply In-person by visiting the Admissions Office:

Rafik Hariri University
Block I, Ground Floor, Room # I-107
Mechref Village
Damour- Lebanon

Apply by mail or email: The application form may be downloaded from www.rhu.edu.lb/admission, completed, submitted with all required materials via mail to the above address or email it to: admissions@rhu.edu.lb

Required Documents

Applications for undergraduate admission must include the following officially **certified** documents:

1. Grades of the last three high school years submitted on the RHU School Record Form in a sealed and stamped envelope.
2. High school certificate or diploma: Lebanese Baccaalaureate, Technical Baccaalaureate or French Baccaalaureate.
3. Lebanese Baccaalaureate equivalency for non-Lebanese degrees or diplomas.
4. Scores of one of the English proficiency exams (see above).
5. SAT I Math and Critical Reading scores or take the RHU relevant entrance exam (see table above).
6. Original Civil Status Record (for Lebanese applicants) or photocopies of passport and residence permit (for non-Lebanese Applicants).
7. Three identical recent passport-size colored photos.
8. A non-refundable application fee of LL 100,000 paid in cash at RHU Finance Office or by a certified check payable to "Rafik Hariri University".

RHU Entrance Exams take place on RHU campus. Applicants should contact the Admissions Office for exam dates.

Admission to the Freshman Program: In addition to the above documents, applicants to the freshman programs must also include:

1. Permission by the Equivalence Committee of the Lebanese Ministry of Higher Education to join the freshman class.
2. Copy of High School Diploma.
3. SAT I and SAT II with a minimum combined score of 2600 for Freshman Arts and 2750 for Freshman Science. Required subjects in the SAT II exam are:
 - a) Math I and any other two subjects for Freshman Arts.
 - b) Math II and two of the following subjects: Biology, Chemistry, Physics for Freshman Science.

Please note the following:

- a. Applicants must submit SAT I score prior to admission and SAT II score during the freshman year and before starting the sophomore year.
- b. Lebanese students will not be able to declare a major and join the sophomore class before satisfying the requirements set by the Lebanese Ministry of Education and Higher Education and RHU freshman program.

Transfer Admission

A student enrolled in an accredited institution of higher education that requires full-time attendance may be admitted as a transfer student to RHU if space in the aspired program is available and the student meets the following conditions:

- Has studied at least one semester in the old institution;
- Was not dismissed from the old institution for disciplinary reasons; and
- Satisfies the admission requirements of the desired program.

Transfer student is required to submit official transcripts and a certified copy of detailed descriptions of the courses taken at the previous institution. Student transferring from an institution outside of Lebanon must also submit a letter of accreditation from the Lebanese Ministry of Higher Education.

If, at a later date, it is discovered that the transfer student had been dismissed from his/her former university for disciplinary reasons, his/her acceptance will be revoked retroactively.

If the above conditions are met, but the average of the secondary school certificate of the transferred students is less than what is required for admission into the desired program, the Vice-President of Academic Affairs may override the requirement if recommended by the concerned department and college councils.

The Admission Committee of the concerned College reviews the transfer applications and forwards its recommendations to the Dean who in turn informs the Director of Admission of the final decision for action.

A transfer student shall be treated as a new student regarding probation and dismissal rules. For transfer purposes, a regular semester is equivalent to a minimum of 12 earned credits. To earn a bachelor degree, a transfer student must study at least three regular semesters at RHU (taking a minimum of 36 credits) for a three years program or four regular semesters (taking a minimum of 48 credits) for a four years program and acquire the Co-op work experience.

Transfer Credits

Courses earned by a transfer student prior to joining RHU may count as RHU credits subject to the following conditions:

- a. The credits were earned within three years of the effective transfer date.
- b. The applicable course is deemed equivalent to the course offered at RHU, that is, at least 80% of its contents match, involves the same components (Lecture, Lab), and has the same number of credits or more.
- c. The student has attained a grade of 75 or above on the course.

A student may not transfer more than 12 credits of major mandatory courses unless a prior agreement with the institution from which the student is transferring is in effect. No requests to transfer credits shall be accepted after enrollment.

A “P” grade shall appear on the student's record for each transferred course but will not be included in the calculation of the cumulative GPA.

A student may decide to take a course at RHU for which an equivalent course credits were transferred. In this case either the transferred course or the RHU course and the associated grade shall appear on the student transcripts.

Visiting Students

Non RHU students who do not wish to pursue a degree but are interested in taking particular courses at RHU may apply for admission as Visiting Students. Visiting status is granted on a case by case basis subject to the approval of the Vice President for Academic Affairs. A Visiting Student is required to submit a written permission from the home institution and verification that the prerequisites for the desired courses are met. The student is responsible for the payment of applicable fees.

Part-Time Students

Students may wish to pursue a degree at RHU on a part-time basis, taking less than the full load of 12 credits per semester. This option is possible provided that the maximum duration for receiving a degree is not exceeded. Accordingly students may be required to enroll on a full-time basis for a few semesters in order to complete their degrees within the sanctioned period.

Admission to Graduate Studies

Admission to any graduate program at RHU is based on merit. It is offered to applicants holding undergraduate degrees from RHU or other accredited institutions. Students can apply to graduate studies for the fall or spring semesters. Applications are available at the Admissions Office or may be downloaded from RHU’s web site: www.rhu.edu.lb. For details on graduate study programs and related regulations please refer to the Graduate Catalog.

Fees and Expenses

Tuition Fees

The University tuition fees are determined by the Board of Trustees on an annual basis. Tuition and fees may be increased annually without prior notice. Currently applied tuitions and fees are posted on the University Website: www.rhu.edu.lb.

Program	Fee/Credit (L.L.)
Engineering	430,000
Business Administration	310,000

Freshman	310,000
Education	300,000
Journalism	300,000
English Language	300,000
Teaching Diploma	300,000
Graphic Design	420,000
Interior Design	Begins in 2017
Computer Science	315,000
Health Care Information Systems	Begins in 2017
Master credits - all programs	585,000
Intensive English (IELP 075, 085, 095)	2,050,000
Intensive English (IELP 100)	1,200,000

Other Fees

Type of Service	Fees in L.L.
Application for joining the University*	100,000
Enrollment deposit – upon acceptance*	250,000
NSSF	202,500
Campus Life	60,000
Internet	125,000
Late Registration	120,000
Late Payment (first month)	120,000
Late payment (subsequent month)	60,000
Transportation – optional	
Regular Shuttle – Fall or Spring Semester	600,000
Regular Shuttle - Summer Term	300,000
Campus Shuttle - Fall or Spring Semester	180,000
Campus Shuttle - Summer Term	90,000
Parking Fee - Fall or Spring Semester	50,000
Parking Fee - Summer Term	25,000
Dormitory/Housing - optional	
Double room in a shared apartment- Fall or Spring Semester	1,050,000
Double room in a shared apartment - Summer Term	525,000
Registration	225,000
Deposit	300,000

* Nonrefundable

Payment Methods

Students are required to pay all tuition balance and other university fees by the announced deadlines to avoid late payment fees and the risk of courses being dropped. Once the student

register for a course, he/she shall remain accountable for all applicable tuitions and fees until he/she drops the course formally by the drop/add deadline. Refer to the academic calendar at www.rhu.edu.lb for applicable deadlines.

Payments must be made by the announced deadlines in one of the following forms: At one of Bank Med branches or On-line or via bank transfer. Students must have the statement of fees on hand when payment is made to ensure proper crediting to the student's account. Statement of fees is available on RHU website.

Students who are unable to make full payments by the billing dates may benefit from the University installment payment plan. The student needs to visit the Finance Department and make the proper arrangement before the payment deadline.

Tuition Refund

A student who had registered and paid the tuitions for a course and then drops it during the drop/add period is entitled for a full refund. Students who do not formally drop a course during the drop/add period will be responsible for payment of all tuitions and fee unless the student withdraws due to emergent circumstances. Refer to the withdrawal section of the catalog for more information.

<Insert refund when withdrawing form University>

LIBRARY

Jamal Tabarah, Director of Libraries

Block E

00961 5 603090; Ext: 434/435

www.rhu.edu.lb/library or Sierra.rhu.edu.lb

Rafik Hariri University Library provides students, faculty and staff the resources and services they need to succeed in their educational and research undertakings. The library building occupies more than 650 square meters of space offering users ample study and computing commons; halls for meetings, seminars and conferences; classrooms; faculty development centers; praying rooms; executive meeting rooms. The library holds collections in The Arts, Humanities, Computer, Social Sciences, Business and Economics, Accounting, Finance, Management, History, Engineering (Civil, Mechanical, Mechatronics , Biomedical and Electrical) Education, Literature and Languages News and Newspapers , Science and Technology, History. The library applies international standards and implements modern technologies in all functions and services. RHU Library provides resources to academic programs in the form of books, journals and multimedia resources. Current collections include more than 6800 printed book items and 115,200 electronic books covering 160 subject area, 7180 full text e-journals, and 40,000 full text dissertations and theses,13,000 case study and 900 reports. Use of these resources is subject to copy right law and the license agreements that RHU signs with the e- resources providers. The Library has a modern IT infrastructure which includes:

- An integrated library system (SIERRA) that embeds all library functions, services, and auxiliary tools that enable access to resources on and off campus;
- Workstations located in the references area and connected to the Internet to access online catalogs, e- databases, Turnitin and other resources;
- An Internet lab equipped with networked computers loaded with the latest applications;
- Multi-media rooms equipped with state-of-the-art tools, computers, video projectors, data shows, CD writers, scanner, etc.;
- Wireless connectivity covers all library spaces.

RHU continues to develop and improve library resources and services in response to changes and emergent needs; participate proactively in the enrichment of the educational experience; improve information technology and multimedia assets; repurpose available space to accommodate changing library role; and improve community outreach and branding.

Information Resources

Collections available at RHU Library include a wide range of information resources to support all academic disciplines and meet the needs of University faculty and students. In addition to maintaining traditional printed resources in form of books and periodicals, the library holds a collection of electronic resources and multimedia materials. The library home page provides

links to the full-text online databases, e-journals, e-books, research databases and online catalog. The homepage also includes information about library policies, service hours, auxiliary tools and services. See <https://rhu.edu.lb/Library>.

Organization of Materials

Library resources are organized in accordance with International standards and best practices. All print resources are arranged and catalogued according to Dewey Decimal Classification 21 and MARC21 formats and standards which are used to build bibliographic databases.

Library Services

The library staff assist users in using library resources and respond to enquiries received in person, by phone, by email or through the library home page electronic forms. The staff also organize specific training sessions to help users improve their skills in searching and retrieving relevant information. Faculty, students and staff holding valid ID cards may borrow library materials in accordance with the circulation policy. Faculty members may request putting books and other materials on reserve for use by students inside the library premises for a period of time. A special arrangement is made with the American University of Beirut libraries, Jafet library and Saab medical library, to allow all RHU users access the materials which are not available at RHU Library. Computer commons allow users on-site access and retrieval of resources. Media resources, copiers and printers are available for use inside the RHU Library. Pre-paid cards may be purchased to use the photocopying machines.

INFORMATION TECHNOLOGY DEPARTMENT

IT Helpdesk

00961 5 603090 Ext: 333

helpdesk@rhu.edu.lb

www.rhu.edu.lb

The Information Technology Department exists to provide optimal IT solutions to support the University students, faculty, and staff in their quest to achieve excellence in teaching, learning, research and service. The IT Department actively engages the teaching and learning processes by introducing multimedia solutions and mobile technologies, creating smart classroom environment, and supporting effective utilization of the learning management system. The IT Department also supports administrative divisions in adopting technologies that improve users' productivity in executing University functions, and manages all University information systems. Additionally, the IT Department is responsible for maintaining, and upgrading all hardware, software and applications dedicated to running University academic and administrative functions. IT Department also engages in infrastructure planning and maintenance and in supervising related projects.

Operation and Network Services

The IT Department runs a state-of-the-art Data Center that houses the computers and related telecommunications and storage systems including latest generation servers, Virtual Desktop Infrastructure, Storage Area Networking, and Intrusion Prevention System. The center operates redundant power sources, redundant data communications connections, and security devices.

The center includes a large number of servers that provide all students, faculty, and staff the storage space and privileged access to network-based data, software resources, and Internet and e-mail services.

The network serves all students, faculty, and staff. It covers over nine buildings of classrooms, offices, student and faculty dorms. The Gigabit Ethernet fiber-optic backbone network is connected to the Internet through a 30 Mb/s line to provide the necessary bandwidth for quality services. The network consists of over 840 voice/data points and includes more than 40 wireless access points covering all university buildings. At present, nearly 400 computers are connected to the University network.

Management Information System (MIS)

The Management Information Systems (MIS) Section includes a highly competent team that manages the University Information Systems. The MIS is responsible for developing, administrating, supporting and providing service management for the University Enterprise Resource Planning (ERP) including: Student Information System (CampusVue), student

accounting, finance, payroll, human resources systems, library and archiving systems, staff work log system and ID card system. Furthermore, the MIS manages information flow and generates reports to various University divisions for planning and decision making purposes.

University Website

RHU website is an important communication tool for the University and the source of vital information for prospective and current students, as well as faculty and staff, among other audiences.

Management of the website through a full responsive content management system (CMS), led by the system administrator, strives to ensure that all the information is accurate and easily accessible.

The website provides the users with all available online services including: Student Information System, Moodle, Online Payment System, Surveys and Voting, Alumni Section, Latest Press Releases, Events and News, Careers, Downloadable Applications and much more.

Instructional and Classroom Technologies

A team of dedicated specialists ensures that technology-aided teaching and learning needs of faculty and students are met. The team maintains the multimedia assets in more than 32 classrooms, and supports smart classrooms. The team manages the Moodle – a Learning Management System (LMS) - which provides the platform through which faculty, and students actively engage the course material and improve students’ potential of attaining expected learning outcomes. New tools are being introduced to simplify the creation of online courses and enable conversion of documents into dynamic objects.

IT Helpdesk Services

The IT Helpdesk team provides a wide range of support services for the students, faculty and staff at RHU in order to ensure that technology aided teaching, learning and administrative processes are running smoothly. These services include but are not limited to: supporting all the IT peripherals (hardware and software) in offices, classrooms and computer labs, users’ accounts management, e-mail services, internet and Wi-Fi services, file sharing management, surveillance cameras management, access control management, ID cards printing, etc.

The Helpdesk team utilizes the Ticket Management System “TMS” as their main communication channel with RHU faculty and staff members. TMS provides a transparent and interactive platform for staff and faculty members to send their requests and report incidents, and to follow up and keep record of their tickets. Also, TMS provides a space for end users to provide satisfaction feedback on the service they are receiving from ITC personnel in each ticket.

CENTRAL LABORATORIES

Samir Berjaoui, Director of Central Labs

Block C

00961 5 603090, Ext. 554

www.rhu.edu.lb/laboratories

Learning by doing is the learning mode that influences knowledge retention the most. Furthermore, experimental verification plays a central role in understanding theories and their applications and in advancing knowledge through discovery. Complementing theoretical knowledge with applied skills and competencies also enhances students' potential to think critically, discover and innovate. Accrediting bodies in almost all fields have identified practical skills as an important element of curricular outcomes. For all these reasons, access to appropriate and adequate lab facilities is guarded as a fundamental student right at Rafik Hariri University (RHU).

RHU provides students the applied experience through more than 15 modern laboratories and workshops that support learning and research activities in the colleges of Sciences and Information Systems and Engineering. The labs provide the learners and researchers the optimal space, tools and support that enable them to transform ideas into meaningful innovations that advance University mission and contribute to community development.

The labs director assisted by the lab engineers are dedicated to: Create supportive and safe conditions for the learners and researchers; assist the academic units in the evaluation and procurement of contemporary lab technologies and scientific equipment; maintain safe lab environment; organize space and lab assets to maximize the efficacy of available resources; maintain and updating inventory of lab assets; institute sustainable practices responsive to environmental concerns; engage in planning to continuously improve the lab conditions and experience; accommodate the testing needs of external entities in search for answers; institute quality management practices in conformity with international standards; facilitate knowledge share and transfer between the University and the outside world; and offer training opportunities to faculty and students.

QUALITY ASSURANCE AND INSTITUTIONAL ADVANCEMENT

Dr. Toufic Hijazi, Director
Ms. Mirna Talhouk, Assistant Director
Block I
Phone: 00961 5 603090, Ext. 799/783
qaia@rhu.edu.lb
www.rhu.edu.lb/qaia

The Quality Assurance and Institutional Advancement (QAIA) unit was established in 2014 to collect and analyze vital institutional data and to develop and implement quality assurance policies and procedures. The aim of the unit is to improve institutional effectiveness, facilitate continuous improvement, support shared decision making, and assure attainment of aspired excellence in all areas of the university. The QAIA unit is responsible for the following duties:

- Design surveys, focus groups, assessment tools to collect and analyze institutional data;
- Issue reports to the University administrators;
- Maintain a database about competitor institutions;
- Prepare and maintain the University portfolio of programs by developing and implementing an institutional database for Rafik Hariri University that will integrate data from all sources of information in all colleges of the university;
- Harmonize the institutional effectiveness activities to ensure that all academic and administrative units achieve their outcomes and ensure consistency in all campus locations;
- Identify gaps in data collection, analysis and utilization and establish procedures to maintain quality of data;
- Ensure proper use of knowledge and internal / external assessment data;
- Design and update the evaluation and assessment methods appropriate for each category of programs and verify all development plans;
- Support academic units in accreditation efforts;
- Conduct periodic audit to monitor performance and improve related practices.

STUDENT AFFAIRS

Dr. Mohamad O. Diab, Dean of Student Affairs

Mrs. Sahar Hallak, Student Affairs Officer

Block I

00961 3 5603090 Ext. 770/777

Dso@rhu.edu.lb

www.rhu.edu.lb/studentaffairs

The Dean of Student Affairs Office is responsible for many functions that serve to support the nonacademic aspects of University life that improve students' potential of academic success and help them attain a meaningful holistic experience. The Office manages student clubs and societies, promotes athletic and creative activities, organizes cultural events, oversees housing facilities, provides counseling services, holds student elections and organizes student orientation programs, in addition to the handling of the Work Study and the Financial Aid Programs. A brief overview of the various functions and services is presented in the following.

Cultural, Social and Artistic Activities

RHU provides a supportive environment that encourages and enables students to actively participate in extracurricular activities. The Dean of Student Affairs office works closely with student clubs, societies and councils to enrich students' life outside the classroom. By organizing a wide spectrum of athletic, cultural, social, artistic and theatrical activities and events that are physically, psychologically and socially constructive, students are able to advance a cause and practice a hobby they are passionate about. In doing so, students have the opportunity to connect with like-minded peers, build friendships and develop leadership skills.

Counseling and Coaching

The Dean of Student Affairs Office aims to create conditions that promote students' social and psychological comfort essentials to achieve academic success. The Student Affairs Office supports students in overcoming obstacles and challenges they encounter during their university experience. The office organizes seminars and workshops to promote student awareness and help them develop skills in coping with social, psychological and emotional difficulties and challenges. The office also provides one-to-one counseling to help a student deal with personal issues and anxieties and make appropriate choices and decisions. For more information please contact us at: Dso@rhu.edu.lb or 05/603090, Ext: 777.

Student Representations

We at RHU strongly believe in the students' participation in the decision making process about issues that matter to them. The Student Representative Committee (SRC) and University Student Faculty Committee (USFC) were established to guarantee that the students' voice, opinions and concerns are debated to influence the outcomes of related decisions. Elections are held annually in which students choose their representatives on the SRC and the USFC in a transparent and democratic manner.

Student Housing

There are two separate dormitories at Rafik Hariri University, one for the female students and the other for the male students.

The employees working in the students' dormitory yearn to offer comfortable, safe housing experience to international students and local residents who study away from home. Each dorm features a social sit-in area, a study room with computers connected to the internet and library resources, and a broadband WiFi coverage. A bus shuttle runs to and from Damour's highway serving students who wish to spend time off campus. The University is keen to making the living experience on campus an opportunity to strengthen ties and build lifelong friendships among all students. The Dean of Students Office organizes sports, cultural and social events exclusive for students living on campus. For more information on housing services please contact us at: atmehns@rhu.edu.lb or 05/603090, Ext: 741.

Athletic and Recreation

The indoor sports center and outdoor tennis, football and basketball courts at RHU provides ample opportunities for students, faculty and staff to participate in their favorite sports, hobbies and training needs. A team of specialists organizes athletic activities and tournaments to engage students and help them develop skills in the sports they are passionate about. Varsity teams are formed and supported to participate in local and international competitions. For more information please contact Coach Khaled Baba at: babakk@rhu.edu.lb or 05/603090, Ext: 330.

The Ushers

This program trains student volunteers and involve them in organizing university sponsored events and conferences, on and off campus. Ushers play a vital role in the success of the open-house activities, graduation ceremony and new-students orientation. Ushers are trained to guide students, parents and guests and make them feel at ease during their visit to the campus. For information contact us at: dso@rhu.edu.lb or 05/603090; Ext: 777.

Transportation

There are free bus shuttles that transport students from the dormitory to Damour's highway. Shuttle bus services are available to transport students to the RHU campus from and to several areas in Lebanon.

The buses run the routes several times per day. For more information about the bus schedule, please contact Nada Atmeh at: atmehns@rhu.edu.lb or 05/603090, Ext: 741.

Student Centers

There are student lounges to relax and enjoy activities such as pool, chess, ping pong and other entertainment. Each dorm also has two common rooms, one for social gathering and the other for studies.

Food Services

The cafeteria at Rafik Hariri University serves a variety of traditional and international cuisines at reasonable prices during the day and through the evening hours. RHU also has ample and comfortable sit in areas to enjoy your meal in the picturesque natural outdoors. Vending machines offering snacks and drinks are placed in various university buildings.

Health Care

The University Medical Clinic has a resident nurse that provides RHU students, faculty and staff preliminary healthcare services around the clock. The clinic is located in Block "I" next to the bookstore. Ambulance services are also available around the clock in case a situation needs attention beyond the clinic's available resources.

Student Rights and Responsibilities

Rafik Hariri University (RHU) pledges to students *the right to*:

- be challenged to enrich the capacity for critical judgment;
- receive support in pursuit of answers and meanings;
- study in an inspiring and supportive learning environment;
- receive proper academic advising and mentoring;
- be treated with dignity and respect by all;
- receive a clear and informative course outline at the start of the semester and to be informed of any modifications thereafter;
- receive constructive feedback on course work within a reasonable timeframe;
- be assessed on the merits of your academic performance without prejudice or other discrimination;
- insure the confidentiality of academic and personal information;

- access all information and documents to which they are entitled;
- express opinion and convey grievances without fear of retribution; and
- protest violation of rights, appeal judgment deemed unfair and receive and understand related decisions;

And expects students to accept *the responsibility to*:

- understand, comply and safeguard the University by laws and student code of conduct;
- set a purpose and drive to achieve it;
- study hard to learn and commit to forever learning;
- know program study plan and graduation requirements;
- follow course outline, attend all classes, and accomplish course requirements timely and honorably;
- respect and adhere to established University deadlines;
- be courteous, respectful of diversity, and tolerant to others' beliefs and concerns;
- express concerns and grievances within the confines of civility;
- follow due process and react with reason in the face of conflict;
- protect University property and preserve campus beauty;
- embrace sustainable practices and to use natural resources wisely; and
- represent the University with honor and professionalism.

Expected Conduct

Students are expected to behave morally, act responsibly and work diligently to advance their lives and that of their communities. In doing so they will:

1. Work hard and intently engage the educational experience.
2. Speak out in a respectful manner and feel free to propose initiatives to improve the university experience.
3. Refrain from smoking except in designated spaces.
4. Help maintain the cleanliness and beauty of the premises.
5. Place trash and recyclable items in designated receptacles.
6. Protect University facilities that are built for their own benefit.
7. Never cheat or claim credit for work that is not their own.
8. Respect diversity and be tolerant of all points of view that are different from their own.
9. Understand the rights and responsibilities and appreciate the premise on which they are founded.
10. Adhere to the university bylaws and policies and assist in implementing them.

Work Study Program

The University provides students with the opportunity to partially support them by working up to 8 hours per week. In addition to earning a modest income, the Work Study (WS) program

helps students gain work experience, improve communication skills, and increase future job prospects. For more information, please contact the Dean of Student Affairs Office at dso@rhu.edu.lb or call 05/603090, Ext: 777.

Financial Aid Program

RHU believes that every student should get the full opportunity to continue his/her education no matter how hard their living conditions are. For that, RHU offers financial assistance to qualified students who could not afford the cost of their tuitions. For inquiry about this program, please contact the Dean of Student Affairs Office at dso@rhu.edu.lb or call 05/603090, Ext: 777.

REGISTRAR'S OFFICE

Nidal Khalaf, Registrar
Amani Baasiri, Assistant Registrar
Block B, Room 102.
00961 5 60390, Ext: 616/617.
registrar@rhu.edu.lb
www.rhu.edu.lb/registrar

The Registrar's Office administers academic processes; enforces academic regulations and tracks students' academic progress. The office coordinates closely with academic advisors and academic units to guarantee the accomplishment of the following responsibilities: implementing updated study plans; maintaining student's academic records; enforcing University academic regulations, policies and bylaws; tracking students' performance and generating students' statistical reports; preparing courses and exams schedules; assigning classrooms; registering students for the correct classes; issuing transcripts; verifying graduation lists; ensuring up-to-date CampusVue records and information; and updating and publishing University calendar and catalog.

The Registrar's Office uses CampusVue Students Information System to implement academic processes and maintain students' records in coordination with the MIS team at the IT Center. Students and faculty have CampusVue personal secured accounts to access relevant records, courses, schedules, grades, etc.

For registration procedures, deadlines and related issues please refer to the Registration section in this catalog or visit: www.rhu.edu.lb/registrar

Registration

Students, after consulting with their academic advisors, must register for the courses they intend to take during the registration period noted in the academic calendar, presented in this catalog and posted on the University website www.rhu.edu.lb/. During the registration period, academic advisors assist the students to prepare the course schedules by completing the Course Registration Forms and activating personal online CampusVue registration. Copies of the Course Registration Forms must be sent to the Registrar's Office after the drop/add period for verification of students' schedules and archiving. Any course registered online by the student without prior approval of the academic advisor shall be automatically dropped.

The course schedule must comply with the following rules: the prerequisite(s) of the courses the student intends to take were completed, the courses are required by the program and are taken in the order noted in the program's study plan, failed courses are taken when first offered, and the maximum and minimum load rules are met. After completing the registration, the student must print the statement of fees and proceed to pay all applicable tuition and fees

by the announced deadlines. Failure to meet financial commitments may result in dropping the class schedule.

National Social Security Fund (NSSF)

The Lebanese Law mandates that all Lebanese students be registered as members of the NSSF. This requirement does not apply to Non-Lebanese students. A Lebanese student admitted to RHU must complete the Social Security Application form that is dispatched with the admission letter. On the form the student indicates:

- NSSF status (beneficiary or not)
- NSSF number if already registered (employed students only)
- NSSF number of parents (if beneficiary)
- An official attestation of the type and source of all benefits including NSSF

Refer to Student Services section for more information on NSSF matters.

Passport and Visa

Expat students admitted to RHU must have their passport valid for 13 months from the date they join RHU and must obtain a visa from the Lebanese Embassy in the country of origin.

ACADEMIC REGULATIONS

The following section presents the academic regulations applied to Bachelor degree programs. These regulations are meant to assist students, academic advisors, administrators and staff in taking appropriate decisions. The President, Vice Presidents, Deans, and the Registrar's Office shall be responsible for their implementation. The University Academic Board is authorized to rule on cases that are not covered in these regulations and to mitigate problems arising from their application.

Pleading ignorance of these regulations or of related publications and announcements posted on catalog boards in various campus buildings shall not exonerate students from the consequences of their violation.

Student petitions to circumvent academic rules must be verified by the academic advisor for the authenticity of the information before it is forwarded to the responsible entity for further action.

Duration of Study

Minimum period

To earn a Bachelor degree, a student has to study a minimum period as a matriculated student at the RHU as indicated in the table below.

Minimum duration to earn a Bachelor degree		
College of Arts	Bachelor of Arts	3 years
College of Business Administration	Bachelor of Business Administration	3 years
College of Engineering	Bachelor of Science	4 years (equivalent to 3 years plus 3 summer terms)
	Bachelor of Engineering	5 years (equivalent to 4 years plus 3 summer terms)
College of Science and Information Systems	Bachelor of Science	3 years
	Bachelor of Fine Arts	3 years

A transfer student shall be treated as a new student regarding probation and dismissal rules. For transfer purposes, a regular semester is equivalent to a minimum of 12 earned credits. To earn a bachelor degree, a transfer student must study at least three regular semesters at RHU (taking a minimum of 36 credits) for a three years program or four regular semesters (taking a minimum of 48 credits) for a four years program and acquire the Co-op work experience.

Maximum period

The maximum study period to earn a Bachelor degree, excluding semesters of approved deferment of study, is 10 regular semesters for the Bachelor of Science, Bachelor of Arts, and Bachelor of Business Administration degrees and 12 regular semesters for the Bachelor of Engineering degree.

If, for compelling reasons, a student cannot complete the Bachelor degree within the apportioned period, a request for extension may be submitted through the college council for approval by the University Academic Board.

Student Class Level

The student class level is defined in accordance with the following criteria:

First year:	00-29 credit hours
Second year:	30-65 credit hours
Third year:	66-99 credit hours
Fourth year:	100 and above credit hours

Course Load

Minimum Load

The minimum semester load shall be 12 credits unless the student needs less than that to graduate. In certain cases, the College Dean may approve a 9 credits minimum upon the recommendation of the Academic Advisor.

Maximum load

The maximum load in a regular semester shall be 18 credits, which may be increased to 19 upon the Dean's approval. A student may be allowed to take a maximum of 21 credit hours if he/she: (1) has a CGPA of no less than 85 or (2) needs 21 credits to graduate and has a GPA of 73 or above.

The maximum load in a summer term shall not exceed 9 credits. A 10 credits load may be allowed if the student: (1) has a CGPA no less than 85 or (2) needs 10 credits to graduate and has a CGPA of 73 or above, or (3) the schedule includes a one credit lab course.

The maximum load for a freshman student is 15 credits in the fall or spring semesters and 9 credits in a summer term.

Intensive English Program (IEP) Students

In addition to the English courses, students in the IEP may take courses required by the intended program of study as listed below.

IELP 075	IELP 085	IELP 095	IELP 100
3 Credits	6 Credits	9 Credits	12 Credits
College of Business Administration			
BITM 200 or MATH 189 <u>OR</u> MATH 207	BITM 200; or MATH 189 or MATH 207; and BADM 225	BITM 200; or MATH 189 or MATH 207; BADM 225; and BACC 201	BITM 200; or MATH 189 or MATH 207; BADM 225; BACC 201; BADM 250; and ARAB 211
College of Engineering			
MATH 190 or MATH 211 <u>OR</u> PHYS 190 or PHYS 211	MATH 190 or MATH 211 and PHYS 190 or PHYS 211	MATH 190 or MATH 211; PHYS190 or PHYS 211; and CIVE 211 or CCEE 221	MATH 190 or MATH 211; PHYS190 or PHYS 211; CIVE 211 and/or CCEE 221; and CCEE 214
College of Sciences and Information Systems			
COSC: MATH 190 or MATH 211 GRDS: GRDS 220	COSC: MATH 190 or MATH 211; and COSC 214 GRDS: GRDS 220 and FADR 220	COSC: MATH 190 or MATH 210; COSC 214; and Sciences / Technology elective GRDS: GRDS 220; FADR 220; and FADR 200	COSC: MATH 190 or MATH 210; COSC 214; Sciences/ Technology Elective; and BMKT 200 GRDS: GRDS 220; FADR 220; and FADR 215
College of Arts			
BITM 222 or Math 220	BITM 222 or Math 220 or ARAB 201 and COGD 230 or any course from college requirements	Freshman: PSYC 195, PSYC 190, and ARAB 180 CA majors: ARAB201 and any two College required courses.	EDUC: EDUC 222; EDUC 200; one Social Science; and one Humanities elective ENGL: EDUC222; PSYC301; and any two College required courses JRSM: Humanities and Social Sciences electives
Freshman Students			
MATH 189 or MATH 190	Arts: MATH 189 AND ARAB 180 or Natural Science Elective Science: MATH 190 and PHYS 190	Arts: MATH 189; ARAB 180; Natural Science Elective Science: MATH 190, PHYS 190, ARAB 180 or Natural Science	Arts: MATH 189; ARAB 180; Natural Science Elective; and Social Science Elective Science: MATH 190, PHYS 190, ARAB 180 or Natural Science; Social Science Elective

Schedule Modification

The student may modify course schedule after registration by adding and/or dropping courses during the official drop and add period noted in the academic calendar. The student completes the Schedule Modifications Form, attains the approval of the academic advisor and the department chairperson and settles consequential financial obligations immediately after completing the transaction on the RHUSIS. If the course modification results in a load less than 12 credits or more than 18 credits, approval of the Dean is also required.

Dropping Courses

Students who do not plan to continue in a course must drop it during the drop/add period otherwise the student remains financially accountable for the course. A course dropped during the official drop and add period will be deleted from the student's schedule and the student will be relieved from the financial liability associated with the deleted course. If a refund is due, the provisions of the refund policy will apply.

Adding Courses

A student may add one or more course to his/her schedule during the drop/add period. The student must settle the financial obligations due to the course(s) addition by the prescribed deadlines.

Late Registration

Students who could not register during the normal registration period may register during the drop/add period and pay a late registration fee of L.L. 120,000. The fee may be waived for new students or for students who could not register earlier due to urgent circumstances.

Repeating Courses

The student must repeat all failed courses when first offered. The student may also repeat a course in which he/she passed with a grade of "70" or lower only once to improve the CGPA. While all repeats shall remain on the student's record the credits of a repeated course shall count only once and the highest grade is used in computing GPA. A course may not be repeated more than two times, including withdrawals.

Substituting Courses

A student may be allowed upon the approval of the college Dean to take a substitute for a required major course in the following cases:

- The required course is not offered or it conflicts with another required course in the semester a student is expected to graduate.

- The student had failed the course three times provided that the student is not on probation. The grades of the required and the substituted courses shall appear on the student's transcripts and used in calculating the student's CGPA.

The substitute and required course shall meet the following criteria: the number of credits and level of the substitute course must be the same or higher; the course is from the same or closely related field; and the course contents and expected competencies are equivalent.

Undergraduate Students Taking Graduate Courses

An undergraduate student may be allowed to register for a maximum of 6 graduate credits under the following conditions:

- The student is in his last year of studies to complete the requirements for an undergraduate degree and has less than full load of registered courses in a semester and has a CGPA of at least 80.
- Substituting for a required undergraduate course which is not offered in the semester to graduate, provided that the student's CGPA is not less than 75.

In all cases student must obtain the approval of the college dean.

Course Syllabus

The student is entitled to receive a detailed course syllabus at the beginning of the first class meeting. The syllabus is a way to inform the students of the course's salient features and rules and help them plan accordingly. The syllabus should in the least include the following components: Information about the instructor – Name, contact information, office location and hours, and the manner and medium of communicating with the students; information about the course - title, brief description, prerequisites, topics covered, learning outcomes; course resources - textbook, web links, references, technology tools and instructional materials; course activities and related deadlines - homework, quizzes, projects, research papers, presentations, group work; etc.; assessment criteria and grade distribution; statement to inspire engagement, communication, motivation, and self-expression; and class policy on attendance, exam make-up, etc.

Attendance

The Instructor must state the attendance policy in the course syllabus. The student is required to attend all class meetings and course-related activities and is ultimately responsible for truancy consequences. Instructors must take attendance regularly and advise truant students of the ramifications of missing classes. If the number of absences reaches the 15 percent mark, the student must voluntarily withdraw from the course by following proper withdrawal procedure and receive a W grade (see the Withdrawal section on [Page 46](#)). If after accruing the 15% absences the student does not withdraw willingly, the instructor completes **forced**

withdrawal form and submits it to the dean for approval, even after the announced withdrawal deadline. The Dean's Office forwards the form to the Registrar's Office for action. Students who represent the country or the University in official activities shall be allowed up to 20% absences. If the absence is due to ill health or other exigent circumstances, the student must provide evidence and plan with the course instructor on how to attend to course requirements by completing the **attendance exemption form**. All absences, excused or otherwise shall be counted and the student is ultimately accountable for the missed work.

If the course instructor does not require attendance of all class sessions, the applicable attendance policy for that course must be approved by the college dean and clearly stated in the course syllabus.

Assessment and Examinations

The College Council shall establish and continuously review and update course evaluation and examination policies and procedures applied in the courses offered by the college. A brief outline of the current policies and procedures is given below.

Performance Assessment

The student has the right to have his/her work assessed and to receive continuous and constructive feedback in accordance with the University guidelines. Assessment of student performance shall be based on the level of attainment of the course outcomes stated in the course syllabus. Assessment instruments include, but not limited to student's participation, blogs, wikis, homework, exams, drop quizzes, research papers, projects, practical work, etc. The instructor must complete a midterm performance assessment and report the results before the withdrawal deadline to give unsatisfactorily performing students a chance to withdraw and to help faculty advisors better advise students during the registration period.

Examinations

The course syllabus must state the number and dates of exams to be given during the semester. At least one major exam should be given before the withdrawal deadline to give the student a chance to make an educated decision on whether to continue or withdraw the course.

The instructor is responsible to prepare clearly written and properly weighted exam questions in line with the course content, language of instruction, learning outcomes, and allotted exam time period stipulated in the course syllabus. Appropriate answer's booklet should be given to the students with clear instructions on exam rules. The instructor shall correct the exam booklets and return them to the students within a week after the exam, and report the grades in letter form and percentage to the Department Chair a week later.

The final examinations are given during the period approved by the University and noted in the academic calendar. Instructors may need to make individual arrangements with students who

have more than two final examinations scheduled on one day. A student shall not be allowed to sit in for the final examinations without having settled all his/her financial obligations to the University.

Absence from the Final Exam

If a student fails to attend a final examination without a valid excuse, the student shall receive a zero on the exam. If missing the exam is due to exigent circumstances beyond the student's control, the student may submit a petition to the Dean of the concerned college and if the Dean concludes that the stated reasons are justifiable, he/she informs the Registrar's Office to record an incomplete "I" grade to the course. The student in coordination with the concerned department and course instructor prepares to take a make-up exam to replace the "I" before the end of the drop/add period of the following semester. If the exigent circumstances persist, the Dean may recommend that the "I" grade be changed to "WE". For more details refer to the 'Incomplete Work' section in this catalog.

Make-up examination

The course syllabus shall indicate the missed examinations and quizzes policy so that students are fully aware of the policy and its consequences. Normally, a student shall receive a grade of zero for the exam or quiz he/she misses. If the absence is due to a legitimate excuse for which a verifiable evidence is presented, the course instructor may then give the student a make-up exam or shift the weight of the missed exam (except the final exam) to other course assessment items.

Course Grades

Course Grade Distribution

The course components, topics, associated assessment criteria and course grade distribution must be clearly stated in the course syllabus. The course grade is distributed such that appropriate weights are given to exams, quizzes, homework, projects, research papers, and student participation. In all cases the final exam grade should not exceed 35%.

Submission of Final Grades

The instructor shall enter the grades into the RHUSIS, prepare the final course grade report according to the established format, and submit the report to the Department Chair within two working days of the final exam scheduled time. Within 24 hours afterward, the department chair verifies course grade reports, secures the dean's approval and forwards them to the Registrar's Office. The Registrar's Office audits the grades reports, roll them into records. Students shall be able to access their grades via the RHUSIS no later than three working days after the conclusion of the final examinations period.

Appeal of Course Grade

If a student feels that the grade he/she has attained on a course was unfair, s/he should discuss the matter with the instructor of the course within five days of posting the grade by the Registrar's Office. If the student and the instructor are unable to resolve the issue, the student may submit a "**Course Grade Review Petition Form**" to the Chairperson of the concerned department within two weeks after the grade is posted. If the student's concern is legitimate, the Dean shall form a committee consisting of the department chair, course instructor and one other faculty member from the same department to investigate the request and adjust the grade in accordance with standard procedures.

Incomplete Coursework

Incomplete coursework is subject to the following rules:

- A student who has completed most of the coursework satisfactorily but, for a verifiable compelling reason, is unable to complete all course requirements within the normal period may request, before the beginning of the final exam period, an extension to complete the unfinished work by submitting a "**Request for Time Extension Form**". If approved, a grade of "I" is temporarily assigned to the course. The instructor computes the course grade, with a zero assigned to the incomplete work, which shall be assigned to the course if the unfinished course work is not completed by the stated deadline.
- The incomplete grade must be removed before the end of the drop/add period of the following semester. After the unfinished work is completed and evaluated, the course instructor completes a change of grade form and submits it to the dean for approval before it is sent to the Registrar's Office for final action. The final semester GPA will be calculated as soon as the final grades of the incomplete courses are turned in.
- Credit for an incomplete course will be assigned to the semester in which the course was taken.
- Graduation requirements shall be considered complete and the student is cleared for graduation when all Incompletes are resolved.
- If the circumstances for receiving an "I" grade persist then a grade of "WE" will be assigned to the course upon the recommendation of the Dean of the concerned College.

Change of Grade

A course grade cannot be changed after it has been submitted. If extreme circumstances warrant a grade change, the course instructor explains the reasons on a "**Change of Grade Form**" and submits it through the department chairperson to the dean for approval before it is sent to the Registrar's Office for final action within one week of grades posting. Grade cannot be changed after the Bachelor Degree is awarded.

Grade Point Average (GPA)

Semester GPA

The Semester GPA is computed as follows:

1. Determine the course quality points by multiplying the number of the course credit hours by the numeral (see the "Grading System" section below)
2. Add the total quality points and the total number of corresponding credit hours.
3. Divide the total quality points by the total number credit hours.

The higher grade of a repeated course is used in the computations. A "W" grade is not included in the GPA computations.

Cumulative GPA (CGPA)

The cumulative GPA is computed as follows:

1. Determine quality points of all courses taken
2. Add the total quality points and the total number of corresponding credit hours.
3. Divide the total quality points by the total number credit hours.

Grading System

Numeric grades are used to represent student performance in a course. The letter grades are calculated according to the scheme outlined below. The minimum passing letter grade is D.

Numeral Grade	Letter Grade	Grade Value	Description
≥ 95	A+	4	Distinguished
≥ 90 and < 95	A	3.85	Excellent
≥ 85 and < 90	B+	3.75	Very Good
≥ 80 and < 85	B	3.40	Good
≥ 77 and < 80	C+	3.00	Fair
≥ 73 and < 77	C	2.70	Average
≥ 70 and < 73	C-	2.35	Satisfactory
≥ 65 and < 70	D+	1.85	Minimal Pass
≥ 60 and < 65	D	1.25	Weak
< 60	F	zero	Fail

Other grade designations	
I	Incomplete
P	Passing grade
PH	Pass with Honor
W	Withdrawal
WE	Excused withdrawal

CIP	Course in progress
CR	Credit Granted

Honors and Distinction

Semester Honor's Lists

At the end of each semester, the University recognizes students with distinguished academic achievements by enlisting their names on two honor rolls: Dean's Honor List and President's Honor list. To be eligible for an honor mention, a student must satisfy the following **general honor conditions**:

1. Is a full-time student
2. Has no "F" grade in any course
3. Does not have any incomplete grade
4. Has not been subject to any disciplinary action

Students whose semester GPA (SGPA) is 85 or above shall be placed on the Dean's honor list and shall receive a commendation from College Dean. Students whose semester GPA is 90 or above are placed on the President's honor list and shall receive a commendation from the University President.

Graduating with Distinction

Students graduating with a cumulative GPA (CGPA) 85 or above shall be graduating with "Distinction" and those graduating with a CGPA of 90 and above shall be granted a designation of "High Distinction" provided they satisfy the general honor conditions stated above. The designation shall be extolled on the students' graduation certificates and official University transcripts.

Nazik Rafik Hariri Graduate Awards

Two students among the graduating class with the highest GPA, one in the College of Business Administration and the other in the College of Engineering shall receive the Nazik Rafik Hariri Award. The award amounts to a full tuition scholarship to pursue a Master Degree at RHU.

Withdrawal

Withdrawal from Courses

A student may, upon approval of the academic advisor, drop one or more courses during the drop/add period posted in the academic calendar – normally during the first week of classes of a regular semester or three days after the commencement of the summer term. No record of the dropped course(s) shall appear on the student's record.

A student, upon approval of the academic advisor, may withdraw from one or more courses between the second and the tenth week of classes of a regular semester, or during the second and fourth weeks of a summer term, provided that the student's load (excluding summer) does not fall below 12 credits. A grade of "W" shall be recorded on the student's transcripts for each withdrawn course and the course shall be counted as a course attempt in applying course repeat policy. Approval of the College Dean is required if the withdrawal results in a load less than 12 credits.

Students who withdraw from classes after the drop period are responsible for all related tuition and applicable fees.

Withdrawal from a Semester

Formal Withdrawal. A student may, for verifiably exigent circumstances, petition to withdraw from all semester's courses at any time after the drop/add period and before the final exams begin. The College Dean may, after consulting with the concerned department chairperson, the student's academic advisor and courses' instructors, approve the petition if the reasons for the withdrawal are deemed legitimate. A grade of "WE" shall appear on the transcripts for each withdrawn course and shall not be counted as a course attempt in applying the course repeat policy. A student returning in the following semester may register by following the normal registration procedures.

Informal Withdrawal. If a student withdraws from the semester without following proper withdrawal procedures as described above, a grade of "F" shall be recorded on the student's transcripts for each registered course and that the course shall be counted as a course attempt in applying the course repeat policy.

If a student withdraws informally and decides to return at a later time, approval of the University Student's Affairs Committee (SAC) is required. The SAC may approve the petition if a convincing evidence is presented that the reasons for the withdrawal were beyond the student's control. In case the SAC approves the request, the "F" grades recorded on the transcripts shall be replaced with a "WE". A "WE" grade is not considered in calculating the student's GPA and the affected courses shall not be counted as course attempts in applying the course repeat policy.

A withdrawn student may not transfer credits for courses he/she has studied at another institutions during that period unless prior approval of the concerned college was obtained.

Withdrawal from the University

Students wish to withdraw from the University are required to complete established clearance procedures. Clearance form is available at www.rhu.edu.lb/it

Leave of Absence

A student may, during the first week of a semester, petition for a leave of absence (LOA) for one or two consecutive semesters by submitting the Continuous Enrollment Registration Form for the Dean's approval and paying the LOA fee of 75000 L.L. for each semester on leave.

A student may not accrue more than three LOA semesters during his/her study toward a degree. The LOA semesters shall count in decisions related to the maximum number of semesters of allowed study deferment. A student returning immediately after the end of the approved LOA period may register by following the normal registration procedures.

If exigent circumstances prevent a student from returning immediately after the end of an approved LOA period, and decides to reenroll in the University at a later time the student must seek approval for reinstatement from the University Student Affairs Committee (SAC). Re-enrolled students must follow the study plan and the catalog in effect at the time of re-enrollment.

A student on approved LOA may not transfer credits for courses he/she studies at other institutions unless prior approval to study those courses is attained from the concerned college.

Special Enrollment

The Special Enrollment (SE) status applies to students who have completed courses requirements but need to remain active RHU students to complete an academic activity such as a project or a thesis or to prepare for exams. Students who do not register as special enrollment student for one or more regular semesters should apply for readmission to their programs. Refer to Informal Withdrawal policy in this catalog.

To register under the SE status, the student should:

- Complete the Continuous Enrollment Registration Form stating the pertinent reasons and submitting it to the Registrar's Office before the end of the Drop and Add Period. The form must be approved by the academic advisor, the department chairperson and the college dean.
- Pay a Continuous Enrollment Fee of 75000 L.L. at the RHU Finance Office for each semester under this status. A penalty of 25000 L.L. shall be added if the fees are not paid during a regular payment period.

Non-Degree Students

A student who is not on track to earn a specific degree from RHU but wishes to register for courses to which he/she is eligible to take may do so as a non-degree student.

Allowable Study Deferment Period

The permissible period of study deferment for a bachelor student, intentional or otherwise, shall not exceed six semesters (summer excluded). In the event the six semesters limit is surpassed, the student shall be dismissed from the University. If the student decides to return at a later date he/she needs to apply for reinstatement subject to the approval of the SAC. Reinstated students must follow the study plan and the catalog in effect at the time of reinstatement.

Change of Major

A student who has completed at least one semester of course work in a major may request a change of major at any time before the thirteenth week of a regular semester (fall or spring). The dean of the college (if in case of college change) in consultation with the department chairperson of the aspired program decides on the request before the start of the following semester based on the following conditions: the request meets college admission requirements; a seat in the desired major is available; the student has not changed major before; the number of earned credits in the old major is less than 64 credits unless the student was forced out of the major for academic reasons. If the student so wishes, all earned credits which are required in the new major shall be transferred and used to calculate the CGPA.

Intensive English Program students in Level 3 or 4 may request a reassignment of major before they complete 15 credit hours. Reassignment of major shall not be considered a transfer or a change of major.

Academic Complications

RHU is committed to providing students every opportunity to thrive because their future success is all that matters. To leverage those opportunities students are urged to communicate with their instructors inside the classroom, via email, phone, social media, or the Learning Management System (Moodle) – and to regularly visit the Learning Support Centers to seek help from their peers to overcome difficulties they face in doing a homework, working on a project, writing a report or preparing for a test.

While RHU shall spare no effort to help students achieve academic success, it is inevitable that many students for one reason or the other experience academic complications that threaten their future prospects. Students must manage their time effectively and tap the resources available as they undertake their academic responsibilities to avoid academic complications, otherwise they risk the consequences outlined below.

Academic Probation

A bachelor student receives an academic probation if his/her CGPA falls below 70 after attempting at least 24 credits by the second or any subsequent matriculated semester, excluding summer sessions. Students with two consecutive probations may choose to:

- a) Continue in the same major with the approval of the College Council but risks academic critical standing if by the end of the following semester the student accumulates three consecutive probations.
- b) Change major: if accepted in the new major, the transferred courses and CGPA will be determined according to the requirements of the new major. If the CGPA of the transferred courses is 70 or higher, the probation status is removed, and if not it shall remain in effect.

The Registrar's Office shall generate a report of students on probation at the end of every semester and send it to the colleges who will inform the student and the concerned department of the probation status.

A student may remove probation in a summer term but the results of the summer term shall not cause probation.

Course Load. Normally the maximum study load for a student on probation is 12 credits (6 in a summer term). The load may be increased to 13 credits (7 in a summer term) if one of the courses is a 4-credit course or a 1 credit required lab course. The load may also be increased to 15 credit hours (9 in a summer term) if the student is expected to graduate at the end of the semester subject to the approval of the concerned dean. A student on probation shall be denied access to on-line registration and must register through the academic advisor. A student on probation should be encouraged to repeat the courses with a grade of 70 or lower and must repeat failed courses when first offered.

Critical Academic Standing

A student shall be placed in *Critical Academic Standing* if he/she:

- Accrues three consecutive probations or four probations throughout the entire period of study, or
- Attains a CGPA less than 60 more than once as a matriculated student.

A student placed on *Critical Academic Standing* by the end of a regular semester shall be allowed to register in the following semester up to 15 credits (at least 9 credits of repeated courses). Based on the student's performance at the end of the semester, the student shall:

1. Resume studies in Good Standing if he/she attains a CGPA of 70 or higher;
2. Continue at RHU on CAS if he/she:
 - Attains a semester GPA of 75 or above;
 - Completes more than 75 percent of the total credits required for graduation.

3. Dismissed from RHU. The department shall inform the student and the concerned of the dismissal decision.

Forced Change of Major

A student whose CGPA falls below 60 at the end of any semester after the first semester as a matriculated student must transfer to another program and shall not be allowed to return to the old program in the future.

Academic Conduct

RHU embraces the values of academic honesty and integrity and expects all to uphold strict ethical and professional standards. The University forbids any unauthorized use of the work of others. Acts of plagiarism or cheating on exams or other types of work submitted for assessment as part of a course grade shall risk possible disciplinary action. Please refer to the Conduct Policy section in this catalog.

RHU Student Taking Courses Elsewhere

Students formally enrolled at RHU may take up to 15 credits hours of courses at a recognized university within Lebanon accredited by the MoHE or at a university outside Lebanon accredited by the country's higher education authority subject to the following conditions:

- The student is registered at RHU
- The student has completed at least 30 credit hours at RHU
- The courses to be taken elsewhere are equivalent to courses required by the student's major
- The student receives prior approval of the courses to be taken from the student's department chairperson and college dean by filling the Course Authorization Form
- A course is transferred to RHU credit if the grade attained is equivalent to 75 or better. The transfer credits do not count in calculating the CGPA.
- The student must submit certified transcripts to receive credits for transferred courses.

Normally students are not allowed to take courses elsewhere during the last two semesters prior to graduation. However, a student may be allowed to take up to 7 credits in the last semester of studies if the courses are not offered at RHU at the time. Students cannot transfer credits for courses taken elsewhere while on a leave of absence or during formal or informal withdrawal periods.

Student Records and Transcripts

The University is committed to protect the rights of its students to privacy and confidentiality of their personal and academic records that are kept at the Registrar's Office. Only authorized personnel are entitled to access secured Students' records. Professors are required to post

exam results by student ID numbers and not by student names. Faculty advisors and academic administrators may access student's records for advising or academic decisions. Official transcripts may be issued to a third party only if a signed authorization from the student is presented or in compliance with a judicial order. Official transcripts are signed by the Registrar. Students may request an unofficial copy of the transcript or a record of their grades any time they are in need of it. Students can access their records and see their grades any time through CampusVue.

Student Petitions

In case a student needs to submit a petition, it must be initiated with the help of his/her advisor. The appropriate form must be typed and completed using proper language. The advisor must verify the accuracy of the information before he/she signs the petition and forwards it to the department chairperson for approval. Student's transcripts should be attached to the petition if the decision is hinged on student's record.

Commencement Exercises

Commencement exercises are held after the conclusion of the spring semester in May. Students who complete graduation requirements in summer or previous fall may attend the May commencement exercises.

Graduates who opt not to participate in the graduation ceremony may receive their diplomas at the Registrar's Office after the commencement date.

Names on Diplomas and Degrees

Names on diplomas and degrees are spelled exactly as they appear on passports as required by the Ministry of Education and Higher Education (MoEHE). If after admission the name on the passport changes the student must update his/her records by submitting a certified evidence of the change to the Registrar's Office before graduation, otherwise the old name will appear on the diploma which cannot be changed thereafter.

CO-OP EDUCATION PROGRAM

Communication and Alumni Relations

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The Co-op program serves a bridge between the intensely learning university experience and the practical, results-oriented, highly competitive professional world. The program is designed to give the student an opportunity to test and apply knowledge, skills and competences acquired in the classrooms and labs and to develop a clear perspective about the expectations of the real world and a sharper focus on career choices. It offers an opportunity for employers and educators to collaborate in mentoring prospective workforce to becoming productive and responsible citizens. The hope is that the student after completing the Co-op experience will develop a clear purpose, become more engaged during the last year of studies, and form a pragmatic perspective about their role in a changing world.

Significance

While the Co-op work experience offer mutual benefits to the student, the university and the employer. In particular it will help the student in:

- Clarifying career goals;
- Understanding of the workplace demands and constraints;
- Pursuing continuous learning and self-improvement undertakings;
- Cultivating self-reliance and self-confidence;
- Refining time management, interpersonal and communication skills;
- Building contacts with potential employers;
- Acquiring marketable skills that improve employability prospects;
- Experiencing practical aspects of the field of study.

Requirements

Duration and Timing

The Co-op program runs for a minimum of eight weeks, 8 hours per day, and is normally completed during the summer term of the third year of studies. Students engage in a practical training experience mentored by professionals in the area related to their field of interest.

Course Prerequisites

Specific college prerequisites to take up the **CO-OP** experience are summarized in the table below.

Specific prerequisites to take up the Co-op experience are summarized in the table below		
College of	Credits	Prerequisite
Engineering	1	<ul style="list-style-type: none"> • Passes ENGL 217 • Senior Standing • Has a CGPA of 70 or higher
Business Administration	3	<ul style="list-style-type: none"> • Passes ENGL 217 • Senior Standing • Has a CGPA of 70 or higher
Information Systems and Science	1	<ul style="list-style-type: none"> • Passes ENGL 217 • Senior Standing • Has a CGPA of 70 or higher
Arts	3	<ul style="list-style-type: none"> • Passes ENGL 217 • Senior Standing • Has a CGPA of 70 or higher

Course Preparations

In preparation for the Co-op work experience, students are required to attend two seminars, a CV Writing seminar and Interviewing Skills seminar. The CV Writing seminar teaches students the principles of CV writing and enables them to fine-tune their CV writing skills. The seminar is coordinated with RHU English Language Center. Each student is required to have his/her CV reviewed by the English Language Center before it is submitted to the prospective employers.

Students are also required to attend an interviewing skills seminar that provides them with information on how to prepare for an interview, what to expect, and how to make a good impression.

Co-op Assignment

The Co-op Office maintains a database of prospective employers and attempts to match the employer's need with student's field of study and personal preferences. However, a student may through personal communications secure a training venue and agree with the employer on the conditions of employment. In this case the students in early spring semester must provide the Co-op Office the contact information of the prospective employer and work supervisor and the conditions of employment for approval. Once approved the Co-op Office follows up with the prospective employer in accordance with the established Co-op procedures. Applicable rules: the organization is reputable and not owned by student's parent; student may not be supervised by a member of the family or assigned to a department in

which a member of the family works. Required Information for Co-op requests outside the offerings of the Co-op office: Organization name, company profile (website), Job description / training plan, supervisor name, contact person and contact details.

Evaluation

While the Co-op office matches the Co-op assignment with the student's field of study and employer's interest, a faculty member (Co-op academic advisor) follows up on the student's work progress throughout the Co-op period. The assigned Co-op advisor conducts field visits and ensures that the student's performance is aligned with his/her aspirations and employer's needs. Each student is required to submit a formal report and a poster, and makes a formal presentation about the Co-op experience at the end of the Co-op period. Based on the employer's evaluation and the submitted formal report, poster and presentation, the Co-op academic advisor will assign the student a Pass with Honors "PH", Pass "P", or Fail "F" grade. "PH" is reserved to trainee who receives outstanding performance evaluation by the work supervisor and the Co-op academic advisor. A grade of "F" is given to a trainee who receives unsatisfactory evaluation by the work supervisor and the Co-op academic advisor.

Trainee's Responsibilities

Students must fulfil the following responsibilities by the indicated dates to guarantee Co-op placement and avoid any delay toward graduation. More details may be found in the Co-op Policy.

- Attend the orientation workshops organized by the Co-op Coordinator during the last week of January;
- Submit the Training Application Form to the co-op office (Coop-3) by the end of April;
- Set training goals and tasks to be accomplished in coordination with the work supervisor and academic advisor in early May;
- Maintain contact with the academic advisor throughout the training period;
- Submit the daily log of tasks, co-op report, poster and presentation to the academic advisor at the end of the training period;
- Complete the Trainee's Assessment of Employer form (Coop-7) at the end of the training period;
- Participate in the coop exhibition organized by the end of the summer term;

Failing to comply with the Co-op office rules and employer's work standards will result in a failing grade.

General Policy

- The logistical aspects of the Co-op program shall be managed by the Co-op Coordinator associated with in the Public Relations and Alumni Office (PRAO).

- Training opportunities shall be approved and thereafter managed by the Co-op Coordinator in collaboration with the academic units and Community Outreach Coordinator.
- A trainee must meet the eligibility criteria set forth in this policy to participate in the Co-op program.
- A student may arrange for a training opportunity on his/her own or, alternatively, the Co-op coordinator shall assist the student in finding a suitable training venue.
- A student may opt to complete the Co-op training at a reputable institution abroad, subject to pertinent approvals.
- Each trainee shall be assigned a Co-op academic advisor to follow up on the trainee's work progress throughout the Co-op period and assess the overall training experience afterward.
- A student must commit to the completing the training at the company mutually agreed to.
- Students may register for one course during the Co-op period if it is the only course needed to graduate and the timing is approved in writing by the employer.
- The Co-op coordinator completes the Co-op training offers in consultation with the employers and college deans and communicated to the student, the Co-op work supervisor and the college taking into consideration employer's needs, student's interest and eligibility, and date of student's application.
- The trainee shall work for the employer a period equivalent to eight weeks, 8 hours per day, on mutually agreeable tasks related to the trainee's field of study.
- Trainees must conform to the employer's work rules and standards and must execute his/her tasks professionally and ethically.
- The student shall directly report and coordinate with the Co-op work supervisor on all tasks and activities.
- The Co-op work supervisor cannot be a direct relative to the trainee;
- The Trainee shall keep a daily record of tasks performed and lessons learned;
- The trainee and the Co-op work supervisor shall submit the training assessment forms to the Co-op academic advisor one week after the training is completed.
- The trainee shall submit to the Co-op academic advisor the daily tasks log, a report, a poster and a power point presentation immediately after the completion of the Co-op work.
- The trainee must prepare and deliver a presentation about the training experience when requested.
- Students are NOT allowed to withdraw the Co-op course without prior approval of the Co-op academic advisor and the Co-op coordinator.
- Failing to comply with the Co-op rules and employer's work standards will result in a failing grade.
- The Co-op office and the Co-op academic advisor are always available to support the student in attaining a rewarding Co-op experience.

- The Chairperson of the academic department is responsible for implementing the provisions in this policy related to the academic advisor and student responsibilities.

FRESHMAN PROGRAM

RHU offers a freshman program to students who have not earned a Lebanese Baccalaureate or its equivalent as a bridge to become eligible to pursue a bachelor degree. The freshman program covers two tracks, the Freshman Arts track and the Freshman Science track. Each track encompasses 30 credits that may be completed in two semesters. The required subjects and corresponding credit hours are summarized in the table below.

Program	Humanities/ Social Sciences	Math	Natural Sciences	Free Elective	English	Arabic
Freshman Arts	12	3	3	6	3	3
Freshman Sciences	6	6	9	3	3	3

All students whose native language is Arabic must take an Arabic language course. Students who are exempted from the Arabic language requirement must take a substitute for the Arabic course to fulfill the 30 credits requirement.

Admission Requirements

To be eligible to join the Freshman Program, an applicant must hold one of the following certificates:

- 1- A high school certificate based on 12 years of schooling, starting with Grade One, awarded by a government or private school and recognized by the Lebanese Ministry of Education and Higher Education (MoEHE). High school certificates that are based on less than 12 years of schooling starting with Grade One are not recognized.
- 2- A General Certificate of Education (GCE). This applies to applicants with an A-level certificate who have completed a minimum of five subjects at the Ordinary Level and one subject at the Advanced Level or two Advanced Supplementary Levels (AS) excluding languages.

To apply for admission to the Freshman Program, the candidate must complete and submit an RHU Undergraduate Application form along with the following documents:

- a. High school grades (10, 11 and 12);
- b. Permission from the Lebanese MoEHE to join the Freshman Program;
- c. SAT I score reports; and
- d. Score report of a recognized English language proficiency exam - SAT I Writing Section, TOEFL or IELTS.

Applicants whose original nationality is Lebanese must also submit SAT II score reports, preferably before joining the program, but definitely during the freshman year and before joining the sophomore class.

Please note that the Equivalence Committee of the Lebanese MoEHE specifies a minimum combined score of 2600 or 2750 on the six SAT I and SAT II subjects to join the Freshman Arts track or the Freshman Science track, respectively. The six topics for each track are as follows:

SAT I Subjects	Math, Critical Reading, and writing	
SAT II Subjects	Freshman Arts	Math I-C, and any other two subjects
	Freshman Science	Math II-C and two sciences from Biology, Chemistry or Physics

Study Plan

The following study plan summarizes the courses and credits distribution for the freshman program. The freshman courses are identified by having “1” as the first digit in the course number.

Freshman Arts

Course No.	Course Name	Credits	Prerequisite
Fall Semester (15 Credits)			
BECN 190	Introduction to Economics*	3	
ENGL 101	Freshman English	3	
MATH 189	Fundamentals of Algebra	3	
	Natural Science Elective	3	
	Humanities/ Social Science Elective	3	
Spring Semester (15 Credits)			
ARAB 180	Arabic Reading and Writing	3	
	Humanities/ Social Science Elective	3	
	Humanities/ Social Science Elective	3	
	Free Elective	3	
	Free Elective	3	

* required for application to the College of Business.

Freshman Science

Course No.	Course Title	Credits	Prerequisite
Fall Semester (15 Credits)			
ARAB 180	Arabic Reading and Writing	3	
ENGL 101	Freshman English	3	
MATH 190	Calculus I	3	
PHYS 190	General Physics I	3	
	Humanities/Social Science Elective I	3	
Spring Semester (15 Credits)			

MATH 191	Calculus II	3	MATH 190
PHYS 191	General Physics II	3	PHYS 190
	Natural Science Elective	3	
	Humanities/Social Science Elective II	3	
	Free Elective	3	

Course Descriptions

Mandatory Courses

Descriptions of the programs mandatory courses are given below.

ARAB 180	Arabic Reading and Writing	3(3,0)
This freshman-level course is designed for native speakers of Arabic with the aim of developing their reading and writing skills. This course is conducted in Arabic. Students will read and discuss essays, articles and other readings, and write essays. It fulfills the Freshman Arabic language requirement. The course is mandatory for all native Arabic speakers		

ENGL 101	Freshman English	3(3,0)
This course is designed to help students develop their reading and writing skills. It focuses on the interrelatedness between reading and writing whereby students critically read and analyze passages of different rhetorical modes (classification, cause/ effect analysis, and comparison/contrast analysis) and learn to write similar essays on these modes. Some grammatical as well as structural elements are reviewed to help students develop accuracy in their writing. In this course, students are also introduced to research skills such as evaluating sources, paraphrasing, summarizing, and quoting while following the APA style.		

BECN 190	Introduction to Economics	3(3,0)
This course is designed to help students develop a basic general understanding of economic principles, issues, history and institutions. It develops their economic literacy and teaches them how economics relates to the everyday life of individuals, businesses and society in general. Topics include markets, firms, economic systems, role of government in the economy, capitalism, macroeconomic indicators and the basics of supply and demand.		

MATH 189	Fundamentals of Algebra	3(3,0)
Real number systems, radicals and rational exponents, polynomials, factoring, fractional expressions, lines in the plane, functions and their graphs, inverse functions, solving equation and inequalities, real zeros and the fundamental theorem of Algebra, exponential functions and their graphs, logarithmic functions and their graphs.		

MATH 190	Calculus I	3(3,0)
Functions and their graphs, Limits and continuity, Differentiation, Applications of derivatives,		

Extreme values and mean value theorem, Definite and indefinite integrals, The substitution method.

MATH 191	Calculus II	3(3,0)
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Inverse trigonometric functions, Integration techniques, Parameterizations and parametric curves, Vectors and dot and cross products, Lines and planes in space, Curves in space, Curvature and normal vectors of a curve

PHYS 190	General Physics - Mechanics	3(3,0)
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This course introduces students to the basic concepts and principles of Mechanics: Vectors, displacement, velocity, acceleration, motion in 1D, projectile motion, forces, Newton's laws of motion, work, energy, momentum, collision, torque and rotational motion.

PHYS 191	General Physics - Electricity and Magnetism	3(3,0)
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This course is an introduction to electricity and magnetism. In this course, students will explore electric charges, electric forces and electric fields, electrical energy and potential, capacitance, direct-current circuits, magnetic force, magnetic field, induced voltage and inductance, alternating-current circuits and electromagnetic waves.

Electives

Descriptions of the possible elective courses are given below.

HIST 100	History of the Ancient World	3(3,0)
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This course examines a range of topics including the origins of civilization in Egypt and Mesopotamia, the civilization of Ancient Greece and Rome, the origins and development of Judaism, and the early Christian Church. **Co-requisite:** ENGL 101.

HIST 102	Europe from the Reformation to the French Revolution	3(3,0)
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A survey of European history beginning with the 16th century Protestant Reform and including absolutism, the scientific revolution, the Enlightenment, and the old regime and the French revolution. **Co-requisite:** ENGL 101.

HIST 103	Europe in the 19th and 20th Centuries	3(3,0)
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Topics include the Industrial revolution, the rise of political ideologies, social classes, nationalism and imperialism, the Russian Revolution, the two world wars, the inter-wars period, and the cold war era. **Co-requisite:** ENGL 101.

HIST 108	Issues and Themes in U.S. History: 1607-1877	3(3,0)
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American history from 1607 to 1877 examines the development of the United States from early settlement through the Civil War era. Emphasis is placed on the evolution of American politics, race relations, economic and social trends, and western expansionism. **Co-requisite:**

ENGL 101.

GEOL 160 | Earth Geology **3(3,0)**

This is an introductory course designed to provide a general overview of some aspects of the Earth's natural environment and system. It Introducers the processes and physical systems of the earth that are important in controlling its environment. In addition, the course talks about the relationships between various earth systems and processes, and their environmental effects.

PHIL 102 | Freshman Philosophy **3(3,0)**

An introduction to the part of philosophy concerned with questions about the ultimate nature of the world we live in and our knowledge of it. The issues discussed include: the existence and nature of God, the place of human beings in the universe, the nature of reality, human nature, human knowledge and skepticism, freedom and determinism, and the relationship between mind and body. The emphasis of the course varies from instructor to instructor. **Co-requisite:** ENGL 101.

PHIL110 | Critical Thinking **3(3,0)**

This course is an introduction to basic rules of clear and rational thought. Students are offered extensive analysis of examples on how to detect false reasoning, illegitimate appeals to emotions, inconsistencies and contradictions. The goal of this course is to develop logical awareness to the point that a person can no longer be victimized by the rhetoric of everyday life, and can develop arguments with clarity and confidence. **Prerequisite:** Native English speakers or English 098. **Co-requisite:** ENGL 101.

POSC 190 | Freshman Politics **3(3,0)**

This survey course is recommended for students interested in discovering how politics impact their lives and how they in turn can affect politics. Students are introduced to the basic concepts of Political Theory, Comparative Politics, International Relations, and Public Policy. **Co-requisite:** ENGL 101.

PSYC 190 | Freshman Psychology **3(3,0)**

This course is aimed at developing some understanding of human psychology by focusing on the elements that affect human behaviors and mental processes. Among others, it covers topics on cognition, emotions, learning, human development, biological bases of behavior, personality, psychological disorders, psychotherapy and behavior change, and social behavior. **Co-requisite:** ENGL 101.

PSYC 195 | Freshman Stress Management **3(3,0)**

This course addresses the basic principles, theories and techniques to effectively manage personal stress. Students will gain a greater understanding of the mind-body relationship, learn

to employ a holistic approach to stress and adopt effective cognitive techniques, copy skills and relaxation techniques. **Co-requisite:** ENGL 101.

SOCI 190	Freshman Sociology	3(3,0)
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This course is designed to give freshman students an overview of the field and to familiarize them with some essential sociological concepts. It focuses on the individual in society, the study of society, social institutions, and human agency. In particular the course will pay attention to how people's lived experiences are both shaped by social forces and reshaped through human action. **Co-requisite:** ENGL 101.

CVLN 160	Monotheistic Religions: A Comparative Study	3(3,0)
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This course covers the three monotheistic religions. It compares and contrasts the idea of God and the law among Judaism, Christianity and Islam.

CVLN 161	The Arabs	3(3,0)
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This course provides a review of the history of the Arabs from the pagan days through the twentieth century.

CVLN 170	God and Creation: East and West	3(3,0)
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A literary attempt to understand the origins of the universe as found in texts from a variety of world cultures.

CVLN 180	Youth and the Growing Up Process	3(3,0)
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An introduction to the themes and challenges of autonomy and independence as experienced by youth, studied through major literary works of the past centuries.

CVLN 181	Arab Renaissance	3(3,0)
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The Arab renaissance is studied through historical and socio-political texts.

CVLN 190	Freshman Art History	3(3,0)
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This course provides an overview of art and its development in the western world. It covers the main art periods from "Prehistoric Art" through 'Contemporary Art' and the effect of the socio-political cultures of the times.

CHEM 160	Chemistry I	3(3,0)
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Students study the principles and methods of chemistry including atomic structure, periodic trends, writing formulas, and determining the names of both inorganic and organic formulas.

CHEM 170	Chemistry II	3(3,0)
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Students learn about acids, bases, and chemical equilibriums; the groups in the periodic table, organic chemistry, and nuclear will be also surveyed.

BIOL 102	Introduction to Biology	3(3,0)
An introductory course to the fundamental principles of biology which covers the following topics: chemical basis of life, the structure and function of cells and systems, genetics and human body systems.		
BIOL 170	Basic Concepts in Biology	3(3,0)
A freshman level course that introduces students to the basic concepts of genetics, evolution, and ecology, and also explores the forms and functions of plants and animals.		

Joining Degree Programs

Students may join a degree granting program at RHU after successful completion of the freshman program provided that they attain the freshman year - to - Lebanese Bacculaureate equivalency certificate from the Equivalence Committee of the Lebanese MoEHE. Students on the Freshman Arts track may join the Graphic Design program or any program offered at the College of Business Administration or the College of Arts. Students on the Freshman Science track are eligible to join any degree granting program offered at the University. Additional requirements to join specific programs are summarized below.

Business Administration programs. A GPA of at least 70 and a grade of at least 70 in both MATH 189 or MATH 190 and BECN 190.

Engineering Programs. A GPA of at least 75, and a minimum grade of 70 in MATH 190, MATH 191, PHYS 190, and PHYS 191.

Computer Science Program: A GPA of at least 75 and a minimum grade of 70 in both MATH 190 and MATH 191.

Graphic Design Program. A GPA of at least 70 and passing the RHU Graphics Design Aptitude Test.

GENERAL EDUCATION

Every RHU student must take 30 credit hours of general education courses distributed over seven domains as described below. Fifteen mandatory credits are selected from domains 1, 4, 6 and 7 and 15 elective credit hours selected from domains 2, 3 and 5.

Domain	Credits	Courses
1	Communication Competency*	6 ENGL 210: English Composition and Rhetoric ENGL 217: Professional English Writing
2	Humanities/Fine Arts	6 Selected from an approved list
3	Social Sciences/Culture	6 Selected from an approved list
4	ICT Competency	3 Per major requirement*
5	Sciences/Technology	3 Selected from an approved list
6	Quantitative Reasoning	3 Per major requirement*
7	Community Forethought	3 Per major requirement*

* Refer to the introductory section of the college of interest for description of courses specific to domains 1, 4, 6 and 7.

Elective Courses

Description of the Courses that satisfy Domain 2, 3 and 5 requirements are given below.

Humanities/Fine Arts

Descriptions of elective courses that may be chosen to satisfy the humanities/Finer Arts domain are given below.

ARAB 330	Introduction to Arabic Language & Literature	3(3,0)
This course provides a basic introduction to Arabic language and literature, emphasizing Arabic language, grammar and literature. Students will study Arabic prose including the Holy Quran and extracts of Arabic poetry. Prior knowledge of Arabic is required.		

CVLN 301	Civilization Studies I	3(3,0)
This course surveys some of the key figures, movements, and texts in cultural studies, from the birth of civilization through the middle Ages. Concentration will be on the historical, political, religious, cultural, and institutional aspects during this period. Students will read, analyze, and interpret certain primary works in order to gain insight into the contexts in which they originated. Co-requisite: English 210.		

CVLN 302	Civilization Studies II	3(3,0)
This course surveys some of the key figures, movements, and texts in cultural studies, from the 14 th through the 18 th centuries. Concentration will be on the historical, political, religious,		

cultural, and institutional aspects during this period. Students will read, analyze, and interpret certain primary works in order to gain insight into the contexts in which they originated. **Co-requisite:** English 210.

CVLN 303	Civilization Studies III	3(3,0)
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This course surveys some of the key figures, movements, and texts in cultural studies, from 19th century up to the present time. Concentration will be on the historical, political, religious, cultural, and institutional aspects during this period. Students will read, analyze, and interpret certain primary works in order to gain insight into the contexts in which they originated. **Co-requisite:** English 210.

ENGL 203	Introduction to English Drama	3(3,0)
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This course is a study of selected and representative plays of different periods. Added to broadening the student's understanding and appreciation of literature, The chief aim of the course is to develop the student's critical thinking and analysis and to encourage original responses to literary expression in well-developed oral and written criticism.

ENGL 213	Creative Writing	3(3,0)
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This course introduces students to the process and practice of imaginative writing. Students will read works of fiction, creative nonfiction and poetry, and will learn techniques for writing in those genres.

ENGL 214	Introduction to English Poetry	3(3,0)
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This course introduces freshman students to poets whose poetry is of intrinsic literary merit. In addition to broadening the students' understanding and appreciation of literature, the chief aim of the course is to develop the student's critical thinking and analysis and to encourage original responses to literary expression in well-developed oral and written criticism. **Co-requisite:** English 210.

ENGL 215	Introduction to American Literature	3(3,0)
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This is a course which explores the works of major literary figures and authors representing different literary schools from the sixteenth century to modern times. Students will closely examine selected texts as literary achievements and set them within the historical context and framework of American culture. **Co-requisite:** English 210.

ENGL 220	Introduction to Literature	3(3,0)
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This course is an introduction to literature through works of fiction, poetry, and drama. It introduces students to the pleasures of reading literature and to interpretative approaches to literature. It aims to provide students with competence in critical thinking and practice in close reading and analysis, knowledge of the formal characteristics of each genre, and appreciation of literary excellence. Readings include a variety of short stories, poems and plays selected

from a wide range of British, American and World literature. **Co-requisite:** English 210.

ENGL 230	Shakespeare's Plays	3(3,0)
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In this course, students study representative comedies, histories, and tragedies by Shakespeare. The plays are read intensively and understood in the context of the theatrical conventions of the period and the culture of play going in early modern England, as well as the social, cultural, religious, and intellectual history of the period. **Co-requisite:** English 210.

FADR 215	History of Art	3(3,0)
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This course explores the major forms of artistic expression from the ancient world to the present from a variety of cultural perspectives. Students learn how to look at and analyze works of art within their historical context, and how to articulate what they see or experience in a meaningful way. This course covers Pre- Renaissance, Renaissance, Post Renaissance and the rich layers of 19th and 20th Century Modern Art up until the manifestations of our present day.

HIST 210	History of England	3(3,0)
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This broad survey course provides a narrative of British history from 1066 through the present, including political, social and cultural developments. **Prerequisite:** ENGL 210.

HIST 350	History of the Arabs in the Classical Period	3(3,0)
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This is an elective course whose major objectives are to familiarize students with the Arab peoples' history. The course's emphasis will be to explain: The early Arab conquests of Bilad al-Sham, Egypt, Persia, North Africa, the internal civil strife inside the early Muslim community, the emergence and development of the Umayyad caliphate, and the emergence and development of the Abbasid Empire.

HIST 360	Contemporary History	3(3,0)
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This is an elective course whose major objectives are to familiarize students with contemporary issues in order to enhance their level from historical and cultural points of view. **Co-requisite:** English 210.

HIST 365	History of Europe in the Middle East	3(3,0)
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This course examines the ties between Europe and the Middle East in the 19th and 20th centuries, focusing on the reaction of Middle Eastern societies to European intervention and influence. **Co-requisite:** English 210.

HIST 370	The Economic and Social History of the Middle East	3(3,0)
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This is an elective course whose main objective is to familiarize students with various events that shaped the evolution of social and economic developments of the Middle East to enhance their level from the historical and economical dimensions. **Co-requisite:** English 210.

HIST 480	Special Topics in History	3(3,0)
<p>This course provides an in-depth look into selected issues related to historical events across ages and development. Through readings, research, discussion and guest lecturers current issues related to historical events across ages and development are thoroughly explored. Prerequisite: Consent of the instructor.</p>		

PHIL 301	Major Trends in Philosophy	3(3,0)
<p>This is a study of some major topics in philosophy. The course emphasizes theory of knowledge, theory of mind, determinism and free will, and morality and ethical values. Along with some assigned readings, students will watch movies, the analysis of which will help them comprehend the content of the course better. Co-requisite: English 210.</p>		

PHIL 302	Introduction to Formal Logic	3(3,0)
<p>This course is a standard introduction to the formal techniques of argument analysis. Formal logic was invented to mirror and evaluate mathematical reasoning; however, this course will concentrate on the relationship between formal logic and everyday reasoning and consequently language usage in general. Co-requisite: English 210.</p>		

PHIL 303	Introduction to Ethics	3(3,0)
<p>People often wonder about what makes good ways to live and right ways to act. They also speculate about what is the best way of life, what action is right, and what sort of authority moral claims have over us. The course introduces students to the major moral theories and thinkers that address these types of questions. Co-requisite: English 210.</p>		

PHIL 307	Business Ethics	3(3,0)
<p>This course is an introduction to contemporary philosophical thinking on ethical issues in business. Students will be exposed to important ethical issues they might face; asked to give sound ethical judgment to problems they might face in their line of work; helped become armed with a set of codes that will prepare them to confront and resolve ethical dilemmas they might encounter at work; and enabled to apply the techniques for analyzing and resolving ethical problems when they arise. Co-requisite: English 210.</p>		

PHIL 310	Philosophers of Peace	3(3,0)
<p>This course introduces students to peace building and conflict prevention through the examination of the main theories on peace and security. It examines ideas of Thucydides, Aristotle, Erasmus Grotius, Kant, Gandhi and other thinkers for whose peace was a high value. It develops students' critical skills and understanding necessary to translate their academic learning to specific practical situations, such those posed by peace building either with the UN, governments, or NGOs. It helps to understand the complex and interconnected challenges to peace and provides knowledge to meet these challenges. Co-requisite: English 210.</p>		

PHIL 480	Special Topics in Philosophy	3(3,0)
This course provides an in-depth look into selected issues related to philosophy and philosophical thinking. Through readings, research, discussion and guest lecturers current issues related to philosophy and philosophical thinking are thoroughly explored. Prerequisite: Consent of the instructor.		

Social Sciences/Culture

Descriptions of elective courses that may be chosen to satisfy the Social Sciences/Culture domain are given below.

CMNS 301	Mass Media Essentials	3(3,0)
This course aims to familiarize students with the concepts and vocabulary used in various fields of communication, understanding the development of mass communication in political, economic, social, and cultural contexts. The course addresses media's influence on society and societal influence in shaping the news process, advertising, and public relations. Students are introduced to media-related research methods. Co-requisite: English 210.		

CMNS 310	Persuasion	3(3,0)
Through reading, writing and speech, students will become familiar with the persuasive strategy described in Aristotle's Rhetoric, and consider how that strategy can be employed in professional and personal situations in writing, public speaking and negotiation. Co-requisite: English 210.		

CMNS 320	Creative Nonfiction	3(3,0)
In this course students will learn rhetorical modes in short essays and journalism, including memoir, reportage and reflective essays. Students will practice a writing style that focuses on conciseness and clarity, effective oral presentations, and the reading of articles, essays and other materials of increasing complexity. Co-requisite: English 210.		

CMNS 330	Arab and International Media	3(3,0)
This course offers students a comparative study of international media, with particular focus on the media in Arab countries, including mass media and social media. Co-requisite: English 210.		

CMNS 340	Media and Public Relations Writing	3(3,0)
This introductory-level course is designed to develop and strengthen general writing skills, and to help students learn the formats and conventions of media and public relations writing, including newspapers, magazines, web and interactive media, advertising copy, press releases, talking points, media alerts, public service announcements, newsletters and social media. It also addresses ethical issues related to writing in these fields. Co-requisite: English 210.		

CMNS 350	Mass and Digital Communication Ethics	3(3,0)
This course addresses the ethical problems that arise in the fields of journalism, public relations and advertising, particularly in today's digital media environment. Prerequisite: CMNS 301.		

CMNS 401	Peace Communication: Media and Conflict Resolution	3(3,0)
This course integrates methods, perspectives and concepts of Peace Studies, Culture Communication and Peace Journalism to explain contemporary debates in the global public sphere. It considers how cultural stereotypes about ideology, religion and culture frame Arabs and Americans in the mass media. RHU students will engage with students from collaborating universities in the United States in online, asynchronous conversation and participate in shared projects that explore the role of the media in influencing Arab and American relations. Co-requisite: English 210.		

CMNS 410	Public Speaking	3(3,0)
This course offers a practical introduction to the fundamental principles of public speaking and a forum for practicing public speaking skills. A variety of instructional strategies - discussion, class workshops, readings, lectures, and presentations – is applied to teach students the processes by which effective speeches are conceived, prepared and delivered. Through practice, students' confidence in their public speaking ability will increase; principles of effective public speaking will be internalized; existing speaking skills will be reinforced and areas for improvement identified; and effective aspects of speech preparation and delivery in a variety of speech contexts demonstrated. Co-requisite: English 210.		

EDUC 211	Fundamentals of Special Education	3(3,0)
This course provides an introduction to Special Education, particularly addressing current practices. Students are introduced to common learning disabilities and intervention programs, as well as an historical overview of the development of the field of Special Education.		

EDUC 360	Children's Literature	3(3,0)
This course draws on the theoretical and practical aspects of the study of literature for children. Students develop both wide familiarity with children's books, and understanding of how children's literature fits into the elementary school curriculum.		

EDUC 365	Art Education	3(3,0)
This course explores concepts of art, music, drama, and movement for young children. The various methods are used to cover various activities associated with the development of children's physical-motor, social-emotional, and cognitive skills, with providing conditions to develop creativity and aesthetic awareness.		

EDUC 415	Factors in Student Motivation	3(3,0)
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This course will examine motivational factors which influence children's learning. Topics include attribution theory, teacher influences (expectancy effects), learning structures (competitive vs. cooperative learning), family influences (the socialization of achievement), cultural influences (how cultural background impacts on college performance), and individual differences (intrinsic motivation and sex differences in learning).

ENGL 207	Introduction to Language	3(3,0)
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This survey course examines current areas in theoretical and applied linguistics including the different levels of structure, the nature of language acquisition, language variation and evolution, and language teaching.

ENGL 300	Introduction to World Literature	3(3,0)
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The course surveys selected works in English or in translation from non-Anglo American cultural traditions. Texts can be drawn from African, Asian, European, Latin American and Middle Eastern literatures with a focus on their historical and cultural contexts. **Prerequisite:** ENGL 210.

ENGL 330	Language Acquisition	3(3,0)
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This course will survey language acquisition theories. It will deal with human language processing, learners' motivational factors and contextual factors which influence language learning. It will uncover the principles of language acquisition.

POSC 301	Introduction to Political Science	3(3,0)
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This course aims at familiarizing students with the basic concepts and disciplines in the study of political science. It focuses on the nature of politics as a science, political ideologies, the state and state-society relations, political parties, electoral systems, democracy, and international organizations. A significant emphasis is placed on the ability of students to utilize these concepts in the analysis of current political issues, disputes and trends. The course combines lectures and class discussions, debates and presentations. **Co-requisite:** ENGL 210.

PSYC 301	Introduction to Psychology	3(3,0)
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This course is an introduction to the theories, concepts, and viewpoints that comprise the discipline of psychology. The course is directed toward the understanding of human behavior by dealing with such topics as history of psychology, learning, personality, behavior, motivation, perception, and social psychology, mental health as well as other areas. **Co-requisite:** English 210.

PSYC 302	Social Psychology	3(3,0)
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This course is a study of the dynamics and effects of social influences on individual human behavior. In this course, students will explore such topics as attitude changes, social beliefs, roles, conformity to group processes, and prejudices with special attention given to the Middle

Eastern perspective. **Co-requisite:** English 210.

PSYC 303	Psychology of Personality	3(3,0)
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This course presents the theories of personality including psychoanalytic, behaviorist, humanist, and others, while considering different factors that shape personality and behavior. The study includes methods of assessing personality. **Co-requisite:** English 210.

PSYC 306	Psychology of Women	3(3,0)
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This course examines the biological, sociological and cultural influences on the psychology of women. It includes such topics as gender stereotypes, the development of gender roles, gender comparisons, women and work, love relations, women's physical and mental health, violence against women, and women in later adulthood. **Co-requisite:** English 210.

PSYC 310	Positive Psychology	3(3,0)
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This course examines the scientific research on happiness and its practical application in three main areas: positive emotions, positive individual traits and positive institutions. This course also presents practical ways to promote and maintain a sense of well-being and happiness in all aspects of one's life. **Co-requisite:** English 210.

PSYC 312	Children and War	3(3,0)
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This course is intended to help students be aware about the consequences of war and conflicts on the mental health and well-being of children. The course will examine a variety of effects, emphasizing posttraumatic stress disorder (PTSD) and other psychological conditions that result from war. The course will empower the students with the techniques of working with children affected by war. **Co-requisite:** English 210.

PSYC 400	Conflict Transformation	3(3,0)
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This course explores practical theories for understanding congregational conflict, as well as various perspectives on conflict transformation. Students will engage in reflection on their own styles of dealing with conflict and learn new ways of responding. They will explore practices of dialogue and mediation for addressing conflict interpersonal, small group and congregational settings with the goal of developing an approach to addressing inevitable situations of difference, change and conflict in a variety of situations. **Co-requisite:** English 210.

PSYC 410	Abnormal Psychology	3(3,0)
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An introduction to the theories of abnormal behaviors, including addiction and substance abuse, bipolar disorder, eating disorders, depression, obsessive-compulsive behaviors, phobias, schizophrenia and sexual disorders. Students will consider theoretical implications of and treatments for a range of abnormal behavior. **Co-requisite:** English 210.

PSYC 480	Special Topics in Psychology	3(3,0)
<p>This course provides an in-depth look into selected issues related to psychology and individuals. Through readings, research, discussion and guest lecturers current issues related to psychology are thoroughly explored. Prerequisite: Consent of the instructor.</p>		
SOCI 210	Research Methods in the Social Sciences	3(3,0)
<p>This course is designed for students majoring in psychology, sociology, communications and other social sciences fields. It introduces them to advanced research design and methodology, including statistical analysis. Prerequisite: MATH 220.</p>		
SOCI 301	Introduction to Sociology	3(3,0)
<p>This course explores a variety of sociological theories and approaches to understanding society. The student will learn about human social life, groups, and societies and will be helped to detect the social influences that shape our lives. The approach used in this course is self-exploratory process that develops individual and social awareness. A secondary objective is discussing methods common to sociology, conflict theory, symbolic interactionism, and feminism. Co-requisite: ENGL 210.</p>		
SOCI302	Political Sociology	3(3,0)
<p>This course tackles the social issues pertaining to the historical and contemporary evolution of various political ideologies. It aims at developing students' understanding of the social bases of politics and political ideologies along with the recent changes in the socio-political world. Different economic and political philosophies are considered and their effects on the fate of nations and their citizens detected. Co-requisite: English 210.</p>		
SOCI 304	Introduction to Educational Sociology	3(3,0)
<p>This course introduces the study of sociological concepts as they apply to the institution of education. Students will examine issues of race, class, status, poverty and bureaucracy in the educational setting. They will also examine current perspectives and research about the social aspects of the learning process.</p>		
SOCI 310	Intercultural Communication	3(3,0)
<p>This course deals with cultural issues like cultural awareness, enculturation, acculturation and cultural shocks. It involves hands-on activities to promote cultural awareness and equip students with skills for dealing with people from diverse cultural backgrounds. It includes a team-oriented research and presentation that reflect all the cultural aspects and some minute details of the culture that they choose to work on. Co-requisite: English 210.</p>		
SOCI 313	Interpersonal Communication	3(3,0)
<p>Students in this course examine communication theory and case studies in order to gain insight into the factors that affect human communications. It aims to improve students'</p>		

communication skills and effectiveness, and give them skills that will enhance the quality of their relationships. The course also offers strategies for managing interpersonal conflicts. **Co-requisite:** English 210.

SOCI 340	Arab Culture and Society	3(3,0)
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This course examines contemporary Arab society, considering its social structures and groups, cultural patterns, and other aspects of the society. Students consider current issues related to Arab culture and society. **Prerequisite:** SOCI 301.

SOCI 410	Culture and Identity	3(3,0)
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This course analyzes the role of culture in an individual's sense of identity, with an emphasis on how it manifests in the Middle East. **Prerequisite:** SOCI 301.

SOCI 420	Social Inequalities	3(3,0)
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The course addresses issues such as class, status, and gender inequalities, examining how they affect individuals and society. **Prerequisite:** SOCI 301.

SOCI 480	Special Topics in Sociology	3(3,0)
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This senior course provides an in-depth look into selected issues related to sociology and society. Through readings, research, discussion and guest lecturers current issues related to sociology are thoroughly explored. **Prerequisite:** Consent of the instructor.

Natural Science Electives

Descriptions of elective courses that may be chosen to satisfy the Natural Sciences domain are given below.

BIOL 211	General Biology	3(3,0)
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Topics covered are small/large molecules, organization of the cell, membranes, energy, enzymes and catalysts, basic cell functions, biological control systems.

CHEM 210	Principles of Chemistry	3(3,0)
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This course emphasizes the fundamental principles of chemistry including: terminology; qualitative and quantitative concepts; acid-base chemistry and buffers, acid – base titrations; quantum theory of the atom; electrons and periodicity; bonding; molecular geometry; hybridization; thermo chemistry and kinetics.

CHEM 211	Environmental Chemistry	3(3,0)
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This course aims to develop an understanding of several basic environmental functions, the complicated nature of environmental systems, and the need for multidisciplinary solutions to environmental problems. Topics covered include the hydrosphere, water quantity and quality, soil and the soil ecosystem, biological resources, waste disposal, air pollution, ozone depletion,

acid rain, global warming, agriculture, and toxicology. **Prerequisite:** None.

GEOL 300	Human Geography: People and Culture	3(3,0)
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Different cultures in different landscapes are compared and contrasted to the Middle East. This course examines the many issues of human population, perception of the environment, diffusion of ideas, and cultural aspects of resource and urban growth. **Co-requisite:** English 210.

PHYS 312	Modern Physics	3(3,0)
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This course covers the various models of atomic description, particles and quantum numbers, different forms of electromagnetic waves and their interactions (PE effect, Auger, Compton, etc.), relativity, vibration and elastic properties of material. **Prerequisite:** None.

COLLEGE OF ARTS

COLLEGE OF ARTS

Officers of the College

Riad Chedid	President
Ahmad Smali	Vice President for Academic Affairs
Hiam Loutfi	Chair of Languages and Humanities Department

Contact Information

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History and Overview

Since Rafik Hariri University was established in 1999, the faculty of the Languages and Humanities Department has provided English, humanities, social science, languages and communication courses to all RHU students. These courses complement students' professional education by giving them a broad liberal arts background. In them, they learn to

- Write academically and professionally,
- Understand how the world works,
- Develop critical thinking and communication skills, and
- Be good citizens in their communities and in the world.

In addition, the Intensive English Program and the English Learning Center support students who need to build their English language skills. The IEP program enables students who would otherwise be admitted to the university to improve their English language skills while taking other courses. The ELC serves the entire RHU community, students and faculty alike, with individualized tutoring services and independent learning labs.

After several years of planning, the L & H faculty secured a license from the Ministry of Education to establish the College of Arts, which is opening in the 2015-2016 academic year. The College of Arts is launching with four new programs: a Bachelor of Arts in Education, a Teaching Diploma in Education, a Bachelor of Arts in English Language and a Bachelor of Arts in Journalism – Media and Digital Communication.

RHU's new BA in Education and its one-year Teaching Diploma program offer the training, education and credentials new teachers need to gain secure positions and command higher

salaries in an atmosphere of growing investment in education in Lebanon. RHU is also on the forefront in providing the English language education needed for work today in education, civil societies, communication and media, and more. The faculty has provided substantial teaching training to area teachers, including UNRWA schools. RHU's connections to strong schools in Lebanon benefit Education and English Language students by creating opportunities for teaching training in the classrooms of top schools in the country and through engagement of experienced teachers in RHU classrooms.

RHU's BA in Journalism-Media and Digital Communication prepares graduates for a wide variety of careers, including new media/social media managers, advertising copywriters, promotions management, public/media relations, corporate communications, TV and print news management and reporting, sports or government information officers, and more. This major is particularly marketable because today media and communication are integral to every organization. RHU's regional and international collaborations in the media fields put it at the heart of developments in media studies education in the region. It is on the forefront of promoting digital media literacy and high quality investigative journalism in the Arab region, in addition to enjoying international collaborations with universities and media associations from across the globe. Journalism – Media and Digital Communication students gain experience through training in leading news outlets in Lebanon and the region.

The College of Arts faculty is active in research in their varied fields, including education, language, journalism and media, the humanities and the social sciences. At the same time, they also have hands-on professional experience that they bring into the classroom. The College of Arts faculty's many publications include books, academic journal articles, conference papers, magazine and newspaper articles, broadcast media scripts and more.

RHU's College of Arts aims to help meet the growing need in Lebanon for education, language and media professionals. The College aims especially to graduate 21st century professionals who can serve effectively in their fields and make a significant difference in their communities. College of Arts graduates have opportunities to play key roles in advancing civil society and civic awareness through involvement in their professions, and in professional and service organizations. CA students develop their leadership skills and will truly make a difference in the greater community.

Vision

The College of Arts aims to be a student-centred academic community that encourages creativity, critical thinking, independent thought, and civic engagement, the understanding of diverse perspectives, professionalism, ethical behavior and life-long learning.

Mission

To instill in students a strong professional background, a broad liberal arts education, the ability to pursue research, and an appreciation for ethics that prepare them to pursue professional excellence, civic and intercultural engagement and leadership, and service to humanity.

Core Values

The College of Arts is committed to acting in accordance with the following guiding values:

Professional Excellence

We, faculty and students alike, strive to consistently do our utmost to reach high standards of excellence in our performance.

Collaboration

We value each other's unique perspectives and benefit from them by engaging together in an atmosphere of mutual respect. We share expertise, resources and time with each other to pursue common goals.

Integrity

We are committed to open, transparent decision-making in all processes in the College of Arts and insist on treating every faculty and staff member and student with fairness and compassion.

Celebration

We recognize, appreciate and celebrate the achievements of all College of Arts members (faculty, students and staff).

Compassion

We are concerned about the whole person and his or her wellbeing, whether it is someone within our College or in the greater community. That concern translates into actions of compassion towards individuals and the larger community.

Innovative Teaching

We will engage faculty and students in innovative educational teaching methodologies, including the effective use of technology in education.

Learning Objectives

Students in the College of Arts will:

Develop professional background and skills in their chosen fields

Students will become proficient in both theory and application relevant to their majors, and learn to pursue research in their chosen fields.

Integrate academic learning with experiences in the community

Students will apply their learning in work-place experiences, preparing them to confidently enter their professions upon graduation.

Value and practice reflective thinking

Students will engage in reflection, learning to think critically and independently.

Develop communication skills

Students will engage in classes that emphasize communication skills. Classes in the College of Arts emphasize the importance of being able to express oneself orally and in writing.

Develop personal values

Programs and activities in the College will provide opportunities for students to develop their personal values through engaging with social issues in the community.

Develop digital media literacy

Students will develop the ability to “read” and “write” in today’s media, which is a key skill for all 21st century citizens.

Academic Programs

The College of Arts offers three undergraduate programs leading to a Bachelor of Arts (BA) degree, and a one-year Teaching Diploma program. It also offers the Intensive Language Program, the English Learning Center, and core education courses to all RHU students. The programs are as follows:

1. Bachelor of Arts in Education
2. Bachelor of Arts in English Language
3. Bachelor of Arts in Journalism – Media and Digital Communication
4. Teaching Diploma in Elementary Education or Secondary Education

Program Codes

The following table lists the code used for each program. This code is used as the prefix of each course designation in the program.

Program Code	Program
EDUC	Education
ENGL	English Language
JRSM	Journalism – Media and Digital Communication

Admission Requirements

Students wishing to enter the College of Arts must fulfill the University admission requirements. Students are strongly advised to carefully review the University Catalog for admission and degree requirements as well as all related academic policies.

Graduation Requirements

Each College of Arts undergraduate program grants students a Bachelor of Arts (BA) degree, which encompasses 93 credits. Required credits are distributed among three categories: University requirements (UR), College requirements (CR) and Program requirements (PR). The University and College requirements are common to all programs in the College of Arts. Each department has its own required and elective courses. The credit hour allocations for each program are shown in the following tables:

BA in Education (93 credits)

Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	6	-	9	15	30	32
College Requirement	-	-	9	-	9	10
Program Requirement	54	-	-	-	54	58
Credits	60		33		93	100

BA in English Language (93 credits)

Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	9	-	6	15	30	32
College Requirement	-	-	9	-	9	10
Program Requirement	27	18	3	6	54	58
Credits	54		39		93	100

BA in Journalism—Media and Digital Communication (93 credits)

Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	15	15	30	32
College Requirement	-	-	9	-	9	10
Program Requirement	27	9	15	3	54	58
Credits	36		69		93	100

A College of Arts student in any of the Bachelor of Arts degree programs is eligible for graduation if he/she has:

- 1) Completed all the requirements of the degree
- 2) Attained a cumulative GPA of 70 % or higher
- 3) Attained a major GPA of 70 % or higher

I. University Requirements

Every RHU student must take 30 credit hours of general education courses distributed over seven domains. Fifteen mandatory credits are selected from domains 1, 4, 6 and 7 and 15 elective credit hours selected from domains 2, 3 and 5.

Domain	Credits	Courses
1 Communication Competency	6	ENGL 210: English Composition and Rhetoric ENGL 217: Professional English Writing
2 Humanities/Fine Arts	6	Selected from an approved list
3 Social Sciences/Culture	6	Selected from an approved list
4 ICT Competency	3	<ul style="list-style-type: none"> • EDUC: EDUC 222 - Computer Applications in Education • ENGL: EDUC 222 - Computer Applications in Education • JRSM: BITM 200 - Business Information Technology Management Essentials
5 Sciences/Technology	3	Selected from an approved list
6 Quantitative Reasoning	3	MATH 220: Statistics for Social and Behavioral Science
7 Community Forethought	3	<ul style="list-style-type: none"> • JRSM: CMNS 355 - Digital Media Literacy • ENGL: ENGL 420 - Literature and Culture or CMNS 355 - Digital Media Literacy • EDUC: CMNS 355 - Digital Media Literacy OR EDUC 480 - Special Topics in Education

Descriptions of the mandatory general education courses are given below:

ENGL 210	English Composition and Rhetoric I	3(3,0)
This course reviews the fundamentals of good academic writing in English, teaches essay writing essentials and research skills in two rhetorical modes (persuasion and argumentation), and provides practice in writing essays in these modes, research paper, and oral presentation. Pre-requisite: ENGL 101 or TOEFL 600+ (paper) or 100+ (computer).		

ENGL 217	Professional English Writing	3(3,0)
This is a required course designed to help students develop effective professional communication skills, both orally and in writing. In this course, students learn how to write emails, memos, letters, proposals, reports, and other forms of employment correspondence. In		

addition, this course helps students sharpen their presentation skills. Broadly, this course enables students to behave professionally and effectively in their prospective jobs. **Prerequisite:** ENGL 210.

MATH 220	Statistics for Social & Behavioral Sciences	3(3,0)
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This course addresses the use of statistics as a tool for scientific investigation in social and behavioral sciences, with special emphasis on descriptive and relational techniques.

BITM 200	Business Information Technology Management Essentials	3(3,0)
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This course is an intro to MS-Office products (Word, Excel, PPT, ACCESS), Web page design and server upload, Internet use, and how PCs work.

EDUC 222	Computer Applications in Education	3(3,0)
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This course focuses on general knowledge about the use of microcomputers in education, including the use of common computer applications such as word processing, spreadsheet, database, and presentation software in teaching/learning activities; evaluating the effectiveness of educational software in teaching/learning in various subject matter areas.

CMNS 355	Digital Media Literacy	3(3,0)
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The class aims to produce media literate students who successfully use media to voice their ideas, become better citizens, and engage in social, political and cultural change. It focuses on how media communicate meanings that influence our perceptions of reality, including ourselves, society, politics and culture. It teaches students to effectively use critical thinking to deconstruct media messages, analyze and interpret intent, and generate constructive responses. It provides students with the essential new media production skills and knowledge needed to create digital media messages including digital design, photo manipulation, video/audio production, blogging, podcasts and screen casting skills.

EDUC 480	Special Topics in Education	3(3,0)
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This senior seminar course provides an in-depth look into selected issues related to education and society. Through readings, research, discussion and guest lecturers current issues related to education are thoroughly explored. **Prerequisite:** Consent of the instructor.

ENGL 420	Literature and Culture	3(3,0)
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A course that considers major works of literature, specifically in the context of twentieth-century cultural theory, including Marxism, post colonialism, national literatures, ethnic writings, and feminist theory. The primary intention of this course is to explore how various texts interact with their societies, or how those societies are influential in the construction of literary works. **Prerequisite:** Consent of the instructor.

II. College Requirements

A. Remedial Courses

Proficiency in the English Language is a requirement for admission to any program in the College of Arts. Students who do not meet the University English proficiency admission requirements may gain admission through the Intensive English Program in which they can develop their English proficiency.

B. Mandatory Courses

All College of Arts students are required to take 9 credit hours of mandatory foundational courses. A list of these courses and their descriptions follow.

Course	Title	Credits	Prerequisite
ARAB 201	Introduction to Arabic Language and Literature	3	
CVLN 301	Civilizations Studies I	3	
CVLN 302	Civilizations Studies II	3	

Descriptions of these courses are given below.

ARAB 201	Introduction to Arabic Language and Literature	3(3,0)
This course has three components: Arabic language and grammar; literature; and the basic language skills of listening and speech. In the literature component, students will study Arabic prose including the Holy Quran and extracts of Arabic poetry. A prior knowledge of Arabic is required for this course. Prerequisite: None.		

CVLN 301	Civilization Studies I	3(3,0)
This is the first of a two-course sequence that include illustrative masterworks in literature, religion, philosophy, politics and science. The course is arranged chronologically starting from the Sumerians, to Egyptians, Greeks and then Semitic religions. Students are encouraged to think critically when the different readings of the original illustrative texts intersect thematically. Co-requisite: ENGL 210.		

CVLN 302	Civilization Studies II	3(3,0)
This course traces the major developments in the global human experience from the 14th through the 18th centuries. Source material is drawn from the humanities, the fine arts, the social sciences and the natural sciences, and is organized thematically around key-topics. Co-requisite: ENGL 210.		

III. Program Requirements

Requirements for the Bachelor of Arts encompass two categories: major and non-major. Each category consists of a set of mandatory courses and a set of elective courses. The program requirements for the Bachelor of Arts degree in the different majors are given hereafter. Details and titles of relevant courses are included in the Student's Study Plan (SSP) that every College of Arts student will have.

Course Coding

Each course offered by the College of Arts is designated by a four-letter code representing the program or the elective categories followed by a three-digit number denoting the course number, for example, "EDUC 301."

The four-letter codes below refer to the respective course categories as follows:

EDUC:	Education
ENGL:	English Language
JRSM:	Journalism – Media and Digital Communication
ADPR:	Advertising and Public Relations
ARAB:	Arabic
CMNS:	Communications
ENGL:	English Electives (literature and writing elective courses)
HIST:	History
POSC:	Political Science
PSYC:	Psychology
SOCI:	Sociology

The first digit in the three-digit course number refers to the level of the course: **1** for freshman, **2** for sophomore, **3** for junior, **4** for senior and **5** for graduate.

The following example demonstrates the coding system: EDUC 201 is a sophomore level Education course.

The designation used to represent credit hours breakdown **c (t, p)** of a course is as follows: "**c**" the total credit hours, "**t**" stands for theoretical component of the course; "**p**" practical or laboratory component. For example, 3(3, 0) represents a 3-credit-hour course with three contact lecture hours and zero laboratory hours.

EDUCATION PROGRAM

Objectives

The Bachelor of Arts in Education Program offers students interested in a career in Elementary Education a broad and deep knowledge about education and teaching and applicable teaching skills. The program provides interdisciplinary breadth in the content areas necessary to teach children in grades 1-6. It also provides depth in the opportunities to connect theory and practice through classroom, school and community activities. The theoretical courses and field-based learning experiences provided through this program empower students with skills and competencies required to effectively meet educational needs of elementary children as well as prepare them for advanced study to become specialists in education.

Program Outcomes

Upon successful completion of the BA program in Education, graduates will be able to:

1. Apply the knowledge, skills and education theories to impact the education of children and school performance.
2. Gain keen understanding of a variety of teaching approaches, learning styles and psychological principles to adapt the most effective teaching approach to the learning preference of children.
3. Adapt modern instructional technologies to different teaching and learning situations.
4. Uphold professional and ethical standards and lead by example both in and out of the classroom.
5. Embrace the spirit of collaboration to contribute to the advancement of the educational experience.
6. Recognize the academic and affective needs of a diverse student groups with the intent to accommodate those needs as appropriate.
7. Engage in purposeful reflection and draw insights to adjust perspective and approaches.
8. Involve parents and education influencers to educate the whole child.

Career Opportunities

Education graduates may pursue career paths in the public and private sectors as: early years and elementary school teacher; instructional coordinator responsible for designing curricula, setting teaching standards and ensuring teaching is done in the right way; school counselor helping students overcome personal difficulties and make appropriate decisions about college and future career; school administrator in charge of managing a school; social worker helping people deal with issues and overcome problems; pursue graduate studies in a myriad of fields

such as education, library sciences, curriculum and instruction, education leadership, counseling, journalism, languages, to name a few.

Program Overview

The Bachelor of Arts in Education Program provides interdisciplinary breadth in the content areas necessary to teach children in grades 1-6. It also provides depth in the opportunities to connect theory and practice through classroom, school and community activities. The theoretical courses and field-based learning experiences provided through this program empower students with skills and competencies required to effectively meet educational needs of elementary children as well as prepare them for advanced study to become specialists in education.

To obtain a Bachelor of Arts degree in Education, the student must complete a total of 93 credit hours. These hours span University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours is shown in the following table:

BA in Education (93 credits)						
Courses Category	Major		Non-Major		# Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	6	-	9	15	30	32
College Requirement	-	-	9	-	9	10
Program Requirement	54	-	-	-	54	58
Credits	60		33		93	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Arts section in this catalog.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Arts section in this catalog.

III. Program Requirements

A. Mandatory Courses

The Education Program's mandatory major courses are listed in the table below.

Course #	Title	Credits	Prerequisites
EDUC 201	Fundamentals in Education	3	
EDUC 210	Educational Psychology	3	

EDUC 211	Fundamentals of Special Education	3	
EDUC 220	Reading Instruction in Elementary Education	3	EDUC201
EDUC 230	Teaching Diverse Learners	3	
EDUC 315	Children's Health and Safety in the School Environment	3	
EDUC 318	Bi-literacy in the Classroom	3	EDUC 201
EDUC 317	Neurological Development and Cognitive Change	3	
EDUC 341	Method of Teaching (Emphasis*) in Elementary I	3	EDUC 201
EDUC 342	Method of Teaching (Emphasis*) in Elementary II	3	EDUC 201
EDUC 370	Measurement and Evaluation for Teachers	3	EDUC 201
EDUC 399	Observation Practicum in Elementary Education	3	EDUC 201
EDUC 400	Teaching Practicum	3	EDUC 201
EDUC 412	Instructional Media	3	
EDUC 415	Factors in Students' Motivation	3	
EDUC 440	Classroom Management	3	
EDUC 460	Senior Study in Education	3	EDUC 201 and Senior Standing
EDUC 480	Special Topics in Education	3	EDUC 201 or consent of Advisor

* Methods of Teaching Courses for Elementary Teachers in the following areas: Mathematics, Science, English as a Foreign Language, Arabic, Social Studies, Arts, Music.

B. Teaching Practicum

Students must complete two semesters of observation and teaching practicum done in an elementary school in an area related to his/her focus area. The observation practicum is usually fulfilled during the spring term of the second year into the program and the teaching practicum experience is usually achieved during the spring term of the program's third year. The Education department matches the practicum assignment with the student's focus area and school's interest. A faculty member follows up on student's progress throughout the practicum period by conducting field visits and ensure that student's performance is aligned with his/her aspirations and school's needs. Students are required to submit a formal report, a poster and make a formal presentation about their practicum experience.

Study Plan

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (15 Credits)			
ENGL 210	English Composition and Rhetoric I	3	ITP TOEFL 600 or IELP 095 or IELP 100 or ENGL 101

MATH 220	Statistics for Social and Behavioral Sciences	3	
EDUC 201	Fundamentals of Education	3	
ARAB 201	Intro. to Arabic Language and Literature	3	
EDUC 210	Educational Psychology	3	
Year 1, Spring Semester (15 Credits)			
EDUC 222	Computer Applications in Education	3	
EDUC 220	Reading Instruction in Elementary Education	3	EDUC 201
EDUC 230	Teaching Diverse Learners	3	
ENGL 217	Professional English Writing	3	ENGL 210
CMNS 355	Digital Media Literacy	3	
Year 1, Summer Semester (6 Credits)			
	Social Sciences/Culture Elective I	3	
CVLN 301	Civilizations Studies I	3	
Year 2, Fall Semester (15 Credits)			
EDUC 33_	Methods of Teaching (Emphasis*) in Elementary Education (1)	3	EDUC 201
EDUC 240	Mathematics for Elementary Teachers	3	EDUC 201
EDUC 316	Neurological Development and Cognitive Change	3	
EDUC 315	Children's Health and Safety in the School Environment	3	
	Humanities/Fine Arts Elective I	3	
Year 2, Spring Semester 2 (15 Credits)			
EDUC 33_	Methods of Teaching in Elementary Schools*	3	EDUC 201
EDUC 318	Bi-literacy in the Classroom	3	EDUC 201
EDUC 384	Classroom Management	3	
	Social Sciences/Culture Elective II	3	
EDUC 399	Observation Practicum in Elementary Education	3	
Year 3, Fall Semester (15 Credits)			
EDUC 211	Fundamentals of Special Education	3	
EDUC 415	Factors in Student Motivation	3	
EDUC 410	Instructional Media	3	
CVLN 302	Civilizations Studies II	3	
	Natural Sciences Elective	3	
Year 3, Spring Semester (15 Credits)			
EDUC 370	Measurement and Evaluation for Teachers	3	EDUC 201
EDUC 480	Special Topics in Education	3	EDUC 201 or consent of Advisor
	Humanities/Fine Arts Elective II	3	
EDUC 460	Senior Study in Education	3	EDUC 201 and Senior

			Standing
EDUC 400	Teaching Practicum in Elementary Education	3	EDUC 33_

Course Description

Mandatory Courses

Descriptions of the major mandatory courses are given below.

EDUC 201	Fundamentals of Education	3(3,0)
This course is a study of the modern principles of education and their application in elementary and secondary schools. It includes the examination and discussion of teaching procedures and techniques as well as considerations of the historical, cultural and societal views of schooling.		

EDUC 210	Educational Psychology	3(3,0)
This course draws on the study of psychological principles, cognitive development, and learning theories applicable to the teaching/learning situations. Focus areas include human growth and development, with a specific focus on adolescent development and developmentally appropriate practices, learning theory, motivation theory, instructional and college practices, individual differences, student interpersonal and group behavior, classroom management and organization.		

EDUC 211	Fundamentals of Special Education	3(3,0)
This course provides an introduction to Special Education, particularly addressing current practices. Students are introduced to common learning disabilities and intervention programs, as well as an historical overview of the development of the field of Special Education.		

EDUC 220	Reading Instruction in Elementary Education	3(3,0)
This course presents trends, theories, and practices in the teaching and evaluation of reading in the elementary school; alternative teaching/learning strategies for developing readiness, comprehension, and evaluation of progress in reading. Prerequisite: EDUC 201.		

EDUC 222	Computer Applications in Education	3(3,0)
This course focuses on general knowledge about the use of microcomputers in education, including the use of common computer applications such as word processing, spreadsheet, database, and presentation software in teaching/learning activities; evaluating the effectiveness of educational software in teaching/learning in various subject matter areas.		

EDUC 230	Teaching Diverse Learners	3(3,0)
This course is designed to prepare teachers to appreciate diversity with regard to language, gender, socioeconomic status, religion, ability, geographic region and age. Students will be		

provided with strategies, techniques and resources that enable them to discover these differences and to plan appropriate educational experiences for every student.

EDUC 240	Mathematics for Elementary Teachers	3(3,0)
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An in-depth review of mathematical skills and concepts in elementary school curricula.
Prerequisite: EDUC 201.

EDUC 315	Children's Health and Safety in the School Environment	3(3,0)
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This course introduces students to all types of childcare facilities and environmental health concepts as they pertain to children's health and wellbeing. It examines current policies and practices of environmental health. It covers indoor and outdoor safety concerns, safe food handling, Universal Precautions, and other aspects of disease prevention, as well as the recognition and reporting of child abuse. It includes specific strategies to strengthen families in order to reduce the risk of child abuse and neglect.

EDUC 317	Neurological Development and Cognitive Change	3(3,0)
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This course provides a unified view of neurological development beginning with the growth of the first neural cells and extending through the emergence of complex thought and behavior. It considers brain mechanisms underlying cognitive, perceptual, social, and emotional development during infancy and childhood.

EDUC 318	Bi-literacy in the Classroom	3(3,0)
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This course offers a foundational knowledge of the first and second language literacy and the relationship between oral and reading proficiency. Theoretical and research methods of bi-literacy will be studied and instructional methods will be explored and practiced. Prerequisite EDUC 201.

EDUC 370	Measurement and Evaluation for Teachers	3(3,0)
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This course examines the selection, design, development, application and appraisal of tests and measurements used to evaluate both student ability/attributes and the instructional process. It emphasizes key concepts of measurement theory as applied to test construction and standard setting. **Prerequisite:** Basic computer literacy and EDUC 201.

EDUC 384	Classroom Management	3(3,0)
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This course provides students with fundamental strategies and techniques to achieve effective classroom management. It includes tools and techniques to minimize disruptive behavior, model appropriate behavior, communicate effectively, create a positive environment, develop consistency and reduce the reasons for disruption by meeting learners' needs.

EDUC 399	Observation Practicum in Elementary Education	3(3,0)
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This course provides students with the opportunity to integrate theoretical knowledge in

education with practical experience as they observe children in high-quality elementary classrooms. Students are involved in observing, recording individual children's growth and learning, room arrangement and scheduling, child guidance, and staff relationships.

Prerequisite: ENGL 217 and EDUC201.

EDUC 400	Teaching Practicum in Elementary Education	3(3,0)
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Teaching practicum is the second part of the required practicum courses. It gives the opportunity for prospective teachers to participate in diverse educational settings. Students will be engaged in planning curriculum and assessment, interacting directly with children, practicing teaching skills, interacting with families and colleagues, and assume responsibility for planning and supervising, child evaluation.

EDUC 412	Instructional Media	3(3,0)
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This course teaches the selection of appropriate instructional media strategies to improve student learning. Students will be introduced to a wide range of instructional media through practical applications and projects.

EDUC 415	Factors in Student Motivation	3(3,0)
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This course will examine motivational factors which influence children's learning. Topics include attribution theory, teacher influences (expectancy effects), learning structures (competitive vs. cooperative learning), family influences (the socialization of achievement), cultural influences (how cultural background impacts on college performance), and individual differences (intrinsic motivation and sex differences in learning).

EDUC 460	Senior Study in Education	3(3,0)
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This course provides an integrative view of education as a field of inquiry and is delivered as a seminar format. It prepares prospective teachers to become research practitioners through working individually or in groups to develop a project within the students' major for a Lebanese school. **Prerequisite:** EDUC 201 and Senior Standing.

EDUC 480	Special Topics in Education	3(3,0)
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This course provides students with advanced study on selected topic or emerging issue in Arab or international education. It is designed in a variety of activities like seminar format, multi-media presentation, experiential learning activities, interactive assignments, cooperative group work. **Prerequisite:** EDUC 201 or consent of advisor.

Focus Areas Courses

Students must choose two of the following courses to meet the specific emphasis requirement.

EDUC 330	Methods of Teaching Arabic in Elementary Schools	3(3,0)
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This course addresses the theory and practice in the methods of teaching Arabic to elementary school students. It emphasizes practical application in planning and implementing lessons, activities and assessment.

EDUC 331	Methods of Teaching Art in Elementary Schools	3(3,0)
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This course addresses the theory and practice in the methods of teaching Art to elementary school students. It emphasizes practical application in planning and implementing lessons, activities and assessment.

EDUC 332	Methods of Teaching TEFL in Elementary Schools	3(3,0)
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This course addresses the theory and practice in the methods of Teaching English as a Foreign Language to elementary school students. It emphasizes practical application in planning and implementing lessons, activities and assessment.

EDUC 333	Methods of Teaching Music in Elementary Schools	3(3,0)
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This course addresses the theory and practice in the methods of teaching Music to elementary school students. It emphasizes practical application in planning and implementing lessons, activities and assessment.

EDUC 334	Methods of Teaching Mathematics in Elementary Schools	3(3,0)
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This course addresses the theory and practice in the methods of teaching Mathematics to elementary school students. It emphasizes practical application in planning and implementing lessons, activities and assessment.

EDUC 335	Methods of Teaching Science in Elementary Schools	3(3,0)
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This course addresses the theory and practice in the methods of teaching Science to elementary school students. It emphasizes practical application in planning and implementing lessons, activities and assessment.

EDUC 336	Methods of Teaching Social Studies in Elementary Schools	3(3,0)
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This course addresses the theory and practice in the methods of teaching Social Studies (including history, geography and civics) to elementary school students. It emphasizes practical application in planning and implementing lessons, activities and assessment.

EDUC 340	Methods of Teaching Arabic I	3(3,0)
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This course addresses the theory and practice in the methods of teaching Arabic to secondary school students. It emphasizes practical application in planning and implementing lessons, activities and assessment.

EDUC 341	Methods of Teaching Arabic II	3(3,0)
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This course builds on the lessons of Methods of Teaching Arabic I by addressing material selection and curriculum planning, in addition to providing further hands-on applications in developing student assignments, projects and activities. **Prerequisite:** EDUC 340.

EDUC 342	Methods of Teaching TEFL I	3(3,0)
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This course addresses the theory and practice in the methods of teaching English as a foreign language to secondary school students. It emphasizes practical application in planning and implementing lessons, activities and assessment.

EDUC 343	Methods of Teaching TEFL II	3(3,0)
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This course builds on the lessons of Methods of Teaching TEFL I by addressing material selection and curriculum planning, in addition to providing further hands-on applications in developing student assignments, projects and activities. **Prerequisite:** EDUC 342.

EDUC 344	Methods of Teaching Mathematics I	3(3,0)
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This course addresses the theory and practice in the methods of teaching Mathematics to secondary school students. It emphasizes practical application in planning and implementing lessons, activities and assessment.

EDUC 345	Methods of Teaching Mathematics II	3(3,0)
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This course builds on the lessons of Methods of Teaching Mathematics I by addressing material selection and curriculum planning, in addition to providing further hands-on applications in developing student assignments, projects and activities. **Prerequisite:** EDUC 344.

EDUC 346	Methods of Teaching Science I	3(3,0)
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This course addresses the theory and practice in the methods of teaching Science to secondary school students. It emphasizes practical application in planning and implementing lessons, activities and assessment

EDUC 347	Methods of Teaching Science II	3(3,0)
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This course builds on the lessons of Methods of Teaching Science I by addressing material selection and curriculum planning, in addition to providing further hands-on applications in developing student assignments, projects and activities. **Prerequisite:** EDUC 346.

EDUC 348	Methods of Teaching Social Studies I	3(3,0)
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This course addresses the theory and practice in the methods of teaching Social Studies (history, geography and civics) to secondary school students. It emphasizes practical application in planning and implementing lessons, activities and assessment.

EDUC 349	Methods of Teaching Social Studies II	3(3,0)
This course builds on the lessons of Methods of Teaching Social Studies I by addressing material selection and curriculum planning, in addition to providing further hands-on applications in developing student assignments, projects and activities. Prerequisite: EDUC 348.		

Teaching Diploma Program

The Teaching Diploma (TD) Program is designed to cater for fresh graduates and teachers who wish to enrich their understanding of student learning, improve their own teaching practice, and develop ideas for educational enhancement. During the program, students will develop knowledge in their area of specialization, communicate effectively and collaborate productively in classroom settings, and demonstrate continuous professional development. The program consists of 21 credits beyond the BA degree as described below.

TD Elementary Education

For Arabic, Arts, Music, Mathematics, Science, Social Studies or TEFL prospective teachers.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (15 Credits)			
EDUC 201	Fundamentals of Education	3	
EDUC 210	Educational Psychology	3	
EDUC 412	Instructional Media	3	
EDUC 33_	Methods of Teaching (Emphasis*) in Elementary Education	3	
Year 1, Spring Semester (15 Credits)			
EDUC 317	Neurological Development and Cognitive Change	3	
EDUC 33_	Methods of Teaching (Emphasis*) in Elementary Education	3	
EDUC 400	Teaching Practicum	3	EDUC 33_

* Methods of Teaching Courses for Elementary Teachers in the following areas: Arabic, Social Studies, Arts, Music, English as a Foreign Language, Social Studies, Mathematics, Science (must choose 2 of the following courses: EDUC 330, EDUC 331, EDUC 332, EDUC 333, EDUC 334, EDUC 335, EDUC 336 .

TD for Secondary Education

For Arabic, Mathematics, Science, Social Studies or TEFL prospective teachers.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (15 Credits)			
EDUC 201	Fundamentals of Education	3	
EDUC 412	Instructional Media	3	

EDUC 210	Educational Psychology	3	
EDUC 3__	Methods of Teaching (Emphasis*) I	3	
Year 1, Spring Semester (15 Credits)			
EDUC 317	Neurological Development and Cognitive Change	3	
EDUC 3__	Methods of Teaching (Emphasis*) II	3	EDUC 34__
EDUC 400	Teaching Practicum	3	EDUC 34__

* Methods of Teaching Courses for Secondary Teachers two courses in each of the following areas: Arabic (EDUC 330 and EDUC331) Social Studies (EDUC 336 and EDUC331), English as a Foreign Language (EDUC 342 and EDUC343), Mathematics (EDUC 344 and EDUC345) Science (EDUC 346 and EDUC 347).

TD electives for Education Major

Students who had completed a BA degree in Education and wish to obtain a TD in Education must take a set of electives in place of the courses they had taken in the BA Education program but are required by the TD curriculum, namely: EDUC 201 - Fundamentals of Education; EDUC 310 - Educational Psychology; EDUC 400 – Practicum; EDUC 33X or 34X - Methods of Teaching (Emphasis). Description of possible replacement electives are given below.

EDUC 230	Instructional Procedures	3(3,0)
This course is an introduction to instructional planning, teaching strategies, classroom management, feedback analysis, questioning techniques, and evaluation procedures, for effective classroom teaching in preschool, elementary, and secondary schools.		

EDUC 312	Educational Philosophy	3(3,0)
This course provides a survey of the development of thought about education through the study of major philosophical writings considered in historical context. Prerequisite: EDUC 210.		

EDUC 350	Teaching Pre- and Emergent Readers	3(3,0)
This course introduces students to modern trends and issues in the teaching of reading to pre- and emergent readers as applied to Arabic and English. It emphasizes practical approaches to acquainting students with the process of reading. Students will learn to help children develop pre- and early reading skills.		

EDUC 351	Behavior Management and Motivation for Special Learners	3(3,0)
This course provides students with practice in applying the techniques of behavioral psychology in order to modify the behavior of and motivate students with special needs. It also addresses the limits of behavior modification.		

EDUC 360	Children's Literature	3(3,0)
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This course draws on the theoretical and practical aspects of the study of literature for children. Students develop both wide familiarity with children's books, and understanding of how children's literature fits into the elementary school curriculum.

EDUC 365	Art Education	3(3,0)
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This course explores concepts of art, music, drama, and movement for young children. The various methods are used to cover various activities associated with the development of children's physical-motor, social-emotional, and cognitive skills, with providing conditions to develop creativity and aesthetic awareness.

EDUC 385	Literacy & Language Development	3(3,0)
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The primary objective of this course is for educational practitioners to achieve a comprehensive understanding of the inter-relatedness of language and literacy learning and to apply this knowledge in the design and evaluation of effective literacy instruction.

PSYC 314	Psychology for Sustainability	3(3,0)
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This course will take a holistic approach to the topic from most major areas of psychology to explore the study of environmental sustainability from a psychological perspective. We will use psychological principles, theories, and methods to examine the reciprocal relationship between human beings and the natural world, discuss the complex nature of environmental problems and review important psychological and social factors that underlie a range of sustainable and non-sustainable behaviors. **Prerequisite:** None.

ENGLISH LANGUAGE PROGRAM

Learning Objectives

The main goal of the Bachelor of Arts in English Language Program is to prepare interested students in English major to become 21st century competent English teachers by providing them with the essential linguistic, literature, and intercultural backgrounds to teach and/or to pursue graduate work in their field. Following the most up-to-date teaching methods, the BA English Language Program helps students construct their own knowledge in the field, develop their critical thinking, and learn to work collaboratively with others. It also equips students with good research and literacy skills to be 21st century teachers.

Learning Outcomes

After completing all the required courses in the English Language program, students should be able to:

1. Identify different subfields in linguistics;
2. Use linguistic and literary terminology in the analysis of literary texts;
3. Differentiate among different theories in linguistics;
4. Analyse and critique different literary texts;
5. Communicate competently in English with speakers from diverse cultures;
6. Synthesize information obtained from different texts;
7. Conduct research related to English language;
8. Take up a profession in English language.

Career Opportunities

English Language graduates find fulfilling careers in a variety of professions in the public or the private sector such as: schools, translation firms, publishing houses, tourism industry public relation firms, , voluntary and charitable organizations, and media organizations, the , , to name a few. English language graduates may become English teachers, editors, journalists, public relations practitioners, writers, translators, and many other professionals where skill in using language is essential. Many also pursue graduate studies in diverse fields, such as linguistics, education, communication and more.

Program Overview

The Bachelor of Arts in English Language Program aims to provide students with the theoretical and practical understanding of the many functions of the structure, use, and learning of English. This program also equips students with linguistic foundations, as well as general

background in literature. Through effective teaching, students develop their own critical and analytical thinking. Finally, this program prepares students to either pursue graduate studies or take a teaching position in English language teaching or other language-related fields.

To obtain a Bachelor of Arts degree in English Language, the student must complete a total of 93 credit hours. These hours span University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours is shown in the following table:

BA in English Language (93 credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	9	-	6	15	30	32
College Requirement	-	-	9		9	10
Program Requirement	27	18	3	6	54	58
Credits	54		39		93	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Arts section in this catalog.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Arts section in this catalog.

III. Program Requirements

A. Mandatory requirements

The English Language Program mandatory courses are listed in the table below.

Course #	Title	Credits	Prerequisites
ENGL 207	Introduction to Language	3	
ENGL 250	Introduction to English Literature I	3	
ENGL 251	Introduction to English Literature II	3	
ENGL 342	Introduction to Shakespeare	3	ENGL 210
ENGL 350	History of the English Language	3	ENGL 210
ENGL 360	Introduction to Phonetics	3	ENGL 210
ENGL 370	Modern English Grammar	3	ENGL 210
ENGL 400	Advanced English Grammar	3	ENGL 210
ENGL 450	Advanced Academic Writing	3	ENGL 210
ENGL 462	Introduction to Psycholinguistics	3	

ENGL 463	Introduction to Sociolinguistics	3	
ENGL 465	Senior Project	3	ENGL 217; senior standing

B. Major Electives

As part of the program for the Bachelor of Arts in English Language, the student is required to study 18 credit hours of major electives. Major electives could be upper level courses in English language or literature. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. Meanwhile, they introduce an element of flexibility into the program, which allows students to individualize the program according to their own interests.

The student should select, in cooperation with the academic advisor, the elective courses that best meet his or her needs and aspirations. It is highly recommended that the student registers for these courses after completing the Departmental requirements. The table below lists some recommendations for major elective courses:

Course #	Title	Credits	Prerequisites
ENGL 203	Introduction to English Drama	3	ENGL 210
ENGL 213	Creative Writing	3	ENGL 210
ENGL 216	English Composition and Rhetoric II	3	ENGL 210
ENGL 215	Introduction to American Literature	3	
ENGL 300	Introduction to World Literature	3	ENGL 210
ENGL 320	Creative Nonfiction	3	ENGL 210
ENGL 330	Language Acquisition	3	
ENGL 365	Applied Linguistics	3	
ENGL 420	Literature and Culture	3	
ENGL 430	Advanced Language Acquisition	3	ENGL 365
ENGL 460	Discourse Analysis	3	

Study Plan

The Bachelor of Arts in English Language encompasses 93 credit hours that are spread over 6 semesters and two summer sessions. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (15 Credits)			
ENGL 210	English Composition and Rhetoric	3	ITP TOEFL 600 or SAT 400+ or IELTS 7.5 or ENGL 101
EDUC 222	Computer Applications in Education	3	
ARAB 201	Introduction to Arabic Language and Literature	3	

ENGL 207	Introduction to Language	3	
ENGL 250	Introduction to English Literature I	3	
Year 1, Spring Semester (18 Credits)			
ENGL 360	Introduction to Phonetics	3	
	Natural Science Elective	3	
ENGL 217	Professional English Writing	3	ENGL 210
MATH 220	Statistics for Social and Behavioral Sciences	3	
ENGL 251	Introduction to English Literature II	3	
	Humanities/Fine Arts Elective I	3	
Year 2, Fall Semester (15 Credits)			
ENGL 342	Introduction to Shakespeare	3	ENGL 210
ENGL 350	History of the English Language	3	ENGL 207
	English Linguistics Elective	3	
	Humanities/Fine Arts Elective II	3	ENGL 210
CVLN 301	Civilizations Studies I	3	
Year 2, Spring Semester (15 Credits)			
	Social Science/Culture Elective I	3	ENGL 210
ENGL 370	Modern English Grammar	3	
	Fiction Nonfiction Writing Elective	3	ENGL 210
CVLN 302	Civilizations Studies II	3	
PSYC301	Introduction to Psychology	3	
Year 3, Fall Semester (15 Credits)			
ENGL 450	Advanced Academic Writing	3	ENGL 210
	Social Science/Culture Elective II	3	ENGL 210
ENGL 400	Advanced English Grammar	3	
	English Linguistic Elective	3	
ENGL 462	Introduction to Psycholinguistics	3	
Year 3, Spring Semester (15 Credits)			
PSYC 301	Introduction to Psychology	3	
ENGL 463	Introduction to Sociolinguistics	3	
	Fiction Nonfiction Writing Elective	3	ENGL 210
	English Linguistic Elective	3	
	English Literature Elective	3	

Course Description

Mandatory Courses

Major Courses

Descriptions of the major mandatory courses are given below.

ENGL 207	Introduction to Language	3(3,0)
This course examines current areas in theoretical and applied linguistics including the different levels of structure, the nature of language acquisition, language variation and evolution, and language teaching.		

ENGL 210	English Composition & Rhetoric	3(3,0)
This course reviews the fundamentals of good academic writing in English, teaches essay writing essentials and research skills in two rhetorical modes (persuasion and argumentation), and provides practice in writing essays in these modes, research paper, and oral presentation. Pre-requisites: ENGL 101 or TOEFL 600 (paper-based) or 250 (computer-based)		

ENGL 217	Professional English Writing	3(3,0)
This course is designed to help students develop effective professional communication skills, both orally and in writing. Students learn how to write emails, memos, letters, proposals, reports, and other forms of employment correspondence, in addition to sharpening presentation skills. Broadly, the course prepares students how to behave professionally and work effectively in their prospective jobs. Prerequisite: ENGL 210.		

ENGL 250	Introduction to English Literature I	3(3,0)
This course covers English literature from Anglo-Saxon times to the later eighteenth century. Specific texts by the principal writers of these periods will be examined against the social, historical, and philosophical background of the period.		

ENGL 251	Introduction to English Literature II	3(3,0)
This course continues the survey of English literature begun in Introduction to Literature I, moving from Blake to Eliot, through the examination of specific texts by major authors against the social, historical, and philosophical background of the period.		

ENGL 342	Introduction to Shakespeare	3(3,0)
A course in which students study representative comedies, histories, and tragedies by Shakespeare. The plays are read intensively and understood in the context of the theatrical conventions of the period and the culture of play going in early modern England, as well as the social, cultural, religious, and intellectual history of the period.		

ENGL 350	History of the English Language	3(3,0)
This is an introductory survey of the history of the English language from its earliest Indo-European origins to the present day. The nature and changes of the language are presented by reviewing the shifts that have occurred from Indo-European, Germanic, Old English, Middle		

English, up to Early Modern English. **Prerequisite:** ENGL 207.

ENGL 360	Introduction to Phonetics	3(3,0)
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This is a course in which the students study the articulatory, auditory, and acoustic description of the sounds of the English language. This course also includes descriptions of the sounds of other languages. The practical component of this course involves practice in transcription and production of sounds in English language.

ENGL 370	Modern English Grammar	3(3,0)
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This course teaches grammar through exploration and analysis. It provides a more detailed study of word and phrase formation, pragmatics, and critical analysis of descriptive uses of grammar are covered.

ENGL 400	Advanced English Grammar	3(3,0)
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An advanced course in English grammar that provides students with the ability to analyze differences of the major English grammars. Traditional, descriptive and transformational grammars are examined.

ENGL 450	Advanced Academic Writing	3(3,0)
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This course allows students to further their academic writing skills through advanced independent research, writing and discussion related to a wide variety of academic topics. Students will receive rigorous training in research, critiquing and analyzing texts and resources, synthesis and composition. This required course helps students to pursue graduate studies.

Non-Major Courses

ARAB 201	Introduction to Arabic Language and Literature	3(3,0)
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This course has three components: Arabic language and grammar; literature; and the basic language skills of listening and speech. In the literature course, students will study Arabic prose including some verses of the Holy Quran and extracts of Arabic poetry. A prior knowledge of Arabic is required for this course. **Prerequisite:** GCE advanced level Arabic.

CVLN 301	Civilization Studies I	3(3,0)
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This is the first in a sequence of courses that include illustrative masterworks in literature, religion, philosophy, politics and science. The courses are arranged chronologically starting from the Sumerians, to Egyptians, Greeks and then Semitic religions. Students are encouraged to think critically when the different readings of the original illustrative texts intersect thematically.

CVLN 302	Civilization Studies II	3(3,0)
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This course traces the major developments in the global human experience from the 14th through the 18th centuries. Source material is drawn from the humanities, the fine arts, the social sciences and the natural sciences, and is organized thematically around key-topics.

EDUC 222	Computer Applications in Education	3(3,0)
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This course focuses on general knowledge about the use of microcomputers in education, including the use of common computer applications such as word processing, spreadsheet, database, and presentation software in teaching/learning activities; evaluating the effectiveness of educational software in teaching/learning in various subject matter areas.

MATH 220	Statistics for Social & Behavioral Sciences	3(3,0)
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This course addresses the use of statistics as a tool for scientific investigation in social and behavioral sciences, with special emphasis on descriptive and relational techniques.

PSYC 301	Introduction to Psychology	3(3,0)
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This course is aimed at developing some understanding of human psychology by focusing on the elements that affect human behaviors and mental processes, while increasing personal awareness and individual effectiveness.

Elective Courses

Descriptions of some major elective courses are given below.

ENGL 203	Introduction to English Drama	3(3,0)
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This course is a study of selected and representative plays of different periods. In addition to broadening the student's understanding and appreciation of literature, the chief aim of the course is to develop the student's critical thinking and analysis and to encourage original responses to literary expression in well-developed oral and written criticism. **Prerequisite:** ENGL 210.

ENGL 213	English Composition and Rhetoric II	3(3,0)
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The course provides students with further practice in essay writing, developing skills in argumentation, synthesis, critiquing and research. Students practice skills associated with writing argumentative essays, critical essays in response to readings and research papers. **Prerequisite:** ENGL 210.

ENGL 215	Introduction to American Literature	3(3,0)
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This course explores the works of major American literary figures and authors representing different literary schools from the sixteenth century to modern times. Students will closely examine selected texts as literary achievements and set them within the historical context and framework of American culture.

ENGL 300	Introduction to World Literature	3(3,0)
<p>The course surveys selected works in English or in translation from non-Anglo American cultural traditions. Texts can be drawn from African, Asian, European, Latin American and Middle Eastern literatures with a focus on their historical and cultural contexts. Prerequisite: ENGL 210.</p>		
ENGL 330	Language Acquisition	3(3,0)
<p>This course discusses language acquisition theories. It will deal with human language processing, learners' motivational factors and contextual factors which influence language learning. It will uncover the principles of language acquisition.</p>		
ENGL 365	Applied Linguistics	3(3,0)
<p>A course in the professional application of linguistics, such as language diversity and teaching English, Lexicography, or English as a Second/foreign Language.</p>		
ENGL 420	Literature and Culture	3(3,0)
<p>A course that considers major works of literature, specifically in the context of twentieth-century cultural theory, including Marxism, post colonialism, national literatures, ethnic writings, and feminist theory. The primary intention of this course is to explore how various texts interact with their societies, or how those societies are influential in the construction of literary works.</p>		
ENGL 430	Advanced Language Acquisition	3(3,0)
<p>An in-depth exploration of current issues in language acquisition in relation to recent developments in linguistic theories. Diverse topics in language acquisition such as children's acquisition of pragmatics, school-aged acquisition, bilingualism, and foreign language acquisition will be discussed. Prerequisite: ENGL 365.</p>		
ENGL 460	Discourse Analysis	3(3,0)
<p>This course considers a number of approaches to analyzing written, spoken and sign language use as it is used in social science disciplines, including linguistics, sociology, anthropology, social work, psychology, and other disciplines. Students will learn methods of discourse analysis, including how to work with a variety of data. They will also consider various schools of thought that have evolved in discourse analysis.</p>		
ENGL 462	Introduction to Psycholinguistics	3(3,0)
<p>This course addresses the psychological and neurobiological aspects of language acquisition and how they influence humans' ability to learn, use and understand language. It also considers the relationship between language and thought.</p>		

ENGL 463	Introduction to Sociolinguistics	3(3,0)
This course addresses the ways language serves and is shaped by society. It considers such topics as the variety of dialects across regions to gender differences in language usage, to the social functions of language.		

ENGL 465	Senior Project	3(3,0)
In this course, the students have to pursue in groups a research study related to English language learning or teaching. Prerequisite: Senior standing.		

Freshman English

ENGL 101	Freshman English	3(3,0)
This course helps students reinforce their reading and writing skills. It focuses on the interrelatedness between reading and writing whereby students critically read and write essays of different rhetorical modes (classification, cause/ effect analysis, and comparison/contrast analysis). Some structural elements are reviewed to ensure accuracy in students' writing. Students are also introduced to research skills and APA documentation. Prerequisite: TOEFL Score of 557-597 or IELP 095.		

Intensive English Program

Mission Statement

The mission of the Intensive English Program at Rafik Hariri University is to provide incoming students with quality English language instruction in order to help them read, write, speak and understand English at increasing levels of proficiency. We prepare students to communicate effectively in English in a friendly and supportive learning environment.

English Placement Chart – 2015

Students are placed in levels according to their English proficiency and progress through the levels as their English skills grow. The contents of a level address a variety of language skills. The following table summarizes the number of credits, number of major required courses a student is allowed to take, and the corresponding scores on standard tests (TOEFL, SAT and IELTS) required to be placed in each Intensive English Language Program (IELP) level.

IELP Level	# of Credits	Allowable Major Credits	TOEFL IBT	TOEFL ITP	New SAT (Writing)	IELTS
IELP 075	14	3	17-30	300 - 397	17-18	2 - 3
IELP 085	12	6	32 - 45	400 - 450	19	3.5 - 4
IELP 095	12	9	46 - 67	451 - 517	20	4.5 - 5
IELP 100	6	12	68 – 82	520 – 556	21	5.5 – 7
ENGL 101	3	15	83 - 98	557 - 597	22	6.5 -7
ENGL 210	3	15	100+	600+	23+	7.5

Note:

- 1) A student after completing IELP 095 will either take IELP 100 or ENGL 101, depending on the score he/she attains in IELP 095.
- 2) A student successfully completing IELP 100 will not be required to take ENGL 101.

Promotion Criteria

A student in an IELP level may skip over the next IELP level provided he/she attains the following scores in the current level:

Current IELP Level	Required Score to Skip Next Level	Level Skipped to
075	85 or above	IELP 095
085	80 or above	IELP 100*
095	80 and above	ENGL 101

If a student in any level does not get the above mentioned grades, then he/she can sit for the TOEFL exam and the acquired score will decide whether the student can skip a level or not.

* A student who takes IELP 100 can skip to ENGL 210.

IELP Course Description

The following are the description of the IELP courses.

IELP 075	Beginner English	14(14,0)
<p>This is a non-credit, beginner level English course which focuses on reading, writing, speaking, and listening. The course consists of fourteen hours of classroom instruction over a 12-week semester. In this course, students develop beginner language skills in listening, speaking, reading, and writing. Students' work is mostly focused on integrating the reading-writing and speaking-listening skills into direct class activities. Students receive blended online instruction through MyEnglishLab which reinforces targeted skills taught. Students prepare for the TOEFL as a part of the curriculum. Pre-requisite: TOEFL score of 300 to 397</p>		

IELP 085	Elementary English	12(12,0)
<p>This is a non-credit, elementary level English course which focuses on reading, writing, speaking, and listening. The course consists of twelve hours of classroom instruction over a 12-week semester. In this course, students develop elementary language skills in listening, speaking, reading, and writing. Students' work is mostly focused on integrating the reading-writing and speaking-listening skills into direct class activities. Students receive blended online instruction through MyEnglishLab which reinforces targeted skills taught. Students prepare for the TOEFL as a part of the curriculum. Pre-requisite: TOEFL score 400- 450 or its equivalent or IELP 075.</p>		

IELP 095	Intermediate English	12(12,0)
<p>This is a non-credit, intermediate level English course which focuses on reading, writing, speaking, and listening. The course consists of twelve hours of classroom instruction over a 12-week semester. In this course, students develop intermediate language skills in listening, speaking, reading, and writing. Students' work is mostly focused on integrating the reading-writing and speaking-listening skills into direct class activities. Students receive blended online instruction through MyEnglishLab which reinforces targeted skills taught. Students prepare for the TOEFL as a part of the curriculum. Pre-requisites: TOEFL score 451- 517 or its equivalent or IELP 085.</p>		

IELP 100	Advanced English	6(6,0)
<p>This course helps students develop their reading and writing skills. It teaches students to read critically and write paragraphs/essays in different rhetorical modes. It gives special attention to sentence structure and editing skills. Research skills as evaluating sources, summarizing, paraphrasing, and quoting are introduced. Prerequisite: TOEFL Score of 520-556 or IELP 095.</p>		

English Language Support Center

RHU English Language Support Center, located in F104 with its dedicated computer lab, provides support to all the RHU community in English usage and proficiency development. Any student, faculty or staff member seeking assistance with English language and composition is encouraged to make an appointment with or drop by the English Learning Center. Faculty members may also refer students with English language needs for individualized tutorials. It is staffed by RHU English faculty members.

Services include consultations on essay and research paper writing, presentations, CV and cover letter writing. In addition, skill practice, study skills, self-study materials for checkout, English as a Second Language lab practice, GMAT and GRE preparation and more are available. These services are provided free of charge to all RHU students, graduate and undergraduate, as well as faculty and staff. Students are encouraged to use these services to improve their English language skills.

JOURNALISM—MEDIA AND DIGITAL COMMUNICATION PROGRAM

Mission

The mission of the BA program in Journalism—Media and Digital Communication is to train socially responsible professionals who will be committed to search for the truth behind current events and life influencing actions, report events accurately and bias-free, and communicate with the public convincingly while being keenly sensitive to diversity to advance the public good in today's rapidly evolving global media landscape.

Learning Objectives

The Bachelor of Arts in Journalism Program has a two-fold purpose: 1) to provide future journalists communication professionals with the skills, and professional and general knowledge needed to succeed as competent, ethical journalists and/or professional communicators and 2) to prepare students to conduct academic research on mass communications and journalism. In professional preparation, it aims to build students' technical skills, particularly investigative, digital media and writing skills, as well as to ensure that students' general educational background, which includes knowledge of national and international institutions, socio-political processes and cultural awareness. Regarding its second aim, students learn social science qualitative and quantitative research methods and are prepared to pursue graduate studies.

Learning Outcomes

- Recognize the moral, social responsibility to evaluate information and authenticate sources.
- Deliver news and convey other related information that are based on strong evidence with fairness and accuracy and without bias or sensationalism.
- Understand laws, rules and principles that bound expression of views, speech and forms of communications.
- Apply tools and technologies to convincingly communicate and deliver information and news in various contexts.
- Practice utmost sensitivity to a wide range of diverse populations and cultures.
- Work tirelessly to find the truth behind events using appropriate and ethical means.
- Write in a clear, concise manner commensurate with the style of the target audience.
- Reflect on past behaviours and practices to draw insights for future improvement.

- Confidently produce content for a wide variety of media formats, including online video, audio and interactive media.
- Recognize the broad career opportunities for journalists and professional communicators.

Career Opportunities

The program prepares graduates to pursue successful careers in a wide variety of firms and organizations including: newspapers, TV stations, social media outlets, marketing and public relations departments in all types of organizations and institutions, online media organizations, corporations, government agencies and non-governmental organizations (NGOs). It also prepares them to work independently as freelance journalists and professional communicators.

Program Overview

The Bachelor of Arts in Journalism – Media and Digital Communication is a program carefully designed to prepare graduates for successful careers in journalism public relations, corporate and governmental communication, and other communication arts.

The program is committed to producing working journalists, public relations practitioners and other communicators with a broad background in the liberal arts and sciences. Reporting, writing, editing and production skills are emphasized in all phases of the degree program.

To obtain a Bachelor of Arts in Journalism – Media and Digital Communication, the student must complete a total of 93 credit hours. These hours span University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours is shown in the following table:

BA in Journalism—Media and Digital Communication (93 credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	3	-	12	15	30	32
College Requirement	-	-	9	-	9	1
Program Requirement	36	9	9		54	58
Credits	48		45		93	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Arts section of this catalog.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Arts section of this catalog.

III. Program Requirements

A. Mandatory requirements

The Journalism – Media and Digital Communications program mandatory courses are listed in the table below.

Course #	Title	Credits	Prerequisites
BEEN 302	Macroeconomics	3	
CMNS 310	Persuasion in a Mediated World	3	
GRDS 230	Photography I	3	
JRSM 210	Arabic News Writing and Reporting	3	
JRSM 240	Media and Public Relations Writing	3	
JRSM 300	Mass Media Essentials	3	
JRSM 305*	Introduction to Broadcast Media	3	
JRSM 310	Advanced Arabic News Writing & Reporting	3	
JRSM 320	Media and Society	3	
JRSM 340	Media Ethics	3	
JRSM 380*	Arab and International Media	3	
JRSM 399	Journalism Co-op Work Experience	3	ENGL 217; Senior Standing
JRSM 400	Student Publications Practicum	3	
POSC 301	Introduction to Political Science	3	

Note: All courses with JRSM and CMNS codes are major courses.

B. Major Electives

As part of the program for the Bachelor of Arts in Journalism – Media and Digital Communication the student is required to study 9 credit hours of major electives. Major electives could be upper level courses in journalism, communication or in closely related area. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. Meanwhile, they introduce an element of flexibility into the program, which allows the integration of newly emerging topics.

The student should select, in cooperation with the academic advisor, the elective course that best meets his or her needs and aspirations. It is highly recommended that the student registers for these courses after completing the Departmental requirements. The table below lists some recommendations for major elective courses:

Course #	Title	Credits	Prerequisites
CMNS 360	Ethics in Communication	3	
CMNS 380	Social Media Campaigns & Strategies	3	ENGL 210
CMNS 410	Public Speaking	3	ENGL 210
JRSM 330	Photojournalism	3	ENGL 210
JRSM 350	Investigative Journalism	3	
JRSM 410	Feature and Magazine Writing	3	

C. Student Publications Practicum

This practicum provides students with hands-on school publications while building their personal portfolios. It teaches them how to plan and produce newspaper, magazine and online student publications. Students will work with the instructor and with RHU student publications to create projects suitable for publication.

D. Co-op Work Experience

This internship program affords students an opportunity to apply their classroom experience in a professional work setting appropriate to their major field of study. Journalism-Media and Digital Communication Students will have hands-on experience in professional newsrooms, NGO communications and other professional communication settings. The internship may require working in English or in Arabic, depending on the organization.

Study Plan

The Bachelor of Arts in Journalism – Media and Digital Communication encompasses 93 credit hours that are spread over 6 semesters and one summer session. The first summer session should be dedicated to the Community Engagement Experience. Meanwhile, the second session should be for the Co-op work experience. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (15 Credits)			
ENGL 210	English Composition and Rhetoric I	3	ITP TOEFL 600 or ENGL 095 or ENGL 100
BITM 200	Business Information Technology Management Essentials	3	
GRDS 230	Photography I	3	
ARAB 201	Introduction to Arabic Language and Literature	3	
JRSM 240	Media and Public Relations Writing	3	
Year 1, Spring Semester (15 Credits)			

MATH 220	Statistics for Social and Behavioral Sciences	3	
ENGL 217	Professional English Writing	3	ENGL 210
JRSM 300	Mass Media Essentials	3	ENGL 210
CVLN 301	Arabic News Writing and Reporting	3	
JRSM 210	Social Science Elective	3	
Year 2, Fall Semester (15 Credits)			
JRSM 310	Advanced Arabic News Writing and Reporting	3	JRSM 210
JRSM 305	Introduction to Broadcast Media	3	
POSC 301	Introduction to Political Science	3	
CVLN 302	Civilizations Studies II	3	
BECN 302	Macroeconomics	3	
Year 2, Spring Semester 2 (18 Credits)			
	Social Science/Culture Elective I	3	
JRSM 340	Media Ethics	3	
	Natural Science Elective	3	
	Communication/Journalism Elective	3	
CMNS 355	Digital Media Literacy	3	
Year 2, Summer Semester (3 Credits)			
JRSM 399	Journalism Co-op Work Experience	3	ENGL 217; Senior Standing
Year 3, Fall Semester (15 Credits)			
CMNS 310	Persuasion in a Mediated World	3	
JRSM 320	Media and Society	3	
	Humanities/Fine Arts Elective I	3	
JRSM 400	Student Publication Practicum	3	JRSM 240
	Communication/Journalism Elective	3	
Year 3, Spring Semester (12 Credits)			
JRSM 380	Arab and International Media	3	ENGL 210
	Communication/Journalism Elective	3	ENGL 210
	Communication, Journalism Elective	3	ENGL 210
	Social Sciences/Culture Elective	3	
	Humanities/Fine Arts Elective II	3	

Course Description

Mandatory Courses

Major Courses

Descriptions of the major mandatory courses are given below.

CMNS 310	Persuasion in a Mediated World	3(3,0)
Through reading, writing and speech, students will become familiar with the persuasive strategy described in Aristotle's rhetoric, and consider how that strategy can be employed in professional and personal situations in writing, public speaking and negotiation in today's media environment.		
CMNS 355	Digital Media Literacy	3(3,0)
This class considers how media communicate meanings that influence our perceptions of reality, including ourselves, society, politics and culture. Students learn to deconstruct media messages, analyze and interpret intent, and generate constructive responses. It also provides students with essential new media production skills.		
JRMS 210	Arabic News Writing & Reporting	3(3,0)
This course emphasizes defining news and its importance in a democratic society; the news-gathering process; the elements of news; introduction to basic news reporting and writing for print and broadcast; use of the Internet as a reporting and research tool; accuracy and fairness as journalistic imperatives. Outside community research and reporting time is required.		
JRMS 240	Media and Public Relations Writing	3(3,0)
This introductory-level course is designed to help students learn the formats and conventions of media and public relations writing, including newspapers, magazines, web and interactive media, advertising copy, public relations writing and social media. It also addresses ethical issues related to writing in these fields.		
JRMS 300	Mass Media Essentials	3(3,0)
This course familiarizes students with concepts and terminology used in various fields of communication, and helps them understand the development of mass communication in political, economic, social, and cultural contexts.		
JRSM 305	Introduction to Broadcast Media	3(3,0)
This course introduces students to broadcast journalism, including the impact of new media on traditional broadcast media. Students learn the history of broadcast media and about its production, including reporting, writing and editing.		
JRSM 310	Advanced Arabic News Writing and Reporting	3(3,0)
The aim of this course is to provide students with theory and development of news stories, with special emphasis on interviewing, observation, document research, source development, and other standard reporting techniques. Students cover community beats and report and write news stories from those beats, primarily in public affairs reporting.		

JRSM 320	Media and Society	3(3,0)
This course examines the relationship between the media and society, considering how each impacts the other. Students will be introduced to various theories that consider this relationship and its implications.		

JRSM 340	Media Ethics	3(3,0)
This course addresses the ethical problems that arise in the fields of journalism, public relations and advertising in today's digital media environment.		

JRSM 380	Arab and International Media	3(3,0)
This course offers students a comparative survey of international media, examining the basic principles and concepts of news and the media that developed in the West, as applied in primarily Arab countries.		

JRSM 399	Journalism Co-op Work Experience	3(3,0)
This course is an internship program that affords students an opportunity to apply their classroom experience in a professional work setting appropriate to their major field of study. Prerequisites: ENGL 217; Senior Standing.		

JRSM 400	Student Publication Practicum	3(3,0)
This course provides students with hands-on experience in producing school publications while building their personal portfolios. It teaches them how to plan and produce newspaper, magazine and online student publications.		

Non Major Courses

Descriptions of some non-major elective courses are given below.

ARAB 201	Introduction to Arabic Language and Literature	3(3,0)
This course has three components: Arabic language and grammar; literature; and the basic language skills of listening and speech. In the literature course, students will study Arabic prose including the Holy Quran and extracts of Arabic poetry. A prior knowledge of Arabic is required for this course. Prerequisite: GCE advanced level Arabic.		

BECN 302	Macroeconomics	3(3,0)
Students will study the general principles of macroeconomics. This course presents the formal Keynesian theory of income determination and its contemporary critiques. Included is the study of the possible causes and solutions to unemployment and Inflation and the importance of the international economy. Government fiscal and monetary policies are examined in detail.		

BITM 200	Business Information Technology Management Essentials	3(3,0)
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This course is an intro to MS-Office products (Word, Excel, PPT, ACCESS), Web page design and server upload, Internet use, and how PCs work.

CVLN 301 | **Civilization Studies I** | **3(3,0)**

This is the first in a two-course sequence that include illustrative masterworks in literature, religion, philosophy, politics and science. The courses are arranged chronologically starting from the Sumerians, to Egyptians, Greeks and then Semitic religions. Students are encouraged to think critically when the different readings of the original illustrative texts intersect thematically.

CVLN 302 | **Civilization Studies II** | **3(3,0)**

This course traces the major developments in the global human experience from the 14th through the 18th centuries. Source material is drawn from the humanities, the fine arts, the social sciences and the natural sciences, and is organized thematically around key-topics.

ENGL 210 | **English Composition & Rhetoric I** | **3(3,0)**

This course reinforces effective critical reading and writing skills with emphasis on writing documented essays for academic purposes in a varying range of rhetorical modes. More specifically, the student will apply the fundamental principles of English spelling, word usage, grammar, punctuation and style necessary for written communication; write academic essays; proofread and edit a variety of texts; analyze general texts for coherence, style and accuracy in writing; read critically from a variety of discourse modes; summarize, paraphrase and quote sources properly; and cite sources according to APA form.

ENGL 217 | **Professional English Writing** | **3(3,0)**

This course is designed to enhance students' professional writing skills. It is tailored to students pursuing careers in the professions and includes advanced business writing and editing, correspondence, critical review, writing professional reports and proposals, and making oral presentations. **Prerequisite:** ENGL 210.

GRDS 230 | **Photography I** | **3(3,0)**

This course teaches students the basics of black & white and digital photography. The course includes extensive hands on practical training. Students learn how to develop an eye for taking pictures and framing objects. They also enhance their knowledge about the different parts of a camera and the mechanism of printing and developing films while continuously scanning other photographers from contemporary and historical scenes.

MATH 220 | **Statistics for Social & Behavioral Sciences** | **3(3,0)**

This course addresses the use of statistics as a tool for scientific investigation in social and behavioral sciences, with special emphasis on descriptive and relational techniques.

POSC 301 | **Introduction to Political Science** | **3(3,0)**

This course aims at familiarizing students with the basic concepts and disciplines in the study of political science. It focuses on the nature of politics as a science, political ideologies, the state and state-society relations, political parties, electoral systems, democracy, and international organizations. A significant emphasis is placed on the ability of students to utilize these concepts in the analysis of current political issues, disputes and trends. The course combines lectures and class discussions, debates and presentations. **Prerequisite:** ENGL 210.

Elective Courses

Descriptions of the major elective courses for Journalism - Media and Digital Communication major are given below.

CMNS 330	Digital and Social Media	3(3,0)
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This course provides students with an overview of the uses of digital and social media in media industries, such as news, public relations and advertising. It examines the impact of digital and social media on media and society.

CMNS 360	Ethics in Communication	3(3,0)
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This course explores the theoretical and practical ethical questions about communication in four contexts: interpersonal, workplace, communication in one's community and society, and mass and digital communication. Discussion of ethical theories in communication studies will provide a basis to explore case studies and contemporary communication dilemmas, heightening personal sensitivity to the underlying ethical implications of human communication.

CMNS 380	Social Media Campaigns and Strategies	3(3,0)
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This course examines the strategic uses, impacts and implications of emerging and social media, and examines the ways in which social media impacts the daily lives of our society and its individual members. It expands the student's knowledge of social media applications in business, advertising and public relations, as well as its use in political movements and the development of communities.

CMNS 410	Public Speaking	3(3,0)
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This course is designed to provide both a practical introduction to the fundamental principles of public speaking and a forum for practicing public speaking skills. Through a variety of instructional strategies (discussion, class workshops, readings, lectures, and presentations), students will learn the processes by which effective speeches are conceived, prepared and delivered.

JRSM 330	Photojournalism	3(3,0)
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The aim of this course is to provide students with theory and practice of making, editing and presenting photographs, photo illustrations and other digital images in accordance with the

highest ethical standards of journalism. Students will learn the fundamentals of generating still images for print and Web publications.

JRSM 350	Investigative Journalism	3(3,0)
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This course introduces students to investigative journalism—its theories, history, practice and role in society, culture and politics. It provides an overview of the principles, skills and tools of investigative reporting for audiovisual, print and online media. Students learn various investigative techniques (particularly story-based inquiry), become familiar with key online and offline sources and ultimately produce a multi-platform investigative story.

JRSM 410	Feature and Magazine Writing	3(3,0)
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This course is the first section of a two-segment magazine writing sequence. It entails writing and reporting of feature news stories for print with special emphasis on stories intended for magazine publication. Outside community research and reporting time is required.

FACULTY LIST

AlSheikh, Mona; Instructor; Diploma in Family Counseling, Future Builders International Academy, 2013.

Akoum, Rola; Instructor, MA, Political Science Lebanese University, 2008.

Ayoub, Leila; Lecturer, MA, TESOL, American University of Beirut, 1995.

Baba, Dina; Instructor, MA Business Administration, 2003.

Banat, Maysaa; Lecturer, MA, TESOL, Lebanese University, 1995.

Daouk, Zeina; Lecturer, MA Education, TESOL, LAU, 2013.

Diab, Yassmine; Instructor, MA, TESOL, LAU, 2015.

El-Khoury, Farid, Lecturer, MA, Ancient Religions and Archeology, La Sierra University, California, 1993.

El Zein, Hiam Loutfi; Associate Professor, Ed.D., Educational Management, Leicester University, 2006.

Farah, Stephanie, Instuctor; MA in applied Linguistics, 2009.

Fares, Najwa; Assistant Professor, Ed.D, Educational Research- TESOL, University of Sussex, 2013.

Harb, Graziella; Lecturer, MA Education (School Management and Leadership), LAU, 2011.

Khalifeh, Jihan; Instructor, MA, TESOL and Special Needs, LAU, 2014.

Nahas, Kamal, Lecturer, MA, Counseling, Walsh University, 1983.

Sinno, Maya; Instructor, Instructor, BA, English Language and Literature, BAU, 2004.

Whitehead, Sandra; Lecturer, MA, Journalism, Marquette University, 1991.

**COLLEGE OF
BUSINESS
ADMINISTRATION**

COLLEGE OF BUSINESS ADMINISTRATION

Officers of the College

Riad Chedid	President
Ahmad Smaili	Vice President for Academic Affairs
Jamil Hammoud	Dean

Contact Information

Ms. Lydia Hyder
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Building G, Room 101-G
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History and Overview

Being the first and oldest college of the University, The College of Business Administration (CBA) at Rafik Hariri University was established in 1999. Since then, the College has grown significantly and presently offers seven undergraduate business programs in Accounting, Business Information Technology Management, Finance and Banking, Human Resources Management, Management, Marketing, Marketing and Advertising. In addition, the College offers a graduate MBA program in general business administration. Moreover, the CBA takes pride in being the first in Lebanon and the Arab World to offer a graduate MBA program with specialization in Oil and Gas Management.

The faculty is active in applied research in a number of business domains and related areas, with a focus on seeking solutions for actual community problems and issues. To that extent and in partnership with governmental entities, civil society, trade associations and the private sector, the College is actively engaged into ongoing outreach activities and initiatives designed to support community development and prosperity.

Finally, the CBA distinguishes itself by its systematic COOP Work Experience program which allows its students to gain real world working experiences, and its Community Engagement Experience program which enables the students to develop leadership skills via actual community service.

Vision

The College of Business Administration aims to become a premier innovative institution of business education in the region.

Mission

The College of Business Administration aspires to transform the lives of students through graduate and undergraduate business education, contribute to the advancement of knowledge through applied research, and makes a positive impact on society's pursuit of development and prosperity.

We aim to foster an educational culture and environment of innovation and collaboration which enables the development of leaders and professionals, capable and willing to become agents of principled, ethical and socially responsible human progress.

The College undertakes its mission in the context of a higher education philosophy that emphasizes proficient technical know-how in a specialization area, reinforced by core knowledge of main business functional areas, and grounded in the general fundamentals of liberal arts education.

Core Values

The College of Business Administration is committed to maintaining a system of norms, behaviors and conduct well-grounded in the following main guiding values:

Academic Freedom of Inquiry

Faculty and students are free to pursue knowledge and learning so long as such pursuits do not breach University and College missions, policies and regulations.

Excellence through Innovation

The College has an unwavering commitment to the pursuit of excellence in everything we do. Key to this pursuit is our innovative initiatives, ideas and efforts.

Ethical and Socially Responsible Conduct

The College exercises all efforts possible to ensure the awareness and practice of ethical and socially responsible norms.

Tolerance and Diversity

The College is committed to highlight and raise awareness of tolerant mentalities which accept and respect differences with others. Moreover, the College recognizes and promotes the enrichment that results from the diversity of individuals, communities, ideas and perspectives.

Personal Initiative and Individual Responsibility

Leaders and professionals have the courage to initiate and take responsibility for their choices. The College promotes this principle and encourages its stakeholders to learn and act in accordance with it.

Teamwork, collaboration and cooperation

The College is committed to conduct its affairs in the spirit of teamwork and collaboration. Furthermore, the College opens up opportunities for students to learn and appreciate the value of collective work.

Continuous Improvement and Innovation

The College regards continuous improvement and innovation in its programs and scholarship as necessary to meet the challenges of rapidly changing business environments.

Learning Goals and Objectives

Conforming to the College's mission statement, we aim to transform the lives of our students through graduate and undergraduate business education; the College's Learning Objectives specify the expected resulting outcome of this transformation as graduates capable of becoming agents of human progress.

Accordingly, the general learning objective of the College is to equip its students with the values, knowledge, competencies and skills needed to produce a positive impact in whatever they do in life. In particular, these values, knowledge, competencies and skills are as follows:

Specialized Know-How

Goal 1: Students will become proficient in up-to-date theories, applications, best practices and other dimensions of their chosen area of specialization, including hands-on applications.

Objective 1: Utilize pertinent theories and best practices in solving problems and making decisions in area of specialization.

Knowledge of Main Business Functional Areas

Goal 2: Students will acquire basic and fundamental knowledge of main business functional areas, necessary for them to understand the general business environment and the interrelationships among the various functional areas of business such as management, marketing, finance, information systems etc.

Objective 2: Identify and explain some core concepts from the various main business functional areas.

Objective 3: Integrate knowledge from various business functional areas to address business problems and situations.

Analysis and Critical Thinking

Goal 3: Programs and activities in the College will involve learning settings which require students to learn and practice analytical and critical thinking tools and methods such as modeling, identification of cause and effect, associations, integration, synthesis, inquiry etc.

Objective 4: Identify and distinguish between causes and effects in business cases and situations.

Objective 5: Demonstrate an ability to summarize and synthesize business information.

Effective Communication

Goal 4: Students will acquire abilities to effectively communicate orally and in writing in various professional environments and settings.

Objective 6: Demonstrate ability to communicate business information via the composition and delivery of presentations, proposals, reports and other means of communication.

Working Knowledge of Information Technology

Goal 5: Student competencies will be enabled by the development of a working knowledge of information technologies adequate to meet the challenges of the information technology and telecommunication revolution. This enablement will include both content and delivery of teaching and learning wherever is appropriate.

Objective 7: Demonstrate ability to use current business software programs in handling business operations and tasks.

Ethics and Social Responsibility

Goal 6: The College will ensure that its students are exposed to learning opportunities which would allow them to improve their recognition and awareness of ethical dilemmas and socially responsible behaviors.

Objective 8: Identify business related ethical dilemmas and recommend actions based on relevant prevailing professional codes of conduct and best practices.

Objective 9: Evaluate the social and environmental impact of business situations and decisions.

Academic Programs

The College of Business Administration offers seven undergraduate programs leading to a Bachelor of Business Administration (BBA) degree, one Minor in Business Administration program, and two graduate programs leading to a Master of Business Administration degree (MBA). The programs are as follows:

1. Bachelor of Business Administration in Accounting
2. Bachelor of Business Administration in Business Information Technology Management
3. Bachelor of Business Administration in Finance and Banking
4. Bachelor of Business Administration in Human Resources Management
5. Bachelor of Business Administration in Management
6. Bachelor of Business Administration in Marketing
7. Bachelor of Business Administration in Marketing and Advertising
8. Minor in Business Administration
9. Master of Business Administration
10. Master of Business Administration in Oil and Gas Management

Program Codes

The following table lists the code used for each program. This code is used as the prefix of each course designation in the program.

Program Code	Program
BACC	Accounting
BFIN	Finance and Banking
BADM	General Business Administration
BECN	Economics
BITM	Business Information Technology Management
BMGT	Management
BHRM	Human Resources Management
BMKT	Marketing
BMKA	Marketing and Advertising

Admission Requirements

Further to fulfilling the University admission requirements, students aspiring to study in one of the business majors may be required to take a placement examination in mathematics, depending on the Lebanese baccalaureate math score. Students who fail to attain a passing score are required to take and pass one or two related courses, depending on their score, to ensure their mastery of basic skills and improve their ability to handle the rigor of college-level subjects. Students are strongly advised to carefully review the University Catalog for admission and degree requirements as well as all related academic policies.

Graduation Requirements

Each Business program grants a Bachelor of Business Administration (BBA) degree which encompasses 99 credits distributed among three categories: University Requirements (UR), College Requirements (CR) and Program Requirements (PR). The University and College requirements are common to all programs in the College of Business Administration. Each department has its own required and elective courses. The credit hour allocations for each program are shown in the following tables:

BBA in Accounting (99 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	18	12	30	30
College Requirement	6	-	35	-	41	41
Program Requirement	25	3	-	-	28	28
Credits	31	3	53	12	99	100

BBA in Business Information Technology Management (99 Credits)

Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	3	-	15	12	30	30
College Requirement	3	-	38	-	41	41
Program Requirement	25	3	-	-	28	28
Credits	31	3	53	12	99	100

BBA in Finance and Banking (99 Credits)

Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	18	12	30	30
College Requirement	3	-	38	-	41	41
Program Requirement	25	3	-	-	28	28
Total Credits	28	3	56	12	99	100

BBA in Human Resources Management (99 Credits)

Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	18	12	30	30
College Requirement	-	-	41	-	41	41
Program Requirement	25	3	-	-	28	28
Total Credits	25	3	59	12	99	100

BBA in Management (99 Credits)

Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	18	12	30	30
College Requirement	3	-	38	-	41	41
Program Requirement	25	3	-	-	28	28
Total Credits	28	3	56	12	99	100

BBA in Marketing (99 Credits)

Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	18	12	30	30
College Requirement	3	-	38	-	41	41
Program Requirement	25	3	-	-	28	28
Total Credits	28	3	56	12	99	100

BBA in Marketing and Advertising (99 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	18	12	30	30
College Requirement	3	-	38	-	41	41
Program Requirement	25	3	-	-	28	28
Total Credits	28	3	56	12	99	100

A business student in anyone of the programs is eligible for graduation if he/she has:

- 1) Successfully completed all the requirements of the degree
- 2) Attained a cumulative GPA of 70 % or higher
- 3) Attained a major GPA of 70 % or higher
- 4) Attained at least a 70 % grade on his/her Integrative Learning Project
- 5) Successfully completed the mandatory COOP Work Experience and the Community Engagement Experience.

I. University Requirements

Every student is required to take 30 credit hours of general education courses distributed over seven domains. Eighteen mandatory credit hours are selected from four domains and twelve elective credit hours selected from three domains as indicated on the following pages.

Domain	Credits	Courses
1 Communication Competency	6	<ul style="list-style-type: none"> • ENGL 210: English Composition and Rhetoric • ENGL 217: Professional English Writing
2 Humanities/Fine Arts	6	<ul style="list-style-type: none"> • ARAB 211¹ - Arabic Language and Communication (3 Credits) • 3 Credits Selected from an approved list
3 Social Sciences/Culture	6	Selected from an approved list
4 ICT Competency	3	BITM 200: Business Information Technology Management Essentials
5 Sciences/Technology	3	Selected from an approved list
6 Quantitative Reasoning	3	BADM 225: Business Math
7 Community Forethought	3	BADM 355: Business Ethics and Social Responsibility

¹ Non-native Speakers of Arabic students are allowed to take either SOCI 310 or CMNS 410 as a substitute for ARAB 211.

Description of the specific courses in this group are given below

ARAB 211	Arabic Language and Communication	3(3,0)
This course provides the student with basic knowledge of written business communication		

skills in Arabic and its components, including content, shape and formatting. Students will be given practice on how to write the inquiry letter, the offer or quotation letter, and the negotiation letter. They will be familiarized with the freight methods, the commercial documents, the payment modes, the types of insurance, the banking services and credit facilities and will end with writing curriculum vitae.

BADM 225	Business Math	3(3,0)
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Linear equations, supply and demand analysis, non-linear equations, quadratic functions, exponential and logarithmic functions, compound interests, geometric series, investments appraisal, Derivatives and marginal revenue-cost-profit, elasticity, functions of several variables, partial elasticity and marginal functions, simple optimizations, indefinite and definite integration, matrix operations and Cramer's rule.

BADM 355	Business Ethics and Social Responsibility	3(3,0)
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This course introduces students to important ethical and corporate social responsibility issues. It will improve the students' ability to make decisions by providing them with a framework to identify, analyze and resolve ethical issues in business. Issues such as conflicts between personal values and organizational goals; the role of sustainability in business strategy; and corporate governance will be also discussed in this course. **Prerequisite:** Junior Standing.

BITM 200	Business Information Technology Management Essentials	3(3,0)
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This course is an introduction to the general and business use of computers. It covers the basics of hardware, the operating system, the internet and software with emphasis on MS Office Suite.

ENGL 210	English Composition and Rhetoric	3(3,0)
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This course reinforces effective critical reading and writing skills with emphasis on writing documented essays for academic purposes in a varying range of rhetorical modes. More specifically, the student will apply the fundamental principles of English spelling, word usage, grammar, punctuation and style necessary for written communication; write academic essays; proofread and edit a variety of texts; analyze general texts for coherence, style and accuracy in writing; read critically from a variety of discourse modes; summarize, paraphrase and quote sources properly; and cite sources according to APA form.

ENGL 217	Professional English Writing	3(3,0)
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This course is designed to enhance students' professional writing skills. It is tailored to students pursuing careers in the professions and includes advanced business writing and editing, correspondence, critical review, writing professional reports and proposals, and making oral presentations. **Prerequisite:** ENGL 210.

II. College Requirements

A. Remedial Courses

Proficiency in the English Language is a requirement for admission to any program in the College of Business Administration. The student may be required to take a remedial mathematics course, depending on the placement exam or the Baccalaureate score on mathematics. This remedial course does not count toward fulfilling the degree requirements. Description of the remedial course follows.

MATH 189	Fundamentals of Algebra	3(3,0)
Real number systems, radicals and rational exponents, polynomials, factoring, fractional expressions, lines in the plane, functions and their graphs, inverse functions, solving equation and inequalities, real zeros and the fundamental theorem of Algebra, exponential functions and their graphs, logarithmic functions and their graphs.		

B. Mandatory Courses

All College of Business Administration students are required to take 41 credit hours of mandatory foundational and business functional courses. Students in the Marketing and Advertising Program take Mass Media Essentials instead of Quantitative Methods for Business. They also take Introduction to Public Relations instead of Business Statistics II. A list of these courses and their descriptions follow.

Course	Title	Credits	Prerequisite
BACC 201	Financial Accounting I	3	
BACC 202	Financial Accounting II	3	BACC 201
BADM 215	Personal Development and Management	1	
BADM 235	Business Research Methodology	1	
BADM 230	Business Law	3	
BADM 250	Business Statistics I	3	
BADM 290	Community Engagement Experience	0	
BADM 350	Business Statistics II	3	BADM 250
BADM 420	Quantitative Methods for Business	3	BADM 350
BECN 301	Microeconomics	3	Junior Standing
BECN 302	Macroeconomics	3	Junior Standing
BFIN 300	Financial Management I	3	BACC 201
BITM 300	Business Information Technology Management	3	BITM 200
BMGT 200	Introduction to Management	3	Co-req. ENGL 210
BMKT 200	Introduction to Marketing	3	Co-req. ENGL 210
MATH 207 ¹	College Algebra	3	Placement

¹ Students who do not pass the Mathematics Placement Test have to take MATH 207. Students who pass the test take a free elective instead of MATH 207.

Descriptions of these courses are given below.

ADPR 320	Introduction to Public Relations	3(3,0)
<p>This course exposes students to the role of advertising in society in general and in the business world in particular from both theoretical and professional perspectives. The material will outline the structure of the advertising industry and focus on professional practices, including the advertising process, messages, branding, campaign design etc. Prerequisite: ENGL 210.</p>		

BACC 201	Financial Accounting I	3(3,0)
<p>This course is an introduction to the basic concepts and principles of financial accounting. It covers major areas of financial accounting: generally accepted accounting principles, accounting cycle, financial reporting and the accrual basis of accounting. The internal control and reporting of cash and receivables together with the various acceptable methods for inventory are also covered in this course.</p>		

BACC 202	Financial Accounting II	3(3,0)
<p>This course is a continuation of BFIN 230. It provides the necessary understanding of basic accounting principles and procedures for recording and reporting noncurrent assets and liabilities. It also introduces the students to the accounting practices in formation, income distribution and preparation of financial statements of partnerships and corporations and the preparation of the statement of cash flows, using the indirect method. Prerequisite: BACC 201.</p>		

BADM 215	Personal Development and Management	11,0)
<p>This course engages the student in a series of self-reflection and self-discovery seminars, workshops and lectures. It is intended to encourage students to develop themselves and plan for the present and the future by becoming more self-aware. Topics and issues include personal SWOT analysis, alignment between career choices and personality types, developing a personal mission statement and goals, time management, stress management and organizational skills.</p>		

BADM 230	Business Law	3(3,0)
<p>This course introduces the legal framework of business; with emphasis on Lebanese law as it pertains to regulating the conduct of business. Topics include legal concepts, sources of law, types and classes of contracts, legal forms of business organizations, the commercial code and labor issues.</p>		

BADM 235	Business Research Methodology	1(1,0)
<p>Business Research Methodology is a way to systematically solve a research problem. It is a science of studying how research is done scientifically. Accordingly, students are exposed to the various steps generally taken by a researcher in studying the research problem, along with the logic behind them. The main topics of the course include problem definition, research design, types and methods, measurement and scaling, data collection, sampling, and reporting.</p>		

BADM 250	Business Statistics I	3(3,0)
<p>Business Statistics I is the first of a two-course series that introduces students to the fundamentals of applied statistics. Accordingly, students are exposed to the concepts of statistics as they are directly applied in solving business problems. The course will cover random variables, sampling, probability distributions, expectation, hypothesis testing and confidence intervals, analysis of variance, correlation and simple linear regression</p>		
BADM 290	Community Engagement Experience	0(0,1)
<p>The Community Engagement experience is a specific number of hours of volunteering by students at community organizations under the supervision of a faculty member. Community organizations may include governmental agencies, non-governmental organizations, and civil society organizations.</p>		
BADM 350	Business Statistics II	3(3,0)
<p>Business Statistics II is the second of a two-course series that introduces students to the fundamentals of applied multivariate statistics. The focus in this course is on applied business statistics rather than statistics theory or derivation. As such, the course will cover factor analysis, multiple regression analysis, discriminant analysis, and cluster analysis, while training students on the use of SPSS. Prerequisite: BADM 350.</p>		
BADM 420	Quantitative Methods for Business	3(3,0)
<p>This course introduces students to managerial decision analysis using quantitative tools. The course will introduce students to the practice of using and building mathematical models that would help managers make informed decisions. Focus is on the applied aspects of statistics and math. As such, the course will cover the basics of probabilistic and statistical techniques, decision analysis, linear programming, optimization, forecasting, and waiting-line theory. Prerequisite: BADM 350.</p>		
BECN 301	Microeconomics	3(3,0)
<p>Students will study the general principles of microeconomics. Included are the theoretical constructs of consumer behavior, cost structure, and the operations of business firms in the market economy under conditions of perfect competition, oligopoly, monopoly and monopolistic competition. Prerequisite: Junior Standing.</p>		
BECN 302	Macroeconomics	3(3,0)
<p>Students will study the general principles of macroeconomics. This course presents the formal Keynesian theory of income determination and its contemporary critiques. Included is the study of the possible causes and solutions to unemployment and inflation and the importance of the international economy. Government fiscal and monetary policies are examined in detail. Prerequisite: Junior Standing.</p>		

BFIN 300	Financial Management I	3(3,0)
<p>This course aims to expose students to the foundational principles, theories and applications of corporate and business finance as well as financial management. It covers such topics as simple and compound interest, risk and rates of return, time value of money, stocks and bonds valuations, discounted cash flow analysis and financial ratios. Prerequisite: BACC 201.</p>		
BITM 300	Business Information Technology Management	3(3,0)
<p>This course provides a comprehensive introduction to information systems and their application. It explains how to use and manage information technologies to revitalize business processes, conduct electronic commerce, improve business decision-making, and gain competitive advantage. Prerequisite: BITM 200</p>		
BMGT 200	Introduction to Management	3(3,0)
<p>Students study the basic functions of management, and are exposed to modern management practices, current events, problem solving, and ethical dilemmas. Topics include decision making, strategic and operational planning, organizational structure, Human Resources management, leadership, and control techniques. The instructor facilitates discussion, and integrates these topics through the use of contemporary business issues and case studies. Co-requisite: ENGL 210</p>		
BMKT 200	Introduction to Marketing	3(3,0)
<p>This course introduces the basic principles, theories, and practices of marketing in our modern ever-changing business environment. It discusses the marketing mix and how to create, communicate, and deliver customer value. The course also covers the full spectrum of Lebanese and international marketing of consumer products and services including market segmentation, targeting, and positioning, along with the study of consumer behavior. Co-requisite: ENGL 210</p>		
CMNS 301	Mass Media Essentials	3(3,0)
<p>This course is required for Marketing and Advertising students only. The aim of this course is to introduce students to the concepts and vocabulary used in various fields of communication, understanding the development of mass communication in political, economic, social, and cultural contexts. The course addresses media's influence on society and societal influence in shaping the news process, advertising, and public relations. Students are introduced to media-related research methods.</p>		
MATH 207	College Algebra	3(3,0)
<p>Solving linear and non-linear equations, modeling with equations, functions and their graphs, increasing and decreasing functions-transformation, quadratic functions-maxima and minima, modeling with functions, combining functions, polynomial functions and their graphs, dividing</p>		

polynomials, real zeros of polynomials, complex numbers, complex zeros of polynomials, exponential and logarithmic functions, sequences and summation notation-arithmetic sequences, counting and probability.

III. Program Requirements

Requirements for the Bachelor of Business Administration degree are program-specific. They encompass two categories: Major and non-major. Each category consists of a set of mandatory courses and a set of elective courses. The program requirements for the Bachelor of Business Administration degree in the different business majors are given hereafter. Details and titles of relevant courses are included in the Student's Study Plan (SSP) that every business student will have.

Course Coding

Each course offered by the College of Business Administration is designated by a four-letter code representing the college and program followed by a three-digit number denoting the course number, "**Babc xyz**".

The letter "**B**" refers to the College of Business Administration and "**abc**" refers to the program as follows:

ACC:	Accounting
ADM:	General Business Administration
ECN	Economics
FIN:	Finance
HRM:	Human Resources Management
ITM:	Information Technology Management
MGT:	Management
MKA:	Marketing and Advertising
MKT:	Marketing

The three digits number "**xyz**" between **200** and **599** denote the course's number. The first digit refers to the level of the course and it could be **1** for freshman, **2** for sophomore, **3** for junior, **4** for senior and **5** for graduate.

The following example demonstrates the coding system: BMKT 201 is a sophomore level marketing course in the College of Business Administration.

The designation used to represent credit hours breakdown **c (t, p)** of a course is as follows: "**c**" the total credit hours, "**t**" stands for theoretical component of the course; "**p**" practical or laboratory component. For example 3(3, 0) represent a 3 credit hour course with three contact lecture hours and zero laboratory hours.

Learning Support Center

The Learning Support Center (LSC) at the College of Business Administration is another manifestation of RHU's resolute commitment to students' academic success. The LSC offers the students a peer-to-peer learning environment that complements classroom learning. The Center aims to support students in advancing their knowledge and skills, reinforcing what they learn in the classrooms or overcoming learning and performance difficulties. In addition to being a focal-point for enquiry and two-way "as questioner-replier" learning, the LSC offers the space for academic interactions that can trigger enhanced learning significantly.

The Center is located in room H 101 and is open to all students throughout the week. The LSC is staffed by carefully selected Teaching Assistants who are graduate students and upper level undergraduate students. Teaching Assistants are always available and ready to assist their fellow students in overcoming their academic challenges. Additionally, an "on-call" faculty member is assigned to ensure that the LSC is performing to the best interest of the students, and to intervene in helping students when necessary.

Center's resources include books, study guides, course materials, boards, computers, videos, DVD's, documentaries and other learning tools.

DEPARTMENT OF FINANCIAL STUDIES

Faculty Members

Chairperson:	Ibrahim Akoum
Associate Professors:	Jamil Hammoud
Lecturers:	Rima Hakim, Jamil Chaya
Adjunct Faculty:	Arfan Ayass, Samar Khayat-Mansour, Yusra Balaa, Faysal Hajjar, Bassim Rahal

Programs Offered

The Financial Studies Department offers three programs – Accounting, Finance and Banking, and Business Information Technology Management. Each program leads to a Bachelor of Business Administration degree. The details of each program follow.

ACCOUNTING PROGRAM

Learning Goals and Objectives

The purpose of the Accounting Program at the College of Business Administration of Rafik Hariri University is an integrative composite of four main dimensions: Specialized Knowledge, Professional Placement, Way of Thinking, and Growth Potential.

Specialized Knowledge

Goal 1: To develop graduates with an effective level of professional competence in most activities of the accounting function including, but not limited to, financial reporting and analysis, taxation, cash management, budgeting and cost controlling, decision making, internal control and legal compliance.

Objective 1: Prepare financial statements in conformance with Generally Accepted Accounting Principles and International Financial Reporting Standards.

Objective 2: Analyze transaction cycles and accounting processes, evaluate risk and recommend internal controls in accordance with current auditing standards and best practices.

Professional Placement

Goal 2: To provide graduates with knowledge adequate for challenging entry and middle level positions in the areas of financial and managerial accounting.

Objective 3: Demonstrate broad accounting knowledge which would enable placement in a wide range of accounting occupations in the private and the public sectors.

Way of Thinking

Goal 3: To promote innovative and critical thinking, as well as ethical conduct in all aspects of accounting, that pertains not only to operational activities, but also to strategic decision making and internal control.

Objective 4: Employ management accounting tools to identify problematic issues at the operational level and reflect upon innovative potential solutions.

Objective 5: Recognize accounting related ethical dilemmas and respond to them according to established codes of conduct, ethics and best practices.

Growth Potential

Goal 4: To ensure that graduates possess a broad array of general and technical skills that enables them to adapt to the ever-changing dynamics of today's global business environment and to seek academic and/or professional growth opportunities.

Objective 6: Demonstrate accounting knowledge which enables qualification for first level professional certification in the domain of accounting or pursuit of graduate education.

Career Opportunities

Accounting offers a wide range of careers in various types of organizations. Besides the traditional roles as financial reporters and analysts, internal and external auditors, cash managers and cost controllers, accountants can act as advisors and strategic input providers to different areas of the organization. Moreover, accountants usually land jobs in all types of government agencies, businesses, industries and organizations.

Program Overview

If you want to be financially literate and able to play a key role in business decision making, then Accounting is the right career choice for you.

Accounting is about the measurement, analysis and communication of financial information pertinent to the economic health of business entities. Accountants devise and use financial information systems to enable investors, creditors, managers and regulators to make sound decisions.

There are two main tracks in accounting: financial Accounting and Management Accounting. If the purpose is to provide information to investors and creditors for their resource allocation decision making, we are talking about financial accounting. But, if the purpose is to provide information to managers to plan, evaluate performance and make decisions, we are talking about management accounting.

To obtain a Bachelor of Business Administration degree in Accounting, the student must complete a total of 99 credit hours. These hours span University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours is shown in the following table:

BBA in Accounting (99 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	18	12	30	30
College Requirement	6	-	35	-	41	41
Program Requirement	25	3	-	-	28	28
Total Credits	31	3	53	12	99	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalogue.

II. College Requirements

The list of the College required courses and their description are presented in the introductory pages of the College of Business Administration section in this catalogue.

III. Program Requirements

A. Mandatory requirements

The Accounting program's mandatory courses are listed in the table below.

Course #	Title	Credits	Prerequisites
BACC 300	Cost Accounting I	3	BACC 202
BACC 305	Intermediate Accounting I	3	BACC 202
BACC 400	Cost Accounting II	3	BACC 300
BACC 405	Intermediate Accounting II	3	BACC 305
BACC 450	External Auditing	3	BACC 405
BACC 460	Advanced Financial Accounting	3	BACC 405
BACC 465	Taxation	3	BACC 405
	Major Elective	3	
BADM 485	Co-op Work Experience	1	ENGL 217; Senior Standing
BADM 495	Integrative Learning Project	3	Senior Standing

B. Major Electives

As part of the program for the Bachelor of Business Administration in Accounting, the student is required to study 3 credit hours of major electives. Major electives could be upper level courses in Accounting or in closely related business areas. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. Meanwhile, they introduce an element of flexibility into the program, which allows the integration of newly emerging topics.

The student should select, in cooperation with the academic advisor, the elective course that best meets his or her needs and aspirations. It is highly recommended that the student register for these courses after completing the Departmental requirements. The table below lists some recommendations for major elective courses:

Course #	Title	Credits	Prerequisites
BACC 350	Accounting Information Systems	3	BACC 202, BITS 300
BACC 455	Internal Auditing	3	BACC 405
BACC 470	Forensic Accounting and Fraud Detection	3	BFIN 300
BFIN 350	Credit and Financial Analysis	3	BFIN 300

C. Integrative Learning Project

The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study.

D. Co-op Work Experience

Each student must complete 8 weeks of practical training in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits and to ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are then required to submit formal reports and posters and make formal presentations about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Study Plan

The Bachelor of Business Administration in Accounting encompasses 99 credit hours that are spread over 6 semesters and two summer sessions. The first summer session should be dedicated to the Community Engagement Experience. Meanwhile, the second session should be for the Co-op work experience. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (16 Credits)			
BMGT 200	Introduction to Management	3	Co-req. ENGL 210
BITM 200	Business Information Technology Management Essentials	3	
BACC 201	Financial Accounting I	3	
BADM 215	Personal Development and Management	1	
ENGL 210	English Composition and Rhetoric	3	ENGL 101
MATH 207	College Algebra*	3	Placement
Year 1, Spring Semester (16 Credits)			
BADM 225	Business Math	3	Placement
BADM 230	Business Law	3	
BACC 202	Financial Accounting II	3	BACC 201
BMKT 200	Introduction to Marketing	3	Co-req. ENGL 210
ENGL 217	Professional English Writing	3	ENGL 210

BADM 235	Business Research Methodology	1	
Year 1, Summer Semester (0 Credits)			
BADM 290	Community Engagement Experience	0	
Year 2, Fall Semester (18 Credits)			
BFIN 300	Financial Management I	3	BACC 201
BACC 300	Cost Accounting I	3	BACC 202
BACC 305	Intermediate Accounting I	3	BACC 202
BADM 250	Business Statistics I	3	
BECN 301	Microeconomics	3	Junior Standing
	Science Elective	3	
Year 2, Spring Semester (18 Credits)			
BITM 300	Business Information Technology Management	3	BITM 200
BACC 400	Cost Accounting II	3	BACC 300
BACC 405	Intermediate Accounting II	3	BACC 305
BECN 302	Macroeconomics	3	Junior Standing
BADM 350	Business Statistics II	3	BADM 250
	Humanities / Fine Arts Elective	3	
Year 2, Summer Semester (1 Credits)			
BADM 485	Co-op Work Experience	1	ENGL 217; Senior Standing
Year 3, Fall Semester (15 Credits)			
BACC 465	Taxation	3	BACC 405
BADM 355	Business Ethics and Social Responsibility	3	Junior Standing
BACC 450	External Auditing	3	BACC 405
BADM 420	Quantitative Methods for Business	3	BADM 350
	Social Science Elective	3	
Year 3, Spring Semester (15 Credits)			
BADM 495	Integrative Learning Project	3	Senior Standing
ARAB 211	Arabic Language and Communication	3	
BACC 460	Advanced Financial Accounting	3	BACC 405
	Major Elective	3	
	Social Science Elective	3	

* Students exempted from this course based on their score in the mathematics placement exam will select a free elective course as a substitute for it.

Course Description

Mandatory Courses

Descriptions of the major mandatory courses are given below.

BACC 300	Cost Accounting I	3(3,0)
<p>This course introduces students to the basic concepts, analyses, uses and procedures of management accounting. It enables students to understand and view the element of cost as part of activities planned and implemented by a company. It covers cost categories, cost behavior, cost-volume-profit analysis, master and flexible budgets, direct costs and manufacturing overhead variances and inventory cost systems. Prerequisite: BACC 202.</p>		

BACC 305	Intermediate Accounting I	3(3,0)
<p>This course is an in- depth study of accounting issues related to the measurement and reporting of assets, liabilities and income in accordance with IFRS. It enables students to evaluate and understand the financial accounting concepts and practices. The course covers: the accounting framework, the use of time value of money in accounting, and the preparation of financial statements. The course also includes a detailed study of accounting for current and noncurrent assets. Prerequisite: BACC 202.</p>		

BACC 400	Cost Accounting II	3(3,0)
<p>This course is a continuation of BFIN 340. It concentrates on cost allocation, process costing, and joint products costing. This course would enable students to understand how cost accounting helps managers make better decisions. It offers the student a comprehensive knowledge as to revenue and income variances, relevant costs, capital budgeting, balance scorecard, profitability analysis, and cost control system analysis. Prerequisite: BACC 300.</p>		

BACC 405	Intermediate Accounting II	3(3,0)
<p>This course is a continuation of BFIN 341. It concentrates on the measurement and reporting of liabilities and of the various components of stockholders' equity. It introduces students to dilutive securities and their effect on earnings per share. The course emphasizes fair value, the proper accounting for financial instruments, and the new developments related to leasing, revenue recognition, and full disclosure Prerequisite: BACC 305.</p>		

BACC 450	External Auditing	3(3,0)
<p>This course introduces the students to international financial accounting standards and general auditing standards. It will enable the students to develop and apply auditing programs and their procedures to various financial statement items. It concentrates on auditing main business cycles such as the inventory cycle, revenue cycle, expenditure cycle, and investment cycle. Prerequisite: BACC 405</p>		

BACC 460	Advanced Financial Accounting	3(3,0)
<p>This course is designed to allow students to deal with certain specialized financial accounting topics that include consolidated financial statements, accounting practices in forming and liquidating partnerships, accounting for multinational corporations, accounting</p>		

for branches and segments, and accounting for not-for-profit organizations and governmental accounting. **Prerequisite:** BACC 405.

BACC 465	Taxation	3(3,0)
This course covers various aspects of the Lebanese taxation system including methods of tax imposition, taxes on the basis of real profit, computation of taxable profit, tax rates and tax due, taxes on non-residents, fixed assets, holding companies, offshore companies, Insurance companies, financial institutions, tax on employees, tax on movable capital (stocks, interests, dividends, etc..) Prerequisite: BACC 405		

BADM 485	Co-op Work Experience	1(0,1)
The Co-op work experience is designed to provide students with full-time work term in business, industry, or government. The main thrust of this course is the opportunity to put into practice the major aspects of the student's business education. Special emphasis will be placed on assessing the attitude and work ethics of the student. Students will be encouraged to network in the industry and to participate in professional organizations. Prerequisite: ENGL 217 and Senior Standing.		

BADM 495	Integrative Learning Project	3(3,0)
The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study. Prerequisite: Senior Standing.		

Elective Courses

Descriptions of major elective courses are given below.

BACC 350	Accounting Information Systems	3(3,0)
This course is designed to give students an in-depth understating of the accounting information systems. It introduces the student to file and database organization; business processes and internal controls; the systems development process and the management of information systems. Moreover, end-user application software including "off the shelf" accounting software packages and spreadsheets. Prerequisite: BACC 202, BITS 300.		

BACC 455	Internal Auditing	3(3,0)
The course develops an understanding and appreciation of the role of internal auditing in an organization. Topics include internal auditing standards, risk assessment, governance, ethics, and audit techniques. Prerequisite: BACC 405		

BACC 470	Forensic Accounting and Fraud Detection	3(3,0)
<p>This course will cover the basic concepts of forensic accounting. Topics include the detection, prevention, investigation and resolution of various types of fraud. The course covers many types of financial statement fraud, including asset misappropriation, fraudulent financial statements, tax fraud, and electronic fraud. Prerequisite: BFIN 300.</p>		
BFIN 350	Credit and Financial Analysis	3(3,0)
<p>Evaluation of financial fitness and performance is a core activity for credit officers, loan officers and financial managers. That is why this course is designed to equip students with the necessary knowledge and tools to perform sound financial analysis using public and non-public statements and reports. Main areas of analysis include liquidity, profitability, solvency, and leverage and market performance. Prerequisite: BFIN 300.</p>		

BUSINESS INFORMATION TECHNOLOGY MANAGEMENT

Learning Goals and Objectives

The purpose of the Business Information Technology Management Program at the College of Business Administration of Rafik Hariri University is an integrative composite of four main dimensions: Specialized Knowledge, Professional Placement, Way of Thinking, and Growth Potential.

Specialized Knowledge

Goal 1: To develop graduates with an effective level of professional competence in most activities of Business Computing so that they are able to use information technology and computer applications to increase efficiency and facilitate the conduct of business.

Objective 1: Demonstrate ability to leverage information and telecommunication technology (ICT) for the benefit of facilitating the conduct of business operations.

Objective 2: Reflect upon and propose ICT ways and means to enhance performance and improve operational efficiency in business.

Professional Placement

Goal 2: To provide graduates with knowledge adequate for challenging entry and middle level positions in the area of information technology and systems management such as ERP, DSS, database management, Web administration and data mining.

Objective 3: Demonstrate broad business computing knowledge which would enable placement in a wide range of business computing capacities in various types of business organizations.

Way of Thinking

Goal 3: To promote innovative and critical thinking, as well as ethical conduct in all aspects of business information technology, that pertains not only to operational activities, but also to strategic decision making and internal control.

Objective 4: Employ business computing tools to identify problematic issues at the operational level and reflect upon innovative potential solutions.

Objective 5: Recognize business computing related ethical dilemmas and respond to them according to established codes of conduct, ethics and best practices

Growth Potential

Goal 4: To ensure that graduates possess a broad array of general and technical skills that enables them to adapt to the ever-changing dynamics of today's global business environment and to seek academic and/or professional growth opportunities.

Objective 6: Demonstrate business computing knowledge which enables qualification for first level professional certification in the domain or pursuit of graduate education.

Career Opportunities

An increasing number of companies and entrepreneurial ventures in the Middle East and North Africa region (MENA) have been trying to capitalize on the computing and information technology revolution to enable and facilitate business operations in areas such as telemarketing, e-trade, e-government, social media, and the like. This is creating numerous job opportunities for people with such skills in such areas as online sales, electronic market research, electronic commerce, online transactions security, phone application development, and information systems management.

Program Overview

Success in the workplace in the twenty first century can hardly be achieved without knowledge, skills, and experience in using modern technology and applying its various components, such as information and telecommunication technology (ICT), computer-based systems and business applications

The Business Information Technology Management program combines business with information technology to enable students to acquire a thorough understanding of how information technology and computer applications improve effectiveness, increase efficiency and facilitate the conduct of business.

Students are thoroughly exposed to the business uses of database management, programming, networking, telecommunication, electronic commerce, internet and online development.

To obtain a Bachelor of Business Administration degree in Business Information Technology Management, the student must complete a total of 99 credit hours. These hours span University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours is shown in the following table:

BBA in Business Information Technology Management (99 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	3	-	15	12	30	30
College Requirement	3	-	38	-	41	41
Program Requirement	25	3	-	-	28	28
Total Credits	31	3	53	12	99	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalogue.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalogue.

III. Program Requirements

A. Mandatory requirements

The Business Information Technology Management program mandatory courses are listed in the table below.

Course #	Title	Credits	Prerequisites
BADM 485	Co-op Work Experience	1	ENGL 217; Senior Standing
BADM 495	Integrative Learning Project	3	Senior Standing
BITM 305	Introduction to Programming	3	BITM 200
BITM 310	Database Management Systems	3	BITM 305
BITM 340	The Development Tools of Information Systems	3	BITM 300
BITM 355	Networking	3	Junior Standing
BITM 401	Web Programming	3	BITM 310
BITM 405	E. Business	3	Senior Standing
BMGT 300	Project Management	3	Junior Standing
	Major Elective Course	3	

B. Major Electives

As part of the program for the Bachelor of Business Administration in Business Information Technology Management, the student is required to study 3 credit hours of major electives. Major electives could be upper level courses in Accounting or in closely related business areas. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. Meanwhile, they introduce an element of flexibility into the program, which allows the integration of newly emerging topics.

The student should select, in cooperation with the academic advisor, the elective course that best meets his or her needs and aspirations. It is highly recommended that the student register for these courses after completing the Departmental requirements. The table below lists some recommendations for major elective courses:

Course #	Title	Credits	Prerequisites
BACC 350	Accounting Information Systems	3	BACC 202, BITM 300
BITM 402	Advanced Web Programming	3	BITM 400
BITM 410	Advanced Programming and Data Structures	3	BITM 305

BITM 455	Advanced Networking	3	BITM 355
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C. Integrative Learning Project

The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study.

D. Co-op Work Experience

Each student must complete 8 weeks of practical training in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits and to ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are then required to submit formal reports and posters and make formal presentations about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Study Plan

The Bachelor of Business Administration in Business Information Technology Management encompasses 99 credit hours that are spread over 6 semesters and two summer sessions. The first summer session should be dedicated to the Community Engagement Experience. Meanwhile, the second session should be for the Co-op work experience. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (16 Credits)			
BMGT 200	Introduction to Management	3	Co-req. ENGL 210
BITM 200	Business Information Technology Management Essentials	3	
BACC 201	Financial Accounting I	3	
BADM 215	Personal Development and Management	1	
ENGL210	English Composition and Rhetoric	3	ENGL 101
MATH 207	College Algebra*	3	Placement
Year 1, Spring Semester (16 Credits)			
BADM 225	Business Math	3	Placement
BADM 230	Business Law	3	

BACC 202	Financial Accounting II	3	BACC 201
BMKT 200	Introduction to Marketing	3	Co-req. ENGL 210
ENGL 217	Professional English Writing	3	ENGL 210
BADM 235	Business Research Methodology	1	
Year 1, Summer Semester (0 Credit)			
BADM 290	Community Engagement Experience	0	
Year 2, Fall Semester (18 Credits)			
BFIN 300	Financial Management I	3	BACC 201
BITM 305	Introduction to Programming	3	BITM 200
BITM 300	Business Information Technology Management	3	BITM 200
BADM 250	Business Statistics I	3	
BECN 301	Microeconomics	3	Junior Standing
	Science Elective	3	
Year 2, Spring Semester (18 Credits)			
BITM 340	Development Tools of Information Systems	3	BITM 300
BITM 310	Database Management Systems	3	BITM 305
BMGT 300	Project Management	3	
BECN 302	Macroeconomics	3	Junior Standing
BADM 350	Business Statistics II	3	BADM 250
	Humanities / Fine Arts Elective	3	
Year 2, Summer Semester (1 Credit)			
BADM 485	Co-op Work Experience	1	ENGL 217; Senior Standing
Year 3, Fall Semester (15 Credits)			
BITM 401	Web Programming	3	BITM 310
BITM 355	Networking	3	Junior Standing
BADM 355	Business Ethics and Social Responsibility	3	Junior Standing
BADM 405	E Business	3	Senior Standing
	Social Science Elective	3	
Year 3, Spring Semester (15 Credits)			
BADM 495	Integrative Learning Project	3	Senior Standing
ARAB 211	Arabic Language and Communication	3	
BADM 420	Quantitative Methods for Business	3	BADM 350
	Major Elective	3	
	Social Science Elective	3	

* Students exempted from this course based on their score in the mathematics placement exam will select a free elective course as a substitute for it.

Course Description

Mandatory Courses

Descriptions of the major mandatory courses are given below.

BADM 485	Co-op Work Experience	1(0,1)
<p>The Co-op work experience is designed to provide students with full-time work term in business, industry, or government. The main thrust of this course is the opportunity to put into practice the major aspects of the student's business education. Special emphasis will be placed on assessing the attitude and work ethics of the student. Students will be encouraged to network in the industry and to participate in professional organizations. Prerequisite: ENGL 217 and Senior Standing.</p>		

BADM 495	Integrative Learning Project	3(3,0)
<p>The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study. Prerequisite: Senior Standing.</p>		

BITM 305	Introduction to Programming	3(2,2)
<p>This is a foundation course for all computer-programming courses. It enhances the programming skills and presents the fundamentals of structured programming concepts in C. The course covers primitive data types, expressions, control statements, functions and arrays. It also provides a hands-on experience on MATLAB. Prerequisite: BITM 200; Equivalent to COSC 214.</p>		

BITM 310	Database Management Systems	3(3,1)
<p>Students will explore advanced database concepts, including automation techniques, using popular windows-based DBMS software. The following topics are included in the course: the planning, creation, and maintenance of databases; the development of information retrieval techniques; the design customization of forms; and the creation and use of macros and modules in an automated system. Prerequisite: BITM 305; Equivalent to COSC 231.</p>		

BITM 340	The Development Tools of Information Systems	3(3,0)
<p>This course offers a traditional look at the systems life cycle process. Modeling and charting will be included. The tools and methodology applied by the systems analyst will be studied. The course covers an over view of the system life cycle, UML Diagrams, feasibility analysis, project management, HCI and the golden rules of user interface design. Prerequisite: BITM 300.</p>		

BITM 355	Networking	3(2,2)
An introduction to the field of data communications and networking, covering networking hardware/operating system concepts, modem, WAN, and LAN standards and protocols. Prerequisite: Junior Standing; Equivalent to COSC 360.		

BITM 401	Web Programming	3(3,1)
This course teaches students how to develop and implement web based program with emphasis on interface programming. It introduces students to the web development and to different client side languages and styles needed to develop adequate and responsive websites. The course covers HTML5, CSS3, JavaScript/jQuery and responsive design. Prerequisite: BITM 310; Equivalent to COSC 333.		

BITM 405	E. Business	3(3,0)
This course offers a comprehensive introduction to the theory and practice of e-business and e-commerce management. It focuses on business issues, challenges, and opportunities in an electronic business environment. The course provides a good balance between the technical and managerial topics and how to improve an organization's effectiveness and competitiveness. Prerequisite: Senior Standing.		

BMGT 300	Project Management	3(3,0)
This course provides the students the necessary skills to manage their business projects using effective techniques in leading, organizing, scheduling, and controlling the tasks contributing to the project goals. Topics include selection and statement of work of projects; skills of project managers and task break down structure, PERT/CPM scheduling and budgeting, Prerequisite: Junior Standing.		

Elective Courses

Descriptions of some elective courses are given below.

BACC 350	Accounting Information Systems	3(3,0)
This course is designed to give students an in-depth understating of the accounting information systems. It introduces the student to file and database organization; business processes and internal controls; the systems development process and the management of information systems. Moreover, end-user application software including "off the shelf" accounting software packages and spreadsheets. Prerequisite: BACC 202; BITS 300.		

BITM 402	Advanced Web Programming	3(3,1)
This course focuses on the server side programming. It allows students get to know how to connect their website or web application to a database, and how to save and retrieve data from that database. The course exposes students to web controls, validation controls, data source controls, data bind controls, state management, as well as working with a third party		

medium like XML and web services. **Prerequisite:** BITM 401; Equivalent to COSC 434.

BITM 410	Advanced Programming and Data Structures	3(3,1)
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This is a continuation course using advanced C++. The student studies object-oriented programming ideas such as classes, objects, polymorphism, data hiding, encapsulation, etc. This course gives the student new perspective in thinking in objects. **Prerequisite:** BITM 305; Equivalent to COSC 215.

BITM 455	Advanced Networking	3(2,2)
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This course prepares students to act as a System and Network Administrator by implementing Active Directory Service ADDS in distributed environments that can include complex network services and domain controllers. The covered materials assist students to efficiently automate the administration of users, groups, and computers. **Prerequisite:** BITM 355; Equivalent to COSC 461.

FINANCE AND BANKING PROGRAM

Learning Goals and Objectives

The purpose of the Finance and Banking Program at the College of Business Administration of Rafik Hariri University is an integrative composite of four main dimensions: Specialized Knowledge, Professional Placement, Way of Thinking, and Growth Potential.

Specialized Knowledge

Goal 1: To develop graduates with an effective level of professional competence in most activities of Finance and Banking including, but not limited to, financial management, corporate finance, investments, derivatives and international finance.

Objective 1: Apply Time Value of Money concepts; evaluate capital investment projects; assess financial risks and performance.

Objective 2: Evaluate investment alternatives; describe the structure, functioning and regulations of financial markets, instruments and institutions.

Professional Placement

Goal 2: To provide graduates with knowledge adequate for challenging entry and middle level positions in the area of finance, in such industries as banking, insurance, investments, and financial services.

Objective 3: Demonstrate broad finance knowledge which would enable placement in a wide range of finance positions in various types of business organizations.

Way of Thinking

Goal 3: To promote innovative and critical thinking, as well as ethical conduct in all aspects of finance, that pertains not only to operational activities, but also to strategic decision making and internal control.

Objective 4: Employ financial tools to identify problematic issues at the operational level and reflect upon innovative potential solutions.

Objective 5: Recognize finance related ethical dilemmas and respond to them according to established codes of conduct, ethics and best practices.

Growth Potential

Goal 4: To ensure that graduates possess a broad array of general and technical skills that enables them to adapt to the ever-changing dynamics of today's global business environment and to seek academic and/or professional growth opportunities.

Objective 6: Demonstrate financial knowledge which enables qualification for first level professional certification in the domain of finance or pursuit of graduate education.

Career Opportunities

The Finance and Banking program equips students with skills and competencies to seek and succeed in a wide range of career opportunities in a variety of organizations and in a number of vibrant industries such as banking, insurance, investments and financial services. Possible career opportunities include financial manager, credit analyst, loan officer, branch manager, trust officer, mortgage banker, financial analyst, investment advisor, and financial planner.

Program Overview

The Bachelor of Business Administration with specialization in Finance and Banking is a program carefully designed to prepare graduates for successful careers in financial Management, the financial services industry and in banking.

The Program offers a balanced blend of economic and financial theories with general and industry-specific applications carefully designed to ensure an effective level of financial knowledge and competence.

To obtain a Bachelor of Business Administration degree in Finance and Banking, the student must complete a total of 99 credit hours. These hours span University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours is shown in the following table:

BBA in Finance and Banking (99 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	18	12	30	30
College Requirement	3	-	38	-	41	41
Program Requirement	25	3	-	-	28	28
Total Credits	28	3	56	12	99	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalog.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalog.

III. Program Requirements

A. Mandatory requirements

The Finance and Banking program mandatory courses are listed in the table below.

Course #	Title	Credits	Prerequisites
BADM 485	Co-op Work Experience	1	ENGL 217; Senior Standing
BADM 495	Integrative Learning Project	3	Senior Standing
BFIN 305	Introduction to Banking	3	Junior Standing
BFIN 310	Financial Markets and Institutions	3	BFIN 300
BFIN 350	Credit and Financial Analysis	3	BFIN 300
BFIN 400	Financial Management II	3	BFIN 300
BFIN 405	Bank Financial and Risk Management	3	BFIN 305
BFIN 450	Investment Analysis	3	BFIN 400
BFIN 455	Financial Derivatives	3	Senior Standing
	Major Elective	3	

B. Major Electives

As part of the program for the Bachelor of Business Administration in Finance and Banking, the student is required to study 3 credit hours of major electives. Major electives could be upper level courses in Finance, Banking or in closely related business areas. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. Meanwhile, they introduce an element of flexibility into the program, which allows the integration of newly emerging topics.

The student should select, in cooperation with the academic advisor, the elective course that best meets his or her needs and aspirations. It is highly recommended that the student register for these courses after completing the Departmental requirements. The table below lists some recommendations for major elective courses:

Course #	Title	Credits	Prerequisites
BACC 300	Cost Accounting I	3	BACC 202
BACC 470	Forensic Accounting	3	Senior Standing
BECN 305	Managerial Economics	3	BECN 301
BFIN 355	International Finance	3	BFIN 300, BECN 302
BMGT 350	Entrepreneurship	3	BACC 202

C. Integrative Learning Project

The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study.

D. Co-op Work Experience

Each student must complete 8 weeks of practical training in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits and to ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are then required to submit formal reports and posters and make formal presentations about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Study Plan

The Bachelor of Business Administration in Finance and Banking encompasses 99 credit hours that are spread over 6 semesters and two summer sessions. The first summer session should be dedicated to the Community Engagement Experience. Meanwhile, the second session should be for the Co-op work experience. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (16 Credits)			
BMGT 200	Introduction to Management	3	Co-req. ENGL 210
BITM 200	Business Information Technology Management Essentials	3	
BACC 201	Financial Accounting I	3	
BADM 215	Personal Development and Management	1	
ENGL 210	English Composition and Rhetoric	3	ENGL 101
MATH 207	College Algebra*	3	Placement
Year 1, Spring Semester (16 Credits)			
BADM 225	Business Math	3	Placement
BADM 230	Business Law	3	
BACC 202	Financial Accounting II	3	BACC 201
BMKT 200	Introduction to Marketing	3	Co-req. ENGL 210
ENGL 217	Professional English Writing	3	ENGL 210
BADM 235	Business Research Methodology	1	
Year 1, Summer Semester (0 Credit)			
BADM 290	Community Engagement Experience	0	
Year 2, Fall Semester (18 Credits)			
BFIN 300	Financial Management I	3	BACC 201
BFIN 305	Intro to Banking	3	Junior Standing

BITM 300	Business Information Technology Management	3	BITM 200
BADM 250	Business Statistics I	3	
BECN 301	Microeconomics	3	Junior Standing
	Science Elective	3	
Year 2, Spring Semester (18 Credits)			
BFIN 310	Financial Markets and Institutions	3	BFIN 300
BFIN 400	Financial Management II	3	BFIN 300
BFIN 350	Credit and Financial Analysis	3	BFIN 300
BECN 302	Macroeconomics	3	Junior Standing
BADM 350	Business Statistics II	3	BADM 250
	Humanities / Fine Arts Elective	3	
Year 2, Summer Semester (1 Credits)			
BADM 485	Co-op Work Experience	1	ENGL 217; Senior Standing
Year 3, Fall Semester (15 Credits)			
BFIN 450	Investment Analysis	3	BFIN 400
BFIN 405	Bank Financial and Risk Management	3	BFIN 305
BADM 355	Business Ethics and Social Responsibility	3	Junior Standing
BADM 420	Quantitative Methods for Business	3	BADM 350
	Social Science Elective	3	
Year 3, Spring Semester (15 Credits)			
BADM 495	Integrative Learning Project	3	Senior Standing
BFIN 455	Financial Derivatives	3	Senior Standing
ARAB 211	Arabic Language and Communication	3	
	Major Elective	3	
	Social Science Elective	3	

* Students exempted from this course based on their score in the mathematics placement exam will select a free elective course as a substitute for it.

Course Description

Mandatory Courses

Descriptions of the major mandatory courses are given below.

BADM 485	Co-op Work Experience	1(0,1)
The first Co-op work experience is designed to provide students with full-time work term in business, industry, or government. The main thrust of this course is the opportunity to put into practice the major aspects of the student's business education. Special emphasis will be placed on assessing the attitude and work ethics of the student. Students will be encouraged to		

network in the industry and to participate in professional organizations. **Prerequisite:** ENGL 217 and Senior Standing.

BADM 495	Integrative Learning Project	3(3,0)
<p>The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study. Prerequisite: Senior Standing.</p>		

BFIN 305	Introduction to Banking	3(3,0)
<p>This course introduces students to the basics of banking and banking operations. Coverage includes such topics as the business of banking, the development of different banking systems, introductory banking regulations, money and interest, credit, product and services, banking risks and performance evaluation. Topics also include the structure and internal organization of banks. Prerequisite: Junior Standing.</p>		

BFIN 310	Financial Markets and Institutions	3(3,0)
<p>This course introduces students to the functions and operations of financial systems, markets, institutions and instruments. It covers loanable funds theory, the term structure of interest rates, money and capital markets, securities markets, and banking and other financial services such as insurance, brokerage and mutual funds. This course also presents the effects and types of financial regulations. Prerequisite: BFIN 300.</p>		

BFIN 350	Credit and Financial Analysis	3(3,0)
<p>Evaluation of financial fitness and performance is a core activity for credit officers, loan officers and financial managers. That is why this course is designed to equip students with the necessary knowledge and tools to perform sound financial analysis using public and non-public statements and reports. Main areas of analysis include liquidity, profitability, solvency, and leverage and market performance. Prerequisite: BFIN 300.</p>		

BFIN 400	Financial Management II	3(3,0)
<p>As a continuation of Financial Management I, this course exposes students to the financial management of the firm for the purpose of value maximization. That includes capital budgeting, capital structure and leverage, dividend policy, mergers & acquisitions, long term debt and financial planning and policy. Prerequisite: BFIN 300.</p>		

BFIN 405	Bank Financial and Risk Management	3(3,0)
<p>This course focuses attention on the principles of bank management of assets and liabilities. Concentration is on the microeconomic problems of financial management of banking firms. Students will learn about the principles of bank balance sheet management and money</p>		

market operations as well as liquidity ratios and capital adequacy ratios. Moreover, students will also study issues of bank supervision and regulation.. **Prerequisite:** BFIN 305.

BFIN 450	Investment Analysis	3(3,0)
The aim of this course is to introduce students to the principles of portfolio theory and how they apply to investments selection and decisions. Topics include systematic portfolio management, portfolio composition, portfolio insurance, portfolio performance, arbitrage and valuation models. Assets allocation alternatives are covered along with various investment strategies and objectives. Prerequisite: BFIN 400.		

BFIN 455	Financial Derivatives	3(3,0)
The aim of this course is for students to develop a good understanding of financial derivatives and their applications to risk management and corporate strategy. The course makes a distinction between using derivatives for hedging risk or speculation. Instruments covered include forwards, futures, options and swaps. Emphasis is placed on using such instruments in foreign exchange trading in particular. Prerequisite: Senior Standing.		

Elective Courses

Descriptions of some major elective courses are given below.

BACC 300	Cost Accounting I	3(3,0)
This course introduces students to the basic concepts, analyses, uses and procedures of management accounting. This course would enable students to understand and view the element of cost as part of activities planned and implemented by a company. It covers cost categories, cost behavior, cost-volume-profit analysis, master and flexible budgets, direct costs and manufacturing overhead variances and inventory cost systems. Prerequisite: BACC 202.		

BACC 470	Forensic Accounting	3(3,0)
This course will cover the basic concepts of forensic accounting. Topics include the detection, prevention, investigation and resolution of various types of fraud. The course covers many types of financial statement fraud, including asset misappropriation, fraudulent financial statements, tax fraud, and electronic fraud. Prerequisite: Senior Standing.		

BECN 305	Managerial Economics	3(3,0)
This course is an application of microeconomics theory to a variety of management and planning decisions such as output maximization and cost minimization given the constraints faced by firms. Demand analysis, cost analysis, and different market structures are studied. Prerequisite: BECN 301.		

BFIN 355	International Finance	3(3,0)
This course exposes students to international financial management and international trade		

from the perspective of managers working in international corporations. Topics include the management of foreign exchange exposure, foreign investments, multinational capital budgeting, the balance of payments, determination of exchange rates and international banking. **Prerequisite:** BFIN 300, BECN 302.

BMGT 350	Entrepreneurship	3(3,0)
The instructor leads the students through detailed aspects of starting a business or purchasing an existing business, including the operational and financial aspects. Students will prepare a business plan as part of their course work. Prerequisite: BACC 202.		

DEPARTMENT OF MANAGEMENT AND MARKETING STUDIES

Faculty Members

Chairperson:	Rima Bizri
Assistant Professors:	Rima Bizri, Najib Mozahem
Lecturers:	Marwan Wahbi
Adjunct Faculty:	Samer Abdallah, Rana Akoum, Rola Akoum, Adel Saheb, Mona Zoughaib, Salah Danaf

Programs Offered

The Department of Management and Marketing Studies offers four programs – Management, Human Resources Management, Marketing, and Marketing and Advertising. Each program leads to a Bachelor of Business Administration degree. The details of each program follows.

HUMAN RESOURCES MANAGEMENT PROGRAM

Program Goals and Objectives

The purpose of the Human Resources Management Program at the College of Business Administration of Rafik Hariri University is an integrative composite of four main dimensions: Specialized Knowledge, Professional Placement, Way of Thinking, and Growth Potential.

Specialized Knowledge

Goal 1: To develop graduates with a high level of professional competence in all activities of the Human Resources Management function including, but not limited to, workforce planning, recruitment & selection, compensation & benefits, training & development, appraisals & performance management, and legal compliance.

Objective 1: Demonstrate knowledge of recruitment, selection and compensation in accordance with legal requirements and professional best practices.

Objective 2: Identify and discuss the principles and best practices of employee training and performance management.

Professional Placement

Goal 2: To prepare graduates for challenging middle and senior-level positions in the capacity of HRM Generalist and Specialist.

Objective 3: Demonstrate broad HRM knowledge which would enable placement in a wide range of positions in various types of business organizations.

Way of Thinking

Goal 3: To encourage innovative and critical thinking, as well as ethical conduct in all HRM areas, pertaining not only to operational activities but also to strategic decision making and leadership.

Objective 4: Employ human resources management tools to identify problematic issues at the operational level and reflect upon innovative potential solutions.

Objective 5: Recognize HRM related ethical dilemmas and respond to them according to established laws, codes of conduct, ethics and best practices.

Growth Potential

Goal 4: To ensure that graduates possess a broad array of general and technical skills that enables them to adapt to the ever-changing dynamics of today's global business environment and to seek academic and/or professional growth opportunities.

Objective 6: Demonstrate accounting knowledge which enables qualification for first level professional certification in HRM or pursuit of graduate education.

Career Opportunities

For those who pursue a professional career, business graduates majoring in HRM normally embark on a career path starting as “HR specialist” in one of the functions of HR at a large organization, or as an “HR generalist” in the HR department of a small firm. From there, they can advance to upper level managerial positions. For HRM graduates pursuing an academic career, they can move forward by electing a graduate and postgraduate-studies path in the domain of general management or HRM, leading them to careers in academia and research.

Program Overview

The Human Resources Management program offers students: a unique experience into the operational and strategic activities of the HR department; a thought-provoking curriculum flavoured with experiential learning opportunities; and taught by experienced and internationally certified faculty; presents a state of the art platform from which HRM graduates can launch their careers.

To obtain a Bachelor of Business Administration degree in Human Resources Management, the student must complete a total of 99 credit hours. These hours span University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours is shown in the following table:

BBA in Human Resources Management (99 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	18	12	30	30
College Requirement	-	-	41	-	41	41
Program Requirement	25	3	-	-	28	28
Total Credits	25	3	59	12	99	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalog.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalog.

III. Program Requirements

A. Mandatory requirements

The HRM mandatory core courses are listed in the table below.

Course #	Title	Credits	Prerequisites
BADM 385	Co-op Work Experience	1	ENGL 217; Senior Standing
BADM 495	Integrative Learning Project	3	Senior Standing
BHRM 300	Human Resources Management	3	BMGT 205
BHRM 305	Labor Law & Relations	3	Junior Standing
BHRM 350	Workforce Planning, Recruitment & Selection	3	BHRM 300
BHRM 400	HR Development & Training	3	BHRM 300
BHRM 450	Compensation & Benefits	3	BHRM 300
BMGT 205	Organizational Behavior	3	BMGT 200
BMGT 485	Strategic Management	3	Senior Standing
	Major Elective	3	

B. Major Electives

As part of the program for the Bachelor of Business Administration in Human Resources Management, the student is required to study 3 credit hours of major electives. Major electives could be upper level courses in Accounting or in closely related business areas. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. Meanwhile, they introduce an element of flexibility into the program, which allows the integration of newly emerging topics.

The student should select, in cooperation with the academic advisor, the elective course that best meets his or her needs and aspirations. It is highly recommended that the student register for these courses after completing the Departmental requirements. The table below lists some recommendations for major elective courses:

Course #	Title	Credits	Prerequisites
BADM 300	Project Management	3	Junior Standing
BADM 405	E-Business	3	Senior Standing
BFIN 400	Financial Management II	3	BFIN 300

C. Integrative Learning Project

The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study.

D. Co-op Experience

Each student must complete 8 weeks of practical training in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits to ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are then required to submit formal reports and posters and make formal presentations about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Study Plan

The Bachelor of Business Administration in Human Resources Management encompasses 99 credit hours that are spread over 6 semesters and two summer sessions. The first summer session should be dedicated to the Community Engagement Experience. Meanwhile, the second session should be for the Co-op work experience. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (16 Credits)			
BMGT 200	Introduction to Management	3	Co-requisite ENGL 210
BITM 200	Business Information Technology Management Essentials	3	
BACC 201	Financial Accounting I	3	
BADM 215	Personal Development and Management	1	
ENGL 210	English Composition and Rhetoric	3	ENGL 101
MATH 207	College Algebra*	3	Placement
Year 1, Spring Semester (16 Credits)			
BADM 225	Business Math	3	Placement
BADM 230	Business Law	3	
BACC 202	Financial Accounting II	3	BACC 201
BMGT 205	Organizational Behavior	3	BMGT 200
ENGL 217	Professional English Writing	3	ENGL 210
BADM 235	Business Research Methodology	1	
Year 1, Summer Semester (0 Credit)			
BADM 290	Community Engagement Experience	0	
Year 2, Fall Semester (18 Credits)			
BFIN 300	Financial Management I	3	BACC 201
BMKT 200	Introduction to Marketing	3	Co-requisite ENGL 210
BHRM 300	Human Resources Management	3	BMGT 205

BADM 250	Business Statistics I	3	
BECN 301	Microeconomics	3	Junior Standing
BHRM 305	Labor Law and Labor Relations	3	Junior Standing
Year 2, Spring Semester (18 Credits)			
BITM 300	Information Technology Management	3	BITM 200
BHRM 350	Workforce Planning, Recruitment and Selection	3	BHRM 300
BECN 302	Macroeconomics	3	Junior Standing
BADM 355	Business Ethics and Social Responsibility	3	Junior Standing
BADM 350	Business Statistics II	3	BADM 250
	Science Elective	3	
Year 2, Summer Semester (1 Credits)			
BADM 385	Co-op Work Experience	1	ENGL 217; Senior Standing
Year 3, Fall Semester (15 Credits)			
BHRM 400	HR Training and Development	3	BHRM 300
ARAB 211	Arabic Language and Communication	3	
BMGT 485	Strategic Management	3	Senior Standing
BADM 420	Quantitative Methods for Business	3	BADM 350
	Social Science Elective	3	
Year 3, Spring Semester (15 Credits)			
BADM 495	Integrative Learning Project	3	Senior Standing
BHRM 450	Compensation and Benefits	3	BHRM 300
	Major Elective	3	
	Humanities / Fine Arts Elective	3	
	Social Science Elective	3	

* Students exempted from this course based on their score in the mathematics placement exam will select a free elective course as a substitute for it.

Course Description

Mandatory Courses

Descriptions of the major mandatory courses are given below.

BADM 300	Human Resources Management	3(3,0)
This course provides the student with a basic, functional understanding of current Human Resources Management concepts and applications in developing small and large businesses. Topics include recruitment, selection, orientation and training, development, assessment, compensation, job design, and career guidance, in addition to compliance with labor laws and labor union negotiations. Prerequisite: BMGT 205		

BADM 485	Co-op Work Experience	1(0,1)
<p>The Co-op work experience is designed to provide students with full-time work term in business, industry, or government. The main thrust of this course is the opportunity to put into practice the major aspects of the student's business education. Special emphasis will be placed on assessing the attitude and work ethics of the student. Students will be encouraged to network in the industry and to participate in professional organizations. Prerequisite: ENGL 217 and Senior Standing.</p>		

BADM 495	Integrative Learning Experience	3(3,0)
<p>The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study. Prerequisite: Senior Standing</p>		

BHRM 305	Labor Law & Relations	3(3,0)
<p>This course introduces students to the fundamentals of labor law, collective bargaining, contract administration and social security regulations pertaining to the management of employees. Labor law history, development and applications are aspects of Lebanese labor law covered to the extent they apply to the management of human resources. Prerequisite: Junior Standing</p>		

BHRM 350	Workforce Planning, Recruitment & Selection	3(3,0)
<p>The objective of this course is to provide students in the HRM major with a solid basic understanding of the Workforce Planning & Recruitment function of Human Resources Management. In particular, this course enables students to develop effective recruiting techniques and selection skills. Prerequisite: BHRM 300</p>		

BHRM 400	HR Training & Development	3(3,0)
<p>This course will introduce students in the HRM major to the HR Development & Training function of Human Resources Management. This course will enable students to effectively and efficiently conduct the development and training process to meet the current and future needs of the organization. Prerequisite: BHRM 300</p>		

BHRM 450	Compensation & Benefits	3(3,0)
<p>This course will provide students in the HRM major with a solid understanding of the Compensation & Benefits function of Human Resources Management. It will enable students to establish strategic pay plans and design effective performance-based incentives. This course will also enable students to design financial and non-financial benefits and services as part of the total compensation package. Prerequisite: BHRM 300</p>		

BMGT 205	Organizational Behavior	3(3,0)
<p>The objective of this course is to allow the student to develop the necessary skills and conceptual tools to understand and deal effectively with human behavior in organizations. Special emphasis will be placed on employee motivation, teamwork, leadership, communication, conflict and negotiation, in addition to an overview of attitudes, values, personality, and perception. Prerequisite: BMGT 200</p>		

BMGT 485	Strategic Management	3(3,0)
<p>This is an advanced course for upper level management students. This course covers basic concepts of strategic management, corporate governance and social responsibility, environmental scanning and industry analysis, internal scanning and organizational analysis, and strategy formulation, including situation analysis and business strategy, corporate strategy, and functional strategy. Prerequisite: Senior Standing</p>		

Elective Courses

Descriptions major elective courses are given below.

BMGT 300	Project Management	3(3,0)
<p>This course provides the students with the necessary skills to manage their business projects using effective techniques in leading, organizing, scheduling, and controlling the tasks contributing to the project goals. Topics include selection and statement of work of projects; skills of project managers, and task break down structure, PERT/CPM scheduling and budgeting, resource analysis, project crashing, project monitoring, and project control. Prerequisite: Junior Standing</p>		

BITM 405	E-Business	3(3,0)
<p>This course offers a comprehensive introduction to the theory and practice of e-business and e-commerce management. It focuses on business issues, challenges, and opportunities in an electronic business environment. The course provides a good balance between the technical and managerial topics and how to improve an organization's effectiveness and competitiveness. Prerequisite: Senior Standing.</p>		

BFIN 400	Financial Management II	3(3,0)
<p>As a continuation of Financial Management I, this course exposes students to the financial management of the firm for the purpose of value maximization. That includes capital budgeting, capital structure and leverage, dividend policy, mergers & acquisitions, long term debt and financial planning and policy. Prerequisite: BFIN 300.</p>		

MANAGEMENT PROGRAM

Learning Goals and Objectives

The objectives of the Management Program at the College of Business Administration of Rafik Hariri University are an integration of four main dimensions: Specialized Knowledge, Professional Placement, Way of Thinking, and Growth Potential.

Specialized Knowledge

Goal 1: To develop business graduates with a high level of professional competence in all functions of management, particularly planning, organizing, leading, and controlling, thus making them capable of making informed and effective managerial decisions.

Objective 1: Make informed and effective managerial decisions in carrying out business planning, organizing, leading and controlling.

Objective 2: Assess and discuss the requirements needed to launch and succeed in a startup business.

Professional Placement

Goal 2: To prepare graduates for challenging entry level positions in management and administration, with potentially fast advancement toward middle and upper-level managerial positions. The program also prepares graduates for assuming entrepreneurial roles in the local community and the region.

Objective 3: Demonstrate broad and diversified managerial knowledge which would enable placement in a wide range of managerial capacities in various business organizations.

Way of Thinking

Goal 3: To promote innovative and critical thinking, as well as ethical conduct in all aspects of management, that pertains not only to operational activities, but also to strategic decision making and internal control.

Objective 4: Identify problematic issues at the operational level and reflect upon innovative potential solutions.

Objective 5: Recognize managerial ethical dilemmas and respond to them according to established codes of conduct, ethics and best practices.

Growth Potential

Goal 4: To ensure that graduates possess a broad array of general and technical skills that enables them to adjust to the dynamics of today's global business environment and to seek academic and/or professional growth opportunities.

Objective 6: Demonstrate management knowledge which enables qualification for first level professional certification in management or pursuit of graduate education.

Career Opportunities

For those who pursue a professional career, business management graduates would be highly eligible for entry level administrative positions in industries like banking, insurance, tourism, retail, and in most support functions of the health, education, consultancy and industrial sectors of the economy. With more experience, they can advance to upper level managerial positions. For management graduates pursuing an academic career, they can move forward by electing a graduate and postgraduate-studies path in the various specialization paths in the field of management such as HRM, Supply Chain Management, Operations, Retail Management, among others, leading them to careers in academia and research.

Program Overview

The Management program offers students an exceptional preparatory experience into the field of management and administration. Our experienced and dedicated faculty deliver a state-of-the-art curriculum that balances theory and practice, using highly effective pedagogical tools that present students with unlimited opportunities to excel.

To obtain a Bachelor of Business Administration degree in Management, the student must complete a total of 99 credit hours. These hours span University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours is shown in the following table:

BBA in Management (99 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	18	12	30	30
College Requirement	3	-	38	-	41	41
Program Requirement	25	3	-	-	28	28
Credits	28	3	56	12	99	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalog.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalog.

III. Program Requirements

A. Mandatory requirements

The Management mandatory core courses are listed in the table below.

Course #	Title	Credits	Prerequisites
BADM 410	International Business	3	Senior Standing
BADM 485	Co-op Work Experience	1	ENGL 217; Senior Standing
BADM 495	Integrative Learning Project	3	Senior Standing
BMGT 205	Organizational Behavior	3	BMGT 200
BMGT 350	Entrepreneurship	3	BACC 201
BMGT 400	Operations Management	3	BADM 250
BMGT 485	Strategic Management	3	Senior Standing
BECN 305	Managerial Economics	3	BECN 301
BHRM 300	Human Resources Management	3	BMGT 205
	One Major Elective	3	

B. Major Electives

As part of the program for the Bachelor of Business Administration in Management, the student is required to study 3 credit hours of major electives. Major electives could be upper level courses in Management or in closely related business areas. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. Meanwhile, they introduce an element of flexibility into the program, which allows the integration of newly emerging topics.

The student should select, in cooperation with the academic advisor, the elective course that best meets his or her needs and aspirations. It is highly recommended that the student register for these courses after completing the Departmental requirements. The table below lists some recommendations for major elective courses:

Course #	Title	Credits	Prerequisites
BADM 405	E-Business	3	Senior Standing
BFIN 400	Financial Management II	3	BFIN 300
BMGT 300	Project Management	3	Junior Standing
BMGT 410	Quality Management	3	BADM 250

C. Integrative Learning Project

The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study.

D. Co-op Work Experience

Each student must complete 8 weeks of practical training in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the second year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits to ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are then required to submit formal reports and posters and make formal presentations about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Study Plan

The Bachelor of Business Administration in Management encompasses 99 credit hours that are spread over 6 semesters and two summer sessions. The first summer session should be dedicated to the Community Engagement Experience. Meanwhile, the second session should be for the Co-op work experience. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (16 Credits)			
BMGT 200	Introduction to Management	3	Co-requisite ENGL 210
BITM 200	Business Information Technology Management Essentials	3	
BACC 201	Financial Accounting I	3	
BADM 215	Personal Development and Management	1	
ENGL 210	English Composition and Rhetoric	3	ENGL 101
MATH 207	College Algebra*	3	Placement
Year 1, Spring Semester (16 Credits)			
BADM 225	Business Math	3	Placement
BADM 230	Business Law	3	
BACC 202	Financial Accounting II	3	BACC 201
BGMT 205	Organizational Behavior	3	BMGT 200
ENGL 217	Professional English Writing	3	ENGL 210
BADM 235	Business Research Methodology	1	
Year 1, Summer Semester (0 Credit)			
BADM 290	Community Engagement Experience	0	
Year 2, Fall Semester (18 Credits)			
BFIN 300	Financial Management I	3	BACC 201
BMKT 200	Introduction to Marketing	3	Co-requisite ENGL 210

BMGT 300	Human Resources Management	3	BMGT 205
BADM 250	Business Statistics I	3	
BECN 301	Microeconomics	3	Junior Standing
	Science Elective	3	
Year 2, Spring Semester (18 Credits)			
BITM 300	Information Technology Management	3	BITM 200
BMGT 350	Entrepreneurship	3	BACC 201
BADM 350	Business Statistics II	3	BADM 250
BECN 302	Macroeconomics	3	Junior Standing
BADM 355	Business Ethics and Social Responsibility	3	Junior Standing
	Humanities / Fine Arts Elective	3	
Year 2, Summer Semester (1 Credits)			
BADM 485	Co-op Work Experience	1	ENGL 217; Senior Standing
Year 3, Fall Semester (15 Credits)			
BMGT 400	Operations Management	3	BADM 250
ARAB 211	Arabic Language and Communication	3	
BADM 410	International Business	3	Senior Standing
BADM 420	Quantitative Methods for Business	3	BADM 350
	Social Science Elective	3	
Year 3, Spring Semester (15 Credits)			
BADM 495	Integrative Learning Project	3	Senior Standing
BMGT 485	Strategic Management	3	Senior Standing
BECN 305	Managerial Economics	3	BECN 301
	Major Elective	3	
	Social Science Elective	3	

* Students exempted from this course based on their score in the mathematics placement exam will select a free elective course as a substitute for it.

Course Description

Mandatory Courses

Descriptions of the major mandatory courses are given below.

BADM 410	International Business	3(3,0)
This course is a blend of lectures, case studies, and discussions, of current events affecting international business. The topics will cover international trade and FDI, International strategy, organizational structure, market analysis, selection, and entry modes,		

import/export practices, international marketing practices and financial management, in addition to an overview of international institutions and other environmental forces relating to PEST analysis. **Prerequisite:** Senior Standing.

BADM 485	Co-op Work Experience	1(1,0)
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The first Co-op work experience is designed to provide students with full-time work term in business, industry, or government. The main thrust of this course is the opportunity to put into practice the major aspects of the student's business education. Special emphasis will be placed on assessing the attitude and work ethics of the "co-op" student. Students will be encouraged to network in the industry and to participate in professional organizations. **Prerequisite:** ENGL 217 and Senior Standing.

BADM 495	Integrative Learning Project	3(3,0)
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The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study. **Prerequisite:** Senior Standing.

BMGT 205	Organizational Behavior	3(3,0)
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The objective of this course is to allow the student to develop the necessary skills and conceptual tools to understand and deal effectively with human behavior in organizations. Special emphasis will be placed on employee motivation, teamwork, leadership, communication, conflict and negotiation, in addition to an overview of attitudes, values, personality, and perception. **Prerequisite:** BMGT 200.

BMGT 350	Entrepreneurship	3(3,0)
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The instructor leads the students through detailed aspects of starting a business, from the identification of the opportunity up to and including the operational and financial aspects. Students will prepare a business plan as part of their course work and will also learn how to approach potential investors. **Prerequisite:** BACC 201.

BMGT 400	Operations Management	3(3,0)
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Students study the principles, practices, and functions of operations management using modern decision making tools. Foundation skills in forecasting, quality management, facility location and layout, inventory control systems, capacity and aggregate planning, JIT, statistical process control (SPC). **Prerequisite:** BADM 250.

BMGT 485	Strategic Management	3(3,0)
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This is an advanced course for upper level management students. It covers basic concepts of strategic management, corporate, environmental scanning and industry analysis, internal

scanning and organizational analysis, and strategy formulation, including situation analysis and business strategy, corporate strategy, and functional strategy. **Prerequisite:** Senior Standing.

BECN 305	Managerial Economics	3(3,0)
This course is an application of microeconomics theory to a variety of management and planning decisions such as output maximization and cost minimization given the constraints faced by firms. Demand analysis, cost analysis, and different market structures are studied. Prerequisite: BECN 301.		

BHRM 300	Human Resources Management	3(3,0)
This course provides the student with a basic, functional understanding of current Human Resources Management concepts and applications in developing small and large businesses. Topics include recruitment, selection, orientation and training, development, assessment, compensation, job design, and career guidance, in addition to compliance with labor laws and labor union negotiations. Prerequisite: BMGT 205		

Elective Courses

Descriptions of some major elective courses are given below.

BITM 405	E-Business	3(3,0)
This course offers a comprehensive introduction to the theory and practice of e-business and e-commerce management. It focuses on business issues, challenges, and opportunities in an electronic business environment. The course provides a good balance between the technical and managerial topics and how to improve an organization's effectiveness and competitiveness. Prerequisite: Senior Standing.		

BFIN 400	Financial Management II	3(3,0)
As a continuation of Financial Management I, this course exposes students to the financial management of the firm for the purpose of value maximization. That includes capital budgeting, capital structure and leverage, dividend policy, mergers & acquisitions, long term debt and financial planning and policy. Prerequisite: BFIN 300.		

BMGT 300	Project Management	3(3,0)
This course provides the students the necessary skills to manage their business projects using effective techniques in leading, organizing, scheduling, and controlling the tasks contributing to the project goals. Topics include selection and statement of work of projects; skills of project managers, and task break down structure, PERT/CPM scheduling and budgeting, Prerequisite: Junior Standing		

BMGT 410	Quality Management	3(3,0)
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This course highlights the fact that TQM has become a crucial requirement for business excellence in worldwide markets. It offers students the opportunity to learn techniques that establish sustainable quality improvement in both product and services industries. Topics include the 7-quality control tools, SPC, quality function deployment and the house of quality, product reliability, Six Sigma, Benchmarking, quality certification and awards, and quality costing. **Prerequisite:** BADM 250

MARKETING PROGRAM

Learning Goals and Objectives

The purpose of the Marketing Program at the College of Business Administration of Rafik Hariri University is an integrative composite of four main dimensions: Specialized Knowledge, Professional Placement, Way of Thinking, and Growth Potential.

Specialized knowledge

Goal 1: To develop graduates with an effective level of professional competence in most activities marketing including, but not limited to, customer relationship management, consumer behavior, marketing research, marketing strategies, sales and promotions, communication, pricing, digital and social media marketing.

Objective 1: Develop marketing strategies and plans based on sound marketing research projects and initiatives.

Objective 2: Reflect upon the delivery of customer value to build long term relationships via assessment and interpretation of consumer behavior.

Professional Placement

Goal 2: To provide graduates with knowledge adequate for challenging entry and middle level positions in the areas of marketing including such positions as sales manager, product manager, marketing analyst etc.

Objective 3: Demonstrate broad marketing knowledge which would enable placement in a wide range of marketing capacities in various types of business organizations.

Way of Thinking

Goal 3: To promote innovative and critical thinking, as well as ethical conduct in all aspects of marketing, that pertains not only to operational activities, but also to strategic decision making and internal control.

Objective 4: Employ marketing tools to identify problematic issues at the operational level and reflect upon innovative potential solutions.

Objective 5: Recognize marketing related ethical dilemmas and respond to them according to established codes of conduct, ethics and best practices

Growth Potential

Goal 4: To ensure that graduates possess a broad array of general and technical skills that enables them to adjust to the dynamics of today's global business environment and to seek academic and/or professional growth opportunities.

Objective 6: Demonstrate marketing knowledge which enables qualification for first level professional certification in the domain of marketing or pursuit of graduate education.

Career Opportunities

With the ever-growing demand for good creative marketers, marketing graduates can choose from a number of career tracks appropriate for their specialization. Career tracks include such areas as account marketing, affinity marketing, branding, marketing research, loyalty marketing, integrated marketing communication and customer relationship management. Possible career options include positions as marketing managers, promotion consultants, advertising managers, sales managers, marketing research analysts, events planner, product or brand manager and communication specialist.

Program Overview

Marketing is not just an occupation, but a crucial business function. First and for most, marketing is about understanding consumer behavior and preferences and then creating and communicating value that meets, if not exceeds consumer's expectations.

Another important aspect of modern marketing is customer relationship management (CRM) which allows a business to develop and exploit a mutually beneficial sustainable relationship with the customer.

Finally, in today's global village, marketing cannot be as effective if its efforts do not fully integrate elements of online communication and social media networking.

To obtain a Bachelor of Business Administration degree in Marketing, the student must complete a total of 99 credit hours. These hours span University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours is shown in the following table:

BBA in Marketing (99 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	18	12	30	30
College Requirement	3	-	38	-	41	41
Program Requirement	25	3	-	-	28	28
Credits	28	3	56	12	99	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalog.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalog. Students in Marketing and Advertising take Mass Media Essentials instead of Quantitative Methods for Business. They also take Principles and Practices of Public Relations instead of Business Statistics II.

III. Program Requirements

A. Mandatory requirements

The Marketing program mandatory courses are listed in the table below.

Course #	Title	Credits	Prerequisites
BADM 410	International Business	3	Senior Standing
BADM 485	Co-op Work Experience	1	ENGL 217; Senior Standing
BADM 495	Integrative Learning Project	3	Senior Standing
BMKT 300	Marketing Research	3	BADM 250
BMKT 305	Sales Management	3	BMKT 200
BMKT 310	Consumer Behavior	3	BMKT 200
BMKT 405	Customer Relationship Management	3	Senior Standing
BMKT 450	Events Marketing and Management	3	Senior Standing
BMKT 485	Strategic Marketing	3	Senior Standing
	One Major Elective	3	

B. Major Electives

As part of the program for the Bachelor of Business Administration in Marketing, the student is required to study 3 credit hours of major electives. Major electives could be upper level courses in Marketing or in closely related business areas. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. Meanwhile, they introduce an element of flexibility into the program, which allows the integration of newly emerging topics.

The student should select, in cooperation with the academic advisor, the elective course that best meets his or her needs and aspirations. It is highly recommended that the student register for these courses after completing the Departmental requirements. The table below lists some recommendations for major elective courses:

Course #	Title	Credits	Prerequisites
BADM 405	E Business	3	Senior Standing
BMKA 300	Principles and Practices of Advertising	3	BMKT 200
CMNS 310	Persuasion	3	

CMNS 340	Media and Public Relations Writing	3	
CMNS 380	Social Media Campaigns and Strategies	3	

C. Integrative Learning Project

The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study.

D. Co-op Experience

Each student must complete 8 weeks of practical training in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits to ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are then required to submit formal reports and poster and make formal presentations about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Study Plan

The Bachelor of Business Administration in Marketing encompasses 99 credit hours that are spread over 6 semesters and two summer sessions. The first summer session should be dedicated to the Community Engagement Experience. Meanwhile, the second session should be for the Co-op work experience. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (16 Credits)			
BMGT 200	Introduction to Management	3	Co-req. ENGL 210
BITM 200	Business Information Technology Management Essentials	3	
BACC 201	Financial Accounting I	3	
BADM 215	Personal Development and Management	1	
ENGL 210	English Composition and Rhetoric	3	ENGL 101
MATH 207	College Algebra*	3	Placement
Year 1, Spring Semester (16 Credits)			
BADM 225	Business Math	3	Placement

BADM 230	Business Law	3	
BACC 202	Financial Accounting II	3	BACC 201
BMKT 200	Introduction to Marketing	3	Co-req. ENGL 210
ENGL 217	Professional English Writing	3	ENGL 210
BADM 235	Business Research Methodology	1	
Year 1, Summer Semester (0 Credit)			
BADM 290	Community Engagement Experience	0	
Year 2, Fall Semester (18 Credits)			
BFIN 300	Financial Management I	3	BACC 201
BADM 250	Business Statistics I	3	
BITM 300	Business Information Technology Management	3	BITM 200
BECN 301	Microeconomics	3	Junior Standing
BMKT 305	Sales Management	3	BMKT 200
	Science Elective	3	
Year 2, Spring Semester (18 Credits)			
ARAB 211	Arabic Language and Communication	3	
BMKT 300	Marketing Research	3	BMKT 200, BADM 250
BMKT 310	Consumer Behavior	3	BMKT 200
BECN 302	Macroeconomics	3	Junior Standing
BADM 350	Business Statistics II	3	BADM 250
	Humanities / Fine Arts Elective	3	
Year 2, Summer Semester (1 Credit)			
BADM 485	Co-op Work Experience	1	ENGL 217; Senior Standing
Year 3, Fall Semester (15 Credits)			
BKMT 405	Customer Relationship Management	3	Senior Standing
BADM 410	International Business	3	Senior Standing
BADM 420	Quantitative Methods for Business	3	BADM 350
	Major Elective	3	
	Social Science Elective	3	
Year 3, Spring Semester (15 Credits)			
BADM 495	Integrative Learning Project	3	Senior Standing
BMKT 450	Events Marketing and Management	3	Senior Standing
BMKT 485	Strategic Marketing	3	Senior Standing
BADM 355	Business Ethics and Social Responsibility	3	Junior Standing
	Social Science Elective	3	

* Students exempted from this course based on their score in the mathematics placement exam will select a free elective course as a substitute for it.

Course Description

Mandatory Courses

Descriptions of the major mandatory courses are given below.

BADM 410	International Business	3(3,0)
<p>In this course, students learn the concepts of international business procedures, such as international trade and FDI, international strategy, organizational structure, market analysis, selection, and entry modes, import/export practices, international marketing practices and financial management. In addition, it provides an overview of international institutions and other environmental forces relating to PEST analysis. Prerequisite: Senior Standing</p>		

BADM 485	Co-op Work Experience	1(0,1)
<p>The Co-op work experience is designed to provide students with full-time work term in business, industry, or government. The main thrust of this course is the opportunity to put into practice the major aspects of the student's business education. Special emphasis will be placed on assessing the attitude and work ethics of the "co-op" student. Students will be encouraged to network in the industry and to participate in professional organizations. Prerequisite: ENGL 217 and Senior Standing.</p>		

BADM 495	Integrative Learning Project	3(3,0)
<p>The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study. Prerequisite: Senior Standing</p>		

BMKT 300	Marketing Research	3(3,0)
<p>This course introduces students to marketing research and its role in the marketing decision-making / planning process. It provides the necessary skills to address marketing problems and opportunities. Applying the marketing research process, students practically learn how to address real-life marketing situations and end the course by preparing a marketing research report. Prerequisite: BMKT 200, BADM 250.</p>		

BMKT 305	Sales Management	3(3,0)
<p>Rapidly changing market conditions and customers' expectation are redefining the roles of salespeople and the sales process into a modern framework. This course helps students understand and apply practical interpersonal techniques and persuasive communication strategies in the selling process. Building and retaining customer value and long-term relationships is a core theme throughout the course. Prerequisite: BMKT 200.</p>		

BMKT 310	Consumer Behavior	3(3,0)
<p>This course is an introduction to the world of consumer behavior. Students explore how perceptions, learning, memory, personality, and attitudes influence consumption behavior; how consumption changes during one's life cycle; and how powerful cultural and sub-cultural factors influence consumers. Application of theories and case studies analysis are employed throughout the course. Prerequisite: BMKT 200</p>		

BMKT 405	Customer Relationship Management	3(3,0)
<p>Customer relationship management involves the use of information technologies and systems to manage organization's interactions with current and future customers. It is a holistic approach that necessitates the coordination and synchronization of sales, marketing, customer service and technical support. Main topics include, relationship marketing, the role of information technology, data mining, economic value of CRM and CRM software packages. Prerequisite: Senior Standing.</p>		

BMKT 450	Events Marketing and Management	3(3,0)
<p>This course covers the skills and concepts necessary to create, manage, market, and finance special events. It provides a conceptual overview and systematic study of event marketing and management. Additionally, it fosters professionalism, coordination, and collaboration to achieve the objectives of special events. The course concludes by implementing and evaluating a special event. Prerequisite: Senior Standing.</p>		

BMKT 485	Strategic Marketing	3(3,0)
<p>This course explores in depth the concepts and methods of the strategic marketing planning process. Drawing heavily from actual marketing case studies, it covers market situational analysis, different marketing strategies at various organizational levels, and marketing tactics to build and sustain competitive advantage. The course concludes by developing and presenting a marketing plan. Prerequisite: Senior Standing.</p>		

Elective Courses

Descriptions of some major elective courses are given below.

BITM 405	E Business	3(3,0)
<p>This course offers a comprehensive introduction to the theory and practice of e-business and e-commerce management. It focuses on business issues, challenges, and opportunities in an electronic business environment. The course provides a good balance between the technical and managerial topics and how to improve an organization's effectiveness and competitiveness. Prerequisite: Senior Standing.</p>		

BMKA 300	Principles and Practices of Advertising	3(3,0)
<p>This course exposes students to the role of advertising in society in general and in the business</p>		

world in particular from both theoretical and professional perspectives. The material will outline the structure of the advertising industry and focus on professional practices, including the advertising process, messages, branding, campaign design etc. **Prerequisite:** BMKT 200

CMNS 310	Persuasion	3(3,0)
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Through reading, writing and speech, students will become familiar with the persuasive strategy described in Aristotle's Rhetoric, and consider how that strategy can be employed in professional and personal situations in writing, public speaking and negotiation.

CMNS 340	Media and Public Relations Writing	3(3,0)
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This introductory-level course is designed to develop and strengthen general writing skills, and to help students learn the formats and conventions of media and public relations writing, including newspapers, magazines, web and interactive media, advertising copy, press releases, talking points, media alerts, public service announcements, newsletters and social media. It also addresses ethical issues related to writing in these fields.

CMNS 380	Social Media Campaigns and Strategies	3(3,0)
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This course examines the strategic uses, impacts and implications of emerging and social media, and examines the ways in which social media affects the daily lives of our society and its individual members. It also expands student knowledge of emerging and social media, and their application to business, advertising and public relations, as well as political movements and the development of communities.

MARKETING AND ADVERTISING PROGRAM

Learning Goals and Objectives

The purpose of the Marketing and Advertising Program at the College of Business Administration of Rafik Hariri University is an integrative composite of four main dimensions: Specialized Knowledge, Professional Placement, Way of Thinking, and Growth Potential.

Specialized knowledge

Goal 1: To develop graduates with an effective level of professional competence in most activities of the business of advertising function including, but not limited to, mass communication, integrated communication, media planning and analysis, consumer preferences, market research, advertising design and copywriting.

Objective 1: Develop integrated marketing communication strategies and plans based on sound marketing research projects and initiatives.

Objective 2: Use advertising theories and principles to evaluate alternative advertising designs, promotional approaches and media plans.

Professional Placement

Goal 2: To provide graduates with knowledge adequate for challenging entry and middle level positions in the areas of media, advertising and marketing communication.

Objective 3: Demonstrate broad marketing and advertising knowledge which would enable placement in a wide range of marketing and advertising capacities in various types of organizations.

Way of Thinking

Goal 3: To promote innovative and critical thinking, as well as ethical conduct in all aspects of media, advertising and communication, that pertains not only to operational activities, but also to strategic decision making and internal control.

Objective 4: Employ marketing, advertising and communication tools to identify problematic issues at the operational level and reflect upon innovative potential solutions.

Objective 5: Recognize marketing and advertising related ethical dilemmas and respond to them according to established codes of conduct, ethics and best practices.

Growth Potential

Goal 4: To ensure that graduates possess a broad array of general and technical skills that enables them to adjust to the dynamics of today's global business environment and to seek academic and/or professional growth opportunities.

Objective 6: Demonstrate marketing and advertising knowledge which enables qualification for first level professional certification in the domain or pursuit of graduate education

Career Opportunities

The program opens up the doors to a range of career possibilities in media, advertising and marketing communication. Career opportunities include such positions as director of account services, advertising manager, account executive, accounts planner, internal communication coordinator, and copywriter.

Program Overview

The Bachelor of Business Administration with specialization in Marketing and Advertising is a program carefully designed to prepare graduates for successful careers in the media and advertising industry or in marketing communication / corporate communication positions which require expertise in both marketing and in advertising.

The program is founded upon general business and management core knowledge base with additional technical and specialized knowledge drawn and integrated together from the main dimensions of marketing, advertising, public relations and communication.

To obtain a Bachelor of Business Administration degree in Marketing and Advertising, the student must complete a total of 99 credit hours. These hours span University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours is shown in the following table:

BBA in Marketing and Advertising (99 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	-	-	18	12	30	30
College Requirement	3	-	38	-	41	41
Program Requirement	25	3	-	-	28	28
Credits	28	3	56	12	99	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalogue.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Business Administration section in this catalogue.

Students in Marketing and Advertising take Mass Media Essentials instead of Quantitative Methods for Business. They also take Principles and Practices of Public Relations instead of Business Statistics II.

III. Program Requirements

A. Mandatory requirements

The Marketing and Advertising program mandatory courses are listed in the table below.

Course #	Title	Credits	Prerequisites
BADM 485	Co-op Work Experience	1	ENGL 217; Senior Standing
BADM 495	Integrative Learning Project	3	Senior Standing
BMKA 300	Principles and Practices of Advertising	3	
BMKA 350	Advertising Copywriting and Creativity	3	BMKA 300
BMKA 400	Design for Advertising	3	BMKA 300
BMKA 405	Media Planning, Analysis & Management	3	CMNS 301, BADM 250
BMKT 300	Marketing Research	3	BMKT 200, BADM 250
BMKT 310	Consumer Behavior	3	BMKT 200
BMKT 485	Strategic Marketing	3	Senior Standing
	Major Elective	3	

B. Major Electives

As part of the program for the Bachelor of Business Administration in Marketing and Advertising, the student is required to study 3 credit hours of major electives. Major electives could be upper level courses in Advertising, Marketing or in closely related business areas. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. Meanwhile, they introduce an element of flexibility into the program, which allows the integration of newly emerging topics.

The student should select, in cooperation with the academic advisor, the elective course that best meets his or her needs and aspirations. It is highly recommended that the student register for these courses after completing the Departmental requirements. The table below lists some recommendations for major elective courses:

Course #	Title	Credits	Prerequisites
BMKT 305	Sales Management	3	BMKT 200
BMKT 450	Events Marketing and Management	3	Senior Standing
CMNS 310	Persuasion	3	
CMNS 380	Social Media Campaigns and Strategies	3	
CMNS 340	Media and Public Relations Writing	3	

C. Integrative Learning Project

The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study.

D. Co-op Experience

Each student must complete 8 weeks of practical training in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits to ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are then required to submit formal reports and posters and make formal presentations about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Study Plan

The Bachelor of Business Administration in Marketing and Advertising encompasses 99 credit hours that are spread over 6 semesters and two summer sessions. The first summer session should be dedicated to the Community Engagement Experience. Meanwhile, the second session should be for the Co-op work experience. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (16 Credits)			
BMGT 200	Introduction to Management	3	Co-req. ENGL 210
BITM 200	Business Information Technology Management Essentials	3	
BACC 201	Financial Accounting I	3	
BADM 215	Personal Development and Management	1	
ENGL 210	English Composition and Rhetoric	3	ENGL 101
MATH 207	College Algebra*	3	Placement
Year 1, Spring Semester (16 Credits)			
BADM 225	Business Math	3	Placement
BADM 230	Business Law	3	
BACC 202	Financial Accounting II	3	BBACC 201
BMKT 200	Introduction to Marketing	3	Co-req. ENGL 210

ENGL 217	Professional English Writing	3	ENGL 210
BADM 235	Business Research Methodology	1	
Year 1, Summer Semester (0 Credit)			
BADM 290	Community Engagement Experience	0	
Year 2, Fall Semester (18 Credits)			
BFIN 300	Financial Management I	3	BACC 201
BADM 250	Business Statistics I	3	
BMKA 300	Principles and Practices of Advertising	3	
ADPR 320	Introduction to Public Relations	3	
BECN 301	Microeconomics	3	Junior Standing
	Science Elective	3	
Year 2, Spring Semester (18 Credits)			
BMKA 350	Advertising Copywriting and Creativity	3	BMKA 300
BMKT 310	Consumer Behavior	3	BMKT 200
CMNS 301	Mass Media Essentials	3	
BECN 302	Macroeconomics	3	Junior Standing
BMKT 300	Marketing Research	3	BMKT 200, BADM 250
	Social Science Elective	3	
Year 2, Summer Semester (1 Credit)			
BADM 485	Co-op Work Experience	1	ENGL 217; Senior Standing
Year 3, Fall Semester (15 Credits)			
BMKA 400	Design for Advertising	3	BMKA 300
BITM 300	Business Information Technology Management	3	BITM 200
ARAB 211	Arabic Language and Communication	3	
BMKA 405	Media Planning, Analysis and Management	3	CMNS 301, BADM 250
	Major Elective	3	
Year 3, Spring Semester (15 Credits)			
BADM 495	Integrative Learning Project	3	Senior Standing
BADM 355	Business Ethics and Social Responsibility	3	Junior Standing
BMKT 485	Strategic Marketing	3	Senior Standing
	Humanities / Fine Arts Elective	3	
	Social Science Elective	3	

* Students exempted from this course based on their score in the mathematics placement exam will select a free elective course as a substitute for it.

Course Description

Mandatory Courses

Descriptions of the major mandatory courses are given below.

BADM 485	Co-op Work Experience	1(1,0)
<p>The Co-op work experience is designed to provide students with full-time work term in business, industry, or government. The main thrust of this course is the opportunity to put into practice the major aspects of the student's business education. Special emphasis will be placed on assessing the attitude and work ethics of the "co-op" student. Students will be encouraged to network in the industry and to participate in professional organizations. Prerequisite: ENGL 217 and Senior Standing.</p>		

BADM 495	Integrative Learning Project	3(3,0)
<p>The Project is a culminating applied experience in which students pursue independent research on a business question or issue or problem of concern to industry or the community at large. Students are expected to engage with the scholarly debates in the pertinent disciplines, and produce a substantial paper that reflects deep understanding of the topic and competence in the chosen field of study. Prerequisite: Senior Standing.</p>		

BMKA 300	Principles and Practices of Advertising	3(3,0)
<p>This course exposes students to the role of advertising in society in general and in the business world in particular from both theoretical and professional perspectives. The material will outline the structure of the advertising industry and focus on professional practices, including the advertising process, messages, branding, campaign design etc. Prerequisite: BMKT 200</p>		

BMKA 350	Advertising Copywriting and Creativity	3(3,0)
<p>Advertising copywriting is a creative communication form based upon a sense of artistry and conducted in a context of business. Students learn to create advertising concepts and ideas and transform them into effective print ads, brochures, direct mail, radio and television commercials and online communication forms. Prerequisite: BMKA 300.</p>		

BMKA 400	Design for Advertising	3(3,0)
<p>In this course students will explore the principles of the graphic design process by applying design principles appropriate to advertising problem solving. The design process is approached from both the creative and business perspectives. Case studies from print, Web, Social Media and TV showcase advertising concepts at work: persuasion, color psychology and composition, copywriting and typography, and brand communication. Prerequisite: BMKA 300</p>		

BMKA 405	Media Planning, Analysis and Management	3(3,0)
<p>This course will teach students critical and strategic planning and select and evaluate media for advertising purposes. The principles of media planning and buying will be emphasized. Students will study audience measurement, media research, audience segmentation and marketing strategies. Prerequisite: CMNS 301, BADM 250.</p>		

BMKT 300	Marketing Research	3(3,0)
<p>This course introduces students to marketing research and its role in the marketing decision-making / planning process. It provides the necessary skills to address marketing problems and opportunities. Applying the marketing research process, students practically learn how to address real-life marketing situations and end the course by preparing a marketing research report. Prerequisite: BMKT 200, BADM 250.</p>		

BMKT 310	Consumer Behavior	3(3,0)
<p>This course is an introduction to the world of consumer behavior. Students explore how perceptions, learning, memory, personality, and attitudes influence consumption behavior; how consumption changes during one's life cycle; and how powerful cultural and sub-cultural factors influence consumers. Application of theories and case studies analysis are employed throughout the course. Prerequisite: BMKT 200</p>		

BMKT 485	Strategic Marketing	3(3,0)
<p>This course explores in depth the concepts and methods of the strategic marketing planning process. Drawing heavily from actual marketing case studies, it covers market situational analysis, different marketing strategies at various organizational levels, and marketing tactics to build and sustain competitive advantage. The course concludes by developing and presenting a marketing plan. Prerequisite: Senior Standing.</p>		

Elective Courses

Descriptions of some major elective courses are given below.

BMKT 305	Sales Management	3(3,0)
<p>Rapidly changing market conditions and customers' expectation are redefining the roles of salespeople and the sales process into a modern framework. This course helps students understand and apply practical interpersonal techniques and persuasive communication strategies in the selling process. Building and retaining customer value and long-term relationships is a core theme throughout the course. Prerequisite: BMKT 200.</p>		

BMKT 450	Events Marketing and Management	3(3,0)
<p>This course covers the skills and concepts necessary to create, manage, market, and finance special events. It provides a conceptual overview and systematic study of event marketing and management. Additionally, it fosters professionalism, coordination, and collaboration to</p>		

achieve the objectives of special events. The course concludes by implementing and evaluating a special event. **Prerequisite:** Senior Standing.

CMNS 310	Persuasion	3(3,0)
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Through reading, writing and speech, students will become familiar with the persuasive strategy described in Aristotle's Rhetoric, and consider how that strategy can be employed in professional and personal situations in writing, public speaking and negotiation.

CMNS 340	Media and Public Relations Writing	3(3,0)
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This introductory-level course is designed to develop and strengthen general writing skills, and to help students learn the formats and conventions of media and public relations writing, including newspapers, magazines, web and interactive media, advertising copy, press releases, talking points, media alerts, public service announcements, newsletters and social media. It also addresses ethical issues related to writing in these fields.

CMNS 380	Social Media Campaigns and Strategies	3(3,0)
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This course examines the strategic uses, impacts and implications of emerging and social media, and examines the ways in which social media affects the daily lives of our society and its individual members. It also expands student knowledge of emerging and social media, and their application to business, advertising and public relations, as well as political movements and the development of communities.

MINOR IN BUSINESS ADMINISTRATION PROGRAM

Learning Goal

Provide students with a fundamental base of knowledge and competence in business administration, with a flavor of entrepreneurship.

Learning Objectives

Upon Completion of the minor program, students should be able to

- 1) Identify and explain basic core concepts in main business functional areas, namely accounting, economics, finance, management and marketing.
- 2) Utilize business principles to assess and consequently understand the dynamics of internal and external business environments.
- 3) Assess and discuss the requirements needed to launch and succeed in a startup business and entrepreneurial initiatives.

Program Overview

In today's world of globalization, interdependence and tough competitive pressures, professional work environments have become multidimensional and multidisciplinary, regardless of one's area of expertise. Consequently, 21st century's professionals are expected to branch out of their areas of expertise and acquire additional competencies, which would enable them to meet the challenges of diverse tasks and work assignments. In particular, it has become difficult today to succeed in engineering, science, medicine, the arts and humanities without some fundamental competence in business administration.

In recognition of this particular development, and in an effort to meet its demands and expectations, the College of Business Administration at Rafic Hariri University offers a Minor in Business Administration program to non-business students. The program is designed to ensure acquisition of a fundamental base of knowledge and competence in business administration, with a flavor of entrepreneurship.

Program Requirements

To successfully complete the Minor in Business Administration program, a student must

- 1) Declare a Minor in Business Administration by completing the Minor Declaration Form;
- 2) Obtain the approval of the dean of the college major and the dean of the College of Business Administration;

- 3) Obtain a Minor Cumulative Grade Point Average (MCGPA) of no less than 70 %.
- 4) Complete 18 credits of business coursework as specified below

Course #	Title	Credits	Prerequisites
BACC 201	Financial Accounting I	3	
BECN 301 or BECN 302	Microeconomics or Macroeconomics	3	Junior Standing
BFIN 301	Financial Management I	3	BACC 201
BMGT 200	Introduction to Management	3	Co-requisite ENGL 210
BMGT 350 *	Entrepreneurship	3	BACC 201
BMKT 200	Introduction to Marketing	3	Co-requisite ENGL 210
* Engineering students may take Technopreneurship instead of Entrepreneurship. Computer Science students may take Project Management instead of Entrepreneurship.			

FACULTY LIST

Abdallah, Samer; Adjunct Professor, Ph.D. in Robotics and MBA in Business Strategy, University of Sydney, Sydney, Australia, 1997.

Akoum, Ibrahim; Associate Professor and Chair, Ph.D. in Public Policy and Political Economy, University of Texas at Dallas, Dallas, USA, 1990.

Akoum, Rana; Instructor, MA in Business Law, Lebanese University, Lebanon, 2005.

Akoum, Rola; Instructor, MA in Business Law, Lebanese University, Lebanon, 2010.

Ayass, Arfan; Instructor, MS in Accounting, University of South Carolina, USA, 1969.

Bizri, Rima; Assistant Professor and Chair, Ph.D. in Risk Management in Islamic Finance, Imam Ouzai University, Beirut, Lebanon, 2014.

Balaa, Yusra; Instructor, MBA in General Business, American University of Beirut, Lebanon, 1992.

Chaya, Jamil; Lecturer, Ph.D. in Money and Finance, University of Rome Tor Vergata, Rome, Italy, 2015.

Hajjar, Faysal; Instructor, MS in Finance; Saint Joseph University, Lebanon, 2005.

Hakim, Rima; Lecturer, M.S., CMA in Business Management, Beirut University College (BUC), Beirut, Lebanon, 1993.

Hammoud, Jamil; Associate Professor and Dean, Ph.D. in Economics, Ecole des Hautes Etudes en Sciences Sociales (EHESS), Paris, France, 2003.

Mansour, Samat Khayat; Instructor, MA in Economics, American University of Beirut, Lebanon, 2001.

Mozahem, Najib; Lecturer, Ph.D. in Organizational Theory, Durham Business School, Durham, England, 2015.

Rahal, Bassim; Instructor, MBA in Finance, Lebanese American University, Lebanon, 1999.

Saheb, Adel; Instructor, MS in Construction Management, University of Pittsburg, USA, 1987

Wahbi, Marwan; Lecturer, MBA in Marketing, Lebanese American University, Beirut, Lebanon, 2005.

Zoughaib, Mona; Lecturer; Ph.D. in Management Science, University of Paris V, Descartes, France, 2009.

COLLEGE OF ENGINEERING

COLLEGE OF ENGINEERING

Officers of the College

Riad Chedid	President
Ahmad Smaili	Vice President for Academic Affairs
Hisham Basha	Dean

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History

The College of Engineering at Rafik Hariri University (RHU) was established in 1999. Since then, the College has grown significantly and presently offers six undergraduate engineering programs in Biomedical, Civil, Computer and Communications, Electrical, Mechanical, Mechatronics Engineering. Fully accredited by the Lebanese Ministry of higher education, the College is working with each department towards accreditation by the Engineering Accreditation Commission of ABET – the most prestigious accrediting agency worldwide.

The College also features active research programs in a number of engineering areas. In this regard, Master Degree's programs in all six programs are available. For those students who are employed and can only be present on campus in the afternoons, a non-thesis Master's degree option is also available. More than 400 students are currently enrolled in the undergraduate and graduate programs.

Overview

The College of Engineering at RHU was established in order to fill a perceived gap that existed in high-caliber, yet affordable, higher education in technology and associated fields. The College strives to apply learning methodologies that can transform entrant students into 21-century leaders in their respective fields. Furthermore, the College stresses the important balance between knowledge-skills and application. To the latter's effect, specialized Labs, modern class rooms, and a unique Co-op experience are implemented.

Vision

The College of Engineering aspires to be a center of excellence in engineering education and an incubational environment for innovation that serves Lebanon, the region and worldwide.

Mission

The College of Engineering's mission is to provide quality professional education in a learning environment conducive to transformation that will enable our students to effectively innovate practical solutions to society's problems and individual needs in Lebanon, the Middle East and the world.

Goals

We strive to achieve our mission. To this end, we are committed to ever-revise our programs while keeping our senses tuned to our surroundings. More than anything else, our students - their learning and potential success - receive our greatest attention.

Values

The college of Engineering fully endorses the values of RHU of: Academic Freedom of Inquiry, Excellence through Innovation, Ethical and Socially Responsible conduct, Tolerance and Diversity, Personal Initiatives and Individual Responsibility, Teamwork, Collaboration and cooperation, and Continuous Improvement.

Academic Programs

The College of Engineering offers six undergraduate programs leading to a Bachelor of Science (BS) or a Bachelor of Engineering (BE) degree, and six programs leading to a Master of Science Degree (MS).

Bachelor of Science Programs

1. Bachelor of Science in Civil Engineering
2. Bachelor of Science in Electrical Engineering
3. Bachelor of Science in Computer and Communications Engineering
4. Bachelor of Science in Biomedical Engineering
5. Bachelor of Science in Mechanical Engineering
6. Bachelor of Science in Mechatronics Engineering

Bachelor of Engineering Programs

1. Bachelor of Engineering in Civil Engineering
2. Bachelor of Engineering in Electrical Engineering
3. Bachelor of Engineering in Computer and Communications Engineering
4. Bachelor of Engineering in Biomedical Engineering
5. Bachelor of Engineering in Mechanical Engineering
6. Bachelor of Engineering in Mechatronics Engineering

Master of Science Programs

1. Master of Science in Civil Engineering
2. Master of Science in Electrical Engineering
3. Master of Science in Computer and Communications Engineering
4. Master of Science in Biomedical Engineering
5. Master of Science in Mechanical Engineering
6. Master of Science in Mechatronics Engineering

Program Codes

The following table lists the code used for each program. This code is used as the prefix of each course designation in the program.

Program Code	Program
CIVE	Civil Engineering
BIOM	Biomedical Engineering
CCEE	Computer and Communications Engineering
ELEC	Electrical and Electronics Engineering
MECH	Mechanical Engineering
MECA	Mechatronics Engineering

Admission Requirements

Further to fulfilling the University admission requirements, students aspiring to study in one of the engineering majors but did not submit SAT I scores may be required to take a placement examination in mathematics and physics, depending on the Lebanese Baccalaureate score on those subjects. Students who fail to attain a passing score in one of these subjects are required to take and pass a related remedial course to ensure their mastery of basic skills and improve their ability to handle the rigor of college-level subjects. Students are strongly advised to carefully review the University Catalog for admission and degree requirements as well as all related academic policies.

Graduation Requirements

Each Engineering program grants students one of two undergraduate degrees, either a Bachelor of Science (BS) or a Bachelor of Engineering (BE). The BS program encompasses 114 credits and the BE 147 credits. A student has to choose the degree that he/she wishes to attain by the end of the spring semester of the second year. The first three years are common in both programs. A student is eligible to receive a BS degree after completing the 114 credits cited in the first three years of the program's study plan. In addition to completing the credits requirements a student is eligible to earn the BS or BE degree if he/she attains a Cumulative GPA, a Major GPA and a Summative Learning Project Grade of 70 or above.

The required credits are distributed among three categories: University requirements (UR), College requirements (CR) and program requirements (PR). The University and College requirements are common to all departments in the College of Engineering. Each department has its own required and elective courses. The credit hour allocations for each degree (BS or BE) in each program are shown in the following table.

Bachelor of Engineering (BE) degrees - 147 credits							
Program	University Requirements		College Requirements		Program Requirements		Total Credits
	Mandatory	Electives	Mandatory	Electives	Mandatory	Electives	
CIVE	15	12	34	0	71	15	147
BIOM	15	12	31	3	71	15	147
CCE	15	12	34	0	71	15	147
ELEC	15	12	31	3	71	15	147
MECH	15	12	31	3	71	15	147
MECA	15	12	31	3	71	15	147
Credits	27		34		86		147

Bachelor of Science (BS) degrees - 114 credits							
Program	University Requirements		College Requirements		Program Requirements		Total Credits
	Mandatory	Electives	Mandatory	Electives	Mandatory	Electives	
CIVE	15	9	31	0	59	0	114
BIOM	15	9	28	3	59	0	114
CCE	15	9	31	0	59	0	114
ELEC	15	9	28	3	59	0	114
MECH	15	9	28	3	59	0	114

MECA	15	9	28	3	56	0	114
Credits	24		31		59		114

An engineering student in all programs is eligible for graduation if he/she has:

1. Completed all the requirements of the degree
2. Attained a cumulative GPA of 70 or above.
3. Attained a major GPA of 70 or above.
4. Attained a grade of 70 or above on the Summative Learning Project.
5. Received a passing grade on the Co-op work experience.

I. University Requirements (General Education)

Every BE (BS) bound student is required to take 30 credits (27 credits) of general education courses distributed over seven domains. 18 mandatory credit hours are taken from Domains 1, 4, 5, and 6 in addition to 12 (9 for BS bound students) elective credit hours from domains 2 and 3 as indicated below.

Domain	Credits	Courses
1 Communication Competency	6	ENGL 210: English Composition and Rhetoric ENGL 217: Professional English Writing
2 Humanities/Fine Arts	6	Selected from an approved list
3 Social Sciences/Culture	6	Selected from an approved list
4 ICT Competency	3	CCEE 214 or COSC 214 – Introduction to Programming
5 Quantitative Reasoning	3	MATH 351 - Probability and Statistics
6 Community Forethought	3	ENGR 200 - Engineering for the Community

Description of the specific courses in this group are given below

ENGL 210	English Composition and Rhetoric	3(3,0)
This course reinforces effective critical reading and writing skills with emphasis on writing documented essays for academic purposes in a varying range of rhetorical modes. More specifically, the student will apply the fundamental principles of English spelling, word usage, grammar, punctuation and style necessary for written communication; write academic essays; proofread and edit a variety of texts; analyze general texts for coherence, style and accuracy in writing; read critically from a variety of discourse modes; summarize, paraphrase and quote sources properly; and cite sources according to APA form.		

ENGL 217	Professional English Writing	3(3,0)
This course is designed to enhance students' professional writing skills. It is tailored to students pursuing careers in the professions and includes advanced business writing and editing, correspondence, critical review, writing professional reports and proposals, and making oral		

presentations. **Prerequisite:** ENGL 210.

ENGR 200	Engineering for the Community	3(3,0)
<p>This course aims to give students a holistic view of engineering, its interdisciplinary nature and role in solving community problems. It entails a brief overview on the role of technology, creativity and problem solving, product development cycle, contemporary engineering systems, and ethical considerations. Students in teams work on a community related project that will culminate in a working artifact. Specific topics are flexible but it shall cover fundamentals of intelligent systems, computer interface, sensing and actuation, mechanisms and structures. Fall and Spring semesters.</p>		

CCEE 214	Introduction to Programming + Lab	3(2,1)
<p>Understanding of the basic principles of programming and computer systems; Applications of programming to the solution of engineering problems; Control structures, functions, arrays, pointers and structures. Laboratory experiments of programming for concepts. Equivalent to COSC 214.</p>		

MATH 351	Probability and Statistics	3(3,0)
<p>Probability and conditional probability, random variable and distribution, continuous and marginal distributions, expectation, variance- moments-mean-median-covariance and correlation, conditional expectation, the sample mean, special distribution, Bernoulli and binomial distributions, Poisson and Gamma distribution. Prerequisite: MATH 211. Annually.</p>		

II. College Requirements

A. Remedial programs and Courses

Proficiency in the English Language is a requirement for admission to any program in the College of Engineering. In addition, all incoming engineering students must sit in for the placement exams in mathematics and physics. Depending on the scores on the placement exam, a student may be required to take one or two remedial course(s) in Physics and/or Mathematics prior to taking program level calculus and physics courses. The possible remedial courses are:

- MATH 190 - Calculus I
- MATH 191 – Calculus II
- PHYS 190 - General Physics - Mechanics
- PHYS 191 - General Physics - Electricity and Magnetism

These remedial courses do not count toward fulfilling the degree requirements. Description of the remedial courses follows.

MATH 190	Calculus I	3(3,0)
Functions and their graphs, Limits and continuity, Differentiation, Applications of derivatives, Extreme values and mean value theorem, Definite and indefinite integrals, The substitution method.		

MATH 191	Calculus II	3(3,0)
Inverse trigonometric functions, Integration techniques, Parameterizations and parametric curves, Vectors and dot and cross products, Lines and planes in space, Curves in space, Curvature and normal vectors of a curve.		

PHYS 190	General Physics – Mechanics	3(3,0)
This course introduces students to the basic concepts and principles of Mechanics: Vectors, displacement, velocity, and acceleration; motion in 1D, projectile motion, forces, and Newton's laws of motion; work, energy, momentum, collision, torque and rotational motion.		

PHYS 191	General Physics - Electricity and Magnetism	3(3,0)
This course is an introduction to electricity and magnetism. In this course, students will explore electric charges, electric forces and electric fields, electrical energy and potential, capacitance, direct-current circuits, magnetic force, magnetic field, induced voltage and inductance, alternating-current circuits and electromagnetic waves.		

B. Mandatory Courses

All Engineering students (BS and BE) are required to take 31 credit hours of College required courses. The BE program includes an additional mandatory 3-credit course Technopreneurship. A list of these courses and their descriptions follow.

Course	Title	Credits	Note
Mathematics (16 credits for MECH, MECA, and CCEE; 13 Credits for others)			
MATH 211	Calculus III	4	All majors
MATH 311	Linear Algebra and Applications	3	All majors
MATH 314	Ordinary Differential equations	3	All majors
MATH 317	Partial Differential Equations	3	MECH & MECA majors only
MATH 421	Numerical Methods	3	All majors
MATH 210	Discrete Mathematics	3	CCEE, May be taken by BIOM, and ELEC majors instead of MATH 421
Sciences (9 credits for MECH, MECA, and CCEE; 12 Credits for all others)			
BIOL 210	Human Anatomy and Physiology	3	BIOM, CCEE & ELEC majors
CHEM 210	Principles of Chemistry	3	CIVE major
CHEM 211	Environmental Chemistry	3	CIVE, MECH & MECA majors

GEOL 221	Fundamentals of Geology	3	CIVE major
PHYS 211	Physics: Electricity and Magnetism	3	All majors
PHYS 312	Modern Physics	3	BIOM, CCEE and ELEC majors
	Science Elective	3	MECH, MECA, ELEC & BIOM majors
Engineering Courses (12 Credits)			
ELEC 210	Electric Circuits	3	All majors
ENGR 300	Engineering Economics and Management	3	All majors
ENGR 500	Technopreneurship	3	All majors (BE track only)

Descriptions of the required Engineering, mathematics and science courses are given below.

Engineering Courses

Description of Engineering required courses are given below.

ELEC 210	Electric Circuits	3(3,0)
Circuit elements and laws, mesh and node equations, network theorems, energy storage elements, RC, R, and RLC circuits, Laplace Transform, sinusoids and phasors and introduction to network theory. Sinusoidal (AC) steady state, mutual inductance, transformers, and introduction to three phase circuit. Prerequisite: PHYS 211.		

ENGR 300	Engineering Economics and Management	3(3,0)
Concepts and techniques in basic Engineering economy principles and applications. Interest and financial mathematics; present worth, annual worth, benefit/cost ratio, internal rate of return, multiple alternatives, income tax, inflation, Risk analysis, Investment and investment choice, equivalence, loans, cost of capital, retirement and replacement, sector analysis and viewpoint, sensitivity analysis, accounting and financial statements.		

ENGR 500	Technopreneurship	3(3,0)
Venture and innovation opportunities; concept and strategy; the Technopreneur; planning; resource acquisition and organization; financing, marketing and sustainability of enterprise. Prerequisite: ENGR 300.		

Mathematics

Description of required mathematics courses are given below.

MATH 211	Calculus III	4(4,0)
Volumes using cross sections-disc and washer methods, Arc length, Hyperbolic functions, Improper integrals, Infinite sequences and series, Parametric equations and polar coordinates, Partial derivatives, Multiple integrals in rectangular-cylindrical-spherical coordinates, Vector fields.		

MATH 311	Linear Algebra and Applications	3(3,0)
Linear equations in linear algebra, matrix algebra, determinants, vector spaces, linear transformations, eigenvalues and eigenvectors, orthogonality and least squares, symmetric matrices and quadratic forms.		

MATH 314	Ordinary Differential Equations	3(3,0)
First order linear differential equations, linear differential equations of second and higher order, differential equations with power series solutions, Legendre's and Bessel's equations, systems of differential equations, Laplace transforms and their inverses, partial differential equations using separation of variables, heat equations: solutions by Fourier series. Prerequisite: MATH 211.		

MATH 317	Partial Differential Equations	3(3,0)
Ordinary differential equations arising from partial differential equations by means of separation of variables, method of characteristics for first order PDEs, boundary value problems for ODEs, partial differential equation and Fourier analysis and applications, comparative study of heat equation, wave equation and Laplace's equation by separation of variables and numerical methods, further topics in numerical solution of ODEs. Prerequisite: MATH 314.		

MATH 210	Discrete Math	3(3,0)
Logic, propositional equivalences, predicates and quantities, methods of proof, sets, set operations, functions, proof strategy, mathematical induction, recursive definitions and structural induction, the basics of counting, permutations and combinations, relations and their properties, representing relations, equivalence relations, introduction to graphs, graph terminology, introduction to trees. Prerequisite: MATH 211. Annually.		

MATH 421	Numerical Analysis	3(3,0)
Error Analysis, solutions of nonlinear equations using fixed point- Newton-Raphson-Muller's methods, solution of linear system using Gaussian elimination-iterative methods, interpolation and approximation using Taylor series-Lagrange approximation-Newton polynomials, numerical differentiation and integration, numerical optimization, solutions of ordinary and partial differential equations using Euler's and Heun's and Rung-Kutta methods. Prerequisite: MATH 311. Annually.		

Science Courses

Description of required Sciences courses are given below.

BIOL 210	Human Anatomy and Physiology	3(3,0)
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A general overview that deals with cell structure and function and physiology, anatomy and physiology of the human body systems. These include cardiovascular, central nervous, respiratory, urinary, digestive, reproductive, and musculoskeletal systems.

CHEM 210	Principles of Chemistry	3(3,0)
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This course is intended for students who desire to acquire the basic principles in chemistry. The emphasis of the course will be on the fundamental principles of chemistry, which include: terminology; qualitative and quantitative concepts; acid-base chemistry and buffers, acid – base titrations; quantum theory of the atom; electrons and periodicity; bonding; molecular geometry; hybridization; thermo chemistry and kinetics.

CHEM 211	Environmental Chemistry	3(3,0)
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This course provides an opportunity to develop an understanding of several basic environmental functions, the complicated nature of environmental systems, and the need for multidisciplinary solutions to environmental problems. Topics covered include the hydrosphere, water quantity and quality, soil and the soil ecosystem, biological resources, waste disposal, air pollution, ozone depletion, acid rain, global warming, agriculture, and toxicology. **Prerequisite:** None. Annually.

GEOL 221	Fundamentals of Geology	3(3,0)
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Physical and chemical properties of earth, structure of the earth, plate tectonic theory and continental drift, volcanism; mountain building processes, surface processes, mineralogy, formation and classification of rocks, earth hazards, geological problems related to civil engineering such as landslide and earthquake, geologic maps, geophysical exploration methods, earth works and tunneling. Annually.

PHYS 211	Physics: Electricity and Magnetism	3(2,2)
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This course covers fundamental topics in Electricity and Magnetism: Electric forces and Electric Fields for discrete and continuous charge distribution, Gauss's Law, Electric Potential, Capacitance and Dielectrics, Kirchhoff's rules, Magnetic Fields and Forces, Biot-Savart Law, Ampere's Law, Magnetic Flux, Gauss's Law in Magnetism, Faraday's and Lenz's Laws. **Prerequisite:** None. Annually.

PHYS 312	Modern Physics	3(3,0)
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This course covers the various models of atomic description, particles and quantum numbers, different forms of electromagnetic waves and their interactions (PE effect, Auger, Compton, etc.), relativity, vibration and elastic properties of material. **Prerequisite:** None. Annually.

III. Program Requirements

Requirements for the Bachelor of Science and Bachelor of Engineering degrees are program-

specific. They encompass two categories: Major and non-major. Each category consists of a set of mandatory courses and a set of elective courses. The program requirements for the Bachelor of Science and Bachelor of Engineering degrees in the different engineering majors are given in the forthcoming sections. Details and titles of relevant courses are included in the Student's Study Plan (SSP) that every engineering student will have.

Course Coding

The courses offered by the College of Engineering programs are designated according to the following coding System (xxxx abc):

xxxx	Program as indicated above
abc	<p>"a" designate the Year or level 1, 2, 3, 4;</p> <p>"b" program focus area;</p> <p>"c" course sequence - 0, 1, ..., 9</p>

The designation used to represent credit hours breakdown c (t, p) of a course is as follows: "c" the total credit hours, "t" stands for theoretical component of the course; "p" practical or laboratory component. For example, 3(3, 0) represents a 3 credit hour course with three contact lecture hours and zero laboratory hours.

Learning Support Center

The learning Support Center (LSC) at the College of Engineering is another manifestation of RHU's resolute commitment to students' academic success. The LSC offers the students a peer-to-peer learning opportunity that complements classroom learning. The Center aims to support students in advancing their knowledge and skills, reinforcing what they learn in the classrooms or overcoming learning and performance difficulties. In addition to being a focal-point for enquiry and two-way "asker-replier" learning, the LSC offers the space for academic interactions that can trigger enhanced learning significantly.

The Center is located in room D205 and is open to all students throughout the week. The LSC is staffed by Teaching Assistants of graduate students and upper level undergraduate students who are always available and ready to assist their fellow students in overcoming their academic challenges. Additionally, "on-call" faculty members are assigned to ensure that the LSC is performing to the best interest of the students.

The center's resources portfolio includes books, study guides, course materials, boards, computers, videos, DVD's, documentaries, a large screen LCD panels, and internet connected PCs.

My Idea to Innovate

The *My Idea to Innovate* is an open course that aims to encourage innovation. A student or a group of students who have a passion for and a dream to nurture and pursue an innovative idea of their own may collaborate with faculty mentors to design the course to cover topics and experiences that could not be achieved within the course offering framework of the concerned program and require collaboration across disciplines and/or fields. Course contents, prerequisites, number of credits, scope, experiences, needed resources, outcomes, assessment tools and rubrics, and timeline for completion will be formulated by the students(s) and the faculty mentor(s) once the idea is approved by the University Academic Board. Student(s) supported by faculty advisor(s) may request approval to design and offer the course after the first year of studies at RHU. The course code and number is ENGR 499 and could count as 3 or 6 technical elective credits.

CIVIL AND ENVIRONMENTAL ENGINEERING (CEE) DEPARTMENT

Faculty Members

Chairperson:	Ahmad El Hajj
Professors:	Hisham Basha
Associate Professors:	Ahmad El Hajj
Assistant Professors:	Riad Al Wardany; Mirvat Abdallah;
Adjunct Faculty:	Ghassan Mounajed; Ali Zeidan; Mohieddine Machaka; Mazen Haydar; Rabih Khatib; Jihad Sawan.

Programs Offered

Currently the CEE Department offers one program in Civil Engineering leading to a Bachelor of Science, Bachelor of Engineering and Master of Science degrees, all in Civil Engineering.

CIVIL ENGINEERING PROGRAM

Mission

The civil engineering program at RHU aims to empower students to attain the knowledge, skills, and theoretical and practical abilities to solve complex civil engineering problems in an interconnected world.

Objectives

The Civil and Environmental Engineering Department offers a program that aims to achieve a set of educational, professional, and community service objectives, listed below:

- Graduates who acquire and impart a sound understanding of the fundamental principles and concepts of civil engineering, and continuously develop their intellectual skills by endorsing independent and creative thinking leading to novel technologies and advanced innovative research and solutions meeting prevailing technical challenges.
- Engineers who continuously cultivate their career advancement and professional skills, and are prepared to assume leading roles in the profession and the community while emphasizing the issues of professional and ethical conduct.

- Engineers who exhibit commitment to the wellbeing of their community and the environment in pursuit of relevant solutions and better service to their community and society.

Program Outcomes

The graduates of the civil engineering program will acquire each of the following characteristics and abilities, which constitute the program outcomes in conformity with the objectives:

- a. An ability to apply knowledge of mathematics, science, and engineering.
- b. An ability to identify, to formulate, and solve engineering problems.
- c. An ability to conduct experiments, as well as to analyze and interpret data.
- d. An ability to design a system, component, or process to meet desired needs.
- e. An ability to use the techniques, skills, and modern tools necessary for engineering practice.
- f. An ability to appreciate the impact of engineering solutions in a local and global context.
- g. An ability to function in a team environment.
- h. An ability to communicate effectively.
- i. An understanding of professional and ethical responsibility.
- j. An ability to engage in life-long learning.
- k. Exposed to site and/or office practical experience in civil engineering projects or undergraduate research.

Career Opportunities

Civil engineers attain a broad spectrum of skills sought after by a wide range of professions. Industrial sectors, enterprises, and services in which a civil engineer can pursue a career include: construction, infrastructure, transportation, consulting, water resources, environmental, public works, and government. Most importantly, students will be endowed with skills to pursue entrepreneurial ventures that enable to realize their own new ideas. There is so much work to be done to fashion a better future and civil engineers can be major contributors to that objective.

Program Overview

The Civil Engineering Program at Rafik Hariri University puts what is in the best interest of students, first and foremost. Every little experience the student attains represents a block in the building of a competent, confident, purposeful, problem solving, competitive, responsible, and conscientious individual. This is accomplished by means of a curriculum and facilities that conform to the highest of standards, faculty members committed to the academic and personal growth of the student, and an environment that inspires learning and drives

creativity.

The Bachelor of Engineering (BE) program in Civil Engineering encompasses 147 credit hours spread over eight regular semesters and three summer terms. The Bachelor of Science (BS) program comprises a total of 114 credit hours spread over six regular semesters and three summer terms. In addition to completing the credits requirements, a BS or a BE degree is conferred upon a student if the earned Cumulative GPA, Major GPA and the Summative Learning Project grade are all 70 or above.

The required credit hours span three categories: University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours for the BS and BE programs are shown in the following table:

BS Program in Civil Engineering (114 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	0	0	15	9	24	21
College Requirement	0	0	31	0	31	27
Program Requirement	50	0	9	0	59	52
Credits	50	0	55	9	114	100

BE Program in Civil Engineering (147 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	0	0	15	12	27	18
College Requirement	0	0	34	0	34	23
Program Requirement	62	15	9	0	86	59
Credits	62	15	58	12	147	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Engineering section in this catalog.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Engineering section in this catalog.

III. Program Requirements

The program requirements for a Bachelor of Engineering degree in Civil Engineering encompasses 86 credits (59 credits for the BS degree) distributed as follows: 71 credits (59

credits for the BS degree) Mandatory courses and 15 credits elective courses. Both categories are summarized below.

A. Mandatory requirements

The major and non-major CIVE program mandatory courses are listed in the table below.

Course #	Title	Credits	Prerequisites
CIVE 202	Civil and Architectural Drawings	3	
CIVE 211	Statics	3	
CIVE 240	Surveying	3	
CIVE 312	Structural Analysis I	3	MECH 320
CIVE 314	Concrete I	3	MECH 320
CIVE 321	Construction Materials	3	
CIVE 321 L	Construction Materials Lab	1	Co-req: CIVE 321
CIVE 332	Environmental Engineering	3	CHEM 211
CIVE 341	Highway Engineering	3	CIVE 240
CIVE 342	Transportation Engineering	3	CIVE 341
CIVE 400*	Summative Learning (BS) Project	3	ENGL 217
CIVE 413	Computer Modeling of Structures	3	CIVE 312
CIVE 415	Concrete II	3	CIVE 314
CIVE 417	Steel Structures	3	CIVE 312
CIVE 423	Soil Mechanics & Lab	3	MECH 320; GEOL 221
CIVE 424	Foundation Engineering	3	MECH 423
CIVE 435	Hydraulics	3	MECH 333
CIVE 499	Co-op Work Experience	1	ENGL 217; Senior Standing
CIVE 501	Construction Planning and Management	3	Senior Standing
CIVE 507	Structural Analysis II	3	CIVE 312
CIVE 536	Hydrology	2	MECH 333
CIVE 538	Water and Wastewater Treatment	3	CIVE 332
CIVE 595A	BE Summative Learning Project 1	1	Senior Standing
CIVE 595B	BE Summative Learning Project 2	3	Senior Standing
CIVE 5xx	Technical Electives I-V	15	per course requirements
MECH 220	Dynamics	3	CIVE 211
MECH 320	Mechanics of Materials	3	CIVE 211
MECH 333	Thermal Fluid Sciences	3	MATH 211

* Required for BS bound students. BE students take a technical elective instead.

The civil engineering courses provide coverage in five area as listed in the following table.

Code	Course Title	Credits	Prerequisite
Common Courses and Construction Management			
CIVE 202	Civil and Architectural Drawings	3	
CIVE 595	BE Summative Learning Project (A + B)	4	Senior standing
CIVE 501	Construction Planning and Management	3	Senior standing
Structural Analysis & Design			
CIVE 211	Statics	3	
CIVE 312	Structural Analysis I	3	MECH 320
CIVE 314	Concrete I	3	MECH 320
CIVE 413	Computer Modeling of Structures	3	CIVE 312
CIVE 415	Concrete II	3	CIVE 314
CIVE 417	Steel Structures	3	CIVE 312
CIVE 507	Structural Analysis II	3	CIVE 312
Construction Materials & Geotechnics			
CIVE 321	Construction Materials	3	
CIVE 321L	Construction Materials - Laboratory	1	
CIVE 423	Soil Mechanics & Laboratory	3	MECH 320 & GEOL 221
CIVE 424	Foundation Engineering	3	CIVE 423
Water Resources & Treatment			
CIVE 332	Environmental Engineering	3	CHEM 211
CIVE 435	Hydraulics	3	MECH 333
CIVE 536	Hydrology	2	CIVE 435
CIVE 538	Water and Wastewater Treatment	3	CIVE 332
Public Works			
CIVE 240	Surveying	3	
CIVE 341	Highway Engineering	3	CIVE 240
CIVE 342	Transportation Engineering	3	CIVE 341

B. Technical Electives

As part of the program for the Bachelor of Engineering in Civil Engineering, the student is required to study 15 credit hours of technical elective courses. These courses allow the student to attain an in-depth knowledge and understanding in a focus area of interest. The student can mix and match elective courses from the different areas to acquire broader knowledge of different Civil Engineering disciplines. The student should select, in cooperation with the academic advisor, the set of electives that best meet his or her needs and aspirations. The CIVE available technical elective courses are distributed in five areas:

1. Construction Management

2. Structural Analysis and Design
3. Construction Materials and Geotechnics
4. Water Resources & Treatment
5. Public Works

It is highly recommended that the student takes elective courses from the list below after completing the mandatory requirements in the related area. Students may select technical electives from other programs subject to approval of the academic advisor and the corresponding course instructor.

Course #	Title	Credits	Prerequisites
Construction Management Sequence			
CIVE 502	Engineering Risk Analysis	3	MATH 351
CIVE 503	Computer Methods in Civil Engineering	3	
CIVE 504	Infrastructure Asset Management	3	Senior Standing
CIVE 505	Decision Making and Risk Management	3	Senior Standing
CIVE 506	LEED Principles in Construction Management	3	Senior Standing
Structural Analysis and Design Sequence			
CIVE 510	Finite Elements Analysis	3	CIVE 312
CIVE 511	Structural Dynamics	3	CIVE 312
CIVE 512	Advanced Structural Analysis	3	CIVE 507
CIVE 513	Inelastic Analysis of Structures	3	CIVE 507
CIVE 514	Earthquake Engineering	3	CIVE 312
CIVE 515	Prestressed Concrete	3	CIVE 415
CIVE 516	Composite Construction	3	CIVE 415
CIVE 518	Special Structures	3	CIVE 415; CIVE 312
CIVE 519	Tall Building Structures	3	CIVE 413
Construction Material and Geotechnics Sequence			
CIVE 521	Special Concretes	3	CIVE 321
CIVE 522	Durability of Construction Materials	3	CIVE 321
CIVE 523	Repair of Concrete Structures	3	CIVE 321
CIVE 524	Nondestructive Evaluation & Instrumentation of Infrastructure	3	CIVE 321
CIVE 525	Concrete Technology	3	CIVE 321
CIVE 526	Admixtures for Concrete	3	CIVE 321
Water and Environmental Engineering Sequence			
CIVE 571	Water Quality	3	CIVE 332
CIVE 572	Environmental Impact Assessment	3	CIVE 332
CIVE 573	Solid Waste Management	3	CIVE 332
CIVE 574	Environmental Policy and Management	3	CIVE 332
CIVE 575	Water Supply & Waste Systems	3	CIVE 435

CIVE 576	Hydraulic Structures	3	CIVE 435
Public Works Sequence			
CIVE 540	GIS for Civil Engineering	3	CIVE 240
CIVE 541	Pavement Design	3	CIVE 423
CIVE 542	Bridge Engineering	3	CIVE 415

C. Summative Learning Project

Students must complete a 3- credit hours course for BS (4-credits for BE; taken 1 credit in the first regular semester and 3 credits in the following regular semester) in which they work preferably in groups on a problem of concern to industry or the community at large, or to innovate a promising idea. The SLP could be an extension of the projects students had worked on in the Engineering for the community course to bring it to a more useful outcome.

D. Co-op Experience

Students must complete 8 weeks of practical training in working in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits and ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are required to submit a formal report, a poster and make a formal presentation about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Study Plan

The following study plan summarizes the courses and credits distribution for the Bachelor of Science (BS) and Bachelor of Engineering (BE) in CIVE Engineering. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (16 Credits)			
CIVE 211	Statics	3	
COSC 214	Introduction to Programming + Lab	3	
ENGL 210	English Composition and Rhetoric	3	
MATH 211	Calculus III	4	
PHYS 211	Physics: Electricity & Magnetism	3	
Year 1, Spring Semester (18 Credits)			
ENGR 200	Engineering for the Community	3	
CIVE 202	Civil & Architectural Drawings	3	
MATH 311	Linear Algebra	3	
MECH 220	Dynamics	3	CIVE 211
CHEM 210	Principles of Chemistry	3	
GEOL 221	Fundamentals of Geology	3	
Year 1, Summer Semester (9 Credits)			
CIVE 240	Surveying	3	
CHEM 211	Environmental Chemistry + Lab	3	
	Social Sciences/Culture Elective I	3	
Year 2, Fall Semester (16 Credits)			
MECH 320	Mechanics of Materials	3	CIVE 211
MATH 314	Ordinary Differential Equations	3	MATH 211
CIVE 321	Construction Materials	3	
CIVE 321L	Construction Materials - Laboratory	1	Co-req: CIVE 321
CIVE 341	Highway Engineering	3	CIVE 240
ENGL 217	Professional English	3	ENGL 210
Year 2, Spring Semester (18 Credits)			
CIVE 312	Structural Analysis I	3	MECH 320
CIVE 314	Concrete I	3	MECH 320
CIVE 332	Environmental Engineering	3	CHEM 211

CIVE 342	Transportation Engineering	3	CIVE 341
MECH 333	Thermal Fluid Sciences	3	MATH 211
	Social Sciences/Culture Elective II	3	
Year 2, Summer Semester (6 Credits)			
ENGR 300	Engineering Economics & Management	3	
ELEC 210	Electric Circuits	3	PHYS 211
Year 3, Fall Semester (15 Credits)			
CIVE 413	Computer Modeling of Structures	3	CIVE 312
CIVE 415	Concrete II	3	CIVE 314
CIVE 423	Soil Mechanics & Laboratory	3	MECH 320 & GEOL 221
CIVE 435	Hydraulics	3	MECH 333 or MECH 330
MATH 351	Probability and Statistics	3	
Year 3, Spring Semester (15 Credits)			
CIVE 417	Steel Structures	3	CIVE 312
CIVE 424	Foundation Engineering	3	CIVE 423
MATH 421	Numerical Analysis	3	MATH 311
	Engineering Technical Elective I*	3	per course requirements
	Humanities I	3	
Year 3, Summer Semester (1 Credit)			
CIVE 499	Co-op Work Experience	1	ENGL 217; Senior Standing
The above 114 credits complete the requirements for a Bachelor of Science degree in Civil Engineering.			
Year 4, Fall Semester (18 Credits)			
ENGR 500	Technopreneurship	3	ENGR 300
CIVE 501	Construction Planning and Management	3	Senior standing
CIVE 507	Structural Analysis II	3	CIVE 413
CIVE 536	Hydrology	2	CIVE 435
	Humanities/Fine Arts Elective II	3	
	Engineering Technical Elective II	3	per course requirements
CIVE 595A	BE Summative Learning Project 1	1	ENGL 217, senior standing
Year 4, Spring Semester (15 Credits)			
CIVE 538	Water and Wastewater Treatment	3	CIVE 332
	Engineering Technical Elective III	3	per course requirements
	Engineering Technical Elective IV	3	per course requirements
	Engineering Technical Elective V	3	per course requirements
CIVE 595B	BE Summative Learning Project 2	3	CIVE 595A

* BS bound students are required to take CIVE400 - Summative Learning (BS) Project instead.

Note: Engineering Technical Electives (levels 400 or above) are selected as such:

6 credit restricted Departmental Electives

9 credits from any Engineering discipline of levels 400 or above.

Course Coding

The courses offered in the Civil Engineering program are designated code numbers in the form of (CIVE abc) where:

-
- a Year (level): 2 = first year, 3 = second Year, 4 = Third year, 5 = Fourth Year
 - b Concentration Areas (as follows)
 - 0: Common Courses and Construction Management; 1: Structural Analysis and Design; 2: Construction Materials and Geotechnics; 4: Public Works; 7: Water Resources and Treatment;
 - c Course sequence in area: 0, 1, ..., 9
-

Course Description

I. Mandatory Courses

Non Major Courses

Description of the non-major mandatory courses follows.

CHEM 210	Principles of Chemistry	3(3,0)
A theoretical introduction to chemical principles, stressing atomic structure, bonding, stoichiometry, gases, solutions, acids and bases, solution equilibria. Prerequisite: None. Annually.		

CHEM 211	Environmental Chemistry+ Lab	3(3,0)
This course provides an opportunity to develop an understanding of several basic environmental functions, the complicated nature of environmental systems, and the need for multidisciplinary solutions to environmental problems. Topics covered include the hydrosphere, water quantity and quality, soil and the soil ecosystem, biological resources, waste disposal, air pollution, ozone depletion, acid rain, global warming, agriculture, and toxicology. Prerequisite: None. Annually.		

COSC 214	Introduction to Programming + Lab	3(3,0)
Understanding of the basic principles of programming and computer systems; Applications of programming to the solution of engineering problems; control structures, functions,		

arrays, pointers and structures. Laboratory experiments.

ELEC 210	Electrical Circuits	3(3,0)
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Circuit elements and laws, mesh and node equations, network theorems, energy storage elements, RC, R, and RLC circuits, Laplace Transform, sinusoids and phasors and introduction to network theory. Sinusoidal (AC) steady state, mutual inductance, transformers, and introduction to three phase circuit. **Prerequisite:** PHYS 211. Annually.

ENGL 210	English Composition and Rhetoric	3(3,0)
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This course reinforces effective critical reading and writing skills with emphasis on writing documented essays for academic purposes in a varying range of rhetorical modes. More specifically, the student will apply the fundamental principles of English spelling, word usage, grammar, punctuation and style necessary for written communication; write academic essays; proofread and edit a variety of texts; analyze general texts for coherence, style and accuracy in writing; read critically from a variety of discourse modes; summarize, paraphrase and quote sources properly; and cite sources according to APA form. **Prerequisite:** None. Every semester.

ENGL 217	Professional English	3(3,0)
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This course is designed to enhance students' professional writing skills. It is tailored to students pursuing careers in the professions and includes advanced business writing and editing, correspondence, critical review, writing professional reports and proposals, and making oral presentations. **Prerequisite:** ENGL 210. Every Semester.

ENGR 200	Engineering for the Community	3(3,0)
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This course aims to give students a holistic view of engineering, its interdisciplinary nature and role in solving community problems. It entails a brief overview on the role of technology, creativity and problem solving, product development cycle, contemporary engineering systems, and ethical considerations. Students in teams work on a community related project that will culminate in a working artifact. Specific topics are flexible but it shall cover fundamentals of intelligent systems, computer interface, sensing and actuation, mechanisms and structures. Fall and Spring semesters.

ENGR 300	Engineering Economics and Management	3(3,0)
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Concepts and techniques in basic Engineering economy principles and applications. Interest and financial mathematics; present worth, annual worth, benefit/cost ratio, internal rate of return, multiple alternatives, income tax, inflation, Risk analysis, Investment and investment choice, equivalence, loans, cost of capital, retirement and replacement, sector analysis and viewpoint, sensitivity analysis, accounting and financial statements. **Prerequisite:** None. Annually.

ENGR 500	Technopreneurship	3(3,0)
Venture and innovation opportunities; concept and strategy; the Technopreneur; planning; resource acquisition and organization; financing, marketing and sustainability of enterprise. Prerequisite: ENGR 300. Annually.		

MATH 211	Calculus III	4(4,0)
Volumes by slicing and rotation about an axis, length of plane curves, areas of surfaces of revolution, integrations and applications of integrals, transcendental functions and their inverses, integration techniques, improper integrals, sequences and infinite series, vectors in the plane and polar functions, Fourier Series; polar functions and their graphs, cylinders and quadric surfaces, functions of several variables, partial derivatives and their applications, extreme values of functions of several variables, Lagrange multipliers, double and triple integrals in rectangular and cylindrical and spherical coordinates, integration in vector fields, Green's and Stoke's theorems. Prerequisite: None. Every semester.		

MATH 311	Linear Algebra	3(3,0)
Linear equations in linear algebra, matrix algebra, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality and least squares, symmetric matrices and quadratic forms. Prerequisite: None. Annually.		

MATH 314	Ordinary Differential Equation	3(3,0)
First order equations, existence and uniqueness theorem, separation of variables, higher order linear equations, Series solutions of second order linear equations, Laplace transforms, systems of first linear equations. Prerequisite: MATH 211. Annually.		

MATH 351	Probability and Statistics	3(3,0)
Probability and conditional probability, random variable and distribution, continuous and marginal distributions, expectation, variance- moments-mean-median-covariance and correlation, conditional expectation, the sample mean, special distribution, Bernoulli and binomial distributions, Poisson and Gamma distribution. Annually.		

MATH 421	Numerical Analysis	3(3,0)
Error Analysis, solutions of nonlinear equations using fixed point- Newton-Raphson-Muller's methods, solution of linear system using Gaussian elimination-iterative methods,		

interpolation and approximation using Taylor series-Lagrange approximation-Newton polynomials, numerical differentiation and integration, numerical optimization, solutions of ordinary and partial differential equations using Euler's and Heun's and Rung-Kutta methods. **Prerequisite:** MATH 311. Annually.

MECH 220	Dynamics	3(3,0)
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Brief review of statics; proper use of different coordinate systems: Cartesian and normal/tangential axes; kinematics of a particle: rectilinear, curvilinear, and relative motion; kinetics of a particle: force and acceleration, work and energy, impulse and momentum; planar kinematics of a rigid body: translating and rotating axes, absolute and relative motion; planar kinetics of a rigid body: force and acceleration, work and energy, impulse and momentum. **Prerequisite:** CIVE 211. Annually.

MECH 320	Mechanics of Materials	3(3,0)
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Mechanical stress, strain, and stress/strain relations under pure tension, compression, pure bending, and pure torsion of circular bars; 1-D thermal strain & stress; thin-walled cylindrical & spherical pressure vessels; combined stresses; principle stresses; plane stress transformation & Mohr's circle; basic 3-D elastic stress/strain relations; Euler-elastic buckling of columns. **Prerequisite:** CIVE 211. Annually.

MECH 333	Thermal Fluid Sciences	3(3,0)
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This course seeks to impart thermal-fluid fundamental concepts (including Thermodynamics, Fluid Mechanics and Heat Transfer) to non-mechanical engineering students. This covers: thermodynamic state and properties of pure substances; concepts of work and heat, energy analysis of closed systems (First Law) and simple flow devices, Fluid statics; Bernoulli's equation; Conservation of mass, momentum & energy, viscous flow in pipes, introduction to conduction, convection and radiation heat transfer. **Prerequisite:** MATH 211. Annually.

PHYS 211	Physics: Electricity and Magnetism	3(2,2)
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This course covers fundamental topics in Electricity and Magnetism: Electric forces and Electric Fields for discrete and continuous charge distribution, Gauss's Law, Electric Potential, Capacitance and Dielectrics, Kirchoff's rules, Magnetic Fields and Forces, Biot-Savart Law, Ampere's Law, Magnetic Flux, Gauss's Law in Magnetism, Faraday's and Lenz's Laws. **Prerequisite:** None. Annually.

Major Courses

Description of the civil engineering mandatory courses follows.

CIVE 202	Civil and Architectural Drawings	3(2,2)
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Essential engineering concepts of drawings for civil and architectural applications, computer drafting skills in 2D and 3D are taught and implemented in producing floor plans, sections, elevations and reinforcement detailing for reinforced concrete elements. Emphasis is directed at teaching students proper placement of symbols, annotation, and scheduling information required for site construction. Annually.

CIVE 211	Statics	3(3,0)
Static laws; force vectors and operations; force system and moment; free body diagram; equilibrium of particles and rigid bodies in 2D and 3D; plane trusses and frames; cables; internal forces: shear and moment diagrams; centroid and center of mass; moment of inertia; and friction. Annually.		

CIVE 240	Surveying	3(2,2)
Surveying fundamentals; theory of errors in observations; leveling; distance measurement; angles, azimuths and bearings; traversing; topographic surveys and maps. The course has also field component in which students work in groups to conduct survey works in the learned topics and write technical reports. Annually.		

CIVE 312	Structural Analysis I	3(3,0)
Shear and bending moment diagrams for frames, equilibrium, stability, and determinacy; influence lines for determinate structures; Elastic deformation of beams, frames and trusses; introduction to indeterminate structures; approximate analysis of indeterminate building frames. Prerequisite: MECH 320. Annually.		

CIVE 314	Concrete I	3(3,0)
Behavior of reinforced concrete structural elements; concepts of design and proportioning sections for strength and serviceability; theory of flexure and shear; analysis and design of beams for flexure and shear; analysis for crack width and deflection; design philosophies and process; design of one way solid and joist slabs; bond theory; development, anchorage and splicing of reinforcement; bars cut-off; continuous beams and one way slabs. Prerequisite: MECH 320. Annually.		

CIVE 321	Construction Materials	3(3,0)
Properties and tests of materials used in construction of civil structures such as aggregate, cement, mixing water, admixtures, steel, masonry, Portland cement concrete, asphalt concrete and timber; laboratory and field measurement techniques to assess material properties and performance; emphasis on fresh and hardened concrete, types of concrete and applications, and concrete mix design. Annually.		

CIVE 321L	Construction Materials Laboratory	1(0,2)
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Los Angeles abrasion test; specific gravity and absorption of coarse and fine aggregates and soils; moisture content; bulk unit weight and voids in aggregates and soils; sieve analysis; concrete mix design; mixing concrete and slump test; compressive strength of concrete; absorption, moisture content and density of concrete masonry units. Report writing and data analysis. **Co-req:** CIVE 321. Annually.

CIVE 332	Environmental Engineering	3(3,0)
Chemical and biological processes related to environmental science and engineering, materials and energy balances; environmental systems analysis with application to air, water and soil; hydrology; water treatment; water quality management; wastewater treatment; air pollution; noise pollution; solid waste management; analysis of environmental problems and development of engineering solutions. Prerequisite: CHEM 211. Annually.		

CIVE 341	Highway Engineering	3(3,0)
Introduction to highway engineering standards; types and classifications of roads; characteristics of the driver, the pedestrian, the vehicle and the road, highway location and survey methods; earthwork, geometric design of highway components: vertical and horizontal alignment, transition curves, super-elevations and intersections, highway materials and evaluations, construction techniques and plants, quality control and testing, visual assessment and maintenance. Prerequisite: CIVE 240. Annually.		

CIVE 342	Transportation Engineering	3(3,0)
Social and economic impact of transportation engineering on the society; basis of traffic engineering; transportation planning; traffic flow theory; traffic studies and analysis; travel demand modeling and forecasting; queuing theory; capacity analysis; level of service; traffic control and analysis at signalized intersections. Prerequisite: CIVE 341. Annually.		

CIVE 400	Summative Learning (BS) Project	3(3,0)
Team-oriented, project-based experience where students work on a meaningful problem of concern to industry or the community at large, or to innovate a promising idea. The project involves whatever it takes to reach the intended project outcome: literature review, design work, data collection, experimentation, data analysis, report writing and presentation. Prerequisite: Senior Standing. Annually.		

CIVE 413	Computer Modeling of Structures	3(3,0)
Principles of structural modeling of different types of structural elements: trusses, beams, columns, and frames; modeling the structural behavior of buildings under the effect of vertical and lateral loads, computational applications using structural analysis software; case studies and project. Prerequisite: CIVE 312. Annually.		

CIVE 415	Concrete II	3(3,0)
Short columns, slender columns, uniaxially and biaxially bent columns; two way slabs behavior, analysis and design; retaining walls; wall footings, concentrically and eccentrically loaded single column footings, and combined footings; staircases. Prerequisite: CIVE 314. Annually.		
CIVE 417	Steel Structures	3(3,0)
Structural steel properties, loads, design methods, analysis and design of members of steel structures: tension members, compression members, flexure members and connections. Prerequisite: CIVE 312. Annually.		
CIVE 423	Soil Mechanics & Laboratory	3(2,2)
Soil classification; origin of soil and grain size; soil structure, weight-volume relationships; plasticity and structure of soil; soil compaction; permeability; seepage, stresses in a soil mass; compressibility of soil and consolidation; shear strength of soil. Experimental testing of soil: Atterberg Limits; Proctor test; sand cone field density measurement; consolidation and direct shear test; report writing and data analysis. Prerequisite: MECH 320. Annually.		
CIVE 424	Foundation Engineering	3(3,0)
Geotechnical site investigation; field and laboratory tests; characterization of strata; foundation systems; ultimate bearing capacity and settlement of shallow foundations (spread footings, strip footings, combined footings and mat); effect of water table level on bearing capacity; structural design of mat foundations; ultimate bearing capacity and settlement of deep foundations (single pile and group of piles); pile load test. Prerequisite: CIVE 423. Annually.		
CIVE 435	Hydraulics	3(3,0)
Engineering approaches to the measurement control and conveyance of water flows with particular emphasis on the analysis, design, characteristics, and selection of: hydraulic models, and pipe systems. Prerequisite: MECH 333. Annually.		
CIVE 499	Co-op Work Experience	1(0,0)
This Co-op work experience is designed to provide students with an eight-week short-term work experience in the field of Civil and Environmental Engineering. Students will be aligned with discipline-related industries, institutions of higher learning, or government agencies. Prerequisites: ENGL 217 and Senior Standing.		
CIVE 595A	BE Summative Learning Project 1	1(1,0)
Team-oriented project which includes conducting and formulating experimental laboratory		

work and/or design problems on a specific approved topic of specialty. The project includes literature review and scope of work as well as project proposal. **Prerequisites:** Senior Standing, ENGL 217. Annually.

CIVE 595B	BE Summative Learning Project 2	3(3,0)
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Team-oriented project which includes conducting and formulating experimental laboratory work and/or design problems on a specific approved topic of specialty. The project includes literature review, design work, data collection, experimentation, data analysis and technical writing. **Prerequisite:** CIVE 595A. Annually.

CIVE 501	Construction Planning and Management	3(3,0)
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Fundamental elements of management of civil engineering projects; roles of all participants in the process: owners, designers, contractors and suppliers; emphasis on contractual aspect, project estimate, planning and control of construction projects; management functions, network techniques (CPM), resource scheduling, construction financing and cost/schedule relationship. **Prerequisite:** Senior standing. Annually.

CIVE 507	Structural Analysis II	3(3,0)
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Statically indeterminate structures, force method (beams, trusses and frames). Cable supported indeterminate structures. Temperature and settlement effects. Displacement methods: slope-deflection equations and moment distribution (beams and rigid frames). Qualitative influence lines for statically indeterminate beams. **Prerequisite:** CIVE 312. Annually.

CIVE 536	Hydrology	2(2,0)
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Measurement and analysis of precipitation data, flood analysis, methods of estimation of evaporation and transpiration, streamflow measurement, groundwater hydrology, groundwater reservoirs, ground-water discharge, rainfall runoff relationship, statistical analysis in hydrology. **Prerequisite:** MECH 333. Annually.

CIVE 538	Water and Wastewater Treatment	3(3,0)
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Quality and control tests of water and wastewater, design principles of water and wastewater treatment plants, physical, chemical and biological operation processes. **Prerequisite:** CIVE 332. Annually.

II. Elective Courses

Students may satisfy their technical electives requirements by selecting from the following set of courses.

Common Courses and Construction Management Sequence

CIVE 502	Engineering Risk Analysis	3(3,0)
Elements of set theory, basic elements of probability theory, random variables, multiple random variables, function of random variables, probabilistic models, statistical inference, and formulation of the reliability problem. Prerequisite: MATH 351.		

CIVE 503	Computer Methods in Civil Engineering	3(3,0)
Using the computer for analysis, design, and decision making in civil engineering. Programming, numerical, and CAD methods. Applications.		

CIVE 504	Infrastructure Asset Management	3(3,0)
Problems of infrastructure, asset management principles, methods of inspection and monitoring of civil infrastructures, risk assessment, asset condition information and data, and replace/maintain decision. Prerequisite: Senior Standing.		

CIVE 505	Decision Making and Risk Management	3(3,0)
Decision making, risk analysis, quantitative analysis, and application of quantitative methods to construction projects' environment. Prerequisite: Senior Standing.		

CIVE 506	LEED and Green Construction Principles in Construction Management	3(3,0)
Green construction methods and benefits in applying the Leadership in Energy and Environmental Design (LEED) principles. Prerequisite: Senior Standing.		

Structural Analysis & Design Sequence

CIVE 510	Finite Elements Analysis	3(3,0)
Theory of the finite element method; spring, truss and beam elements; constant strain elements; plane stress or strain for axisymmetric problems; plates and shells; introduction to non-linear material analysis; introduction to structural dynamic analysis; applications. Prerequisite: CIVE 312. On demand.		

CIVE 511	Structural Dynamics	3(3,0)
Dynamic response of single, and multi-degree of freedom systems; modal analysis of lumped; continuous mass systems; Natural frequencies and modes shapes, deterministic time domain approach and design response spectra; seismic response of structures; peak response; seismic design principles. Prerequisite: CIVE 312. On demand.		

CIVE 512	Advanced Structural Analysis	3(3,0)
Flexibility and Stiffness matrix methods for analysis of indeterminate trusses, beams, and		

frames. Grid beams and structures on elastic supports. Composite Structural systems. Influence lines of indeterminate structure utilizing concepts of virtual work and moment distribution methods – Qualitative and Quantitative approaches. **Prerequisite:** CIVE 507. On demand.

CIVE 513	Inelastic Analysis of Structures	3(3,0)
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Concept of plastic analysis, plastic hinges, incremental load method (step by step), mechanism method, upper bound, lower bound, and uniqueness theorems, combined mechanisms, beams, multistory, multi-bay and gable frames, computer implementation. **Prerequisite:** CIVE 507. On demand.

CIVE 514	Earthquake Engineering	3(3,0)
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Earthquake causes and measures, earthquake faults and waves, plate tectonics, structural dynamics of single and multi-degree of freedom systems, seismic hazard evaluation in engineering practice; response analysis of structures. Equivalent static lateral force method, lateral loads resistive systems, architectural consideration for earthquakes, mitigation of earthquake forces. **Prerequisite:** CIVE 312. On demand.

CIVE 515	Prestressed Concrete	3(3,0)
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Definitions and Methods of prestressing. Materials and their properties. Discussion of losses in prestressing. Elastic behavior stress distribution under different load stages. Analysis and design of homogeneous sections. Magnel diagram. Shear cracking load. Behavior of beam. Deflection. Ultimate load. Design of anchorage zone in beams and anchorage losses and time-dependent losses (shrinkage and creep). Composite beams. Stresses resulting from shrinkage and creep. Partial prestressing. **Prerequisite:** CIVE 415. On demand.

CIVE 516	Composite Construction	3(3,0)
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Composite systems; fundamental of composite construction; composite beams; composite columns; Lateral resisting systems; design of joints. **Prerequisite:** CIVE 415. On demand.

CIVE 518	Special Structures	3(3,0)
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Design of bearing and retaining walls, strut-and-tie model; deep beams, corbels, inverted beams, water tanks, domes, ring beams and beams subjected to torsion; finite element modeling and design of plates and shells. **Prerequisite:** CIVE 415. On demand.

CIVE 519	Tall Building Structures	3(3,0)
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Loadings; structural systems and analysis modeling; braced frames; rigid frames structures, stability of high rise buildings, dynamic response, shear wall structures, coupled shear wall structures, wall-frames Dual structural systems. **Prerequisite:** CIVE 413. On demand.

Construction Material and Geotechnics Sequence

CIVE 521	Special Concretes	3(3,0)
Design and characteristics of lightweight concrete, heavyweight concrete, self-consolidating concrete, fiber-reinforced concrete, mass concrete; concrete in hot weather, concrete in cold weather, high strength concrete, high performance concrete, roller compacted concrete and shrinkage compensating concrete. Prerequisite: CIVE 321. On demand.		
CIVE 522	Durability of Construction Materials	3(3,0)
Definition and importance of durability; properties of main building materials (concrete, ferrous and non-ferrous metals, wood, building stones, clay bricks, gypsum, lime, plastics); factors affecting durability; mechanisms of decaying; precautions to increase durability; selection of durable material; tests for durability; economic aspects and impact of durability. Prerequisite: CIVE 321. On demand.		
CIVE 523	Repair of Concrete Structures	3(3,0)
Conventional methods of investigation, nondestructive methods, structural health monitoring, corrosion risk evaluation, protection of reinforcing steel against corrosion, instrumentation techniques, repair materials and techniques, removal and preparation of concrete for repair, crack repair, concrete patching, structure strengthening, case studies. Prerequisite: CIVE 321. On demand.		
CIVE 524	Nondestructive Evaluation & Instrumentation of Infrastructure	3(3,0)
Overview on the different types of civil infrastructure, their problems and durability, use of nondestructive evaluation methods to assess their actual conditions, basic NDE methods, sonic and ultrasonic methods, ground penetrating radar (GPR), infrared thermography, electrical resistivity, radioactive and nuclear methods, sensing technologies, different instruments/sensors and their use, wireless technology, structural health monitoring. Case studies and laboratory demonstrations. Prerequisite: CIVE 321. On demand.		
CIVE 525	Concrete Technology	3(3,0)
Cement and supplementary cementitious materials, mechanical behavior of concrete, properties and applications of various specialized concretes, hot weather concreting, cold weather concreting, chemical admixtures, concrete mix proportioning, deterioration mechanisms, environmental and physical causes of degradation, alkali-aggregate reaction, carbonation, chloride attack, sulfate attack, acid and seawater attack, freeze-thaw cycle. Prerequisite: CIVE 321. Annually.		
CIVE 526	Admixtures for Concrete	3(3,0)
Definition and classification of concrete admixtures; precautions in their use; chemical admixtures; mineral admixtures; miscellaneous admixtures; type and properties of admixtures; standard specifications; classification and purpose of use; beneficial and detrimental effects on		

the properties of fresh and hardened concrete; mechanism of action; advantages and disadvantages. **Prerequisite:** CIVE 321. On demand.

Water and Environmental Engineering Sequence

CIVE 571	Water Quality	3(3,0)
Water quality parameters, sources of drinking water, drinking water problems and impact on human life, drinking water treatment methods, common operations in water treatment plants, design of distribution systems, assessment and monitoring of water quality. Prerequisite: CIVE 332. On demand.		

CIVE 572	Environmental Impact Assessment	3(3,0)
Study and evaluation of the impacts of large scale projects on the physical, biological, and socio-economic environmental aspects taking into account environmental laws and regulations and EIA guidelines, identification of impacts, quantification methods, mitigation measures, and monitoring plans. Case study involving the preparation of an EIA report including sustainability impact assessment and preparation of an environmental management plan. Prerequisite: CIVE 332. On demand.		

CIVE 573	Solid Waste Management	3(3,0)
Study of types and sources of non-hazardous municipal solid wastes, estimating quantity and storage volumes of wastes, identify collection, transfer, treatment and disposal alternatives, solid waste management principles and processes, environmental legislation and risk, and pollution control management. Prerequisite: CIVE 332. On demand.		

CIVE 574	Environmental Policy and Management	3(3,0)
This course explores human made problems in the environment parallel with concepts in environmental ethics, management and policies so as solutions are provided concerning preservation of the environment. Topics covered are pollution of air, water, and soil, international and national environmental ethics, management and policies. Prerequisite: CIVE 332. On demand.		

CIVE 575	Water Supply & Waste Systems	3(3,0)
Identification and evaluation of water supply solutions; design of water distribution networks; pumping; population forecasting and requirements; collecting and disposing of stormwater and sewage; design of storm and sewage systems; excess stormwater management, environmental risk and protection measures. Prerequisite: CIVE 435. On demand.		

CIVE 576	Hydraulic Structures	3(3,0)
Hydraulic aspects of the theory and design of hydraulic structures, types of dams and their		

function, stability analysis of gravity dams, culverts, navigation canals, reservoirs and port facilities, control structures such as gates and weirs. **Prerequisite:** CIVE 435. On demand.

Public Works Sequence

CIVE 540	GIS for Civil Engineering	3(3,0)
Review of basic cartographic principles and the use of geographic information systems for thematic mapping and spatial analysis. Laboratory emphasizes experience with GIS software. Prerequisite: CIVE 240.		
CIVE 541	Pavement Design	3(3,0)
Analysis and design of flexible and rigid pavements; pavement type selection; loading; failure criteria and reliability; mechanistic pavement design; design exercises using existing methods. Prerequisite: CIVE 423. On demand.		
CIVE 542	Bridge Engineering	3(3,0)
Types of bridges and influence lines. Loads and their distribution on bridges, serviceability of bridges, design of bridge deck, superstructure, and substructure. Prerequisite: CIVE 415. On demand.		

ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT

Faculty Members

Chairperson:	Rached Zantout
Professors:	Toufic Hijazi
Associate Professors:	Mohammad Diab, Jad Nasreddine, Mohammad Taha, Rached Zantout.
Assistant Professors:	Bassam Moslem, Maher Sabbah, Dina Serhal
Adjunct Faculty:	Marios Azzam, Hussein Wehbe

Vision

The department of Electrical and Computer Engineering envisages to be a leader in shaping intellectual and human capital in electrical, computer, communication, and biomedical engineering. The department seeks to produce experienced graduates in all fields of electrical, computer, communication, and biomedical engineering who are application oriented. Our graduates are trained so as to enrich Lebanon, the Middle East and the world in general technologically, economically, and socially.

Mission

The mission of the department is to be recognized as one of the best departments of electrical and computer engineering. Such excellence is not restricted to education only but should also encompass research, especially in transferring research outcomes to the community at large.

Programs Offered

The ECE Department offers three programs – Electrical Engineering, Computer and Communications Engineering and Biomedical Engineering. Each program grants three degrees: Bachelor of Science, Bachelor of Engineering and Master of Science.

ELECTRICAL ENGINEERING PROGRAM

Mission

The Electrical Engineering program at RHU aims to help students explore their innate creativity and potential and endow them with the knowledge, skills and abilities to: pursue successful careers in electrical engineering and related fields; think critically in solving complex problems using modern tools and technologies; communicate and work effectively with diverse groups; learn more every day, and succeed in graduate studies in renowned institutions if they choose to.

Objectives

The program objectives are to:

1. Foster an environment that encourages excellence in endeavor;
2. Provide degree and professional education which prepare leaders; and
3. Conduct multidisciplinary research to solve problems facing the society and industry in Lebanon, the Middle East and the world.

Program Outcomes

The Electrical Engineering program adopts the learning outcomes of ABET so their graduates have:

- a) an ability to apply knowledge of mathematics, science, and engineering;
- b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- c) an ability to design a system, component, or process to meet desired needs;
- d) an ability to function on multi-disciplinary teams;
- e) an ability to identify, formulate, and solve engineering problems;
- f) an understanding of professional ethical responsibility;
- g) an ability to communicate effectively;
- h) the broad education necessary to understand the impact of engineering solutions in a global and societal context;
- i) a recognition of the need for, and an ability to engage in life-long learning;
- j) a knowledge of contemporary issues;
- k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Career Opportunities

An Electrical engineer could develop components for some of the most fun things in our lives (MP3 players, digital cameras, or roller coasters) as well as the most essential (medical tests or communications systems). This largest field of engineering encompasses the macro (huge power grids that light up cities, for example) as well as the micro (including a device smaller than a millimeter that tells a car's airbags when to inflate). An electrical engineer may work in the areas of robotics, computer networks, medical imaging, or renewable energy systems — areas that are at the very forefront of technological innovation - as well as in the low power industry and power plants.

Program Overview

The Electrical (ELEC) Engineering Program at Rafik Hariri University puts what is in the best interest of students, first and foremost. Every little experience the student attains represents a block in the building of a competent, confident, purposeful, problem solving, competitive, responsible, and conscientious individual. This is accomplished by means of a curriculum and facilities that conform to the highest of standards, faculty members committed to the academic and personal growth of the student, and an environment that inspires learning and drives creativity.

The Bachelor of Engineering (BE) program in Electrical Engineering encompasses 147 credit hours spread over eight regular semesters and three summer terms. The Bachelor of Science (BS) program comprises a total of 114 credit hours spread over six regular semesters and three summer terms. In addition to completing the credits requirements, a BS or a BE degree is conferred upon a student if the earned Cumulative GPA, Major PGA and the Summative Learning Project grade are all 70 or above.

The required credit hours span three categories: University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours for the BS and the BE programs is shown in the following tables:

BS in Electrical Engineering (114 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	0	0	15	9	24	21
College Requirement	3	0	25	0	28	25
Program Requirement	35	0	27	0	62	54
Credits	38	0	67	9	114	100

BE in Electrical Engineering (147 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	0	0	15	12	27	18
College Requirement	3	0	29	0	32	22
Program Requirement	46	15	27	0	88	59
Credits	49	15	71	12	147	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Engineering section in this catalogue.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Engineering section in this catalogue.

III. Program Requirements

The program requirements for a Bachelor of Engineering degree in Electrical Engineering encompasses 88 credits (62 credits for the BS degree) distributes as follows: 71 credits (62 credits for the BS degree) Mandatory courses and 15 credits elective courses. Both categories are summarized below.

A. Mandatory requirements

The major and non-major ELEC program mandatory courses are listed in the table below.

Course #	Title	Credits	Prerequisites
BIOM 301 + 301L	Biomedical Sensors and Lab	4	
BIOM 413	Principles of Bioelectronics Circuit Design	3	BIOM 301
CCEE 221 + 221L	Logic Design and Lab	4	
CCEE 231	Signals and Systems	3	
CCEE 341	Communication Systems	3	CCEE 231
CCEE 426 + 426L	Design of Embedded Systems and Lab	4	CCEE 221
CCEE 534	Signal Processing	2	CCEE 231
ELEC 320 + 320L	Electronics and Lab	4	ELEC 210

ELEC 330	Power Systems	3	ELEC 210
ELEC 331 + 331L	Electric Machines and Lab	4	ELEC 210
ELEC 340	Engineering Electromagnetics	3	PHYS 211
ELEC 405	Electrical System Design	3	ELEC 210
ELEC 431	Introduction to Renewable Energy Systems	3	ELEC 320
ELEC 432 + 432L	Power Electronics and Lab	4	ELEC 320
ELEC 451	Control Systems	3	CCEE 231
ELEC 499	Co-op Work Experience	1	ENGL 217
ELEC 533	Advanced Machines and Drives	3	ELEC 331
ELEC 534	Advanced Power Systems	3	ELEC 330
ELEC 550	Advanced Control Systems	3	ELEC 451
ELEC 595A	BE Summative Learning Project 1	1	ENGL 217
ELEC 595B	BE Summative Learning Project 2	3	ELEC 595A
ENGR 300	Engineering Economics and Management	3	
ENGR 500	Technopreneurship	3	ENGR 300
MECA 341 + 341L	Measurements and Instrumentation	3	ELEC 320
MECH 333	Thermal Fluid Sciences	3	MATH 211

* Required of BS bound students. BE students takes Technical Elective instead.

B. Technical Electives

As part of the program for the Bachelor of Engineering in ELEC Engineering, the student is required to study 15 credit hours of technical elective courses. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. The student can also mix and match elective courses from the different areas to get a more general exposure to the different ELEC Engineering disciplines. The student should select, in cooperation with the academic advisor, the list of electives that best meet his or her needs and aspirations. The listed technical elective courses and other courses from other engineering programs, in addition to the required program courses, are designed to allow the student to develop in-depth knowledge and understanding in the following areas: (1) Power, (2) Renewable Energy, (3) intelligent systems.

It is highly recommended that the student takes elective courses from the list below after completing the mandatory requirements in the related area. Students may select technical electives from other programs subject to approval of the academic advisor and the corresponding course instructor.

Course #	Title	Credits	Prerequisites
ELEC 406	Modeling and Simulation	3	ELEC 210

ELEC 425	Switching	3	PHYS 211
ELEC 433	High Voltage Engineering	3	PHYS 211
ELEC 434	Electrical Power Distribution	3	PHYS 211
ELEC 444	Electromagnetic Compatibility	3	ELEC 210
ELEC 498	Special Topics in Electrical Engineering	3	Instructor's consent
ELEC 503	Artificial Neural Systems	3	
ELEC 504	Lasers and Laser Applications in Engineering	3	
ELEC 532	Application of Power Electronics in Power Systems	3	ELEC 330, ELEC 432
ELEC 536	Renewable Energy Systems	3	
ELEC 542	Advanced Power Electronics	3	
ELEC 551	Nonlinear Adaptive Control	3	

C. Summative Learning Project

Students must complete a 3- credit hours course for BS (4-credits for BE; taken 1 credit in the first regular semester and 3 credits in the following regular semester) in which they work preferably in groups on a problem of concern to industry or the community at large, or to innovate a promising idea. The SLP could be an extension of the projects students had worked on in the Engineering for the community course to bring it to a more useful outcome.

D. Co-op Experience

Students must complete 8 weeks of practical training in working in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits and ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are required to submit a formal report, a poster and make a formal presentation about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Course Coding

The courses offered in the ELEC Engineering program are designated code numbers in the form of (ELEC abc) where:

-
- a: Designate course year/level
 - b: Designate focus area as follows
-

0: General; 1: Electrical; 2: Electronics; 3: Power; 4: Magnetism ; 5: Control

c: Designate course sequence in area

For example ELEC 320 is the *first course* in the area of *Electronics* offered by the *electrical engineering program* in the *second year*.

Study Plan

The following study plan summarizes the courses and credits distribution for the Bachelor of Science (BS) and Bachelor of Engineering (BE) in ELEC Engineering. The study plan serves as a roadmap to facilitate student's smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (16 Credits)			
MATH 211	Calculus III	4	
PHYS 211	Electricity and Magnetism	3	
ENGL 210	English Composition and Rhetoric	3	
COSC 214	Introduction to Programming	3	
CCEE 221	Logic Design	3	
Year 1, Spring Semester (16 Credits)			
ELEC 210	Electric Circuits	3	PHYS 211
CCEE 221L	Logic Design Lab	1	CCEE 221
MATH 311	Linear Algebra and Applications	3	
ENGR 200	Engineering for the Community	3	
CCEE 231	Signals and Systems	3	
MECH 333	Thermal Fluid Sciences	3	MATH 211
Year 1, Summer term (6 Credits)			
BIOL 210	Human Anatomy and Physiology	3	
PHYS 312	Modern Physics	3	
Year 2, Fall Semester (18 Credits)			
ELEC 320	Electronics	3	ELEC 210
ELEC 320L	Electronics Lab	1	Co-req: ELEC 320
BIOM 301	Biomedical Sensors	3	
BIOM 301L	Biomedical Sensors Lab	1	Co-req: BIOM 301
ELEC 331	Electric Machines	3	ELEC 210
ELEC 331L	Electric Machines Lab	1	Co-req.: ELEC 331
ENGL 217	Professional English	3	ENGL 210

MATH 314	Ordinary Differential Equations	3	MATH 211
Year 2, Spring Semester (16 Credits)			
ELEC 340	Engineering Electromagnetics	3	PHYS 211
MECA 341	Measurements and Instrumentation	3	ELEC 320
MECA 341L	Measurements and Instrumentation Lab	1	Co-req: MECA 341
MATH 351	Probability and Statistics	3	
ELEC 330	Power Systems	3	ELEC 210
	Social Sciences/Culture Elective I	3	
Year 2, Summer term (9 Credits)			
ENGR 300	Engineering Economics and management	3	
	Social Sciences/Culture Elective II	3	
MATH 210 / MATH 421	Discrete Math/Numerical Analysis	3	MATH211/ MATH 311
Year 3, Fall Semester (16 Credits)			
ELEC 451	Control Systems	3	CCEE 231
CCEE 426	Design of Embedded Systems	3	CCEE 221
CCEE 426L	Design of Embedded Systems Lab	1	Co-req.: CCEE 426
CCEE 341	Communication Systems	3	CCEE 231
BIOM 413	Principles of Bioelectronics Circuit Design	3	BIOM 311
	Humanities/Fine Arts Elective I	3	
Year 3, Spring Semester (16 Credits)			
ELEC 405	Electrical System Design	3	ELEC 210
ELEC 432	Power Electronics	3	ELEC 320
ELEC 432L	Power Electronics Lab	1	Co-req: ELEC 432
ELEC 4xx	Engineering Technical Elective 1*	3	
ELEC 431	Introduction to Renewable Energy Systems	3	ELEC 320
	Science Elective	3	
Year 3, Summer term (1 Credit)			
ELEC 499	Co-op Work Experience	1	ENGL 217
The above 114 credits completes the requirements for a Bachelor of Science degree in Electrical Engineering.			
Year 4, Fall Semester (18 Credits)			
ENGR 500	Technopreneurship	3	ENGR 300
CCEE 534	Signal Processing	2	CCEE 231
ELEC 534	Advanced Power Systems	3	ELEC 330

	Humanities/Fine Arts Elective II	3	
	Engineering Technical Elective 2	3	
	Engineering Technical Elective 3	3	
ELEC 595A	BE Summative Learning Project 1	1	ENGL 217, senior standing
Year 4, Spring Semester (15 Credits)			
ELEC 550	Advanced Control Systems	3	ELEC 451
ELEC 533	Advanced Machines and Drives	3	ELEC 331
	Engineering Technical Elective 4	3	
	Engineering Technical Elective 5	3	
ELEC 595B	BE Summative Learning Project 2	3	ELEC 595A
Total BE credits: 147			

* BS bound students are required to take ELEC 400 – Summative Learning (BS) Project instead.

Note: Engineering Technical Electives (levels 400 or above) are selected as such:
 6 credit restricted Departmental Electives
 9 credits from any Engineering discipline of levels 400 or above.

Course Description

I. Mandatory Courses

Non Major Courses

Description of the mandatory, non-major courses follows.

BIOL 210	Human Anatomy and Physiology	3(3,0)
A general overview of cells structure function and physiology, anatomy and physiology of the body system such as heart and cardiovascular system, central nervous, respiratory, urinary, digestive, reproductive systems, and musculoskeletal systems. .		

BIOM 301	Biomedical Sensors	3(3,0)
This course provides an introductory overview of the multidisciplinary field of biomedical sensors. It includes: interpreting biological and medical relevant signals; measurement of noise, pressure, blood flow, motion and force; and electrode theory. Prerequisite: CCEE 231.		

BIOM 301L	Biomedical Sensors Lab	1(0,2)
The lab teaches students how to measure and interpret biological and medical signals. Experiments include: signal, noise, pressure (strain gauge) and temperature measurements;		

blood and gases flow, motion and force measurements; and applications using electrodes based on medical equipment and research and simulation kits. **Co-requisite:** BIOM 301.

CCEE 214	Introduction to Programming	3(2,2)
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Understanding of the basic principles of programming and computer systems; Applications of programming to the solution of engineering problems; Control structures, functions, arrays, pointers and structures. Equivalent to COSC 214.

CCEE 221	Logic Design	3(3,0)
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This course addresses Boolean algebra and logic simplification techniques, data representation, and the design of combinational logic networks for decoders, encoders, multiplexers, and demultiplexers. Design of sequential logic devices including flip-flops, registers, and counters, as well as analysis of devices used to build logic networks, including programmable logic devices. Equivalent to COSC 351.

CCEE 221L	Logic Design Lab	1(0,2)
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This Lab covers design techniques and implementation of combinational and sequential logic circuits. Experiments include: logic gates, design and implementation of logic circuits, combinational logic circuits (decoders, encoders, multiplexers, demultiplexers and adders), and design of sequential logic devices using flip-flops, registers, and counters. Prerequisite: CCEE 221. **Prerequisite:** CCEE 221. Equivalent to COSC 351L.

CCEE 231	Signals and Systems	3(3,0)
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This course covers mathematical description and classification of continuous and discrete signals and systems. Topics include: types of signals and systems, Fourier series, Fourier transforms, Discrete-Time Fourier transforms (DTFT), Discrete and Fast Fourier Transforms (DFT and FFT), Laplace transforms, z-transforms, transfer functions.

CCEE 341	Communication Systems	3(3,0)
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This course introduces the fundamentals transmission and reception of communication systems and effect of noise. Topics include: power spectral density, amplitude modulation and demodulation, angle modulation and demodulation, analog communication system performance in the presence of noise, sampling and analog-to-digital conversion, introduction to digital modulations, channel capacity. **Prerequisite:** CCEE 231.

CCEE 426	Design of Embedded Systems	3(3,0)
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This course addresses the design of embedded real-time systems, models of computation, validation techniques, and automatic synthesis. Finite state machines, synchronous languages, data flow networks, petri nets, software optimization and performance estimation, operating

systems and scheduling, system-level simulation, and interface-based design. **Prerequisite:** CCEE 221. Equivalent to COSC 356.

CCEE 426L	Design of Embedded Systems Lab	1(0,2)
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This lab complements topics covered in the CCEE 426 course. It involves design of embedded real-time systems, models of computation, validation techniques, and automatic synthesis. Experiments include: Design using finite state machines, synchronous languages, data flow networks, petri nets, software optimization and performance estimation, scheduling, system-level simulation, and interface-based design. **Co-requisite:** CCEE 426. Equivalent to COSC 356L.

CCEE 534	Signal Processing	2(2,0)
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This course covers time series analysis, frequency analysis, time-frequency and time-scale analysis. It also covers the design of digital filters and signal modeling. **Prerequisite:** CCEE 231.

ENGL 210	English Composition and Rhetoric	3(3,0)
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This course reinforces effective critical reading and writing skills with emphasis on writing documented essays for academic purposes in a varying range of rhetorical modes. More specifically, the student will apply the fundamental principles of English spelling, word usage, grammar, punctuation and style necessary for written communication; write academic essays; proofread and edit a variety of texts; analyze general texts for coherence, style and accuracy in writing; read critically from a variety of discourse modes; summarize, paraphrase and quote sources properly; and cite sources according to APA form.

ENGL 217	Professional English Writing	3(3,0)
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This course is designed to enhance students' professional writing skills. It is tailored to students pursuing careers in the professions and includes advanced business writing and editing, correspondence, critical review, writing professional reports and proposals, and making oral presentations. **Prerequisite:** ENGL 210.

ENGR 200	Engineering for the Community	3(3,0)
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This course aims to give students a holistic view of engineering, its interdisciplinary nature and role in solving community problems. It entails a brief overview on the role of technology, creativity and problem solving, product development cycle, contemporary engineering systems, and ethical considerations. Students in teams work on a community related project that will culminate in a working artifact. Specific topics are flexible but it shall cover fundamentals of intelligent systems, computer interface, sensing and actuation, mechanisms and structures.

ENGR 300	Engineering Economics and management	3(3,0)
<p>Concepts and techniques in basic Engineering economy principles and applications. Interest and financial mathematics; present worth, annual worth, benefit/cost ratio, internal rate of return, multiple alternatives, income tax, inflation, Risk analysis, Investment and investment choice, equivalence, loans, cost of capital, retirement and replacement, sector analysis and viewpoint, sensitivity analysis, accounting and financial statements. .</p>		
ENGR 500	Technopreneurship	3(3,0)
<p>Venture and innovation opportunities; concept and strategy; the Technopreneur; planning; resource acquisition and organization; financing, marketing and sustainability of enterprise. Prerequisite: ENGR 300. .</p>		
MATH 210	Discrete Mathematics	3(3,0)
<p>Logic, propositional equivalences, predicates and quantities, methods of proof, sets, set operations, functions, proof strategy, mathematical induction, recursive definitions and structural induction, the basics of counting, permutations and combinations, relations and their properties, representing relations, equivalence relations, introduction to graphs, graph terminology, introduction to trees. Prerequisite: MATH 211.</p>		
MATH 211	Calculus III	4(4,0)
<p>Volumes by slicing and rotation about an axis, length of plane curves, areas of surfaces of revolution, integrations and applications of integrals, transcendental functions and their inverses, integration techniques, improper integrals, sequences and infinite series, vectors in the plane and polar functions, Fourier Series; polar functions and their graphs, cylinders and quadric surfaces, functions of several variables, partial derivatives and their applications, extreme values of functions of several variables, Lagrange multipliers, double and triple integrals in rectangular and cylindrical and spherical coordinates, integration in vector fields, Green's and Stoke's theorems.</p>		
MATH 311	Linear Algebra	3(3,0)
<p>Linear equations in linear algebra, matrix algebra, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality and least squares, symmetric matrices and quadratic forms.</p>		
MATH 314	Ordinary Differential Equation	3(3,0)
<p>First order equations, existence and uniqueness theorem, separation of variables, higher order linear equations, Series solutions of second order linear equations, Laplace transforms, systems of first linear equations. Prerequisites: MATH 211.</p>		
MATH 351	Probability and Statistics	3(3,0)

Probability and conditional probability, random variable and distribution, continuous and marginal distributions, expectation, variance- moments-mean-median-covariance and correlation, conditional expectation, the sample mean, special distribution, Bernoulli and binomial distributions, Poisson and Gamma distribution.

MATH 421	Numerical Analysis	3(3,0)
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Error Analysis, solutions of nonlinear equations using fixed point- Newton-Raphson-Muller's methods, solution of linear system using Gaussian elimination-iterative methods, interpolation and approximation using Taylor series-Lagrange approximation-Newton polynomials, numerical differentiation and integration, numerical optimization, solutions of ordinary and partial differential equations using Euler's and Heun's and Rung-Kutta methods. **Prerequisite:** MATH 311.

MECA 341	Measurements and Instrumentation	3(3,0)
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This course covers the fundamentals of instrumentation and measurement of various physical quantities. Topics include: sensor types, technologies, characteristics and calibration; design of a measurement system; statistical analysis of measured data; measurement noise and uncertainties; data acquisition, data storage and display devices; signal conditioning and interface electronics concepts including filtering, A/D and D/A conversion, amplification, modulation, compensation; applications; **Prerequisite:** ELEC 320, Annually.

MECA 341L	Measurements and Instrumentation Lab	1(0,2)
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The lab experience complements the topics covered in MECA 341. Students learn to use the NI ELVIS platform, LabVIEW programming and data acquisition systems characteristics to build a measurement system, perform data analysis and sensor calibration, and design and build signal conditioning circuits for various types of measurements. The lab involves a team project to integrate all instrumentation and measurement tools and techniques are applied to build a measurement system and submit a report. **Co-requisite:** MECA 341.

MECH 333	Thermal Fluid Sciences	3(3,0)
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This course seeks to impart thermal-fluid fundamental concepts (including Thermodynamics, Fluid Mechanics and Heat Transfer) to non-mechanical engineering students. This covers: thermodynamic state and properties of pure substances; concepts of work and heat, energy analysis of closed systems (First Law) and simple flow devices, Fluid statics; Bernoulli's equation; Conservation of mass, momentum & energy, viscous flow in pipes, introduction to conduction, convection and radiation heat transfer. **Prerequisite:** MATH 211. Annually.

PHYS 211	Physics: Electricity and Magnetism	3(3,0)
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This course covers fundamental topics in Electricity and Magnetism: Electric forces and Electric Fields for discrete and continuous charge distribution, Gauss's Law, Electric Potential, Capacitance and Dielectrics, Kirchhoff's rules, Magnetic Fields and Forces, Biot-Savart Law, Ampere's Law, Magnetic Flux, Gauss's Law in Magnetism, Faraday's and Lenz's Laws.

PHYS 312	Modern Physics	3(3,0)
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This course covers the various models of atomic description, particles and quantum numbers, different forms of electromagnetic waves and their interactions (PE effect, Auger, Compton...), relativity, vibration and elastic properties of material.

Major Courses

Mandatory electrical engineering courses are described below.

ELEC 210	Electric Circuits	3(3,0)
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This course covers circuit elements and laws, mesh and node equations, network theorems, energy storage elements, RC, R, and RLC circuits, transformers, sinusoidal (AC) steady state analysis, power calculation, and introduction to three phase circuit.

Prerequisite: PHYS 211.

ELEC 320	Electronics	3(3,0)
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This course covers semiconductors, PN junctions, diode theory and circuits, bipolar junction transistors, transistor fundamentals, transistor biasing, amplifiers, MOSFETs, and operational amplifiers. **Prerequisite:** ELEC 210.

ELEC 320L	Electronics Lab	1(0,2)
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This is a Lab course with experiments in Electrical and Electronic Circuits. It covers passive electrical elements and sources; lab instruments; voltage divider circuits; Thevenin's theorem; RC circuits; diode circuits; Op-Amp circuits; BJT and MOSFET characteristics. **Co-requisite:** ELEC 320.

ELEC 330	Power Systems	3(3,0)
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This course covers three-phase power systems; symmetrical components, transmission lines, power transformers, power systems modeling, per unit analysis, power flow studies and fault analysis. **Prerequisite:** ELEC 210.

ELEC 331	Electric Machines	3(3,0)
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This course covers magnetic circuits, fundamentals of electromechanical energy conversion, construction, testing, steady-state analysis, and operational characteristics of DC machines, transformers, induction machines and synchronous machines.

Prerequisite: ELEC 210.

ELEC 331L	Electric Machines Lab	1(0,2)
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This is a Lab course with experiments on electric machines. It covers the following topics: basics of DC motors and generators, DC series, shunt and separately excited motors and generators, single phase AC induction machines and 3-phase machines. **Co-requisite:** ELEC 331.

ELEC 340	Engineering Electromagnetics	3(3,0)
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This course covers vector analysis, static electric fields, static magnetic fields, time varying fields and Maxwell's equations and electromagnetic waves. **Prerequisite:** PHYS 211.

ELEC 405	Electrical System Design	3(3,0)
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This course aims to teach students how to design various electrical systems based on equipment selection, protection systems, EMC and safety requirements, international standards, draw and interpret schematics and wiring diagrams, cost considerations, energy efficiency. **Prerequisite:** ELEC 210.

ELEC 431	Introduction to Renewable Energy Systems	3(3,0)
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This course discusses the use of solar (thermal and photovoltaic), hydro-electric, wind, geothermal, ocean thermal, wave, tidal and geothermal energy, as well as energy from biomass. Issues relevant to energy efficiency and energy storage are discussed.

Prerequisite: ELEC 320.

ELEC 432	Power Electronics	3(3,0)
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This course familiarizes the students with basic power switch technology and associated electronic circuits. In this course power electronic circuits and switching devices are studied. Their applications in AC/DC, DC/DC, DC/AC and AC/AC converters as well as switching power supplies are studied. **Prerequisite:** ELEC 320.

ELEC 432L	Power Electronics Lab	1(0,2)
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This Lab course is designed to teach students the fundamentals of power electronics. It covers the following topics: uncontrolled single and 3-phase rectifiers using diodes, controlled single phase and 3-phase rectifiers using thyristors, DC-to-AC converters, DC-to-DC buck and boost converters, applications on DIAC, TRIAC and IGBT. **Co-requisite:** ELEC 432.

ELEC 451	Control Systems	3(3,0)
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This course is to explore the modeling of linear dynamic systems via differential equations and transfer functions utilizing state-space and input-output representations; analysis of

control systems in the time and frequency domains, study of the classical stability tests, such as the Routh-Hurwitz and Nyquist criterions, and design methods using root-locus plots and Bode plots; and the development of control techniques based on PID, lead and lag networks.
Prerequisite: CCEE 231.

ELEC 499	Co-op Work Experience	1(0,0)
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This Co-op work experience is designed to provide students with a five-week short-term work experience in the field of electrical engineering. Students are encouraged to network in the discipline-related industries. Report, poster, and power-point presentation, are required.
Prerequisites: ENGL 217 and Senior Standing.

ELEC 533	Advanced Electric Machines and Drives	3(3,0)
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This course is concerned with the design, construction and performance of electrical machines in modern control systems. Topics will normally include the following: electromechanical control devices and systems, electronic converters used to drive DC and AC machines. **Prerequisite:** ELEC 331.

ELEC 534	Advanced Power Systems	3(3,0)
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The course is designed to give students a deeper knowledge on the analysis of power systems by covering the following topics: Circuit models, Per unit representation, Network methods, Load-flow studies, Load-flow control, and Economic dispatch. It covers also the Symmetrical three-phase faults, Unsymmetrical faults, Power system stability, and computer methods.
Prerequisite: ELEC 330.

ELEC 535	Power System Protection	3(3,0)
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This course is designed to help students understand the fundamentals of power system protection. In this course, the various techniques of detecting faults (over current, differential current, symmetrical components of current and voltages...) as well as the corresponding components and circuits (electromechanical, electronic and digital Relays, circuit breakers and fuses...) will be covered. **Prerequisite:** ELEC 330.

ELEC 550	Advanced Control Systems	3(3,0)
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This course focuses on the formulation of the linear control problem by state space methods, frequency response and time response analysis; it introduces students to advanced concepts of controllability, observability, canonical forms, state transition matrices, stability, Nonlinear systems linearization as well as discrete and time-invariant systems. **Prerequisite:** ELEC 451.

ELEC 595A	BE Summative Learning Project 1	1(1,0)
First phase of a team-oriented, project-based experience that culminates in the creation of an artifact; milestones include: project selection and proposal, creative solution, report, presentation, and demonstration of the created device. Prerequisite: ENGL 217.		

ELEC 595B	BE Summative Learning Project 2	3(3,0)
Second phase of a team-oriented, project-based experience that culminates in the creation of an artifact; milestones include: project selection and proposal, creative solution, report, presentation, and demonstration of the created device. Prerequisite: ELEC 595A.		

II. Elective Courses

Students may meet their technical electives requirements from the following selection of elective courses.

ELEC 406	Modeling and Simulation	3(3,0)
This course aims to teach the students the concept of representing, characterizing, understanding, analyzing or solving real world problem through modeling and simulation. In this course, students are introduced to the tools and techniques used to model and simulate different systems varying from basic circuits to more advanced and complex technical systems found in various engineering domains. Prerequisite: ELEC 210.		

ELEC 425	Switching	3(3,0)
This course focuses on switches (types and characteristics) as well as the concept of switching and its applications such as DC-DC converters, AC/AC converters, rectifiers, inverters, switch mode power supplies. The course covers both single phase and three phase converters. Prerequisite: ELEC320.		

ELEC 433	High Voltage Engineering	3(3,0)
This course gives an introduction to high voltage engineering, withstand levels, S curves; insulation coordination; breakdown mechanisms. Non-destructive testing of apparatus; insulation resistance, partial discharge, measurements HV production for test objects. System over-voltages, switching, lightning and over-voltage protection devices. Prerequisite: ELEC 330.		

ELEC 434	Electrical Power Distribution	3(3,0)
This course gives general considerations; load characteristics; sub-transmission and distribution substations; primary and secondary distribution, secondary network systems; distribution transformers; voltage regulation and application of capacitors; voltage fluctuations; protective device coordination. Prerequisite: ELEC 330.		

ELEC 444	Electromagnetic Compatibility	3(3,0)
<p>This course gives an introduction to Electromagnetic Interference, Conducted and Radiated Emission, Conducted and Radiated Susceptibility, Product slippage. EMC standards and Regulations. EMC Theory and Materials Relating to EMC design. EMC Measurement and test facilities. Prerequisite: ELEC 210.</p>		

ELEC 498	Special Topics in Electrical Engineering	3(3,0)
<p>This course is designed to enable students to study current special topics of interest which are carefully selected from ELEC-related topics. The contents of such a course are to be determined by the instructor and the department.</p>		

ELEC 503	Artificial Neural Systems	3(3,0)
<p>This course focuses on the foundations of neural network theory and their application in engineering, cognitive science, and artificial intelligence. The course covers also the foundations of machine learning and neural processing algorithms: supervised and unsupervised learning of feed forward and recurrent neural networks, perception layers, associative memories, feature maps.</p>		

ELEC 504	Lasers and Laser Applications in Engineering	3(3,0)
<p>This course is designed to give students a functional knowledge in lasers. The course covers light, atoms, absorption processes, and spontaneous and simulated emission of radiation. Moreover, laser types and characteristics are discussed. Laser sources, resonators, and amplifiers are discussed. In addition, applications in engineering, technology, and biomedical field applications will be discussed.</p>		

ELEC 532	Application of Power Electronics in Power Systems	3(3,0)
<p>This course focuses on power electronic and its applications in power systems by covering the following topics: Flexible AC transmission systems (FACTS), conventional thyristor controlled reactors and phase shifters, voltage source inverter (VSI) based static condenser (STATCON) and unified power flow controller (UPFC). Prerequisites: ELEC 330; ELEC 432.</p>		

ELEC 536	Renewable Energy Systems	3(3,0)
<p>The course covers the basics of energy production from renewable sources, the relevant thermodynamics background, the structure and nature of the interconnected electric power system and the critical need for environmentally sensitive solutions. In addition, the economic and regulatory policy aspects of electricity and electricity markets are treated. Prerequisite: ELEC 431.</p>		

ELEC 542	Advanced Power Electronics	3(3,0)
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This course is designed to provide students with a functional knowledge of modeling switching power converters, advanced power converter topologies, design constraints and control methods. It also covers the operation of multi-level DC/AC inverters and matrix converters.

Prerequisite: ELEC 432.

ELEC 551	Nonlinear Adaptive Control
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3(3,0)

This course presents a comprehensive exposition of the theory of nonlinear dynamical systems and its control. It will focus on the methods of characterizing and understanding the behavior of systems that can be described by nonlinear ordinary differential equations, and as well as the methods for designing controllers for such systems. In this course, both classical and modern concepts from nonlinear system theory will be introduced.

COMPUTER AND COMMUNICATIONS ENGINEERING PROGRAM

Mission

The CCE program aims to help students explore their innate creativity and potential and endow them with the knowledge, skills and abilities to: pursue successful careers in computer and communication engineering and related fields; think critically in solving complex problems using modern tools and technologies; communicate and work effectively with diverse groups; learn more every day, and succeed in graduate studies in renowned institutions if they choose to.

Objectives

The program objectives are to:

1. Foster an environment that encourages excellence in endeavor;
2. Provide degree and professional education which prepare leaders; and
3. Conduct multidisciplinary research to solve problems facing the society and industry in Lebanon, the Middle East and the world.

Program Outcomes

The Computer and Communication Engineering program adopts the learning outcomes of ABET so their graduates have:

- a) an ability to apply knowledge of mathematics, science, and engineering;
- b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- c) an ability to design a system, component, or process to meet desired needs;
- d) an ability to function on multi-disciplinary teams;
- e) an ability to identify, formulate, and solve engineering problems;
- f) an understanding of professional ethical responsibility;
- g) an ability to communicate effectively;
- h) the broad education necessary to understand the impact of engineering solutions in a global and societal context;
- i) a recognition of the need for, and an ability to engage in life-long learning;
- j) a knowledge of contemporary issues;
- k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Career Opportunities

As a CCE graduate, you can pursue successful careers in related fields such as the computer software industry, the computer hardware industry, connecting computers across the world, the communication industry whether wired or wireless, mobile communication as well as satellite communication.

As a computer engineer, you will create new opportunities for businesses by driving new technologies, and devise engineering solutions to make businesses more productive and competitive. You will assist businesses to develop robotics and multimedia systems such as speech and image processing. You will also work with embedded computer systems, such as the computerized controls in a car's electrical system.

Network engineers design, implement and maintain the digital communication networks that surround us. In this field, telecommunication operators such as Alfa and Touch employ network engineers as do equipment manufacturers such as Cisco and Huawei and the IT departments of many organizations, mainly banks. You'll also have the skills to run your own computer or network services business.

As a telecommunication engineer, you can work at telecommunication operators or equipment manufacturer as radio planner, optimizer and integrator; transmission planner and integrator; Circuit Switching/Packet Switching core expert; Customer Relationship Management; sales engineer/manager; or operation and maintenance engineer.

Program Overviews

The Computer and Communications Engineering Program at Rafik Hariri University puts the best of students' interest, first and foremost. Every little experience the student attains represents a block in the building of a competent, confident, purposeful, problem solving, competitive, responsible, and conscientious individual. This is accomplished by means of a curriculum and facilities that conform to the highest of standards, faculty members committed to the academic and personal growth of the student, and an environment that inspires learning and drives creativity.

The Bachelor of Engineering (BE) program in Computer and Communications Engineering encompasses 147 credit hours spread over eight regular semesters and three summer terms. The Bachelor of Science (BS) program comprises a total of 114 credit hours spread over six regular semesters and three summer terms. In addition to completing the credits requirements, a BS or a BE degree is conferred upon a student if the earned Cumulative GPA, Major PGA and the Summative Learning Project grade are all 70 or above.

The required credit hours span three categories: University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours for the BS and BE programs are shown in the following table:

BS in Computer and Communication Engineering (114 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	3	0	12	9	24	21
College Requirement	0	0	28	0	28	25
Program Requirement	47	0	15	0	62	54
Credits	50	0	55	9	114	100

BE in Computer and Communication Engineering (147 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	3	0	12	12	27	19
College Requirement	0	0	31	0	31	21
Program Requirement	59	15	15	0	89	60
Credits	62	15	58	12	147	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Engineering section in this catalog.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Engineering section in this catalog.

III. Program Requirements

The program requirements for a Bachelor of Engineering degree in Computer and Communications Engineering (CCE) encompasses 89 credits (62 credits for the BS degree) distributes as follows: 74 credits (47 credits for the BS degree) Mandatory courses and 15 credits elective courses.

A. Mandatory requirements

The major and non-major CCEE program mandatory courses are listed in the table below.

Course #	Title	Credits	Prerequisites
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BIOM 301+301L	Biomedical Sensors and Lab	4	
CCEE 221+221L	Logic Design and Lab	4	
CCEE 222	Computer Organization	3	CCEE 221
CCEE 231	Signals and Systems	3	
CCEE 315	Database Management Systems	3	CCEE 214
CCEE 316	Object Oriented Programming	3	CCEE 214
CCEE 323	Computer Architecture	3	CCEE 222
CCEE 341	Communication Systems	3	CCEE 231
CCEE 411	Web Programming	3	CCEE 315
CCEE 426+426L	Design of Embedded Systems and Lab	4	CCEE 221
CCEE 447+447L	Digital Communications and Lab	4	CCEE 441
CCEE 449	Wireless Communications	3	CCEE 447
CCEE 499	Co-op Experience	1	ENGL 217
CCEE 510	Software Engineering	3	CCEE 214
CCEE 534	Signal Processing	2	CCEE 231
CCEE 544	Antennas and Propagation	3	ELEC 340
CCEE 454+454L	Networking 1 and Lab	4	CCEE 231
CCEE 562	Artificial Intelligence	3	
CCEE 595A	BE Summative learning Project 1	1	ENGL 217
CCEE 595B	BE Summative learning Project 2	3	CCEE 595A
CCEE xxx	Technical Electives	15	Per course requirement
ELEC 320+320L	Electronics and Lab	4	ELEC 210
ELEC 340	Engineering Electromagnetics	3	PHYS 211
MECA 341+341L	Measurements and Instrumentation	3	ELEC 320

* Required for BS bound students. BE students takes Technical Elective instead.

B. Technical Electives

As part of the Bachelor of Engineering degree program in CCE Engineering, the student is required to study 15 credit hours of technical elective courses. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. The student can also mix and match elective courses from the different areas to get a more general exposure to the different CCE Engineering disciplines. The student should select, in cooperation with the academic advisor, the list of electives that best meet his or her needs and aspirations. The listed technical elective courses and other courses from other engineering programs, in addition to the required program courses, are designed to allow the student to develop in-depth knowledge and understanding in the following areas:

1. Computer Software

2. Computer Hardware
3. Signal Processing
4. Communication Systems
5. Networking
6. Artificial Intelligence

It is highly recommended that the student takes elective courses from the list below after completing the mandatory requirements in the related area. In each track, one restricted elective is mandatory. The table below lists the mandatory electives for each track.

Course #	Title	Credits	Prerequisites	Track
CCEE 510	Mobile Application Development	3	CCEE 214	1
CCEE 535	Digital Signal Processing	3	CCEE 320	3
CCEE 543	Mobile Communications	3	CCEE 449	4
CCEE 555	Networking 2	3	CCEE 454	5
CCEE 564	Machine Learning and Data Mining	3	CCEE 316	6

Students may select the other technical electives from other programs subject to approval of the academic advisor and the corresponding course instructor. The list of available electives is given in the table below:

Course #	Title	Credits	Prerequisites
CCEE 498	Special Topics in Computer and Communication Engineering	3	
CCEE 513	Operating Systems	3	CCEE 214
CCEE 514	Advanced Web Programming	3	CCEE 411
CCEE 520	Advanced Embedded Systems	3	CCEE 221
CCEE 521	Hardware-Software Co-design	3	CCEE 221
CCEE 528	Reconfigurable Computing	3	CCEE 221
CCEE 536	Digital Image Processing	3	CCEE 231
CCEE 537	Multimedia Systems	3	CCEE 447
CCEE 540	Satellite Communication Systems	3	CCEE 441
CCEE 542	Microwave Communications	3	ELEC 340
CCEE 545	Advanced Mobile Communications	3	CCEE 541
CCEE 546	Array Processing	3	CCEE 544
CCEE 547	Optical Communications	3	CCEE 231
CCEE 552	Cryptography and Network Security	3	CCEE 231, CCEE 454
CCEE 553	Advanced Communication Networks	3	CCEE 454
CCEE 556	Internet Engineering	3	CCEE 454
CCEE 561	Computer Vision	3	

CCEE 563	Robotics	3	
CCEE 566	Natural Language Processing	3	

C. Summative Learning Project

Students must complete a 3- credit hours course for BS (4-credits for BE; taken 1 credit in the first regular semester and 3 credits in the following regular semester) in which they work preferably in groups on a problem of concern to industry or the community at large, or to innovate a promising idea. The SLP could be an extension of the projects students had worked on in the Engineering for the community course to bring it to a more useful outcome.

D. Co-op Experience

Students must complete 8 weeks of practical training working in an area related to their field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on the student's progress throughout the Co-op period by conducting field visits and ensuring that the student's performance is aligned with his/her aspirations and employer's needs. Students are required to submit a formal report, a poster and make a formal presentation about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Course Coding

The courses offered in the CCE Engineering program are designated code numbers in the form of (CCEE abc) where:

-
- a Designates the year (level)
 - b Designates the focus area as follows:
0: General; 1: Computer Software; 2: Computer Hardware; 3: Signal Processing; 4: Communication Systems; 5: Networking; 6: Artificial Intelligence
 - c Designates the course sequence in a focus area
-

Study Plan

The following study plan summarizes the courses and credits distribution for the Bachelor of Science (BS) and Bachelor of Engineering (BE) in CCEE Engineering. The study plan serves as a roadmap to facilitate student's smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
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Year 1, Fall Semester (17 Credits)			
ENGL 210	English Composition and Rhetoric	3	
MATH 211	Calculus III	4	
PHYS 211	Electricity and Magnetism	3	
COSC 214	Introduction to Programming	3	
CCEE 221	Logic Design	3	
Year 1, Spring Semester (15 Credits)			
ELEC 210	Electric Circuits	3	PHYS 211
MATH 311	Linear Algebra and Applications	3	
ENGR 200	Engineering for the Community	3	
CCEE 221L	Logic Design Lab	1	CCEE 221
CCEE 231	Signals and Systems	3	
CCEE 222	Computer Organization	3	CCEE 221
Year 1, Summer term (9 Credits)			
BIOL 210	Human Anatomy and Physiology	3	
PHYS 312	Modern Physics	3	
	Social Sciences/Culture Elective I	3	
Year 2, Fall Semester (16 Credits)			
ELEC 320	Electronics	3	ELEC 210
ELEC 320L	Electronics Lab	1	Co-req: ELEC 320
CCEE 316	Object Oriented Programming	3	CCEE 214
ENGL 217	Professional English Writing	3	ENGL 210
CCEE 341	Communication Systems	3	CCEE 231
MATH 314	Ordinary Differential Equations	3	MATH 211
Year 2, Spring Semester (16 Credits)			
ELEC 340	Engineering Electromagnetics	3	PHYS 211
MECA 341	Measurements and Instrumentation	3	ELEC 320
MECA 341L	Measurements and Instrumentation Lab	1	Co-req: MECA 341
MATH 351	Probability and Statistics	3	
CCEE 315	Database Management Systems	3	CCEE 214
CCEE 323	Computer Architecture	3	CCEE 222
Year 2, Summer term (9 Credits)			
ENGR 300	Engineering Economy and Management	3	
MATH 210	Discrete Mathematics	3	MATH 211
	Humanities/Fine Arts Elective I	3	
Year 3, Fall Semester (15 Credits)			
CCEE 447	Digital Communications	3	CCEE 341
CCEE 447L	Communications Lab	1	Co-req: CCEE 447

CCEE 426	Design of Embedded Systems	3	CCEE 221
CCEE 426L	Design of Embedded Systems Lab	1	Co-req: CCEE 426
CCEE 454	Networking 1	3	CCEE 231
BIOM 301	Biomedical Sensors	3	
BIOM 301L	Biomedical Sensors Lab	1	Co-req: BIOM 301
Year 3, Spring Semester (16 Credits)			
CCEE 411	Web Programming	3	CCEE 315
CCEE 449	Wireless Communications	3	CCEE 447
CCEE 454L	Networking Lab 1	1	CCEE 454
	Social Sciences/Culture Elective II	3	
	Engineering Technical Elective 1*	3	ENGL 217
MATH 421	Numerical Analysis	3	MATH 311
Year 3, Summer term (1 Credits)			
CCEE 499	Co-op Work Experience	1	ENGL 217
The above 114 credits complete the requirements for a Bachelor of Science degree in Computer and Communication Engineering			
Year 4, Fall Semester (18 Credits)			
CCEE 534	Signal Processing	2	CCEE 231
CCEE 595A	BE Summative Learning Project 1	1	ENGL 217
CCEE 544	Antennas and Propagation	3	ELEC 340
CCEE 510	Software Engineering	3	CCEE 214
CCEE 562	Artificial Intelligence	3	
	Engineering Technical Elective 2	3	
ENGR 500	Technopreneurship	3	ENGR 300
Year 4, Spring Semester (15 Credits)			
CCEE 595B	BE Summative Learning Project 2	3	CCEE 595A
	Engineering Technical Elective 3	3	
	Engineering Technical Elective 4	3	
	Engineering Technical Elective 5	3	
	Humanities/Fine Arts Elective II	3	
Total BE credits: 147			

* BS bound students are required to take CCEE 400 – Summative Learning (BS) Project instead.

Note: Engineering Technical Electives (levels 400 or above) are selected as such:
 6 credit restricted Departmental Electives
 9 credits from any Engineering discipline of levels 400 or above.

Course Description

I. Mandatory Courses

Non Major Courses

Description of the non-major mandatory courses follows.

BIOL 210	Human Anatomy and Physiology	3(3,0)
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A general overview of cells structure function and physiology, anatomy and physiology of the body system such as heart and cardiovascular system, central nervous, respiratory, urinary, digestive, reproductive systems, and musculoskeletal systems.

BIOM 301	Biomedical Sensors	3(3,0)
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This course provides an introductory overview of the multidisciplinary field of biomedical sensors. It includes: interpreting biological and medical relevant signals; measurement of noise, pressure, blood flow, motion and force; and electrode theory. **Prerequisite:** CCEE 231.

BIOM 301L	Biomedical Sensors Lab	1(0,2)
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The lab teaches students how to measure and interpret biological and medical signals. Experiments include: signal, noise, pressure (strain gauge) and temperature measurements; blood and gases flow, motion and force measurements; and applications using electrodes based on medical equipment and research and simulation kits. **Co-requisite:** BIOM 301.

ELEC 210	Electric Circuits	3(3,0)
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Circuit elements and laws, mesh and node equations, network theorems, energy storage elements, RC, R, and RLC circuits, Laplace Transform, sinusoids and phasors and introduction to network theory. Sinusoidal (AC) steady state, mutual inductance, transformers, and introduction to three phase circuit. **Prerequisite:** PHYS 211.

ELEC 320	Electronics	3(3,0)
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A course on semiconductors, PN junctions, diode theory and circuits, bipolar junction transistors, transistor fundamentals, transistor biasing, amplifiers, JFETs, MOSFETs, and operational amplifiers. **Prerequisite:** ELEC 210.

ELEC 320L	Electronics Lab	1(0,2)
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This is a Lab course with experiments in Electrical and Electronic Circuits. It covers passive electrical elements and sources; lab instruments; voltage divider circuits; Thevenin's theorem; RC circuits; diode circuits; Op-Amp circuits; BJT and MOSFET characteristics. **Co-requisite:** ELEC 320.

ELEC 340	Engineering Electromagnetics	3(3,0)
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Introduction to vector analysis, Electrostatic fields in vacuum and dielectrics Conductors, Capacitance, Electrostatic energy and forces, Poisson's equation. Magnetic fields Maxwell's equations, electric and magnetic static fields, boundary-value problems, Laplace's and Poisson's equation, and electromagnetic static fields. Time dependent Maxwell's equations and Plane wave propagation. **Prerequisite:** PHYS 211.

ENGL 210	English Composition and Rhetoric	3(3,0)
<p>This course reinforces effective critical reading and writing skills with emphasis on writing documented essays for academic purposes in a varying range of rhetorical modes. More specifically, the student will apply the fundamental principles of English spelling, word usage, grammar, punctuation and style necessary for written communication; write academic essays; proofread and edit a variety of texts; analyze general texts for coherence, style and accuracy in writing; read critically from a variety of discourse modes; summarize, paraphrase and quote sources properly; and cite sources according to APA form.</p>		

ENGL 217	Professional English Writing	3(3,0)
<p>This course is designed to enhance students' professional writing skills. It is tailored to students pursuing careers in the professions and includes advanced business writing and editing, correspondence, critical review, writing professional reports and proposals, and making oral presentations. Prerequisite: ENGL 210.</p>		

ENGR 200	Engineering for the Community	3(3,0)
<p>This course aims to give students a holistic view of engineering, its interdisciplinary nature and role in solving community problems. It entails a brief overview on the role of technology, creativity and problem solving, product development cycle, contemporary engineering systems, and ethical considerations. Students in teams work on a community related project that will culminate in a working artifact. Specific topics are flexible but it shall cover fundamentals of intelligent systems, computer interface, sensing and actuation, mechanisms and structures.</p>		

ENGR 300	Engineering Economics and Management	3(3,0)
<p>Concepts and techniques in basic Engineering economy principles and applications. Interest and financial mathematics; present worth, annual worth, benefit/cost ratio, internal rate of return, multiple alternatives, income tax, inflation, Risk analysis, Investment and investment choice, equivalence, loans, cost of capital, retirement and replacement, sector analysis and viewpoint, sensitivity analysis, accounting and financial statements.</p>		

ENGR 500	Technopreneurship	3(3,0)
<p>Venture and innovation opportunities; concept and strategy; the Technopreneur; planning;</p>		

resource acquisition and organization; financing, marketing and sustainability of enterprise.
Prerequisite: ENGR 300.

MATH 210	Discrete Mathematics	3(3,0)
<p>Logic, propositional equivalences, predicates and quantities, methods of proof, sets, set operations, functions, proof strategy, mathematical induction, recursive definitions and structural induction, the basics of counting, permutations and combinations, relations and their properties, representing relations, equivalence relations, introduction to graphs, graph terminology, introduction to trees. Prerequisite: MATH 211.</p>		

MATH 211	Calculus III	4(4,0)
<p>Volumes by slicing and rotation about an axis, length of plane curves, areas of surfaces of revolution, integrations and applications of integrals, transcendental functions and their inverses, integration techniques, improper integrals, sequences and infinite series, vectors in the plane and polar functions, Fourier Series; polar functions and their graphs, cylinders and quadric surfaces, functions of several variables, partial derivatives and their applications, extreme values of functions of several variables, Lagrange multipliers, double and triple integrals in rectangular and cylindrical and spherical coordinates, integration in vector fields, Green's and Stoke's theorems.</p>		

MATH 311	Linear Algebra and Applications	3(3,0)
<p>Linear equations in linear algebra, matrix algebra, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality and least squares, symmetric matrices and quadratic forms.</p>		

MATH 314	Ordinary Differential Equations	3(3,0)
<p>First order equations, existence and uniqueness theorem, separation of variables, higher order linear equations, Series solutions of second order linear equations, Laplace transforms, systems of first linear equations. Prerequisites: MATH 211.</p>		

MATH 351	Probability and Statistics	3(3,0)
<p>Probability and conditional probability, random variable and distribution, continuous and marginal distributions, expectation, variance- moments-mean-median-covariance and correlation, conditional expectation, the sample mean, special distribution, Bernoulli and binomial distributions, Poisson and Gamma distribution.</p>		

MATH 421	Numerical Analysis	3(3,0)
<p>Error Analysis, solutions of nonlinear equations using fixed point- Newton-Raphson-Muller's methods, solution of linear system using Gaussian elimination-iterative methods, interpolation and approximation using Taylor series-Lagrange approximation-Newton polynomials,</p>		

numerical differentiation and integration, numerical optimization, solutions of ordinary and partial differential equations using Euler's and Heun's and Rung-Kutta methods. **Prerequisite:** MATH 311.

MECA 341	Measurements and Instrumentation	3(3,0)
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This course covers the fundamentals of instrumentation and measurement of various physical quantities. Topics include: sensor types, technologies, characteristics and calibration; design of a measurement system; statistical analysis of measured data; measurement noise and uncertainties; data acquisition, data storage and display devices; signal conditioning and interface electronics concepts including filtering, A/D and D/A conversion, amplification, modulation, compensation; applications; **Prerequisite:** ELEC 320, Annually.

MECA 341L	Measurements and Instrumentation Lab	1(0,2)
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The lab experience complements the topics covered in MECA 341. Students learn to use the NI ELVIS platform, LabVIEW programming and data acquisition systems characteristics to build a measurement system, perform data analysis and sensor calibration, and design and build signal conditioning circuits for various types of measurements. The lab involves a team project to integrate all instrumentation and measurement tools and techniques are applied to build a measurement system and submit a report. **Co-requisite:** MECA 341.

PHYS 211	Electricity and Magnetism	3(2,2)
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This course covers fundamental topics in Electricity and Magnetism: Electric forces and Electric Fields for discrete and continuous charge distribution, Gauss's Law, Electric Potential, Capacitance and Dielectrics, Kirchhoff's rules, Magnetic Fields and Forces, Biot-Savart Law, Ampere's Law, Magnetic Flux, Gauss's Law in Magnetism, Faraday's and Lenz's Laws.

PHYS 312	Modern Physics	3(3,0)
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This course covers the various models of atomic description, particles and quantum numbers, different forms of electromagnetic waves and their interactions (PE effect, Auger, Compton, etc.), relativity, vibration and elastic properties of material.

Major Courses

Mandatory computer and communication engineering courses are described below.

CCEE 214	Introduction to Programming	3(2,2)
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Understanding of the basic principles of programming and computer systems; Applications of programming to the solution of engineering problems; Control structures, functions, arrays, pointers and structures. Includes introduction to MATLAB. Equivalent to COSC 214.

CCEE 221	Logic Design	3(3,0)
<p>This course addresses Boolean algebra and logic simplification techniques, data representation, and the design of combinational logic networks for decoders, encoders, multiplexers, and demultiplexers. Design of sequential logic devices including flip-flops, registers, and counters, as well as analysis of devices used to build logic networks, including programmable logic devices. Equivalent to COSC 351.</p>		
CCEE 221L	Logic Design Lab	1(0,2)
<p>This Lab covers design techniques and implementation of combinational and sequential logic circuits. Experiments include: logic gates, design and implementation of logic circuits, combinational logic circuits (decoders, encoders, multiplexers, demultiplexers and adders), and design of sequential logic devices using flip-flops, registers, and counters. Prerequisite: CCEE 221. Prerequisite: CCEE 221. Equivalent to COSC 351L.</p>		
CCEE 222	Computer Organization	3(3,0)
<p>Computer system organization and design, implementation of CPU data path and control, instruction set design, memory hierarchy (caches, main memory, virtual memory) organization and management, input/output subsystems (bus structures, interrupts, DMA), performance evaluation, pipelined processors. Prerequisite: CCEE 221. Equivalent to COSC 353.</p>		
CCEE 231	Signals and Systems	3(3,0)
<p>This course covers mathematical description and classification of continuous and discrete signals and systems. Topics include: types of signals and systems, Fourier series, Fourier transforms, Discrete-Time Fourier transforms (DTFT), Discrete and Fast Fourier Transforms (DFT and FFT), Laplace transforms, z-transforms, transfer functions.</p>		
CCEE 315	Database Management Systems	3(3,0)
<p>Nature and purpose of database systems, introduction to data modeling: Entity Relationship Model, Relational Model with relational algebra, relational calculus and SQL; integrity constraints; file organization and index files; normalization. Introduction to object databases, data mining, schema evolution, distributed databases, web enabled databases, and databases for e-commerce applications Prerequisite: CCEE 214. Equivalent to COSC 231.</p>		
CCEE 316	Object Oriented Programming	3(2,2)
<p>This course covers advanced object-oriented programming concepts including: Overloading, Inheritance, Polymorphism. In addition, the course covers data structures concepts including: analysis, sorting and searching algorithms, stacks, queues, trees, graphs. Prerequisite: CCEE 214. Equivalent to COSC 215.</p>		

CCEE 323	Computer Architecture	3(3,0)
<p>This course focuses on the techniques of quantitative analysis and evaluation of modern computing systems, such as the selection of appropriate benchmarks to reveal and compare the performance of alternative design choices in system design. The emphasis is on the major component subsystems of high performance computers: pipelining, instruction level parallelism, memory hierarchies, input/output, and network-oriented interconnections. Students will undertake a major computing system analysis and design project. Prerequisite: CCEE 222.</p>		
CCEE 341	Communication Systems	3(3,0)
<p>This course introduces the fundamentals transmission and reception of communication systems and effect of noise. Topics include: power spectral density, amplitude modulation and demodulation, angle modulation and demodulation, analog communication system performance in the presence of noise, sampling and analog-to-digital conversion, introduction to digital modulations, channel capacity. Prerequisite: CCEE 231.</p>		
CCEE 411	Web Programming	3(3,0)
<p>This course teaches students how to develop and implement web based programs with emphasis on interface programming. It introduces students to web development and to different client side languages and styles needed to develop adequate and responsive websites. The course covers HTML5, CSS3, JavaScript/jQuery, PHP and responsive design Prerequisite: CCEE 315. Equivalent to COSC 333.</p>		
CCEE 426	Design of Embedded Systems	3(3,0)
<p>This course addresses the design of embedded real-time systems, models of computation, validation techniques, and automatic synthesis. Finite state machines, synchronous languages, data flow networks, petri nets, software optimization and performance estimation, operating systems and scheduling, system-level simulation, and interface-based design. Prerequisite: CCEE 221. Equivalent to COSC 356.</p>		
CCEE 426L	Design of Embedded Systems Lab	1(0,2)
<p>This lab complements topics covered in the CCEE 426 course. It involves design of embedded real-time systems, models of computation, validation techniques, and automatic synthesis. Experiments include: Design using finite state machines, synchronous languages, data flow networks, petri nets, software optimization and performance estimation, scheduling, system-level simulation, and interface-based design. Co-requisite: CCEE 426. Equivalent to COSC 356L.</p>		
CCEE 447	Digital Communications	3(3,0)
<p>This course introduces the basic structures and fundamentals of modern digital</p>		

communication systems. Topics include: Deterministic and Random Signal Analysis; Optimum Receivers for AWGN Channels; Inter-Symbol Interference (ISI); Digital Communication Through Band-Limited Channels; Maximum-Likelihood Detection; Coherent and Non-Coherent Digital Modulation Schemes (ASK, PSK and M-PSK, FSK and M-FSK, M-QAM); Error Probabilities; bandwidth efficiency and energy efficiency tradeoffs. **Prerequisite:** CCEE 441.

CCEE 447L	Communications Lab	1(0,2)
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This Lab is accompanying CCEE 447. The student will acquire knowledge on implementing analog and digital communication technologies using NI EMONA Add-in Module and NI USRP. The Lab experiments include: analog and digital modulation, sampling and reconstruction, coding, transmission chain implementation. **Co-requisite:** CCEE 447

CCEE 454	Networking 1	3(3,0)
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This course enables students to gain fundamental knowledge of computer networks, appreciate various tradeoffs and choices in networking, learn to design and analyze protocols, build client/server networking applications using sockets, and get ready for studying advanced topics in the field of networks. **Prerequisite:** CCEE 231. Equivalent to COSC 360.

CCEE 454L	Networking Lab 1	1(0,2)
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This Lab helps prepare students seeking to pass advanced Cisco Certifications. The student will acquire the knowledge of the functionalities of network equipment and protocols, learn how to build a simple Ethernet network using routers, switches and computers, and use router CLI commands to perform basic configuration and verification. The student will also learn valuable network problem solving techniques and concepts. Accompanying Lab for CCEE 454. **Co-requisite:** CCEE 454.

CCEE 449	Wireless Communications	3(3,0)
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This course introduces current wireless systems and standards. Characterize the wireless channel, radio channel propagation fundamentals, modulation, and fading counter measure. Simple digital modulation techniques and their performance under wireless channel; coding, interleaving and diversity techniques to improve the wireless link quality are investigated. The course will also study the multiple access capabilities of spread spectrum; adaptive equalization. **Prerequisite:** CCEE 447.

CCEE 499	Co-op Work Experience	0(0,0)
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This Co-op work experience is designed to provide students with a five-week short-term work experience in the field of computer and communication engineering. Students are encouraged to network in the discipline-related industries. Report, poster, and power-point presentation, are required Prerequisites: Completed two years at RHU; Senior Standing. **Prerequisite:** ENGL 217 and Senior Standing.

CCEE 510	Software Engineering	3(3,0)
Analysis, design, construction, maintenance, and evolution of large software systems are covered. Students are introduced to the system life cycle, project management techniques, and database systems. Analysis, design and implementation of a software systems are also included. Prerequisite: CCEE 214. Equivalent to COSC 341.		

CCEE 534	Signal Processing	2(2,0)
This course covers time series analysis, frequency analysis, time-frequency and time-scale analysis. It also covers the design of digital filters and signal modeling. Prerequisite: CCEE 231.		

CCEE 544	Antennas and Propagation	3(3,0)
This course provides an introduction to the fundamental principles of antenna and propagation for communications-oriented electrical engineers. Topics include: fundamental parameters of antennas, wire antennas, linear and planar arrays, aperture antennas, microstrip antennas, radio wave propagation, free space path loss and link budget. Prerequisite: ELEC 340.		

CCEE 595A	Summative Learning Project 1	1(1,0)
First phase of a team-oriented, project-based experience that culminates in the creation of an artifact; milestones include: project selection and proposal, creative solution, report, presentation, and demonstration of the created device. Prerequisites: ENGL 217.		

CCEE 595B	BE Summative Learning Project 2	3(3,0)
Team-oriented, project-based experience that culminates in the creation of an artifact; milestones include: project selection and proposal, creative solution, report, presentation, and demonstration of the created device. Maybe be a continuation of Summative Learning Project I under special circumstances. Prerequisite: CCEE 595A.		

II. Elective Courses

Students may meet their technical electives requirements from the following selection of elective courses.

CCEE 498	Special Topics in Computer and Communication Engineering	3(3,0)
This course is designed to enable students to study current special topics of interest which are carefully selected from Bioelectronics-related topics. The contents of such a course are to be determined by the instructor and the department.		

CCEE 510	Mobile Application Development	3(3,0)
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Today's applications are increasingly mobile. Computers are no longer confined to desks and laps but instead live in our pockets and hands. This course teaches students how to build mobile apps for Android and iOS, two of today's most popular platforms, and how to deploy them in Android Market and the App store. Students learn how to write native apps for Android using Eclipse and the Android SDK, how to write native apps for iPhones, iPod touches, and iPad using xcode and the iOS SDK, and how to write web apps for both platforms.

Prerequisite: CCEE 214. Equivalent to COSC 435.

CCEE 513	Operating Systems	3(3,0)
Topics include: Operating systems principles, scheduling and resource management, virtual memory, file systems, concurrent processing and synchronization, security and protections; the Internet, network structures, distributed operating systems, Web technologies and operating systems (URL, HTML, HTTP, applets). A case study of a UNIX operating system will accompany the course. Prerequisite: CCEE 214. Equivalent to COSC 451.		

CCEE 514	Advanced Web Programming	3(3,0)
This course focuses on the server side programming. It allows students get to know how to connect their website or web application to a database, and how to save and retrieve data from that database. The course exposes students to web controls, validation controls, data source controls, data bind controls, state management, as well as working with a third party medium like XML and web services. Prerequisite: CCEE 411/COSC 333. Equivalent to COSC 434.		

CCEE 535	Digital Signal Processing	3(3,0)
This course focuses on digital signal processing (DSP) and its application. It allows students to understand how digital signal processing can be used in operational systems. Students are required to develop simulations of the learned concepts using Matlab. Specific topics covered include: Review of mathematical tools used in DSP, Digital processing of continuous-time signals, digital filter structure, digital filter design, simple DSP algorithm implementation, applications of DSP. Prerequisite: CCEE 320.		

CCEE 536	Digital Image Processing	3(3,0)
Two-dimensional signals and systems. Image formation and perception. Representation, coding, filtering restoration and enhancements. Feature extraction and scene analysis. Introduction to computer vision. Introduction to Medical Imaging. Prerequisite: CCEE 231.		

CCEE 537	Multimedia Systems	3(3,0)
Multimedia applications and requirements, Audio/Video fundamentals including analog and digital representations, human perception, and audio/video equipment, audio and video		

compression including perceptual transform coders for images/video scalable coders and perceptual audio encoders. Application and performance comparison of various coding algorithms including hardware/software trade-offs. Image and video processing applications and algorithms. Multimedia hardware and software. **Prerequisite:** CCEE 447.

CCEE 543	Mobile Communications	3(3,0)
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This course deals with the evolution of cellular technologies from 2G to LTE: cellular systems, medium access techniques, wireless standardization, GSM networks (history, architecture overview, access network, GSM air interface, dimensioning aspects, network design and planning, handover, call handling, network operation), introduction to 3G mobile systems, 3G architecture, 3G air interface, protocols and procedures used in 3G, 3G functionalities such as: idle mode camping, power control and capacity management, handover in 3G, introduction to 4G/LTE: requirements and features, overview on LTE architecture, air interface and functionalities. **Prerequisite:** CCEE 449.

CCEE 540	Satellite Communication Systems	3(3,0)
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Description of a Satellite Communication System, Orbit Types, Radio Regulations Applications of Communication Satellites. Multiple Access Techniques. Multi-beam Satellite Systems, Regenerative Satellite Systems, Broadcasting by Satellites, Satellite Communication Techniques, Satellite Communication Payload, Earth Station Technology. **Prerequisite:** CCEE 441.

CCEE 545	Advanced Mobile Communications	3(3,0)
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This course seeks to provide insight into the development of the latest generations of mobile networks. The course focuses mainly on LTE and LTE-Advanced (LTE-A). Topics include: *LTE*: Introduction, Air Interface/OFDMA, Multi-Antenna Systems, Throughput Calculation, Functionalities (including Packet scheduling, Multi-antenna communications and systems, Inter-cell interference coordination), Interaction with 2G/3G; *LTE-A*: Requirements, Features, Air Interface Enhancements, Procedures. **Prerequisite:** CCEE 541.

CCEE 546	Array Processing	3(3,0)
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This course includes: Mono- and Multi-Antenna Concept introduction: multi-path fading channel, spectral efficiency, multi-antenna benefits; beam forming techniques, adaptive antennas, MIMO systems: diversity/multiplexing tradeoff, multi-antenna transmission techniques (Alamouti and spatio-temporal techniques), multi-antenna reception techniques, transmission strategies; applications (MIMO in 3G and LTE). **Prerequisite:** CCEE 544.

CCEE 547	Optical Communications	3(3,0)
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This course is designed to progress from the description of the components in a fiber link to

the interconnections into a link or a network. The components in fiber links will be discussed (the fiber, the connections, the sources and receivers). These optical-components will be integrated together in a complete optical link. **Prerequisite:** CCEE 231.

CCEE 555	Networking 2	3(3,0)
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This course introduces the fundamentals of primary routing protocols such as static routing, dynamic routing, OSPF, BGP. It is tailored to help students prepare their professional careers in networking field. **Prerequisite:** CCEE 454/COSC 360.

CCEE 556	Internet Engineering	3(3,0)
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This course explains to students how internet works using a top-down approach and presents the latest paradigms in this domain. Specific topics covered include: Application and management protocols (SMTP, HTTP, DNS, DHCP, SSH, RTP, VoIP, and SNMP), Software Defined Networks, Internet of Things, Peer to peer networks, Content Distribution network. **Prerequisite:** CCEE 454.

CCEE 564	Machine Learning and Data Mining	3(3,0)
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This course introduces students to the basic knowledge representation and learning techniques. The emphasis consists of understanding the data mining process, as well as being able to practically apply the corresponding approaches in solving practical problems and developing intelligent software applications. The course covers several topics that lie with classification, prediction and clustering. **Prerequisite:** COSC 215 or CCEE 316. Equivalent to COSC 480.

CCEE 566	Natural Language Processing	3(3,0)
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This course introduces the student to the area of natural language processing (NLP). The student is first introduced to word and sentence tokenization. The student then uses the learned skills to implement systems for text classification and sentiment analysis, spelling correction, information extraction, parsing, meaning extraction, and question answering, Machine learning algorithms as well as algorithms like n-gram language modeling, naive bayes and maxent classifiers, sequence models like Hidden Markov Models, probabilistic dependency and constituent parsing, and vector-space models of meaning will be introduced as needed for the above NLP applications.

BIOMEDICAL ENGINEERING PROGRAM

Mission

The program aims to help students to explore their innate creativity and potential and endow them with the knowledge, skills and abilities to: pursue successful careers in the biomedical engineering and related fields; think critically in solving complex problems using modern tools and technologies; communicate and work effectively with diverse groups; learn more every day, and succeed in graduate studies in renowned institutions if they choose to.

Objectives

The program objectives are to:

1. Foster an environment that encourages excellence in endeavor;
2. Provide degree and professional education which prepare leaders; and
3. Conduct multidisciplinary research to solve problems facing the society and industry in Lebanon, the Middle East and the world.

Program Outcomes

All programs adopt the learning outcomes of ABET so their graduates have:

- a) an ability to apply knowledge of mathematics, science, and engineering;
- b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- c) an ability to design a system, component, or process to meet desired needs;
- d) an ability to function on multi-disciplinary teams;
- e) an ability to identify, formulate, and solve engineering problems;
- f) an understanding of professional ethical responsibility;
- g) an ability to communicate effectively;
- h) the broad education necessary to understand the impact of engineering solutions in a global and societal context;
- i) a recognition of the need for, and an ability to engage in life-long learning;
- j) a knowledge of contemporary issues;
- k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Career Opportunities

Biomedical engineers use their engineering and science backgrounds to design the next generation of systems and treatments that will advance the quality of life for patients. They leave an impact through the creation of medical devices that detect and treat disease, the

invention of materials that can be used to treat illness in the body, and by designing complex computer models to develop the next generation of disease-fighting drugs.

Biomedical engineers are responsible for the creation of artificial organs, automated patient monitoring, blood chemistry sensors, advanced therapeutic and surgical devices, application of expert systems and artificial intelligence to clinical decision making, design of optimal clinical laboratories, medical imaging systems, computer modelling of physiological systems, biomaterials design, and biomechanics for injury and wound healing, among many others.

Biomedical engineers respond to societal needs and provide solutions to engineer and a better and healthier world. Bioinstrumentation engineering is the fastest-growing career and this trend is expected to continue over the next decade.

Program Overview

The Biomedical (BIOM) Engineering Program at Rafik Hariri University puts the best of students' interest, first and foremost. Every little experience the student attains represents a block in the building of a competent, confident, purposeful, problem solving, competitive, responsible, and conscientious individual. This is accomplished by means of a curriculum and facilities that conform to the highest of standards, faculty members committed to the academic and personal growth of the student, and an environment that inspires learning and drives creativity.

The Bachelor of Engineering (BE) program in BIOM Engineering encompasses 147 credit hours spread over eight regular semesters and three summer terms. The Bachelor of Science (BS) program comprises a total of 114 credit hours spread over six regular semesters and three summer terms. In addition to completing the credits requirements, a BS or a BE degree is conferred upon a student if the earned Cumulative GPA, Major PGA and the Summative Learning Project grade are all 70 or above.

The required credit hours span three categories: University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours for the BS and BE programs are shown in the following table:

BS in BIOM Engineering (114 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	0	0	15	9	24	21
College Requirement	0	0	25	3	28	25
Program Requirement	24	0	38	0	62	54
Credits	24	0	78	12	114	100

BE in BIOM Engineering (147 Credits)

Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	0	0	12	12	24	16
College Requirement	0	0	34	3	37	25
Program Requirement	39	15	32	0	86	64
Credits	39	15	78	15	147	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Engineering section in this catalogue.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Engineering section in this catalogue.

III. Program Requirements

The program requirements for a Bachelor of Engineering degree in BIOM Engineering encompasses 86 credits (62 credits for the BS degree) distributes as follows: 71 credits (62 credits for the BS degree) Mandatory courses and 15 credits elective courses. Both categories are summarized below.

A. Mandatory requirements

The BIOM mandatory core courses (Major and non-major) are listed in the table below.

Course #	Title	Credits	Prerequisites
BIOM 301+301L	Biomedical Sensors + Lab	4	
BIOM 311	Biomedical Instrumentation Design	3	BIOM 301
BIOM 312+312L	Biomedical Engineering Design I and Lab	4	BIOM 301
BIOM 400*	BS Summative Learning Project	3	
BIOM 413	Principles of Bio-electronics Circuit Design	3	BIOM 311
BIOM 414	Advanced Biomedical Instrumentation	3	BIOM 311
BIOM 415	Advanced Biomedical Lab	1	BIOM 311
BIOM 416	Clinical Laboratory Instrumentation	3	BIOM 311
BIOM 417	Biomedical Engineering Design Lab II	3	BIOM 311
BIOM 421	Medical Imaging	3	BIOM 414
BIOM 499	Co-op Work Experience	1	ENGL 217; Senior Standing
BIOM 519	Advanced Therapeutic Devices	3	BIOM 414

BIOM 522	Advanced Medical imaging	3	BIOM 421
BIOM 531	Clinical Engineering	3	BIOM 416
BIOM 595A	BE Summative Learning Project 1	1	
BIOM 595B	BE Summative Learning Project 2	3	
BIOM xxx	Technical Electives	15	Per course requirements
CCEE 221+221L	Logic Design and Lab	4	
CCEE 231	Signals and Systems	3	
CCEE 426+426L	Design of Embedded Systems & Lab	4	CCEE 221
CCEE 534	Signal Processing	2	CCEE 231
CIVE 211	Statics	3	
ELEC 320+320L	Electronics and Lab	4	ELEC 210
ELEC 340	Engineering Electromagnetics	3	PHYS 211
ELEC 451	Control Systems	3	CCEE 231
MECA 341+341L	Measurements and instrumentation & Lab	4	ELEC 320

* Required for BS bound students. BE students takes Technical Elective instead.

B. Technical Electives

As part of the program for the Bachelor of Engineering in BIOM Engineering, the student is required to study 12 credit hours of technical elective courses. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. The student can also mix and match elective courses from the different areas to get a more general exposure to the different BIOM Engineering disciplines. The student should select, in cooperation with the academic advisor, the list of electives that best meet his or her needs and aspirations. The listed technical elective courses and other courses from other engineering programs, in addition to the required program courses, are designed to allow the student to develop in-depth knowledge and understanding in the following areas:

1. Medical Instrumentation
2. Medical Imaging
3. Clinical Engineering
4. Artificial organs

It is highly recommended that the student takes elective courses from the list below after completing the mandatory requirements in the related area. Students may select technical electives from other programs subject to approval of the academic advisor and the corresponding course instructor.

Course #	Title	Credits	Prerequisites
BIOM 402	Radio Frequency Applications in Biomedical Engineering	3	CCEE 231
BIOM 418	Rehabilitation Engineering	3	BIOM 414

BIOM 504	Bio-Image Processing	3	CCEE 231
BIOM 505	Computer Simulations for Life Sciences	3	BIOM 414
BIOM 506	Biomaterials	3	BIOM 414
BIOM 507	Bio-fluids	3	BIOM 414
BIOM 508	Microcontroller and Embedded Systems for Biomedicine	3	CCEE 426
BIOM 532	Biomedical Servicing	3	BIOM 421
BIOM 533	Health-care Facility Management	3	BIOM 421
BIOM 534	Advanced Topics in Bio- Engineering	3	BIOM 414
BIOM 535	Introduction to E-Healthcare	3	BIOM 421

C. Summative Learning Project

Students must complete a 3- credit hours course for BS (4-credits for BE; taken 1 credit in the first regular semester and 3 credits in the following regular semester) in which they work preferably in groups on a problem of concern to industry or the community at large, or to innovate a promising idea. The SLP could be an extension of the projects students had worked on in the Engineering for the community course to bring it to a more useful outcome.

D. Co-op Experience

Students must complete 8 weeks of practical training in working in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits and ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are required to submit a formal report, a poster and make a formal presentation about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Course Coding

The courses offered in the BIOM Engineering program are designated code numbers in the form of (BIOM abc) where:

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- a Designates year (level)
 - b Designates focus areas (as follows)
 - 0: General Biomedical courses; 1: Medical Instrumentation; 2: Medical Imaging; 3: Clinical Engineering
 - c Designates course sequence in a focus area
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Study Plan

The following study plan summarizes the courses and credits distribution for the Bachelor of Science (BS) and Bachelor of Engineering (BE) in BIOM Engineering. The study plan serves as a roadmap to facilitate student's smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (16 Credits)			
MATH 211	Calculus III	4	
PHYS 211	Physics: Electricity and Magnetism	3	
ENGL 210	English Composition and Rhetoric	3	
CCEE 214	Programming	3	
CCEE 221	Logic Design	3	
Year 1, Spring Semester (16 Credits)			
ELEC 210	Electric Circuits	3	PHYS 211
MATH 311	Linear Algebra and Applications	3	
ENGR 200	Engineering for the Community	3	
CCEE 221L	Logic Design Lab	1	
CCEE 231	Signals and Systems	3	
CIVE 211	Statics	3	
Year 1, Summer term (6 Credits)			
BIOL 210	Human Anatomy and Physiology	3	
PHYS 312	Modern Physics	3	
Year 2, Fall Semester (17 Credits)			
ELEC 320	Electronics	3	ELEC 210
ELEC 320L	Electronics Lab	1	Co-req: ELEC 320
	Social Sciences Elective I	3	
ENGL 217	Professional English	3	ENGL 210
BIOM 301	Biomedical Sensors	3	
BIOM 301L	Biomedical Sensors Lab	1	Co-req: BIOM 301
MATH 314	Differential Equations	3	MATH 211
Year 2, Spring Semester (17 Credits)			
ELEC 340	Engineering Electromagnetics	3	PHYS 211
MECA 341	Measurements and Instrumentation	3	ELEC 320
MECA 341L	Measurements and Instrumentation Lab	1	Co-req: MECA 341
MATH 351	Probability and Statistics	3	
BIOM 311	Biomedical Instrumentation Design	3	BIOM 301
BIOM 312	Biomedical Engineering Design I	3	BIOM 301
BIOM 312L	Biomedical Engineering Design Lab I	1	Co-req: BIOM 312

Year 2, Summer term (9 Credits)			
ENGR 300	Engineering Economics and management	3	
	Social Sciences Elective 2	3	
MATH 210/ MATH421	Discrete Math/Numerical Analysis	3	MATH 211/ MATH 311
Year 3, Fall Semester (16 Credits)			
ELEC 451	Control Systems	3	CCEE 231
CCEE 426	Design of Embedded Systems	3	CCEE 221
CCEE 426L	Design of Embedded Systems Lab	1	Co-req: CCEE 426
BIOM 413	Principles of Bio-electronics Circuit Design	3	BIOM 311
BIOM 414	Advanced Biomedical Instrumentation	3	BIOM 311
	Humanities/Fine Arts Elective I	3	
Year 3, Spring Semester (16 Credits)			
BIOM 415	Advanced Biomedical Lab	1	BIOM 311
BIOM 416	Clinical Laboratory Instrumentation	3	BIOM 311
BIOM 417	Biomedical Engineering Design Lab II	3	BIOM 311
BIOM 421	Medical Imaging	3	BIOM 414
	Engineering Technical Elective 1*	3	
	Science Elective	3	
Year 3, Summer term (1 Credits)			
BIOM 499	Co-op Work Experience	1	ENGL 217
The above 114 credits completes the requirements for a Bachelor of Science degree in Biomedical Engineering			
Year 4, Fall Semester (18 Credits)			
ENGR 500	Technopreneurship	3	ENGR 300
BIOM 519	Advanced Therapeutic Devices	3	BIOM 414
CCEE 534	Signal Processing	2	CCEE 231
	Humanities/Fine Arts Elective II	3	
	Engineering Technical Elective 2	3	
	Engineering Technical Elective 3	3	
BIOM 595A	BE Summative Learning Project 1	1	ENGL 217
Year 4, Spring Semester (15 Credits)			
BIOM 522	Advanced Medical imaging	3	BIOM 421
BIOM 531	Clinical Engineering	3	BIOM 416
	Engineering Technical Elective 4	3	
	Engineering Technical Elective 5	3	
BIOM 595B	BE Summative Learning Project 2	3	BIOM 595A
Total BE credits: 147			

* BS bound students are required to take BIOM 400 – Summative Learning (BS) Project instead.

Note: Engineering Technical Electives (levels 400 or above) are selected as such:
 6 credit restricted Departmental Electives
 9 credits from any Engineering discipline of levels 400 or above.

Course Description

I. Mandatory Courses

Non Major Courses

Description of the non-major mandatory courses follows.

BIOL 210	Human Anatomy and Physiology	3(3,0)
A general overview of cells structure function and physiology, anatomy and physiology of the body system such as heart and cardiovascular system, central nervous, respiratory, urinary, digestive, reproductive systems, and musculoskeletal systems.. Prerequisite: None.		

CCEE 214	Programming	3(2,2)
Understanding of the basic principles of programming and computer systems; Applications of programming to the solution of engineering problems; Control structures, functions, arrays, pointers and structures.		

CCEE 221	Logic Design	3(3,0)
This course addresses Boolean algebra and logic simplification techniques, data representation, and the design of combinational logic networks for decoders, encoders, multiplexers, and demultiplexers. Design of sequential logic devices including flip-flops, registers, and counters, as well as analysis of devices used to build logic networks, including programmable logic devices.		

CCEE 221L	Logic Design Lab	1(0,2)
This Lab covers design techniques and implementation of combinational and sequential logic circuits. Experiments include: logic gates, design and implementation of logic circuits, combinational logic circuits (decoders, encoders, multiplexers, demultiplexers and adders), and design of sequential logic devices using flip-flops, registers, and counters. Prerequisite: CCEE 221. Prerequisite: CCEE 221.		

CCEE 231	Signals and Systems	3(3,0)
This course covers mathematical description and classification of continuous and discrete signals and systems. Topics include: types of signals, Fourier series, Fourier transforms,		

Discrete-Time Fourier transforms (DTFT), Fast Fourier Transforms (FFT), Laplace transforms, z-transforms, linear time invariant systems, transfer functions, state-space representation.

CCEE 426	Design of Embedded Systems	3(3,0)
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This course addresses the design of embedded real-time systems, models of computation, validation techniques, and automatic synthesis. Finite state machines, synchronous languages, data flow networks, petri nets, software optimization and performance estimation, operating systems and scheduling, system-level simulation, and interface-based design. **Prerequisite:** CCEE 221. Equivalent to COSC 356.

CCEE 426L	Design of Embedded Systems Lab	1(0,2)
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This lab complements topics covered in the CCEE 426 course. It involves design of embedded real-time systems, models of computation, validation techniques, and automatic synthesis. Experiments include: Design using finite state machines, synchronous languages, data flow networks, petri nets, software optimization and performance estimation, scheduling, system-level simulation, and interface-based design. **Co-requisite:** CCEE 426. Equivalent to COSC 356L.

CIVE211	Statics	3(3,0)
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Static laws; force vectors and operations; force system and moment; free body diagram; equilibrium of particles and rigid bodies in 2D and 3D; plane trusses and frames; cables; internal forces: shear and moment diagrams; centroid and center of mass; moment of inertia; and friction.

ELEC 210	Electric Circuits	3(3,0)
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Circuit elements and laws, mesh and node equations, network theorems, energy storage elements, RC, R, and RLC circuits, Laplace Transform, sinusoids and phasors and introduction to network theory. Sinusoidal (AC) steady state, mutual inductance, transformers, and introduction to three phase circuit. **Prerequisite:** PHYS 211. .

ELEC 320	Electronics	3(3,0)
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A course on semiconductors, PN junctions, diode theory and circuits, bipolar junction transistors, transistor fundamentals, transistor biasing, amplifiers, JFETs, MOSFETs, and operational amplifiers. **Prerequisite:** ELEC 210

ELEC 320L	Electronics Lab	1(0,2)
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This is a Lab course with experiments in Electrical and Electronic Circuits. It covers passive electrical elements and sources; lab instruments; voltage divider circuits; Thevenin's theorem; RC circuits; diode circuits; Op-Amp circuits; BJT and MOSFET characteristics. **Co-requisite:** ELEC 320.

ELEC 340	Engineering Electromagnetics	3(3,0)
Introduction to vector analysis, Electrostatic fields in vacuum and dielectrics Conductors, Capacitance, Electrostatic energy and forces, Poisson's equation. Magnetic fields Maxwell's equations, electric and magnetic static fields, boundary-value problems, Laplace's and Poisson's equation, and electromagnetic static fields. Time dependent Maxwell's equations and Plane wave propagation. Prerequisite: PHYS 211.		
ELEC 451	Control Systems	3(3,0)
Introduction to control systems; Modeling of systems in various energy domains; transfer function and block diagrams; time-domain analyses; Laplace domain analyses; frequency-domain analyses; stability; precision; rapidity; root locus; Bode, Nyquist and Nichols diagrams; design of PID controllers and dynamic compensators. Prerequisite: CCEE 231.		
CCEE 534	Signal Processing	2(2,0)
This course covers time series analysis, frequency analysis, time-frequency and time-scale analysis. It also covers the design of digital filters and signal modeling. Prerequisite: CCEE 231.		
ENGL 210	English Composition and Rhetoric	3(3,0)
This course reinforces effective critical reading and writing skills with emphasis on writing documented essays for academic purposes in a varying range of rhetorical modes. More specifically, the student will apply the fundamental principles of English spelling, word usage, grammar, punctuation and style necessary for written communication; write academic essays; proofread and edit a variety of texts; analyze general texts for coherence, style and accuracy in writing; read critically from a variety of discourse modes; summarize, paraphrase and quote sources properly; and cite sources according to APA form. Prerequisite: None. Every semester.		
ENGL 217	Professional English	3(3,0)
This course is designed to enhance students' professional writing skills. It is tailored to students pursuing careers in the professions and includes advanced business writing and editing, correspondence, critical review, writing professional reports and proposals, and making oral presentations. Prerequisite: ENGL 210. Every Semester.		
ENGR 200	Engineering for the Community	3(3,0)
This course aims to give students a holistic view of engineering, its interdisciplinary nature and role in solving community problems. It entails a brief overview on the role of technology, creativity and problem solving, product development cycle, contemporary engineering systems, and ethical considerations. Students in teams work on a community related project that will culminate in a working artifact. Specific topics are flexible but it shall cover fundamentals of intelligent systems, computer interface, sensing and actuation, mechanisms and structures. Fall and Spring semesters.		

ENGR 300	Engineering Economics and management	3(3,0)
<p>Concepts and techniques in basic Engineering economy principles and applications. Interest and financial mathematics; present worth, annual worth, benefit/cost ratio, internal rate of return, multiple alternatives, income tax, inflation, Risk analysis, Investment and investment choice, equivalence, loans, cost of capital, retirement and replacement, sector analysis and viewpoint, sensitivity analysis, accounting and financial statements. Prerequisite: None.</p>		
ENGR 500	Technopreneurship	3(3,0)
<p>Venture and innovation opportunities; concept and strategy; the Technopreneur; planning; resource acquisition and organization; financing, marketing and sustainability of enterprise. Prerequisite: ENGR 300.</p>		
MATH 210	Discrete Mathematics	3(3,0)
<p>Logic, propositional equivalences, predicates and quantities, methods of proof, sets, set operations, functions, proof strategy, mathematical induction, recursive definitions and structural induction, the basics of counting, permutations and combinations, relations and their properties, representing relations, equivalence relations, introduction to graphs, graph terminology, introduction to trees. Prerequisite: MATH 211.</p>		
MATH 211	Calculus III	4(4,0)
<p>Volumes by slicing and rotation about an axis, length of plane curves, areas of surfaces of revolution, integrations and applications of integrals, transcendental functions and their inverses, integration techniques, improper integrals, sequences and infinite series, vectors in the plane and polar functions, Fourier Series; polar functions and their graphs, cylinders and quadric surfaces, functions of several variables, partial derivatives and their applications, extreme values of functions of several variables, Lagrange multipliers, double and triple integrals in rectangular and cylindrical and spherical coordinates, integration in vector fields, Green's and Stoke's theorems. Prerequisite: None. Every semester.</p>		
MATH 311	Linear Algebra	3(3,0)
<p>Linear equations in linear algebra, matrix algebra, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality and least squares, symmetric matrices and quadratic forms. Prerequisite: None.</p>		
MATH 314	Ordinary Differential Equation	3(3,0)
<p>First order equations, existence and uniqueness theorem, separation of variables, higher order linear equations, Series solutions of second order linear equations, Laplace transforms, systems of first linear equations. Prerequisite: MATH 211.</p>		

MATH 351	Probability and Statistics	3(3,0)
Probability and conditional probability, random variable and distribution, continuous and marginal distributions, expectation, variance- moments-mean-median-covariance and correlation, conditional expectation, the sample mean, special distribution, Bernoulli and binomial distributions, Poisson and Gamma distribution.		

MATH 421	Numerical Analysis	3(3,0)
Error Analysis, solutions of nonlinear equations using fixed point- Newton-Raphson-Muller's methods, solution of linear system using Gaussian elimination-iterative methods, interpolation and approximation using Taylor series-Lagrange approximation-Newton polynomials, numerical differentiation and integration, numerical optimization, solutions of ordinary and partial differential equations using Euler's and Heun's and Rung-Kutta methods. Prerequisite: MATH 311.		

MECA 341	Measurements and Instrumentation	3(3,0)
This course covers the fundamentals of instrumentation and measurement of various physical quantities. Topics include: sensor types, technologies, characteristics and calibration; design of a measurement system; statistical analysis of measured data; measurement noise and uncertainties; data acquisition, data storage and display devices; signal conditioning and interface electronics concepts including filtering, A/D and D/A conversion, amplification, modulation, compensation; applications; Prerequisite: ELEC 320, Annually.		

MECA 341L	Measurements and Instrumentation Lab	1(0,2)
The lab experience complements the topics covered in MECA 341. Students learn to use the NI ELVIS platform, LabVIEW programming and data acquisition systems characteristics to build a measurement system, perform data analysis and sensor calibration, and design and build signal conditioning circuits for various types of measurements. The lab involves a team project to integrate all instrumentation and measurement tools and techniques are applied to build a measurement system and submit a report. Co-requisite: MECA 341		

PHYS 211	Physics: Electricity and Magnetism	3(3,0)
This course covers fundamental topics in Electricity and Magnetism: Electric forces and Electric Fields for discrete and continuous charge distribution, Gauss's Law, Electric Potential, Capacitance and Dielectrics, Kirchhoff's rules, Magnetic Fields and Forces, Biot-Savart Law, Ampere's Law, Magnetic Flux, Gauss's Law in Magnetism, Faraday's and Lenz's Laws. Prerequisite: None.		

PHYS 312	Modern Physics	3(3,0)
This course covers the various models of atomic description, particles and quantum numbers, different forms of electromagnetic waves and their interactions (PE effect, Auger, Compton,		

etc.), relativity, vibration and elastic properties of material.

Major Courses

Mandatory biomedical engineering courses are described below.

BIOM 301	Biomedical Sensors	3(3,0)
This course provides an introductory overview of the multidisciplinary field of biomedical sensors. It includes: interpreting biological and medical relevant signals; measurement of noise, pressure, blood flow, motion and force; and electrode theory. Prerequisite: CCEE 231.		

BIOM 301L	Biomedical Sensors Lab	1(0,2)
The lab teaches students how to measure and interpret biological and medical signals. Experiments include: signal, noise, pressure (strain gauge) and temperature measurements; blood and gases flow, motion and force measurements; and applications using electrodes based on medical equipment and research and simulation kits. Co-requisite: BIOM 301.		

BIOM 311	Biomedical Instrumentation Design	3(3,0)
The course describes the major medical electronic instruments used in the diagnostic medicine. It explains the theoretical background, bloc diagrams and the circuitry of some prosthetic devices such as the different types of cardiac pacemaker, muscle and bladder prostheses, cochlear prosthesis, and the different types of cardiac defibrillator and cardioverters. Prerequisite: BIOM 301.		

BIOM 312	Biomedical Engineering Design I	3(3,0)
This course deals with the genesis of various bioelectric phenomena's and signals that are recorded routinely in modern clinical practice. Given adequate monitoring equipment, the engineer of today can record many forms of bioelectric phenomena with relative ease. This course describes theoretical, bloc diagram and the circuitry of the electrophysiological devices such as electrocardiogram, electroencephalogram, electroneurogram, electromyogram and the like. Prerequisite: BIOM 301.		

BIOM 312L	Biomedical Engineering Design I Lab	1(0,2)
Accompanying Lab for BIOM 301 teaches students about measuring and interpreting biological and medical signals. Experiments cover the following topics: signal, noise, pressure (strain gauge) and temperature measurements; blood and gases flow, motion and force measurements; and applications using electrodes based on medical equipment and research and simulation kits. Co-requisite: BIOM 312.		

BIOM 413	Principles of Bio-electronics Circuit Design	3(3,0)
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This course offers students a methodology of the design process with emphasis on the feasibility and preliminary design phases such as conditioning circuit, Op-amp and feed-back systems, filters, oscillators, sample/hold, DAC/ADC, Data acquisition Boards. Students will learn how to write proposals and reports as well as increasing their creativity through group projects from industry with inter-disciplinary topics. **Prerequisite:** BIOM 311.

BIOM 414	Advanced Biomedical Instrumentation	3(3,0)
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The course describes the advanced medical electronic instruments used in the therapeutic and diagnostic medicine. It includes the extracorporeal shock wave lithotripsy, infant incubator, medical laser application, ventilator and the different medical devices used in the operating room such as electrosurgical units and anesthesia units. **Prerequisite:** BIOM 311.

BIOM 415	Advanced Biomedical Lab	1(0,2)
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Accompanying Lab for BIOM 414 teaches students about advanced medical electronic instruments used in the therapeutic and diagnostic medicine. Experiments cover the following topics: extracorporeal shock wave lithotripsy, infant incubator, medical laser application, ventilator and the different medical devices used in the operating room such as electrosurgical units and anesthesia units. **Co-requisite:** BIOM 414.

BIOM 416	Clinical Laboratory Instrumentation	3(3,0)
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This course deals with the clinical laboratory that is responsible for analyzing patient specimens in order to provide information to aid in the diagnosis of disease and evaluate the effectiveness of therapy. The major topics covered in this course are spectrophotometry, flame photometers, spectrofluorometry, chemistry analyzers, hematology analyzers and chromatography columns. **Prerequisite:** BIOM 311.

BIOM 417	Biomedical Engineering Design Lab II	3(3,0)
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This lab course deals with the genesis of a variety of hospital equipment. The content is divided into two parts: theoretical and practical. This lab course takes an experimental approach to: 1. Clinical electrophysiological equipment such as monitors, ESU, ECG, etc. 2. Clinical laboratory equipment such as the spectrophotometers, centrifuge analyzer and the microhematocrite reader. **Prerequisite:** BIOM 311.

BIOM 421	Medical Imaging	3(3,0)
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Students will understand the interaction between light x-rays, radiopharmaceuticals, ultrasound, magnetic fields, and other energy probes with tissues and detectors to produce useful image contrast. Topics covered include beam generation, dose limitations, patient motion, spatial resolution and dynamic range limitations, and cost-effectiveness. **Prerequisite:** BIOM 414.

BIOM 499	CO-OP Work Experience	1(0,0)
This CO-OP work experience is designed to provide students with a five-week short-term work experience in the field of biomedical engineering. Students are encouraged to network in the discipline-related industries. Report, poster, and power-point presentation, are required Prerequisites: ENGL 217 and Senior Standing.		

BIOM 519	Advanced Therapeutic Devices	3(3,0)
This course emphasizes design of new equipment, patient aid technologies and techniques to help in health care delivery. Design of assistive and rehabilitation devices, artificial organs, prosthetics, and specialized accessories for effective patient care are studied. Prerequisite: BIOM 415		

BIOM 522	Advanced Medical imaging	3(3,0)
This course increases the students' knowledge in imaging modalities, which are applied for diagnostic and interventional medical procedures. It Covers topics that include magnetic resonance imaging, nuclear medicine, catheterization, endoscopy, contrast agents and molecular imaging concepts. Prerequisite: BIOM 421		

BIOM 531	Clinical Engineering	3(3,0)
This course presents mission and responsibilities of biomedical engineering in health care delivery institutions. Topics include strategic planning and technology assessment, system analysis, quality control, standards and regulations, equipment management, education of medical equipment users, computing applications, and development of patient safety and risk management systems. Prerequisite: BIOM 418		

BIOM 595A	BE Summative Learning Project 1	1(1,0)
First phase of a team-oriented, project-based experience that culminates in the creation of an artifact; milestones include: project selection and proposal, creative solution, report, presentation, and demonstration of the created device. Prerequisites: ENGL 217.		

BIOM 595B	BE Summative Learning Project 2	3(3,0)
Second phase of a team-oriented, project-based experience that culminates in the creation of an artifact; milestones include: project selection and proposal, creative solution, report, presentation, and demonstration of the created device. Prerequisite: BIOM 595A.		

II. Elective Courses

Students may meet their technical electives requirements from the following selection of elective courses.

BIOM 402	Radio Frequency Applications in Biomedical Engineering	3(3,0)
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This course addresses radio frequency design and applications for biomedical engineering and medicine, including circuit elements, equivalent circuits, impedance transformations, Smith Chart, two ports, scattering parameters, amplifiers, resonant circuits, mixers, and receivers. Applications include telemetry, transcutaneous power transfer, hyperthermia, RF ablation, and magnetic resonance imaging. **Prerequisite:** CCEE 231.

BIOM 418	Rehabilitation Engineering	3(3,0)
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The design and prescription of prosthetic limbs, orthotic devices, seating and positioning systems will be discussed in this course. This course focuses on musculoskeletal anatomy, muscle mechanics, soft tissue mechanics, gait/locomotion, amputation surgery, electromyography, seating and positioning, and assistive devices. **Prerequisite:** BIOM 414.

BIOM 504	Bio-Image Processing	3(3,0)
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This course introduces the basic theories and methodologies of digital image processing. Topics include intensity transformations for image enhancement, two-dimensional discrete Fourier transform, spatial and frequency domain linear image filtering, nonlinear image filtering, binary image processing, edge detection, image segmentation, and digital video processing basics. This course makes extensive use of MATLAB as an analysis, design, and visualization tool. **Prerequisite:** CCEE 321.

BIOM 505	Computer Simulations for Life Sciences	3(3,0)
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This course describes systems of equations and algorithms implemented in order to simulate dynamic medical processes. It deals with physiological mechanisms of biological organs; consequently it includes studies of mass transfer, circulation and gas exchange, as well as current transmission models. The course examines modeling techniques based on Matlab/Simulink. **Prerequisite:** BIOM 414.

BIOM 506	Biomaterials	3(3,0)
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The course studies cell-surface interactions carried through the adhesive proteins of physiological medium, analysis of signal transduction and cellular functions induced by surface controlled. An emphasis is given to biomaterial polymers, ceramics, and bone substitutes. Research applications include aid in the diagnosis of malignant tumor and nanobiotechnology for the coating of medical devices. **Prerequisite:** BIOM 414.

BIOM 507	Bio-fluids	3(3,0)
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This course elaborates on the application of fluid mechanics principles to major human organ systems. It is an introduction to physiologically relevant fluid flow phenomena, underlying physical mechanisms from an engineering perspective. The focus of the course is on intracellular and extra cellular fluids properties, blood rheology, and soft tissues stress and strain. **Prerequisite:** BIOM 414.

BIOM 508	Microcontroller and Embedded Systems for Biomedicine	3(3,0)
<p>This course explains the architecture of microcontroller based systems; registers, timers, interrupts, ports, memory; serial communication and design. It also covers parallel communication and design; analog to digital conversion and the use of PIC 16F84 and PIC 16F877 microcontrollers. MPLAB, PROTEUS and mikroC software are used. Prerequisite: CCEE 426.</p>		

BIOM 520	Introduction to E-Health Care	3(3,0)
<p>This course introduces diagnostic and interventional operations that rely on telecommunication concepts. Topics include applications in telemedicine (modulation/demodulation, digital transmission and others), Computer-assisted surgery, and robotics in operating room, laboratory instruments and human-machine interface. Prerequisite: BIOM 421.</p>		

BIOM 532	Biomedical Servicing	3(3,0)
<p>This course provides students with technical knowledge and skills necessary to become a broad-based electro-medical specialist. Students will learn to install, set up, troubleshoot, integrate, program, test, operate, and repair systems and components. The topics covered in this course include inspection, corrective and preventive maintenance, calibration, repair, supply management, best practices and accreditation of medical equipment. Prerequisite: BIOM 421.</p>		

BIOM533	Health-care Facility Management	3(3,0)
<p>This course presents procedures followed for medical and health services management. It covers duties of administrator and his assistants, as well as work flow between staffs of different services and departments. This course emphasizes topics such as credentials, quality control, human resources, finances, recovery, insurance, sterilization, and infection control and health safety procedures. Prerequisite: BIOM 421.</p>		

BIOM 534	Advanced Topics in Bio- Engineering	3(3,0)
<p>This course is designed to enable students to study advanced topics of interest which are carefully selected from Bio-Engineering-related topics. The contents of such a course are to be determined by the instructor and the department. Prerequisite: BIOM 414.</p>		

MECHANICAL AND MECHATRONICS ENGINEERING DEPARTMENT

Faculty Members

Chairperson:	Ahmad Chaaban
Professors:	Ahmad Chaaban; Rida Nuwayhid
Assistant Professors:	Jad Kozaily; Nadim Diab
Lecturers:	Nizar Al-Awar; Rami Al-Khatib

Programs Offered

The Mechanical and Mechatronics Engineering (MME) Department offers two programs – Mechanical Engineering (MECH) and Mechatronics Engineering (MECA). Each program grants three degrees: Bachelor of Science, Bachelor of Engineering and Master of Science. The details of each program follows.

Vision

To be recognized for the ability, agility and tenacity of its graduates in confronting the challenges of a changing work place.

MECHANICAL ENGINEERING PROGRAM

Mission

The mission of the Mechanical Engineering program at RHU is to provide solid education necessary for the students to start a professional career and/or to continue graduate studies in mechanical engineering. The program seeks to instill in the students a feeling for, and understanding of, the moral and professional responsibilities, the ability to learn more, and the leadership required in their calling, mainly in Lebanon and the Middle East regions.

Objectives

The educational objectives of the Mechanical Engineering program intends to enable graduates as they pursue their career goals to:

1. Be competent to handle complex mechanical engineering tasks requiring multidisciplinary knowledge and multifaceted skills;
2. Be recognized for their ability to pursue innovative solutions through creative integration of best practices;
3. Demonstrate career advancement and exhibit the habits and personal attributes to handle management and leadership roles;
4. Exhibit commitment to the wellbeing of the community and the environment in pursuit of relevant solutions.

Program Outcomes

Upon successful completion of the BS/BE program in Mechanical Engineering graduates will:

1. Apply knowledge of mathematics, science, and engineering;
2. Build an experimental setup, conduct key experiments, analyze and interpret data, and take appropriate action as needed;
3. Identify, formulate, and solve mechanical engineering problems in thermal and mechanical systems using real world engineering tools;
4. Apply the techniques, skills, and modern engineering tools necessary for engineering practice;
5. Exhibit higher-order thinking and sound reasoning in dealing with complex engineering problems;
6. Demonstrate knowledge of the entrepreneurial process and related tools;
7. Recognize the need for, and an ability to engage in life-long learning;

8. Function on multidisciplinary and multicultural teams;
9. Use information and communication technologies to effectively communicate ideas and present technical information to constituents in oral and written forms;
10. Demonstrate commitment to upholding established professional and ethical norms;
11. Design a system, component, or process to meet desired needs and satisfy realistic constraints;
12. Recognize the global, economic, environmental, and social context and the associated implications of engineering solutions.

Career Opportunities

Mechanical engineers attain a broad spectrum of skills sought after by a wide range of professions. Industrial sectors, enterprises, and services in which a mechanical engineer can pursue a career include: power generation and distribution, building and construction, medicine and pharmacology, aerospace, automotive, chemicals, computers and electronics, renewable energy, entertainment, water resources, sports, environmental institutions, and government.

Mechanical engineering also serves as an excellent foundation for careers in business management and business consulting.

Program Overviews

The Mechanical Engineering Program at Rafik Hariri University puts the best of students' interest, first and foremost. Every little experience the student attains represents a block in the building of a competent, confident, purposeful, problem solving, competitive, responsible, and conscientious individual. This is accomplished by means of a curriculum and facilities that conform to the highest of standards, faculty members committed to the academic and personal growth of the student, and an environment that inspires learning and drives creativity.

The Bachelor of Engineering (BE) program in Mechanical Engineering encompasses 147 credit hours spread over eight regular semesters and three summer terms. The Bachelor of Science (BS) program comprises a total of 114 credit hours spread over six regular semesters and three summer terms. In addition to completing the credits requirements, a BS or a BE degree is conferred upon a student if the earned Cumulative GPA, Major GPA and the Summative Learning Project grade are all 70 or above.

The required credit hours span three categories: University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours for the BS and BE programs are shown in the following table:

BS in Mechanical Engineering (114 Credits)				
Category	Major	Non-Major	Credits	Percent

Mechanical Engineering

2016-2017 Undergraduate Catalog

	Mandatory	Electives	Mandatory	Electives		
University Requirements	0	0	18	9	27	24
College Requirements	4	0	24	0	28	25
Program Requirements	39	0	20	0	59	51
Credits	43	0	62	9	114	100

BE in Mechanical Engineering (147 Credits)

Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirements	0	0	18	12	30	20
College Requirements	4	0	27	0	31	21
Program Requirements	51	15	20	0	86	59
Credits	55	15	65	12	147	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Engineering section in this catalog.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Engineering section in this catalog.

III. Program Requirements

The program requirements for a Bachelor of Engineering degree in Mechanical Engineering encompasses 86 credits (59 credits for the BS degree) distributes as follows: 71 credits (59 credits for the BS degree) Mandatory courses and 15 credits elective courses.

A. Mandatory requirements

The major and non-major Mechanical Engineering program mandatory courses are listed in the table below.

Course #	Title	Credits	Prerequisites
CIVE 211	Statics	3	
ELEC 320/320L	Electronics + Lab	4	ELEC 210
MECA 340	Dynamic Systems Modeling	3	MATH 314
MECA 341/341L	Measurements and Instrumentation + Lab	4	ELEC 320

MECH 400*	Summative Learning (BS) Project	3	ENGL 217
MECA 440	Control Systems Design	3	MECA 340
MECH 220	Dynamics	3	CIVE 211
MECH 223	Material Science	3	
MECH 224	Mechanical Engineering Graphics and CAD	3	
MECH 320	Mechanics of Materials	3	CIVE 211
MECH 321	Mechanisms and Dynamics of Machinery	3	MECH 220
MECH 330	Thermodynamics I	3	MATH 211
MECH 334/334L	Thermodynamics II + Lab	4	MECH 330
MECH 335/335L	Fluid Mechanics + Lab	4	MECH 330
MECH 421	Mechanical Design I	3	MECH 320
MECH 422	Manufacturing processes	3	MECH 320
MECH 423	Mechanical Design II	3	MECH 421 and MECH 223
MECH 431	Heat Transfer	3	MECH 330 or MECH 333
MECH 435	HVAC	3	MECH 330 or MECH 333
MECH 499	Co-op Work Experience	1	ENGL 217; Senior Standing
MECH 520	Finite Element Method for Mechanical Engineers	3	MECH 320 and MATH 421
MECH 521	Vibrations and Acoustics	3	MECA 340
MECA 540	CAD/CAM/CAE	2	MECH 224
MECH 595A	BE Summative Learning Project - I	1	ENGL 217
MECH 595B	BE Summative Learning Project - II	3	MECH 595A
MECH 4xx/5xx	Technical Electives	15	Per course requirement

* Required of BS bound students. BE students take Technical Elective instead.

B. Technical Electives

As part of the program for the Bachelor of Engineering in Mechanical Engineering, the student is required to study 15 credit hours of technical elective courses. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. The student can also mix and match elective courses from the different areas to get a more general exposure to the different Mechanical Engineering disciplines. The student should select, in cooperation with the academic advisor, the list of electives that best meet his or her needs and aspirations. The listed technical elective courses and other courses from other engineering programs, in addition to the required program courses, are designed to allow the student to develop in-depth knowledge and understanding in the following areas:

- Mechanical Design and Manufacturing
- Energy and Thermo-fluid Systems

It is highly recommended that the student takes elective courses from the list below after completing the mandatory requirements in the related area. Students may select technical electives from other programs subject to approval of the academic advisor and the corresponding course instructor.

Course #	Title	Credits	Prerequisites
MECH 436	Petroleum Refining Technology for Mechanical Engineers	3	CHEM 211, MECH320, MECH 330
MECH 437	Heat Exchanger Design, Performance, and Inspection	3	MECH 320, MECH 431
MECH 445	Automotive Engineering	3	MECH 330, MECH 321
MECH 448	Plumbing Engineering	3	MECH 335 or MECH 333
MECH 451	Fluid Mechanics II	3	MECH 335
MECH 453	Buildings and Energy	3	MECH 330 Or MECH 333
MECH 455	Gas Turbines	3	MECH 334
MECH 461	Thermal Systems Design	3	MECH 431
MECH 468	Internal Combustion Engines	3	MECH 334
MECH 470	Product Design and Development	3	MECH 421
MECH 471	Refrigeration	3	MECH 334
MECH 498	Special Topics in Mechanical Engineering	3	
MECH 520	Advanced Metallurgy	3	MECH 223
MECH 523	Mechanics of Composite Materials	3	MECH 320
MECH 524	Elasticity and Plasticity	3	MECH 320
MECH 525	Advanced Dynamics	3	MECH 220
MECH 530	Computational Fluid Dynamics	3	MECH 431
MECH 541	Renewable Energy	3	MECH 330 or MECH 333
MECH 544	Advanced Heat Transfer	3	MECH 431
MECH 570	Advanced Manufacturing	3	MECH 422
MECH 571	Optimization in Engineering Design	3	MATH 421
MECH 597	Advanced Topics in Mechanical Engineering	3	

C. Summative Learning Project

Students must complete a 3- credit hours course for BS (4-credits for BE; taken 1 credit in the first regular semester and 3 credits in the following regular semester) in which they work preferably in groups on a problem of concern to industry or the community at large, or to innovate a promising idea. The SLP could be an extension of the projects students had worked

on in the Engineering for the community course to bring it to a more useful outcome.

D. Co-op Experience

Students must complete 8 weeks of practical training while working in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits and ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are required to submit a formal report, a poster and make a formal presentation about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Course Coding

The courses offered in the Mechanical Engineering program are designated code numbers in the form of (MECH abc) where:

-
- a Year (level): 2 = first year, 3 = second Year , 4 = Third year, 5 = Fourth Year
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- b Concentration Areas (as follows)
- 1: Reserved for courses offered to other programs; 2: Mechanical Design and Manufacturing; 3: Thermal, fluid and Energy Systems
-
- c Course sequence in area: 0, 1, ..., 9
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For example MECH 421 is the second course in the area of Mechanical Design offered by the mechanical engineering program in the third year.

Study Plan

The following study plan summarizes the courses and credits distribution for the Bachelor of Science (BS) and Bachelor of Engineering (BE) in MECH Engineering. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (16 Credits)			
ENGL 210	English Composition and Rhetoric	3	
MATH 211	Calculus III	4	
PHYS 211	Physics: Electricity and Magnetism	3	
CCEE 214	Introduction to Programming & lab	3	
CIVE 211	Statics	3	

Year 1, Spring Semester (15 Credits)			
ENGR 200	Engineering for the Community	3	
MATH 311	Linear Algebra and Applications	3	
ELEC 210	Electric Circuits	3	PHYS 211
MECH 220	Dynamics	3	CIVE 211
MECH 223	Material Science	3	
Year 1, Summer term (9 Credits)			
	Science Elective	3	
	Social Sciences/Culture Elective I	3	
MECH 224	Mechanical Engineering Graphics and CAD	3	
Year 2, Fall Semester (16 Credits)			
MATH 314	Ordinary Differential Equations	3	MATH 211
MECH 330	Thermodynamics I	3	MATH 211
MECH 320	Mechanics of Materials	3	CIVE 211
MECH 321	Mechanisms and Dynamics of Machinery	3	MECH 220
ELEC 320	Electronics	3	ELEC 210
ELEC 320L	Electronic Lab	1	Co-req: ELEC 320
Year 2, Spring Semester (17 Credits)			
MATH 351	Probability and Statistics	3	
MECA 340	Dynamic Systems Modeling	3	MATH 314
MECH 334	Thermodynamics II	3	MECH 330
MECH 334L	Thermodynamics II Lab	1	Co-req: MECH 334
MECH 335	Fluid Mechanics	3	MECH 330
MECH 335L	Fluid Mechanics Lab	1	Co-req: MECH 335
ENGL 217	Professional English	3	ENGL 210
Year 2, Summer term (9 Credits)			
MATH 317	Partial Differential Equations	3	MATH 314
ENGR 300	Engineering Economics and management	3	
	Social Sciences/Culture Elective II	3	
Year 3, Fall Semester (16 Credits)			
MATH 421	Numerical Analysis	3	MATH 311
MECH 421	Mechanical Design I	3	MECH 320
MECH 431	Heat Transfer	3	MECH 330 or MECH 333
MECA 341	Measurements and Instrumentation	3	ELEC 320

MECA 341L	Measurements and Instrumentation Lab	1	Co-req: MECA 341
CHEM 211	Environmental Chemistry	3	
Year 3, Spring Semester (15 Credits)			
MECH 423	Mechanical Design II	3	MECH 421, MECH 223
MECH 422	Manufacturing Processes	3	MECH 320
MECH 435	HVAC	3	MECH 330 or MECH 333
	Humanities I	3	
	Engineering Technical Elective I*	3	per course requirements
Year 3, Summer term (1 Credits)			
MECH 499	Co-op Work Experience	1	ENGL 217
The above 114 Credits complete the requirements for a Bachelor of Science Degree in Mechanical Engineering.			
Year 4, Fall Semester (18 Credits)			
ENGR 500	Technopreneurship	3	ENGR 300
MECH 520	Finite Element Method for Engineers	3	MECH 320; MATH 421
MECA 440	Control Systems Design	3	MECA 340
MECA 540	CAD/CAM/CAE	2	MECH 224
	Humanities II	3	
	Engineering Technical Elective II	3	per course requirements
MECH 595A	Summative Learning (BE) Project - I	1	ENGL 217; Senior Standing
Year 4, Spring Semester (15 Credits)			
MECH 521	Vibrations and Acoustics	3	MECA 340
	Engineering Technical Elective III	3	per course requirements
	Engineering Technical Elective IV	3	per course requirements
	Engineering Technical Elective V	3	per course requirements
MECH 595B	Summative Learning (BE) Project - II	3	MECH 595A
Total BE credits: 147			

* BS bound students are required to take MECH 400 – Summative Learning (BS) Project I instead.

Note: Engineering Technical Electives (levels 400 or above) are selected as such:
 6 credits restricted Departmental Electives
 9 credits from any Engineering discipline of levels 400 or above.

Course Description

I. Mandatory Courses

Non Major Courses

Description of the mandatory, non-major courses follows.

CCEE 214	Introduction to Programming	2(2,0)
Understanding of the basic principles of programming and computer systems; Applications of programming to the solution of engineering problems; Control structures, functions, arrays, pointers and structures.		

CCEE 214L	Introduction to Programming Lab	1(0,2)
Laboratory experiments of programming for concepts covered in CCEE 212 course. Co-req: CCEE 212.		

CHEM 211	Environmental Chemistry	3(3,0)
This course provides an opportunity to develop an understanding of several basic environmental functions, the complicated nature of environmental systems, and the need for multidisciplinary solutions to environmental problems. Topics covered include the hydrosphere, water quantity and quality, soil and the soil ecosystem, biological resources, waste disposal, air pollution, ozone depletion, acid rain, global warming, agriculture, and toxicology. Prerequisite: None. Annually.		

CIVE 211	Statics	3(3,0)
Static laws; force vectors and operations; force system and moment; free body diagram; equilibrium of particles and rigid bodies in 2D and 3D; plane trusses and frames; cables; internal forces: shear and moment diagrams; centroid and center of mass; moment of inertia; and friction. Annually.		

ELEC 210	Electrical Circuits	3(3,0)
Circuit elements and laws, mesh and node equations, network theorems, energy storage elements, RC, R, and RLC circuits, Laplace Transform, sinusoids and phasors and introduction to network theory. Sinusoidal (AC) steady state, mutual inductance, transformers, and introduction to three phase circuit. Prerequisite: PHYS 211. Annually.		

ELEC 320	Electronics	3(3,0)
This course covers semiconductors, PN junctions, diode theory and circuits, bipolar junction transistors, transistor fundamentals, transistor biasing, amplifiers, MOSFETs, and operational amplifiers. Prerequisite: ELEC 210.		

ELEC 320L	Electronics Lab	1(0,2)
This is a Lab course with experiments in Electrical and Electronic Circuits. It covers passive electrical elements and sources; lab instruments; voltage divider circuits; Thevenin's theorem; RC circuits; diode circuits; Op-Amp circuits; BJT and MOSFET characteristics. Co-requisite: ELEC		

320.

ENGL 210	English Composition and Rhetoric	3(3,0)
<p>This course reinforces effective critical reading and writing skills with emphasis on writing documented essays for academic purposes in a varying range of rhetorical modes. More specifically, the student will apply the fundamental principles of English spelling, word usage, grammar, punctuation and style necessary for written communication; write academic essays; proofread and edit a variety of texts; analyze general texts for coherence, style and accuracy in writing; read critically from a variety of discourse modes; summarize, paraphrase and quote sources properly; and cite sources according to APA form. Prerequisite: None. Every semester.</p>		

ENGL 217	Professional English	3(3,0)
<p>This course is designed to enhance students' professional writing skills. It is tailored to students pursuing careers in the professions and includes advanced business writing and editing, correspondence, critical review, writing professional reports and proposals, and making oral presentations. Prerequisite: ENGL 210. Every Semester.</p>		

ENGR 200	Engineering for the Community	3(3,0)
<p>This course aims to give students a holistic view of engineering, its interdisciplinary nature and role in solving community problems. It entails a brief overview on the role of technology, creativity and problem solving, product development cycle, contemporary engineering systems, and ethical considerations. Students in teams work on a community related project that will culminate in a working artifact. Specific topics are flexible but it shall cover fundamentals of intelligent systems, computer interface, sensing and actuation, mechanisms and structures. Fall and Spring semesters.</p>		

ENGR 300	Engineering Economics and management	3(3,0)
<p>Concepts and techniques in basic Engineering economy principles and applications. Interest and financial mathematics; present worth, annual worth, benefit/cost ratio, internal rate of return, multiple alternatives, income tax, inflation, Risk analysis, Investment and investment choice, equivalence, loans, cost of capital, retirement and replacement, sector analysis and viewpoint, sensitivity analysis, accounting and financial statements. Prerequisite: None. Annually.</p>		

ENGR 500	Technopreneurship	3(3,0)
<p>Venture and innovation opportunities; concept and strategy; the Technopreneur; planning; resource acquisition and organization; financing, marketing and sustainability of enterprise. Prerequisite: ENGR 300. Annually.</p>		

MATH 211	Calculus III	4(4,0)
<p>Volumes by slicing and rotation about an axis, length of plane curves, areas of surfaces of</p>		

revolution, integrations and applications of integrals, transcendental functions and their inverses, integration techniques, improper integrals, sequences and infinite series, vectors in the plane and polar functions, Fourier Series; polar functions and their graphs, cylinders and quadric surfaces, functions of several variables, partial derivatives and their applications, extreme values of functions of several variables, Lagrange multipliers, double and triple integrals in rectangular and cylindrical and spherical coordinates, integration in vector fields, Green's and Stoke's theorems. **Prerequisite:** None. Every semester.

MATH 311	Linear Algebra	3(3,0)
Linear equations in linear algebra, matrix algebra, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality and least squares, symmetric matrices and quadratic forms. Prerequisite: None. Annually.		

MATH 314	Ordinary Differential Equation	3(3,0)
First order equations, existence and uniqueness theorem, separation of variables, higher order linear equations, Series solutions of second order linear equations, Laplace transforms, systems of first linear equations. Prerequisite: MATH 211. Annually.		

MATH 351	Probability and Statistics	3(3,0)
Probability and conditional probability, random variable and distribution, continuous and marginal distributions, expectation, variance- moments-mean-median-covariance and correlation, conditional expectation, the sample mean, special distribution, Bernoulli and binomial distributions, Poisson and Gamma distribution. Annually.		

MATH 421	Numerical Analysis	3(3,0)
Error Analysis, solutions of nonlinear equations using fixed point- Newton-Raphson-Muller's methods, solution of linear system using Gaussian elimination-iterative methods, interpolation and approximation using Taylor series-Lagrange approximation-Newton polynomials, numerical differentiation and integration, numerical optimization, solutions of ordinary and partial differential equations using Euler's and Heun's and Rung-Kutta methods. Prerequisite: MATH 311. Annually.		

MATH 317	Partial Differential Equations	3(3,0)
Ordinary differential equations arising from partial differential equations by means of separation of variables, method of characteristics for first order PDEs, boundary value problems for ODEs, partial differential equation and Fourier analysis and applications, comparative study of heat equation, wave equation and Laplace's equation by separation of variables and numerical methods, further topics in numerical solution of ODEs. Prerequisite: MATH 314.		

MECA 340	Dynamic Systems Modeling	3(3,0)
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Introduction to dynamic modeling of mechanical, electrical, electromechanical, thermal, fluid, and mixed discipline systems; Block diagrams and computer simulation (MATLAB); State-variable solution Laplace Transform solution; Laplace transform properties; inverse Laplace transform; transfer function, frequency response, first and second order systems. **Prerequisite:** MATH 314. Annually.

MECA 341	Measurements and Instrumentation	3(3,0)
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This course covers the fundamentals of instrumentation and measurement of various physical quantities. Topics include: sensor types, technologies, characteristics and calibration; design of a measurement system; statistical analysis of measured data; measurement noise and uncertainties; data acquisition, data storage and display devices; signal conditioning and interface electronics concepts including filtering, A/D and D/A conversion, amplification, modulation, compensation; applications; **Prerequisite:** ELEC 320, Annually.

MECA 341L	Measurements and Instrumentation Lab	1(0,2)
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The lab experience complements the topics covered in MECA 341. Students learn to use the NI ELVIS platform, LabVIEW programming and data acquisition systems characteristics to build a measurement system, perform data analysis and sensor calibration, and design and build signal conditioning circuits for various types of measurements. The lab involves a team project to integrate all instrumentation and measurement tools and techniques are applied to build a measurement system and submit a report. **Co-requisite:** MECA 341

MECA 440	Control Systems design	3(3,0)
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This course focuses on the analysis and design of systems control. Topics include analytical solutions analysis in time and S domain, root locus, Bode, Nyquist, Lead Lag controller design, and PID compensator design are covered. **Prerequisite:** MECA 340, Annually.

PHYS 211	Physics: Electricity and Magnetism	3(3,0)
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This course covers fundamental topics in Electricity and Magnetism: Electric forces and Electric Fields for discrete and continuous charge distribution, Gauss's Law, Electric Potential, Capacitance and Dielectrics, Kirchhoff's rules, Magnetic Fields and Forces, Biot-Savart Law, Ampere's Law, Magnetic Flux, Gauss's Law in Magnetism, Faraday's and Lenz's Laws. **Prerequisite:** None. Annually.

Major Courses

Mandatory mechanical engineering courses are described below.

MECH 220	Dynamics	3(3,0)
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Brief review of statics; proper use of different coordinate systems: Cartesian and normal/tangential axes; kinematics of a particle: rectilinear, curvilinear, and relative motion; kinetics of a particle: force and acceleration, work and energy, impulse and momentum; planar

kinematics of a rigid body: translating and rotating axes, absolute and relative motion; planar kinetics of a rigid body: force and acceleration, work and energy, impulse and momentum.
Prerequisite: CIVE 211. Annually.

MECH 223	Material Science	3(3,0)
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The course introduces the fundamentals of materials science. The following topics will be discussed: Classification of materials; atomic structure and inter-atomic bonding; crystalline structures & amorphous materials; imperfections in solids. Overview of Alloying, Analysis of Phase diagrams & heat treatment of metals. Discussion of electrical, thermal, magnetic and optical properties. Annually.

MECH 224	Mechanical Engineering Graphics and CAD	3(3,0)
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Drafting principles; piece part and assembly drawings; generation of 2D and 3D drawings as well as solid models using AutoCAD; customizing AutoCAD for any particular application; generating 2D drawings using CAD/CAM software; generating parametric, feature based solids using the AutoDesk Mechanical Desktop. Annually.

MECH 320	Mechanics of Materials	3(3,0)
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Mechanical stress, strain, and stress/strain relations under pure tension, compression, pure bending, and pure torsion of circular bars; 1-D thermal strain & stress; thin-walled cylindrical & spherical pressure vessels; combined stresses; principle stresses; plane stress transformation & Mohr's circle; basic 3-D elastic stress/strain relations; Euler-elastic buckling of columns.
Prerequisite: CIVE 211. Annually.

MECH 321	Mechanisms and Dynamics of Machinery	3(3,0)
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Mechanization of motion; kinematic analysis of linkage mechanisms; synthesis of cam-follower mechanisms (graphical and analytical designs); gear terminology and types of gears used in machines; analysis and synthesis of gear trains; velocity, acceleration, and force analysis of mechanisms; introduction to linkage synthesis of four bar planar mechanisms. **Prerequisite:** MECH 220. Annually.

MECH 330	Thermodynamics I	3(3,0)
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The course introduces interconversion of heat and work. It covers: concepts of a given system and surroundings; thermodynamic state and properties of pure substances; work and heat, energy analysis (First Law) of closed systems and control volumes, application to thermal conversion systems, Second Law of thermodynamics and Entropy. **Prerequisite:** MATH 211. Annually.

MECH 333	Thermal Fluid Sciences	3(3,0)
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This course seeks to impart thermal-fluid fundamental concepts (including Thermodynamics, Fluid Mechanics and Heat Transfer) to non-mechanical engineering students. This covers:

thermodynamic state and properties of pure substances; concepts of work and heat, energy analysis of closed systems (First Law) and simple flow devices, Fluid statics; Bernoulli's equation; Conservation of mass, momentum & energy, viscous flow in pipes, introduction to conduction, convection and radiation heat transfer. **Prerequisite:** MATH 211. Annually.

MECH 334	Thermodynamics II	3(3,0)
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This course focuses on the real-world engineering examples & applications to give students a feel for how thermodynamics is applied in engineering practice. This covers: Exergy analysis; vapor and gas power cycles; refrigeration and heat pump systems; psychrometric basics and air conditioning; combustion; compressible flow. **Prerequisite:** MECH 330. Annually.

MECH 334L	Thermodynamics Lab	1(0,2)
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This laboratory takes an experimental approach to demonstrate the fundamentals of thermodynamics. Students use Matlab/Simulink™ thermodynamic modeling to compare with experimental data. The lab includes: A bomb calorimeter, Miniature steam plant, Internal Combustion Engine bench, and an Air Conditioning unit. **Co-req.:** MECH 334. Annually.

MECH 335	Fluid Mechanics	3(3,0)
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A course that introduces the basic fundamentals of Fluid Mechanics. The course involves a series of laboratory sessions that examine the topics studied and in which one learns how to perform experiments, treat and analyze data. The topics covered are: Fluid statics; Bernoulli's equation; Conservation of mass, momentum and energy; Navier-Stokes; viscous flow in pipes; external flows, boundary layers, lift & Drag. **Prerequisite:** MECH 330. Annually.

MECH 335L	Fluid Mechanics Lab	1(0,2)
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This laboratory follows an experimental approach to demonstrate the fundamentals of fluid mechanics. Students have to use CFD/ANSYS™ modeling to compare with their experimental results. The lab includes: A pressure and temperature measurement bench, hydraulic bench (pumps, piping, weirs...), wind tunnel (Boundary Layer measurement, flow over a NACA 2412 airfoil, flow over a sphere, flow over a cylinder, Lift and Drag measurements, smoke generator,...). **Co-requisite:** MECH 335. Annually.

MECH 400	Summative Learning (BS) Project	3(3,0)
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Team-oriented, project-based experience that culminates in the creation of an artifact; milestones include: project selection and proposal, creative solution, report, presentation, and demonstration of the created device. **Prerequisite:** Taken in the last semester of the BS Program; ENGL 217. Annually.

MECH 421	Mechanical Design I	3(3,0)
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Materials properties; tools of machine design; stress, strain and deformation of machine parts; statistical methods; yielding theories of materials; design of machine parts for strength under

steady loads; design of machine parts for rigidity, deflection of beams and rotation of shafts; design of machine parts for strength under cyclic loads; codes and standards. **Prerequisite:** MECH 320. Annually.

MECH 422	Manufacturing Processes	3(3,0)
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General overview of manufacturing; properties of materials; dimensions and tolerances; metals, ceramics, and polymers; solidification processes; metal forming; plastic processing; powder metallurgy; joining and assembly; inspection, and quality control; industrial visit if possible; project. **Prerequisite:** MECH 320. Annually.

MECH 423	Mechanical Design II	3(3,0)
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Static & fatigue design of shafts and axles; design of permanent and non-permanent joints (screws, fasteners, bolting, welding); rolling-contact bearings; lubrication and journal bearings; Gears-general, spur and helical gears; flexible mechanical elements; power transmission case study; Finite Element Application; team project. **Prerequisites:** MECH 223 and MECH 421. Annually.

MECH 431	Heat Transfer	3(3,0)
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Relation of Heat transfer to thermodynamics; Steady and transient heat conduction in one and two dimensions; exact and approximate solutions; extended surfaces; internal and external flow, forced and natural heat convection **Prerequisite:** MECH 335. Annually.

MECH 435	HVAC	3(3,0)
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Air conditioning basics; occupant comfort and indoor air quality; heating and cooling load calculations; HVAC controls; air conditioning systems and air delivery systems; refrigeration basics, methods and applications. **Prerequisite:** MECH 330 or MECH 333. Annually.

MECH 499	Co-op Work Experience	1(1,0)
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This Co-op work experience is designed to provide students with a five-week short-term work experience in the field of mechanical engineering. Students are encouraged to network in the discipline-related industries. Report, poster, and power-point presentation, are required **Prerequisites:** ENGL 217 and Senior Standing.

MECH 520	Finite Element Method for Engineers	3(3,0)
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Historical review of the finite element method; solution steps; basic elements; modeling techniques and boundary conditions; application of finite element method to static, frequency and transient analysis; modal and dynamic analysis of structures and mechanical systems; application to heat transfer problems; use of commercial code. **Prerequisites:** MECH 320 and MATH 421. Annually.

MECH 521	Vibrations and Acoustics	3(3,0)
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Quick review of differential equations and dynamics; Laplace transform; Un-damped free vibration; Energy methods; Un-damped forced vibration; Viscous damped free and forced vibration; Stability of motion; Troubleshooting and measurement; Numerical applications.
Prerequisite: MECA 340. Annually.

MECH 595A	BE Summative Learning Project I	1(1,0)
Team-oriented project which includes conducting and formulating experimental laboratory work and/or design problems on a specific approved topic of specialty. The project includes literature review and scope of work as well as project proposal. Prerequisite: Senior Standing, ENGL 217. Annually.		

MECH 595B	BE Summative Learning Project II	3(3,0)
Team-oriented project which includes conducting and formulating experimental laboratory work and/or design problems on a specific approved topic of specialty. The project includes literature review, design work, data collection, experimentation, data analysis and technical writing. Prerequisite: MECH 595A. Annually.		

II. Elective Courses

Students may meet their technical electives requirements from the following selection of elective courses.

MECH 436	Petroleum Refining Technology for Mechanical Engineers	3(3,0)
Crude oil; petroleum products; refinery configuration; process major equipment; crude distillation; catalytic reforming; hydro-treating; gasoline; gas treating; product blending; risk based inspection; environmental control; economics. Prerequisites: CHEM 211, MECH 330, MECH 320. On demand.		

MECH 437	Heat Exchangers Design, Performance, and Inspection	3(3,0)
Quick review of “mechanics of materials” and “heat transfer”; Codes & Standards; Heat exchangers types and applications; Thermal design; Mechanical design; Inspection and testing; Efficiency; TEMA standard use; Design project; Laboratory testing. Prerequisites: MECH 320, MECH 431. On demand		

MECH 445	Automotive Engineering	3(3,0)
Studies of automotive components; engines; fuel systems; ignition systems; cooling system; lubrication, power boosting, transmission, steering, braking, suspension and damping; starting and recharging; emission control; updating of automotive technology; laboratory demo’s; project. Prerequisites: MECH 330 and MECH 321. On demand.		

MECH 448	Plumbing Engineering	3(3,0)
Soil, waste, and vent piping; drainage system; piping systems for domestic and industrial hot		

and cold water, fuel oil, de-ionized and de-mineralized water; laboratory compressed air and vacuum; laboratory outlets; laboratory drains; vacuum pumps; general piping installation.
Prerequisites: MECH 335 or MECH 333. On demand.

MECH 451	Fluid Mechanics II	3(3,0)
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Review of incompressible flow; potential flow; similitude, dimensional analysis and modeling; external and open channel flow; pumps and turbines. **Prerequisite:** MECH 335. On demand

MECH 453	Buildings and Energy	3(3,0)
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Selected topics in low- energy building design: building history and energy usage; buildings physics; architectural and material considerations; building energy systems and the use of renewable energy systems; hands-on project. **Prerequisite:** MECH 330 or MECH 333. On demand.

MECH 455	Gas Turbines	3(3,0)
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Thermodynamic of gas turbines; Gas turbine design; comparison of designs; shaft power and aircraft propulsion cycles, component efficiencies, basic components, general considerations of turbomachinery design, axial compressors, combustors, clean combustion systems, fuel control, design point performance calculations, off-design behavior and matching procedure, project. **Prerequisite:** MECH 334. On demand.

MECH 461	Thermal Systems Design	3(3,0)
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Modeling of thermal systems; system solution; design applications of optimization methods: Lagrange multipliers, search methods, and dynamic, geometric and linear programming.
Prerequisite: MECH 431. On demand.

MECH 468	Internal Combustion Engines	3(3,0)
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Fuels and their properties; review of basic thermodynamics and gaseous mixtures; combustion thermodynamics; engine types; combustion chambers; valve mechanisms; dynamic balance of ICE; flame temperature; dissociation and detonation; turbo charging and super-charging; testing and measurements; engine characteristics and performance; laboratory demonstration. **Prerequisite:** MECH 334. On demand.

MECH 470	Product Design and Development	3(3,0)
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Idea generation; concept generation; concept selection; functional analysis; engineering design process for systems and components; economic consideration; reliability analysis; product safety; design project. **Co-requisite:** MECH 421. On demand.

MECH 471	Refrigeration	3(3,0)
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Methods of producing cold: thermodynamic basis, first and second law analyses – vapor compression systems; ideal vs. actual cycles; single stage, multistage and cascaded systems;

environmental consideration and alternate refrigerants; vapor absorption systems.
Prerequisite: MECH 334. On demand.

MECH 498	Special Topics in Mechanical Engineering	3(3,0)
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Guided study and research on topics related to the major. **Prerequisite:** Consent of the instructor. On demand.

MECH 520	Advanced Metallurgy	3(3,0)
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Advanced coverage on metals and alloys; applications and processing of ceramics; characteristics, applications, and processing of polymers; surface properties enhancement; materials simulation; economics, environmental, and societal issues in material sciences; bio materials and nano-scale materials. **Prerequisite:** MECH 223. On demand.

MECH 523	Mechanics of Composite Materials	3(3,0)
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Analysis of a thin sheet of align-fiber reinforced, elastic matrix (lamina) to layered structures comprised of these sheets (laminates); mechanics of the thick-sectioned components (of many microstructural compositions) desirable in many engineering applications; processing of composite materials; mechanical and thermal properties and their degradation with time; practical use; fatigue versus static strength; finite element application. **Prerequisite:** MECH 320. On demand.

MECH 524	Elasticity and Plasticity	3(3,0)
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Analysis of Cartesian tensors using indicial notation; 3-D stress and strain concepts; point stress and strain in relation to tensor concepts; deviatoric and spherical stress state; Octahedral shear stress; equations of equilibrium and compatibility; constitutive laws for 3-D elastic and elastic-plastic stress state; kinematic & isotropic hardening models in plasticity; finite element applications. **Prerequisite:** MECH 320. On demand.

MECH 525	Advanced Dynamics	3(3,0)
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General introduction; rigid body kinematics: translation (3-D), rotation (3-D), compositions of rotations, Euler-angles presentation of rotation, Roll-pitch-yaw presentation of rotation, axis-angle presentation of rotation, homogenous transformations, rotation matrix derivative, angular velocity, linear velocity, acceleration; rigid body kinetics: review of Newtonian dynamics, generalized coordinates, holonomic and non-holonomic constraints, virtual displacements, virtual work, D'Alembert's principle, Lagrange equations, Hamilton's principle, canonical transformations; applications of Hamiltonian dynamics; multi-body dynamics. **Prerequisite:** MECH 220. On demand.

MECH 530	Computational Fluid Dynamics	3(3,0)
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This course introduces computational techniques to solve thermal-fluid problems. It covers: discretization methods; finite difference and finite volume methods; implicit and explicit

schemes; Von Neumann stability analysis; Matlab project; CFD analysis process; introduction to turbulence modelling and boundary layer development; apply ANSYS Fluent code to basic practical problems; final project. **Prerequisite:** MECH 431. On demand.

MECH 541	Renewable Energy	3(3,0)
Energy situation; energy conversion; solar power; Photovoltaic and thermoelectric conversion, ocean, tidal and wave power; wind power; biomass energy; the case of nuclear power; project. Prerequisite: MECH 330 or MECH 333. On demand.		

MECH 544	Advanced Heat Transfer	3(3,0)
Derivation of energy and mass conservation equations with constitutive laws for conduction, convection, radiation, and mass diffusion; dimensional analysis; heat exchangers; boiling and condensation. Prerequisite: MECH 431. On demand.		

MECH 570	Advanced Manufacturing	3(3,0)
Overview of manufacturing: engineering materials, metal forming, particulate processing, solidification processes; non-traditional machining, understanding metrology and instrumentations; joining & assembly processes; micro-fabrication and nanofabrication technologies; automation technologies; production planning, control, and inspection; industrial visits. Prerequisite: MECH 422. On demand.		

MECH 571	Optimization in Engineering Design	3(3,0)
Problem definition, cost function and constraints; local vs. global methods; deterministic vs. stochastic methods; linear vs. non-linear programming; constrained vs. unconstrained; continuous vs. discrete; gradient-based methods; combinatorial optimization techniques; applications to various engineering problems (single/multi-objective); project. Prerequisite: MATH 421. On demand.		

MECH 597	Advanced Topics in Mechanical Engineering	3(3,0)
This course is designed to enable students to study a given advanced topic of interest, which is carefully selected from the mechanical engineering-related topics. The content outline of such a topic is to be determined by the instructor and to be approved by the department Chair. On demand.		

APPLIED PETROLEUM ENGINEERING TECHNOLOGY

Rationale

The Applied Petroleum Engineering Technology (APET) minor aims to address the expected national need for engineering personnel knowledgeable in the Oil and Gas field. It also serves to prepare undergraduate students for possible graduate studies in petroleum engineering and related fields.

It is mostly geared towards mechanical engineering students but it should also accommodate students from a variety of engineering backgrounds given that all prerequisite courses are completed.

The program is primarily concerned with the technical, environmental, and economic aspects of extraction of oil and gas as well as downstream processing and handling. The goal is to apply fundamental knowledge relevant to upstream and downstream operations which will enhance the graduate's capability to perform as a good practitioner in a short period of time.

Program participants are required to complete a minimum of 18 credits of related coursework. Although not a requirement, with proper and timely advising they may also have their Co-op work experience or their BS project in the area of Oil and Gas thus enhancing their capability.

In order to effectively cover the added course work during fall and spring semesters, one full-time faculty member with specialty related to Petroleum/Chemical Engineering is required.

Program Objectives

The primary objectives of the APET minor program are to:

- Give engineering students basic knowledge of the Oil and Gas industry;
- Endow students with the ability to deal with applied Oil and Gas downstream engineering;
- Prepare qualified Lebanese graduates to become productive contributors to the future Lebanese petroleum sector;
- Provide an impetus for undergraduate students to pursue graduate studies in the Oil and Gas domain.

Learning Outcomes

After completing the minor program, students should have the ability to:

- Apply relevant knowledge of mathematics, science and engineering to identify, formulate, and solve practical problems related to downstream petroleum engineering processes;

- Use modern engineering tools relevant to core petroleum engineering practices;
- Deal with the uncertainty and risk involved in petroleum transportation, refining, and storage problems.

Career Options

This minor allows the APET holders to start careers as field technologists in line with the exploration, transportation, refining, and storage sectors of the conventional oil and gas production industry. Typical employers include oil and gas Companies; oil service companies including QA/QC sector; government related agencies; and refineries.

Program Requirements

While most relevant to mechanical engineering students, this minor is offered to undergraduate RHU students in the BS program, from different disciplines (mechanical, mechatronics, civil, electrical, computer and communications and biomedical). It may also be offered to students with a BS/BE from other universities subject to a case-by-case evaluation of their transcripts and other specific RHU requirements. Proper advising is pertinent to a timely completion of the minor.

To successfully complete the APET minor, a student must

- 1) Declare an APET minor by completing the Minor Declaration Form;
- 2) Obtain the approval of the dean of the college major and the dean of the College of Business Administration;
- 3) Obtain a Minor Cumulative Grade Point Average (MCGPA) of no less than 70 %.
- 4) Complete 18 credits of coursework as specified below

APET Curriculum

The program strikes a proper balance between fundamentals and practice and prepare students to become productive contributors in the oil and gas domain. Accordingly, this minor shall include:

- Oil and gas chemistry and properties
- Design and analysis of systems and procedures for producing, and handling fluids;
- Decision making under conditions of risk and uncertainty;
- Safety hazards and environmental impact consideration and protection;
- Pipeline design and installation;
- Gas and oil processing and storage (gas, crude oil, and refined oil products);
- Refinery units and equipment inspection using codes and standards of international organizations such as API and ASME;
- Quality assurance and quality control aspects;

- National and regional macro-economic impact.

The APET curriculum encompasses 18 credits, 15 mandatory credits and 3 elective credits, selected to satisfy the requirements of the proposed program objectives and learning outcomes. The courses that encompass the minor are given below.

Mandatory Courses

Description of the five mandatory course (15 credits) follows.

APET 200	Petroleum Engineering	3(3,0)
Overview of the petroleum engineering and petroleum industry: Nature of oil and gas reservoirs, exploration and drilling techniques, formation evaluation, well completions and production, surface facilities, reservoir mechanics, off-shore and in-shore structures, environmental considerations; new technologies, future prospects; petroleum industry activities in Lebanon and the Middle East; available industry and challenges; Oil & gas Safety issues.		

APET 201	Crude Oil & Natural Gas Transportation & Storage	3(3,0)
This course will introduce the petroleum student to natural gas and crude oil transportation and storage equipment design and operation; following the flow of gas from the wellhead to the gas & oil pipelines, to the storage tanks; calculations are performed on pipeline sizing, inspection, and installation; storage tanks design, installation and inspection; use of commercial software's. Prerequisite: APET 200.		

APET 203	Modern Refining Technology	3(3,0)
This course presents an introduction to petroleum refining technology; an overview of crude oil supply and petroleum product demand; a description of refinery process technology. Some refining technologies are described such as crude oil distillation, heavy oil conversion options, hydrotreating, and catalytic reforming. Some gas processing is also discussed. Prerequisite: APET 200.		

CHEM 213	Physical and Organic Chemistry	3(3,0)
This course will allow students to learn chemical principles related to General, Physical and Organic fields of chemistry. Topics include study of different states of matter, homogeneous and heterogeneous mixtures, study of endothermic and exothermic processes, discussion on surface phenomena and industrial applications of adsorption and absorption processes; Structure and properties of organic compounds, synthesis and reactions of various compounds, mechanism of radical substitution, electrophilic addition and electrophilic aromatic substitution, Liquids and liquid-gas solutions, viscosity and surface tension of liquids, name and write formulas of selected organic compounds generally found in oil and gas industries; Catalyst types and use. Prerequisite: general or environmental chemistry.		

GEOL 210	Petroleum Geology	3(3,0)
This course introduces the concepts of geology that are important to petroleum exploration and exploitation. Topics include; the make-up of the Earth, plate tectonics, rocks and minerals, formation of sediments and sedimentary rocks, stratigraphy, geologic structures, oil and gas sources, reservoir engineering properties, exploration techniques, well evaluation and reservoir development.		

Elective Course

Students may choose one three-credit course from the following list.

APET 202	Materials Selection – Corrosion Monitoring and Control	3(3,0)
Topics will provide the student with an understanding of the factors involved in materials utilization in the petroleum equipment design and construction such as pressure vessels & piping; materials properties, basic welding principles and the applicable codes, standards, and engineering specification used for materials specification in the hydrocarbon industries. Common nondestructive testing procedures used on equipment and types of defects such as corrosion and cracks identification, Equipment strategy: monitoring and control. Prerequisite: APET 200.		

APET 300	Applied Fluid Mechanics	3(3,0)
Review of incompressible flow, turbulence and dimensional analysis; pipe flows; boundary layers, lift, drag and flow separation; compressible flow; turbo and rotating machinery, oil and gas issues.		

Program Prerequisites

Students who wish to study the APET minor must complete the following courses.

Course Code	Title	Credits
CHEM 211	Environmental Chemistry	3
ENGL 217	Professional English Writing	3
MATH 211	Calculus III	4
MATH 311	Linear Algebra with Applications	3
MATH 314	Ordinary Differential Equations	3
MATH 351	Probability and Statistics	3
MECH 320	Mechanics of Materials	3
MECH 330	Thermodynamics I	3
MECH 335	Fluid Mechanics	3
PHYS 211	Physics: Electricity and Magnetism	3

MECHATRONICS ENGINEERING PROGRAM

Mission

The mission of the Mechatronics Engineering program at RHU is to provide solid education necessary for the students to start a professional career and/or to continue graduate studies in mechatronics engineering. The program seeks to instill in the students a feeling for, and understanding of, the moral and professional responsibilities, the ability to learn more, and the leadership required in their calling, mainly in Lebanon and the Middle East regions.

Objectives

In 3-5 years after graduating, Mechatronics Engineering students will:

1. Apply mechanical engineering, electrical engineering and computer communication engineering knowledge and skills to problems and challenges in the areas of mechatronic engineering.
2. Design and develop integration systems that utilizes modern microelectronics, modern industrial automation tools, embedded control algorithm, instrumentation and sensing tools and devices for service of industrial needs.
3. Develop communication skills to work effectively with team members and in a multi-disciplinary environment.
4. Pursue advanced education in their profession and function professionally in a responsible and ethical manner.
5. Participate effectively in activities that support service to and economic development of Lebanon, as well as the Middle East region.

Program Outcomes

Upon successful completion of the BS/BE program in Mechatronics Engineering, graduates will have a/an:

1. Knowledge of and an ability to apply engineering and science fundamentals to many real problems.
2. Ability to design an assortment of mechanical or mechatronic components, systems and processes.
3. Ability to set up and conduct key experiments in the field, and to analyze and interpret resulting data.
4. Ability to use modern computer tools in mechanical or mechatronics engineering.
5. Ability to communicate effectively in written and oral form
6. Ability to work effectively individually or in teams and apply interpersonal skills in engineering contexts and in society.

7. Ability and desire to lay a foundation for continued learning beyond the baccalaureate degree.
8. Awareness of professional issues in engineering practice, including ethical responsibility, safety, the creative enterprise, and commitment to the profession.
9. Awareness of contemporary issues in engineering practice, including economic, social, political, and environmental issues and global impact.

Career Opportunities

Mechatronics engineers attain a broad spectrum of skills that are central to the practice of almost any professional field. Mechatronics engineers can find career opportunities in industries and enterprises such as food processing, building and construction, medical and pharmaceutical industries, aerospace, automotive, chemical, oil and gas, computer and electronics, renewable energy, and far more. Most importantly, you will be prepared to be able to imagine something that never was and drive forward to make it a reality! There is so much to be had to guarantee the future of mankind and mechatronics engineers can tap the possibilities through the spirit of innovation and entrepreneurship.

Program Overview

At RHU, every experience the student has represents a block in building a competent, confident, purposeful, problem-solving, competitive, responsible, and conscientious individual. Mechatronics engineering, being a holistic approach to designing and developing multifaceted smart systems, has strength of remarkable dimensions. Student transformation is accomplished through a curriculum that orbits the edges of knowledge, facilities equipped with the latest technology and conformed, to the highest of norms, faculty members who are passionate and committed to the academic success and personal growth of the student, and an environment that inspires learning and drives discovery.

The Bachelor of Engineering (BE) program in Mechatronics Engineering encompasses 147 credit hours spread over eight regular semesters and three summer terms. The Bachelor of Science (BS) program comprises a total of 114 credit hours spread over six regular semesters and three summer terms. In addition to completing the credits requirements, a BS or a BE degree is conferred upon a student if the earned cumulative GPA, major PGA and the Summative Learning Project grades are all 70 or above.

The required credit hours span three categories: University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours for the BS and the BE programs is shown in the following tables where the apparent multi-disciplinary nature of Mechatronics is obvious. This demonstrates the value of a degree in Mechatronics as a starting point for several higher degree paths.

BS in Mechatronics Engineering (114 Credits)

Courses Category	Major	Non-Major	Credits	Percent
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	Mandatory	Electives	Mandatory	Electives		
University Requirement	0	0	18	9	27	24
College Requirement	4	0	24	0	28	25
Program Requirement	30	0	29	0	59	51
Credits	34	0	71	9	114	100

BE in Mechatronics Engineering (147Credits)

Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	0	0	18	12	30	20
College Requirement	4	0	27	0	31	21
Program Requirement	36	15	35	0	86	59
Credits	40	15	80	12	147	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Engineering section in this catalog.

II. College Requirements

The list of the College required courses and their descriptions are presented in the introductory pages of the College of Engineering section in this catalog.

III. Program Requirements

The program requirements for a Bachelor of Engineering degree in Mechatronics Engineering encompasses 86 credits (59 credits for the BS degree) distributes as follows: 71 credits (59 credits for the BS degree) Mandatory courses and 15 credits elective courses.

A. Mandatory requirements

The Mechatronics Engineering mandatory core courses (major and non-major) are listed in the table below.

Course #	Title	Credits	Prerequisites
CCEE 221/221L	Logic Design +Lab	4	
CIVE 211	Statics	3	
ELEC 320/320L	Electronics + Lab	4	ELEC 210
ELEC 331	Electric Machines	3	ELEC 210
MECA 340	Dynamic System Modeling	3	MATH 314
MECA 341/341L	Measurements and Instrumentation + Lab	4	ELEC 320
MECA 400*	Summative Learning (BS) Project	3	ENGL 217
MECA 440	Control Systems Design	3	MECA 340

MECA 441	Sensors and Actuators	3	MECA 341
MECA 442	Microcontrollers for Mechatronics	3	CCEE 426
MECA 443	Mechatronic System Design & Lab	3	MECA 441
MECA 499	Co-op Work Experience	1	ENGL 217; Senior Standing
MECA 595A	BE Summative Learning (BE) Project -I	1	ENGL 217
MECA 595B	BE Summative Learning (BE) Project -II	1	MECA 595A
MECA 540	CAD/CAM/CAE	2	MECH 224
MECA 542	Industrial and manufacturing Control	3	MECA 442
MECA 544	Robotics	3	MECH 321
MECA 4xx/5xx	Technical Electives	15	Per course requirement
MECH 220	Dynamics	3	CIVE 211
MECH 224	Mechanical Engineering Graphics & CAD	3	
MECH 320	Mechanics of Materials	3	CIVE 211
MECH 321	Mechanisms and Dynamics of Machinery	3	MECH 220
MECH 333	Thermal Fluid Sciences	3	MATH 211
MECH 421	Mechanical Design I	3	MECH 320
MECH 422	Manufacturing processes	3	MECH 320

* Required of BS bound students. BE students take Technical Elective instead.

B. Technical Electives

As part of the program for the Bachelor of Engineering in Mechatronics Engineering, the student is required to study 15 credit hours of technical elective courses. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. The student can also mix and match elective courses from the different areas to get a more general exposure to different yet inter-related Engineering disciplines. The student should select, in cooperation with the academic advisor, the list of electives that best meet his or her needs and aspirations. The listed technical elective courses and other courses from other engineering programs, in addition to the required program courses, are designed to allow the student to develop in-depth knowledge and understanding in the following areas:

- Mechanisms and Robotics
- Measurements and Instrumentation
- Control Systems

It is highly recommended that the student takes elective courses after completing the mandatory requirements in the related area. Students may select technical electives from other programs subject to approval of the academic advisor and the corresponding course instructor.

Course #	Title	Credits	Prerequisites
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MECA 484	Civionics	3	
MECA 485	Autotronics	3	
MECA 515	Modern Control Systems	3	MECA 440
MECA 543	Fluid Power Systems	3	MECH 333 or MECH 335
MECA 581	Systems Engineering	3	MECH 470
MECA 583	Multi Agent System MAS	3	
MECA 586	Lean/Six Sigma Processes	3	

C. Summative Learning Project

Students must complete a 3- credit hours course for BS (4-credits for BE; taken 1 credit in the first regular semester and 3 credits in the following regular semester) in which they work preferably in groups on a problem of concern to industry or the community at large, or to innovate a promising idea. The SLP could be an extension of the projects students had worked on in the Engineering for the community course to bring it to a more useful outcome.

D. Co-op Experience

Students must complete 8 weeks of practical training while working in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits and ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are required to submit a formal report, a poster and make a formal presentation about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Study Plan

The following study plan summarizes the courses and credits distribution for the Bachelor of Science (BS) and Bachelor of Engineering (BE) in MECA Engineering. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (16 Credits)			
ENGL 210	English Composition and Rhetoric	3	
MATH 211	Calculus III	4	
PHYS 211	Physics: Electricity & Magnetism (2 +1 Lab)	3	
CCEE 214	Introduction to Programming & Lab	3	
CIVE 211	Statics	3	
Year 1, Spring Semester (15 Credits)			

ENGR 200	Engineering for the Community	3	
MATH 311	Linear Algebra and Applications	3	
ELEC 210	Electric Circuits	3	PHYS 211
MECH 220	Dynamics	3	CIVE 211
MECH 224	Mechanical Engineering Graphics & CAD	3	
Year 1, Summer term (6 Credits)			
CCEE 221	Logic Design	3	
	Science Elective	3	
Year 2, Fall Semester (17 Credits)			
MATH 314	Ordinary Differential Equations	3	MATH 211
ELEC 320	Electronics	3	ELEC 210
ELEC 320L	Electronics Lab	1	Co-req: ELEC 320
MECH 320	Mechanics of Materials	3	CIVE 211
MECH 321	Mechanisms and Dynamics of Machinery	3	MECH 220
ENGL 217	Professional English Writing	3	ENGL 210
CCEE 221L	Logic Design Lab	1	Co-req: CCEE 221
Year 2, Spring Semester (17 Credits)			
MATH 351	Probability and Statistics	3	
MECA 340	Dynamic Systems Modeling	3	MATH 314
MECA 341	Measurements and Instrumentation	3	ELEC 320
MECA 341L	Measurements and Instrumentation Lab	1	Co-req: MECA 341
MECH 333	Thermal Fluid Sciences	3	MATH 211
CCEE 426	Design of Embedded Systems	3	CCEE 221
CCEE 426L	Design of Embedded Systems Lab	1	Co-req: CCEE 426
Year 2, Summer term (9 Credits)			
MATH 317	Partial Differential Equations	3	MATH 314
ENGR 300	Engineering Economics and management	3	
	Social Sciences/Culture I	3	
Year 3, Fall Semester (18 Credits)			
MECA 440	Control Systems Design	3	MECA 340
MECA 442	Microcontrollers for Mechatronics	3 (2+2)	CCEE 426
ELEC 331	Electric Machines	3	ELEC 210
MATH 421	Numerical Analysis	3	MATH 311
CHEM 211	Environmental Chemistry	3	
	Social Sciences/Culture II	3	
Year 3, Spring Semester (15 Credits)			

MECH 422	Manufacturing Processes	3	MECH 320
MECA 443	Mechatronic System Design & Lab	3 (2+2)	MECA 341
MECH 421	Mechanical Design I	3	MECH 320
	Humanities I	3	
	Engineering Technical Elective I*	3	Per course requirements
Year 3, Summer term (1 Credits)			
MECA 499	Co-op Work Experience	1	ENGL 217
The above 114 Credits complete the requirements for a Bachelor of Science Degree in Mechatronics Engineering			
Year 4, Fall Semester (18 Credits)			
ENGR 500	Technopreneurship	3	ENGR 300
MECA 441	Sensors & Actuators	3	MECA 341
MECA 540	CAD/CAM/CAE	2	MECH 224
	Humanities II	3	
	Engineering Technical Elective II	3	Per course requirements
	Engineering Technical Elective III	3	Per course requirements
MECA 595A	BE Summative Learning Project - I	1	ENGL 217; Senior Standing
Year 4, Spring Semester (15 Credits)			
MECA 542	Industrial and Manufacturing Control	3 (2+2)	MECA 442
MECA 544	Robotics	3	MECH 321
	Engineering Technical Elective IV	3	Per course requirements
	Engineering Technical Elective V	3	Per course requirements
MECA 595B	BE Summative Learning Project - II	3	MECA 595A
Total BE credits: 147			

* BS bound students are required to take MECA 400 – Summative Learning (BS) Project instead.

Note: Engineering Technical Electives (levels 400 or above) are selected as such:
 6 credit restricted Departmental Electives
 9 credits from any Engineering discipline of levels 400 or above.

Course Description

I. Mandatory Courses

Non Major Courses

Description of the mandatory, non-major courses follows.

CCEE 214	Programming & Lab	3(2,2)
Understanding of the basic principles of programming and computer systems; Applications of programming to the solution of engineering problems; Control structures, functions, arrays, pointers and structures. Laboratory experiments.		

CCEE 221	Logic Design	3(3,0)
This course addresses Boolean algebra and logic simplification techniques, data representation, and the design of combinational logic networks for decoders, encoders, multiplexers, and demultiplexers. Design of sequential logic devices including flip-flops, registers, and counters, as well as analysis of devices used to build logic networks, including programmable logic devices.		

CCEE 221L	Logic Design Lab	1(0,2)
This Lab covers design techniques and implementation of combinational and sequential logic circuits. Experiments include: logic gates, design and implementation of logic circuits, combinational logic circuits (decoders, encoders, multiplexers, demultiplexers and adders), and design of sequential logic devices using flip-flops, registers, and counters. Prerequisite: CCEE 221. Prerequisite: CCEE 221.		

CHEM 211	Environmental Chemistry	3(3,0)
This course provides an opportunity to develop an understanding of several basic environmental functions, the complicated nature of environmental systems, and the need for multidisciplinary solutions to environmental problems. Topics covered include the hydrosphere, water quantity and quality, soil and the soil ecosystem, biological resources, waste disposal, air pollution, ozone depletion, acid rain, global warming, agriculture, and toxicology. Prerequisite: None. Annually.		

CIVE 211	Statics	3(3,0)
Static laws; force vectors and operations; force system and moment; free body diagram; equilibrium of particles and rigid bodies in 2D and 3D; plane trusses and frames; cables; internal forces: shear and moment diagrams; centroid and center of mass; moment of inertia; and friction. Annually.		

ELEC 210	Electrical Circuits	3(3,0)
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Circuit elements and laws, mesh and node equations, network theorems, energy storage elements, RC, R, and RLC circuits, Laplace Transform, sinusoids and phasors and introduction to network theory. Sinusoidal (AC) steady state, mutual inductance, transformers, and introduction to three phase circuit. **Prerequisite:** PHYS 211. Annually.

ELEC 320	Electronics	3(3,0)
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This course covers semiconductors, PN junctions, diode theory and circuits, bipolar junction transistors, transistor fundamentals, transistor biasing, amplifiers, MOSFETs, and operational amplifiers. **Prerequisite:** ELEC 210.

ELEC 320L	Electronics Lab	1(0,2)
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This is a Lab course with experiments in Electrical and Electronic Circuits. It covers passive electrical elements and sources; lab instruments; voltage divider circuits; Thevenin's theorem; RC circuits; diode circuits; Op-Amp circuits; BJT and MOSFET characteristics. **Co-requisite:** ELEC 320.

ELEC 331	Electric Machines	3(3,0)
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Magnetic circuits, fundamentals of electromechanical energy conversion. DC machines, synchronous machines, transformers, induction motors, construction, testing, steady-state analysis, and operational characteristics. **Prerequisite:** ELEC 210. Annually.

ELEC 331L	Electric Machines Lab	1(0,2)
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Accompanying Lab of ELEC 331. **Co-req:** ELEC 331.

ENGL 210	English Composition and Rhetoric	3(3,0)
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This course reinforces effective critical reading and writing skills with emphasis on writing documented essays for academic purposes in a varying range of rhetorical modes. More specifically, the student will apply the fundamental principles of English spelling, word usage, grammar, punctuation and style necessary for written communication; write academic essays; proofread and edit a variety of texts; analyze general texts for coherence, style and accuracy in writing; read critically from a variety of discourse modes; summarize, paraphrase and quote sources properly; and cite sources according to APA form. **Prerequisite:** None. Every semester.

ENGL 217	Professional English Writing	3(3,0)
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This course is designed to enhance students' professional writing skills. It is tailored to students pursuing careers in the professions and includes advanced business writing and editing, correspondence, critical review, writing professional reports and proposals, and making oral presentations. **Prerequisite:** ENGL 210. Every Semester.

ENGR 200	Engineering for the Community	3(3,0)
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This course aims to give students a holistic view of engineering, its interdisciplinary nature and role in solving community problems. It entails a brief overview on the role of technology,

creativity and problem solving, product development cycle, contemporary engineering systems, and ethical considerations. Students in teams work on a community related project that will culminate in a working artifact. Specific topics are flexible but it shall cover fundamentals of intelligent systems, computer interface, sensing and actuation, mechanisms and structures. Fall and Spring semesters.

ENGR 300	Engineering Economics and management	3(3,0)
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Concepts and techniques in basic Engineering economy principles and applications. Interest and financial mathematics; present worth, annual worth, benefit/cost ratio, internal rate of return, multiple alternatives, income tax, inflation, Risk analysis, Investment and investment choice, equivalence, loans, cost of capital, retirement and replacement, sector analysis and viewpoint, sensitivity analysis, accounting and financial statements. **Prerequisite:** None. Annually.

ENGR 500	Technopreneurship	3(3,0)
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Venture and innovation opportunities; concept and strategy; the Technopreneur; planning; resource acquisition and organization; financing, marketing and sustainability of enterprise. **Prerequisite:** ENGR 300. Annually.

MATH 211	Calculus III	4(4,0)
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Volumes by slicing and rotation about an axis, length of plane curves, areas of surfaces of revolution, integrations and applications of integrals, transcendental functions and their inverses, integration techniques, improper integrals, sequences and infinite series, vectors in the plane and polar functions, Fourier Series; polar functions and their graphs, cylinders and quadric surfaces, functions of several variables, partial derivatives and their applications, extreme values of functions of several variables, Lagrange multipliers, double and triple integrals in rectangular and cylindrical and spherical coordinates, integration in vector fields, Green's and Stoke's theorems. **Prerequisite:** None. Every semester.

MATH 311	Linear Algebra	3(3,0)
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Linear equations in linear algebra, matrix algebra, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality and least squares, symmetric matrices and quadratic forms. **Prerequisite:** None. Annually.

MATH 314	Ordinary Differential Equation	3(3,0)
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First order equations, existence and uniqueness theorem, separation of variables, higher order linear equations, Series solutions of second order linear equations, Laplace transforms, systems of first linear equations. **Prerequisite:** MATH 211. Annually.

MATH 317	Partial Differential Equations	3(3,0)
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Ordinary differential equations arising from partial differential equations by means of separation of variables, method of characteristics for first order PDEs, boundary value

problems for ODEs, partial differential equation and Fourier analysis and applications, comparative study of heat equation, wave equation and Laplace's equation by separation of variables and numerical methods, further topics in numerical solution of ODEs. **Prerequisite:** MATH 314.

MATH 351	Probability and Statistics	3(3,0)
Probability and conditional probability, random variable and distribution, continuous and marginal distributions, expectation, variance- moments-mean-median-covariance and correlation, conditional expectation, the sample mean, special distribution, Bernoulli and binomial distributions, Poisson and Gamma distribution. Annually.		

MATH 421	Numerical Analysis	3(3,0)
Error Analysis, solutions of nonlinear equations using fixed point- Newton-Raphson-Muller's methods, solution of linear system using Gaussian elimination-iterative methods, interpolation and approximation using Taylor series-Lagrange approximation-Newton polynomials, numerical differentiation and integration, numerical optimization, solutions of ordinary and partial differential equations using Euler's and Heun's and Rung-Kutta methods. Prerequisite: MATH 311. Annually.		

MECH 220	Dynamics	3(3,0)
Coordinate systems: Cartesian and normal/tangential axes; kinematics of a particle: rectilinear, curvilinear, and relative motion; kinetics of a particle: force and acceleration, work and energy, impulse and momentum; planar kinematics of a rigid body: translating and rotating axes, absolute and relative motion; planar kinetics of a rigid body: force and acceleration, work and energy, impulse and momentum. Prerequisite: CIVE 211. Annually.		

MECH 224	Mechanical Engineering Graphics and CAD	3(3,0)
Drafting principles; piece part and assembly drawings; generation of 2D and 3D drawings as well as solid models using AutoCAD; customizing AutoCAD for any particular application; generating 2D drawings using CAD/CAM software; generating parametric, feature based solids using the AutoDesk Mechanical Desktop. Annually.		

MECH 320	Mechanics of Materials	3(3,0)
Mechanical stress, strain, and stress/strain relations under pure tension, compression, pure bending, and pure torsion of circular bars; 1-D thermal strain & stress; thin-walled cylindrical & spherical pressure vessels; combined stresses; principle stresses; plane stress transformation & Mohr's circle; basic 3-D elastic stress/strain relations; Euler-elastic buckling of columns. Prerequisite: CIVE 211. Annually.		

MECH 321	Mechanisms and Dynamics of Machinery	3(3,0)
Mechanization of motion; kinematic analysis of linkage mechanisms; synthesis of cam-follower mechanisms (graphical and analytical designs); gear terminology and types of gears used in		

machines; analysis and synthesis of gear trains; velocity, acceleration, and force analysis of mechanisms; introduction to linkage synthesis of four bar planar mechanisms. **Prerequisite:** MECH 220. Annually.

MECH 333	Thermal Fluid Sciences	3(3,0)
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This course seeks to impart thermal-fluid fundamental concepts (including Thermodynamics, Fluid Mechanics and Heat Transfer) to non-mechanical engineering students. This covers: thermodynamic state and properties of pure substances; concepts of work and heat, energy analysis of closed systems (First Law) and simple flow devices, Fluid statics; Bernoulli's equation; Conservation of mass, momentum & energy, viscous flow in pipes, introduction to conduction, convection and radiation heat transfer. **Prerequisite:** MATH 211. Annually.

MECH 421	Mechanical Design I	3(3,0)
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Materials properties; tools of machine design; stress, strain and deformation of machine parts; statistical methods; yielding theories of materials; design of machine parts for strength under steady loads; design of machine parts for rigidity, deflection of beams and rotation of shafts; design of machine parts for strength under cyclic/dynamic loads; codes and standards. **Prerequisite:** MECH 320. Annually.

MECH 422	Manufacturing Processes	3(3,0)
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General overview of manufacturing; properties of materials; dimensions and tolerances; metals, ceramics, and polymers; solidification processes; metal forming; plastic processing; powder metallurgy; joining and assembly; inspection, and quality control; industrial visit if possible; project. **Prerequisite:** MECH 320. Annually.

PHYS 211	Electricity and Magnetism	3(3,0)
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This course covers fundamental topics in Electricity and Magnetism: Electric forces and Electric Fields for discrete and continuous charge distribution, Gauss's Law, Electric Potential, Capacitance and Dielectrics, Kirchhoff's rules, Magnetic Fields and Forces, Biot-Savart Law, Ampere's Law, Magnetic Flux, Gauss's Law in Magnetism, Faraday's and Lenz's Laws. **Prerequisite:** None. Annually.

Major Courses

Mandatory mechatronics courses are described below.

MECA 340	Dynamic Systems Modeling	3(3,0)
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Introduction to dynamic modeling of mechanical, electrical, electromechanical, thermal, fluid, and mixed discipline systems; Block diagrams and computer simulation (MATLAB); State-variable solution; Laplace Transform solution; Laplace transform properties; inverse Laplace transform; transfer function, frequency response, first and second order systems. **Prerequisite:** MATH 314, Annually.

MECA 341	Measurements and Instrumentation	3(3,0)
<p>This course covers the fundamentals of instrumentation and measurement of various physical quantities. Topics include: sensor types, technologies, characteristics and calibration; design of a measurement system; statistical analysis of measured data; measurement noise and uncertainties; data acquisition, data storage and display devices; signal conditioning and interface electronics concepts including filtering, A/D and D/A conversion, amplification, modulation, compensation; applications; Prerequisite: ELEC 320, Annually.</p>		

MECA 341L	Measurements and Instrumentation Lab	1(0,2)
<p>The lab experience complements the topics covered in MECA 341. Students learn to use the NI ELVIS platform, LabVIEW programming and data acquisition systems characteristics to build a measurement system, perform data analysis and sensor calibration, and design and build signal conditioning circuits for various types of measurements. The lab involves a team project to integrate all instrumentation and measurement tools and techniques are applied to build a measurement system and submit a report. Co-requisite: MECA 341</p>		

MECA 400	Summative Learning (BS) Project	3(3,0)
<p>Team-oriented, project-based experience that culminates in the creation of an artifact; milestones include: project selection and proposal, creative solution, report, presentation, and demonstration of the created device. Prerequisite: for the last semester of the BS Program, ENGL 217. Annually.</p>		

MECA 440	Control Systems Design	3(3,0)
<p>This course focuses on the analysis and design of systems control. measure control system performance; Transient and steady state response analyses ;Topics include analytical solutions analysis in time and S domain, root locus, Bode, Nyquist, Lead Lag controller design, and PID compensator design are covered, Analysis and design control systems in state space. Control system analysis and design using MATLAB and SIMULINK; set up a control system and understand and optimize its performance; Prerequisites: MECA 340 Annually.</p>		

MECA 441	Sensors and Actuators	3(3,0)
<p>Sensor and actuator technologies; classification and terminology of sensors and actuators; sensors characteristics; physical principles of sensing; measurement applications (position and speed, stress and strain, temperature, vibration and acceleration, pressure and flow...); Electromagnetic principles; solenoids and relays; electric motors (DC motors , Stepper motors...); Hydraulics actuators; Pneumatic actuators; interface methodologies and circuits; integration aspects; manufacturing techniques and material properties; team projects. Prerequisite: MECA 341, Annually.</p>		

MECA 442	Microcontrollers for Mechatronics	3(2,2)
<p>This course is a comprehensive introduction to control system synthesis and hands-on laboratory experience. The course covers elements of real-time microcontroller architecture;</p>		

input-output interfaces and data converters; analysis and synthesis of sampled-data control systems using classical and modern (state-space) methods; analysis of trade-offs in control algorithms for computation speed and quantization effects. Associated projects in the Lab emphasizing practical digital servo interfacing and implementation problems with timing, noise, and nonlinear devices. **Prerequisite:** MECA 426, Annually.

MECA 443	Mechatronic System Design	3(2,2)
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This course is an integration of all mechatronics systems design modules. It consists of an overview of mechatronics; mechatronics systems design strategies; advanced modeling; usage of control strategies; design of electric actuators; design of sensors; power electronics; hardware and software integration; Team projects on design and implementation of integration between mechanical, electrical and control systems . **Prerequisite:** MECA 440. Annually.

MECA 499	Co-op Work Experience	1(1,0)
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This Co-op work experience is designed to provide students with a five-week short-term work experience in the field of mechanical engineering. Students are encouraged to network in the discipline-related industries. Report, poster, and power-point presentation, are required **Prerequisites:** ENGL 217 and Senior Standing.

MECA 542	Industrial and Manufacturing Control	3(2,2)
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This course explores open, feedback control algorithms and PLC's required to operate electrical motors and mechanical actuators used in industrial process. Various forms of process control, including statistical process control, run by run, adaptive control, and real-time feedback are covered. **Prerequisite:** MECA 442. Annually.

MECA 544	Robotics	3(3,0)
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Introductory historical development of robotics; static grasp analysis; rigid objects Kinematics; degrees of freedom; robot arm kinematics; inverse kinematics; dynamics; kinematic singularities; closed chain kinematics; introduction of trajectory planning and control of manipulators, screw motions; **Prerequisite:** MECH 321, Annually.

MECA 595A	BE Summative Learning Project I	1(1,0)
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Team-oriented project which includes conducting and formulating experimental laboratory work and/or design problems on a specific approved topic of specialty. The project includes literature review and scope of work as well as project proposal. **Prerequisites:** Senior Standing, ENGL 217. Annually.

MECA 595B	BE Summative Learning Project II	3(3,0)
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Team-oriented project which includes conducting and formulating experimental laboratory work and/or design problems on a specific approved topic of specialty. The project includes literature review, design work, data collection, experimentation, data analysis and technical

writing. **Prerequisite:** MECA 595A. Annually.

II. Elective Courses

Students may meet their technical electives requirements from the following selection of elective courses.

MECA 484	Civionics	3(3,0)
Applications of mechatronic techniques to civil construction. This course will provide engineers with background necessary to aid in optimizing design techniques and understanding infrastructure performance, behavior and state of condition. The successful integration of intelligent sensing of innovative structures will allow civil structural engineers to expand the design envelope and introduce new design concepts, materials and innovation in civil engineering. Prerequisites: Instructor's consent.		

MECA 485	Autotronics	3(3,0)
This course explores topics such as sensors and actuators in automotive, communication systems, can protocol, electronics circuits automotive standard, electronic suspension and steering, engine management and on board diagnostics. Prerequisite: Instructor's consent.		

MECA 498	Special Topics in Mechatronics Engineering	3(3,0)
Guided study and research on topics related to the major. Prerequisites: Consent of the instructor. On demand.		

MECA 515	Modern Control Systems	3(3,0)
The course covers Various forms of process control, including statistical process control, run by run and adaptive control, and real-time feedback control, Static optimization, optimal control for continuous-time systems, the tracking problem and other LQR extenders, adaptive and predictive control H-infinity controller design; Mu-synthesis; model and compensator simplification; and nonlinear effects. The assignments for the course comprise of computer-aided (MATLAB®) design problems. Prerequisite: MECA 440.		

MECA 543	Fluid Power Systems	3(3,0)
Introduction to hydraulic and pneumatic systems: study of basic hydraulic/pneumatic circuit components: pipes, valves, pumps, motors, filters, accumulators, sensors, and silencers; analysis/design of various hydraulic/pneumatic circuits such as high-low, regenerative, and synchronization circuits; use of Matlab/Simulink for simulation of fluid power system circuits. Prerequisites: MECH 333 or MECH 335, Annually.		

MECA 581	Systems Engineering	3(3,0)
A course with an interdisciplinary approach intended to enable the realization of successful systems. It focuses on defining customer needs and required functionality early in the		

development cycle, documenting requirements, then proceeding with design synthesis and system validation while considering the complete problem including operations, performance, test, manufacturing, cost, and schedule. This course emphasizes the links of systems engineering to fundamentals of decision theory, statistics, and optimization. Introduction to the most current, commercially successful techniques for systems engineering. **Prerequisite:** MECH 470.

MECA 583	Multi Agent System MAS	3(3,0)
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The objective of the course is to present tools and methodologies for performing system Realization in a multidisciplinary design context. Focus will be equally strong on all three aspects of the problem: (i) the multidisciplinary character of engineering systems, (ii) design of these complex systems, and (iii) tools for realization. **Prerequisites:** Instructor's consent.

MECA 586	Lean/Six Sigma Processes	3(3,0)
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Students of this course will develop a broad understanding of Lean/Six Sigma principles and practices, build capability to implement Lean/Six Sigma initiatives in manufacturing operations, and learn to operate with awareness of Lean/Six Sigma at the enterprise level. All course materials are organized around a common "single-point lesson" (SPL) format, with some of the SPLs provided by the instructor and guests and with some developed and delivered by student teams. **Prerequisite:** Instructor's consent.

MECA 597	Advanced Topics in Mechatronics Engineering	3(3,0)
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This course is designed to enable students to study a given advanced topic of interest, which is carefully selected from the mechatronics engineering-related topics. The content outline of such a topic is to be determined by the instructor and to be approved by the department Chair. On demand.

FACULTY LIST 2014-2015

- Abdallah, Mirvat**; Assistant Professor, PhD in Civil Engineering, 2013, Lille 1 University, France.
- Al Awar, Nizar**; Lecturer, MS in Electrical Engineering, 2003, Marquette University, USA.
- Al Hajj, Ahmad**; Associate Professor, PhD in Civil Engineering, 1993, University of Pittsburgh, USA.
- Al Wardany, Riad**; Assistant Professor, PhD in Civil Engineering, 2005, University of Sherbrooke, Canada.
- Basha, Hisham**; Professor and Dean, PhD in Civil Engineering, 1994, University of Michigan, USA.
- Chaaban, Ahmad**; Professor and Chairperson, PhD in Mechanical Engineering, 1985, University of Waterloo, Canada.
- Diab, Mohammad**; Associate Professor, PhD in Biomedical Engineering, 2007, University of Compiègne, France.
- Diab, Nadim**; Assistant Professor, PhD in Mechanical Engineering, 2014, American University of Beirut, Lebanon.
- Hammoud, Roula**; MD, 1991, Université Libre de Bruxelles, Belgium.
- Haydar, Mazen**; Lecturer, PhD in Civil Engineering, Environmental Engineering, 2005, Michigan State University, USA.
- Hijazi, Toufic**; Professor, PhD in Electrical Engineering, 1988, Clarkson University, USA
- Kasamani, Jihad**; Instructor, MS. In Mechanical Engineering, 1989, American University of Beirut, Lebanon.
- Khatib, Rabih**; Instructor, MS. in Civil Engineering, Transportation, 2002, University of Balamand, Lebanon.
- Khatib, Rami**; Lecturer, MS in Mechatronics Engineering, 2012, Rafik Hariri University, Lebanon
- Kozaily, Jad**; Assistant Professor, PhD in Material Science, 2012, Université d'Orléans, France.
- Mechaymech, Ahmad**; Lecturer, PhD in Civil Engineering, Concrete Technology, 2010, University of Sherbrooke, Canada.
- Moslem, Bassam**; Assistant Professor, PhD in Signal Processing, 2011, University of Compiègne, France.
- Mounajed, Ghassan**; Lecturer, PhD in Civil Engineering, 1991, Ecole Nationale des Ponts et Chaussées, Paris- France.
- Nasreddine, Jad**; Associate Professor, PhD in Computer Science, 2004, University of Rennes 1, France.
- Nuwayhid, Rida**; Professor, PhD in Mechanical/Nuclear Engineering, 1989, Imperial College, UK.

Sabbah, Maher; Ph.D, 2006, Biomedical Engineering, University of Technology of Campiegne (UTC) France and Universite Claude Bernard, Lyon, France.

Sawan, Jihad; Lecturer, PhD in Civil Engineering, Geotechnical & Highway Engineering, 1978, University of Illinois at Urbana Champaign, USA.

Serhal, Dina; Assistant Professor, PhD in Communications Engineering, 2009, University of Limoges, France.

Taha, Mohammed; Associate Professor, PhD in Electrical engineering, 1992, Aston University, UK.

Zantout, Rached; Associate Professor, PhD in Communications Engineering, 1994, Ohio State University, USA.

Zeidan, Ali; Lecturer, PhD in Civil Engineering - Hydraulics, 1991, University of Khartoum, Sudan.

College of Science and Information Systems

COLLEGE OF SCIENCES AND INFORMATION SYSTEMS

Officers of the College

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Ahmad Smaili	VP for Academic Affairs
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History

The College of Sciences and Information Systems at Rafik Hariri University was established in 2006. Since then, the College has grown significantly and presently offers two undergraduate programs in Computer Science and Graphic Design and will soon be launching two new programs: Healthcare Information Systems and Interior Design.

Vision

The CSIS vision is to provide excellent educational standards and purposeful research that allow for the development of critical thinkers and leaders.

Mission

The CSIS mission is to:

1. Seek and achieve distinction in the creation and distribution of knowledge by providing quality degree programs of international standards.
2. Increase our visibility and aim for interdisciplinary collaboration with academic institutions and professional bodies.

3. Offer student-centered educational experience that will enable the development of high caliber leaders for our society.
4. Constantly introduce the latest technology and design innovations.
5. Promote active learning methodologies.

Objectives

1. Provide a rich and diverse curricula in all programs offered by the CSIS.
2. Provide the educational conditions that foster knowledge, problem solving and innovative thinking.
3. Encourage and support faculty research that act as proof of college innovation and discovery.
4. Educate students to become effective citizens armed with creative, engaged, critical and objective thinking.
5. Provide students with the necessary means to conduct research in their field of interest.
6. Instill students with the sense of professionalism, ethics and respect for both team and work environments.
7. Strengthen ties and maintain a deeper connection with our alumni for mutual benefit.

Academic Programs

The CSIS offers five undergraduate programs leading to the following degrees:

1. Bachelor of Science in Computer Science.
2. Bachelor of Science in Healthcare Information Systems.
3. Bachelor of Science in Graphic Design.
4. Bachelor of Fine Arts Interior Design
5. Bachelor of Science in Mathematics.

Program Codes

The following table lists the code used for each program. This code is used as the prefix of each course designation in the program.

Program Code	Program
COSC	Computer Science
HCIS	Healthcare Information Systems
GRDS	Graphic Design
INDS	Interior Design
MATH	Mathematics

Admission Requirements

Further to fulfilling the University admission requirements, students aspiring to study a major in the Computer and Information Systems Department are required to take a placement test. Students who fail to attain a passing score are required to take and pass a related remedial course to ensure their mastery of basic skills and improve their ability to handle the rigor of college-level subjects. Students aspiring to study a major in the Design Department are required to take an aptitude test to get accepted into the major. Students are strongly advised to carefully review the University Bulletin for admission and degree requirements as well as all related academic policies.

Graduation Requirements

Each CSIS program grants students an undergraduate degree. The BS program encompasses 94 credits for Computer Science degree, 99 credits for Healthcare Information Systems, 111 credits for Graphic Design, 111 credits for Interior Design and 91 credits for mathematics. Required credits are distributed among three categories: University requirements (UR), College requirements (CR) and program requirements (PR). The University and College requirements are common to all departments in the College of Science and Information Systems. Each department has its own required and elective courses. The credit hour allocations for each program are shown in the following table:

BS in Computer Science (94 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	6	–	9	15	30	32
College Requirement	-	–	–	–	-	0
Program Requirement	33	15	16	–	64	68
Credits	39	15	25	15	94	100

BS in Healthcare Information Systems (99 Credits)						
Courses Category	Major		Non-Major		# Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	9	-	9	12	30	30
College Requirement	-	-	-	-	-	-
Program Requirement	41	12	16	-	69	70
Credits	50	12	25	12	99	100

BS in Graphic Design (111 Credits)						
Courses Category	Major		Non-Major		Credits	Percent

	Mandatory	Electives	Mandatory	Electives		
University Requirement	12	-	6	12	30	27
College Requirement	-	-	-	-	-	-
Program Requirement	51	6	21	3	81	73
Credits	63	6	27	15	111	100

BS in Interior Design (111 Credits)

Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	9	-	6	15	30	27
College Requirement	-	-	-	-	-	0
Program Requirement	51	6	21	3	81	73
Credits	60	6	27	18	111	100

BS in Mathematics (91 Credits)

Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	3	-	12	15	30	33
College Requirement	-	-	-	-	-	0
Program Requirement	52	3	3	3	61	67
Credits	55	3	15	18	91	100

A student in any of the CSIS programs is eligible for graduation if he/she has:

- 1) Completed all the requirements of the degree
- 2) Attained a cumulative GPA of 70 or higher
- 3) Attained a major GPA of 70 or higher
- 4) Attained at least a 70 grade on the summative learning project
- 5) Successfully completed the mandatory Co-op training program.

I. University Requirements

Every student is required to take 30 credit hours of general education courses distributed over seven domains. 15 mandatory credits are selected from domains 1, 4, 6 and 7 and 15 elective credit hours selected from domains 2, 3 and 5.

Domain	Credits	Courses
1 Communication Competency	6	ENGL 210: English Composition and Rhetoric ENGL 217: Professional English Writing
2 Humanities/Fine Arts	6	Selected from a an approved list
3 Social Sciences/Culture	6	Selected from a an approved list

4	ICT Competency	3	<ul style="list-style-type: none"> • COSC: COSC 214 - Introduction to Programming • HCIS: COSC 214 - Introduction to Programming • GRDS: GRDS 220 - Computer I • INDS: INDS 220 - Computer Design I • MATH: COSC 214 - Introduction to Programming
5	Sciences/Technology	3	<p>Selected from an approved list</p> <ul style="list-style-type: none"> • GRDS: GRDS 355 - Production • HCIS: BIOL 210 - Human Anatomy and Physiology • MATH: PHYS 211-Physics: Electricity and Magnetism
6	Quantitative Reasoning	3	<ul style="list-style-type: none"> • COSC: MATH 351 - Probability and Statistics • HCIS: MATH 351 - Probability and Statistics • GRDS: GRDS 360 - Visual Perception & Infographics • INDS: INDS 325 - Lighting & Mechanics • MATH: MATH 351 - Probability and Statistics
7	Community Forethought	3	<ul style="list-style-type: none"> • GRDS: GRDS 440 - Design and Social Impact • INDS: INDS 335 - Design Issues & Sustainability • COSC: GRDS 440 - Design and Social Impact • HCIS: HCIS 201 - Environmental Health • MATH: MATH205-Mathematics for the environment

Description of the specific courses in this group are given below.

BIOL 210	Human Anatomy and Physiology	3(3, 0)
<p>Basic biological concepts approach that deals with cells structure function and physiology, followed by basic anatomy and physiology of the body system including central nervous, respiratory, urinary, digestive and reproductive systems. Prerequisite: None.</p>		

BIOL 222	Introduction to Food Safety	3(2,2)
<p>This course aims to provide instruction in the general principles of food microbiology and food safety. The course covers the biology and epidemiology of foodborne microorganisms of public health significance, including bacteria, fungi, protozoa and viruses, and food spoilage microorganisms; chemical pollution of food stuffs; safety and preservation of food commodities; Principal methods for examination of foods; food quality control and implementation of Hazard Analysis Critical Control Point (HACCP) scheme. Prerequisite: None.</p>		

COSC 214	Introduction to Programming	3(2, 2)
<p>This course presents the fundamentals of structured programming concepts. It covers primitive data types, expressions, control statements, functions, arrays, basic searching, and sorting algorithms. Prerequisite: None. Equivalent to CCEE 214.</p>		

ENVS 201	Introduction to Environmental Science	3(3,0)
<p>The main goal of the Introduction to Environmental Science (ENVS201) course is to provide students (except engineering) with the scientific principles and concepts required to understand the interrelationships of the natural world; to identify and analyze environmental problems both natural and Man-made; to evaluate the relative risks associated with these problems; and to examine alternative solutions for resolving and/or preventing environmental problems. Prerequisite: None.</p>		

ENGL 210	English Composition and Rhetoric	3(3,0)
<p>This course reinforces effective critical reading and writing skills with emphasis on writing documented essays for academic purposes in a varying range of rhetorical modes. More specifically, the student will apply the fundamental principles of English spelling, word usage, grammar, punctuation and style necessary for written communication; write academic essays; proofread and edit a variety of texts; analyze general texts for coherence, style and accuracy in writing; read critically from a variety of discourse modes; summarize, paraphrase and quote sources properly; and cite sources according to APA form.</p>		

ENGL 217	Professional English Writing	3(3,0)
<p>This course is designed to enhance students' professional writing skills. It is tailored to students pursuing careers in the professions and includes advanced business writing and editing, correspondence, critical review, writing professional reports and proposals, and making oral presentations. Prerequisite: ENGL 210.</p>		

GRDS 220	Computer I	3(3,0)
<p>In this course, students will develop a solid foundation of Adobe Illustrator and Adobe Photoshop tools and techniques. Students will learn the difference between vector based and pixel based programs and how to integrate both work fields to produce creative graphics. Moreover, students will receive a brief introduction about Adobe InDesign: work space, function and tools.</p>		

GRDS 335	Production	3(3,0)
<p>In this course, students will develop an understanding of the "process flow" in contemporary methods of print production. The course covers the entire timeline of production: Prepress-Press-Post Press. In addition to printing technologies, students will learn about various types of ink and paper, binding, varnishes, finishing techniques and the effect of the printing process on the end product. Students will also learn how to handle projects and deal with clients as freelance designers or as designers working for companies. Prerequisite: GRDS 222.</p>		

GRDS 360	Visual Perception & Infographics	3(3,0)
<p>Visual perception is the ability to interpret information from our surroundings through visible</p>		

light that reaches the eye. This course will explore the various theories of visual perception with an emphasis on Gestalt theory and its relation to Graphic Design. It will create an understanding of our human visual perception and its limitations. Students will also be given projects in which they will apply Gestalt principles and the learned theories. In addition to visual perception theories, students will learn 2 key disciplines in design: Infographics and Wayfinding. **Prerequisite:** GRDS 311.

GRDS 440	Design and Social Impact	3(3,0)
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This course prepares students to become leading agents of social change through community engagement. It aims at promoting collaborative work between computer science and graphic design students to design effective solutions to existent community issues. The course is structured on a balance between classroom theory learning, extensive field research and implementation of a real-world solution using both expertise. **Senior Standing.**

HCIS 201	Environmental Health	3(3, 0)
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This course is designed to provide students with an introduction to the key areas of environmental health. Using the perspectives of the population and community, the course will cover factors associated with the development of environmental health problems. **Prerequisite:** None.

INDS 220	Computer Design I	3(3,0)
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This course is an introduction to the principles and uses of computer-aided drafting and design using the most recent version of the AutoCAD software. Students will acquire the technical skills needed to draft 2D architectural plans, sections, elevations, and details. In addition, students will learn computer-rendering techniques using Adobe Photoshop.

INDS 325	Lighting & Mechanics	3(3,0)
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This course is a comprehensive study of the principles and theories of both lighting systems and mechanics. Students will learn about the applications of lighting design, lighting specifications, in-depth lighting mathematical calculations, available equipment and fixtures and aesthetic considerations needed to complete installation. Additionally, students will become familiar with different types of heating, ventilation, Ac systems, their installation, design considerations and needs, in addition to plumbing and sanitary systems. **Prerequisite:** INDS 315.

INDS 335	Design Issues and Sustainability	3(3,0)
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This course investigates theoretical and philosophical constructs and design issues related to the study of interior architecture and design. It focuses on the examination of the philosophical and practical principles of sustainable design through exploration of environmental issues, sustainable materials and methods, and professional practice. Students will develop awareness

of the implications of design decisions upon the environment and will gain a foundation for evaluation of materials, processes and practices according to the principles of sustainable and environmentally responsible design.

MATH 205	Mathematics for the Environment	3(3,0)
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A truly interdisciplinary, concrete study of mathematics, this classroom-tested text discusses the importance of certain mathematical principles and concepts, such as fuzzy logic, feedback, deductive systems, fractions, and logarithms, in various areas other than pure mathematics. It teaches students how to make informed choices using fundamental mathematical tools, encouraging them to find solutions to critical real-world problems.

MATH 351	Probability and Statistics	3(3,0)
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Probability and conditional probability, random variable and distribution, continuous and marginal distributions, expectation, variance- moments-mean-median-covariance and correlation, conditional expectation, the sample mean, special distribution, Bernoulli and binomial distributions, Poisson and Gamma distribution. **Prerequisite:** MATH 211. Annually.

PHYS 211	Physics: Electricity and Magnetism	3(2,2)
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This course covers fundamental topics in Electricity and Magnetism: Electric forces and Electric Fields for discrete and continuous charge distribution, Gauss's Law, Electric Potential, Capacitance and Dielectrics, Kirchoff's rules, Magnetic Fields and Forces, Biot-Savart Law, Ampere's Law, Magnetic Flux, Gauss's Law in Magnetism, Faraday's and Lenz's Laws. Prerequisite: None. Annually.

II. College Requirements

Remedial Courses

Proficiency in the English Language is a requirement for admission to any program in the College of Sciences and Information Systems. In addition, incoming students must pass the placement exam in mathematics. Those who fail the mathematics placement exam and obtain a low score are required to take one or two remedial Mathematics course(s) prior to taking program level calculus courses. The possible remedial courses are:

- MATH 190 - Calculus I
- MATH 191 – Calculus II

These remedial courses do not count toward fulfilling the degree requirements. Description of the remedial courses follows.

MATH 190	Calculus I	3(3,0)
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Functions and their graphs, limits and continuity, differentiation, applications of derivatives,

Extreme values and mean value theorem, definite and indefinite integrals, the substitution method.

MATH 191	Calculus II	3(3,0)
Inverse trigonometric functions, integration techniques, parameterizations and parametric curves, vectors and dot and cross products, Lines and planes in space, curves in space, curvature and normal vectors of a curve. Prerequisite: Math 190.		

III. Program Requirements

Requirements for the Bachelor's degree are program-specific. They encompass two categories: Major and non-major. Each category consists of a set of mandatory courses and a set of elective courses. The program requirements for the Bachelor's degree in the different CSIS majors are given hereafter. Details and titles of relevant courses are included in the Student's Study Plan (SSP) that every CSIS student will have.

Course Coding

Each course offered by the College of Science and Information Systems is designated by a four-letter code representing the college and program followed by a three-digit number denoting the course number, "**abcd xyz**".

The four-letter code "**abcd**" refers to the program as follows:

- COSC Computer Science
- GRDS Graphic Design
- HCIS Healthcare Information Systems
- INDS Interior Design
- MATH Mathematics

The three digits number "**xyz**" between **200** and **599** denote the course is a number. The first digit refers to the level of the course and it could be **1** for freshman, **2** for sophomore, **3** for junior, **4** for senior and **5** for graduate.

The following example demonstrates the coding system: COSC 360 is a junior level Computer Science course.

The designation used to represent credit hours breakdown **c(t, p)** of a course is as follows: "**c**" the total credit hours, "**t**" stands for theoretical component of the course; "**p**" practical or laboratory component. For example 3(3, 0) represent a 3 credit hour course with three contact lecture hours and zero laboratory hours.

Learning Support Center

The learning Support Center (SLC) at the College of Science and Information Systems is another manifestation of RHU's resolute commitment to students' academic success. The LSC offers the students a peer-to-peer learning opportunity that complements classroom learning. The Center aims to support students in advancing their knowledge and skills, reinforcing what they learn in the classrooms or overcoming learning and performance difficulties. In addition to being a focal-point for enquiry and two-way "asker-replier" learning, the LSC offers the space for academic interactions that can trigger enhanced learning.

The Center is located in room H201 and is open to all students throughout the week. The LSC is staffed by Teaching Assistants of graduate students and upper level undergraduate students who are always available and ready to assist their fellow students in overcoming their academic challenges. Additionally, an "on-call" faculty member is assigned to ensure that the LSC is performing to the best interest of the students.

The center's resources portfolio includes books, study guides, course materials, boards, computers, videos, DVD's, documentaries, a large screen LCD panels and internet connected PCs.

COMPUTER AND INFORMATION SYSTEMS (CIS) DEPARTMENT

Faculty Members

Chairperson:	Mohamad El-Abed
Professors:	Mohammad Al Ladan; Mahmoud Halablab; Ziad Zahreddine
Associate Professors:	Mohammad Zahran
Assistant Professors:	Housam Salami
Instructors:	Nour Al-Fatairi
Adjunct Faculty:	Hussein Wehbe; Marios Azzam

Programs Offered

The CIS Department offers two programs – Computer Science and Healthcare Information Systems. Each program grants a Bachelor of Science degree. The details of each program will follow.

Vision

The vision of the Computer and Information Systems (CIS) Department is to achieve academic excellence beyond accreditation standards in computing technologies and Information Systems.

COMPUTER SCIENCE PROGRAM

Mission

The mission of the CS program is to:

- Provide students with state of the art curricula.
- Establish and maintain persistent relationships with industry in order to cultivate opportunities for students and faculty.
- Provide the environment and educational experiences that will enable our students to be innovative generations for the society.

Objectives

In pursuit of its mission, the strategic objectives of the CS program are to:

- Graduate competent professionals that meet the expectations of the workplace.
- Continuous review and development of the program to keep up with the current technological advances.
- Recruit, mentor and retain dedicated faculty members who are committed to achieving the college mission.
- Establish a research environment that recognizes, enhances, and enables scholarly and innovative research work.
- Build and maintain strong relationships with other universities and industries locally and internationally.

Program Outcomes

Upon successful completion of the BS program in Computer Science, an RHU graduate in Computer Science should demonstrate the following ABET criteria:

- a. An ability to apply knowledge of computing and mathematics appropriate to the discipline.
- b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
- c. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
- d. An ability to function effectively on teams to accomplish a common goal.
- e. An understanding of professional, ethical, legal, security and social issues and responsibilities.
- f. An ability to communicate effectively with a range of audiences.

- g. An ability to analyze the local and global impact of computing on individuals, organizations, and society.
- h. Recognition of the need for and an ability to engage in continuing professional development.
- i. An ability to use current techniques, skills, and tools necessary for computing practice.
- j. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
- k. An ability to apply design and development principles in the construction of software systems of varying complexity.

Career Opportunities

Computer Science major opens up various opportunities and prepare students for careers in a variety of sectors in industries, governmental and academic units, TV stations, banking sector, and far more. You will find our graduates in jobs like games developer, system analyst, software engineer, web designer, database analyst/developer/administrator, network engineer/administrator, and IT consultant. It is a challenging work, but it is very rewarding. Rewarding intellectually, because you get to work on interesting problems, and rewarding financially as well.

Program Overview

The Computer Science Program at Rafik Hariri University develops students' computational and critical thinking skills and shows them how to create, not simply use, new technologies. Students learn how to think and solve problems in a logical way by acquiring the fundamentals principles of sciences as well as advanced techniques that are currently used for practical systems development. They also learn oral communication and presentational proficiencies, as well as how to work on individual and team projects to develop new systems which enhance time management and team coordination skills. Graduates of RHU's Computer Science Department are lifetime learners; they are able to adapt quickly to this ever-changing challenging field.

To obtain a Bachelor of Science degree in CS, the student must complete a total of 93 credit hours. These hours span University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours is shown in the following table:

BS in Computer Science (94 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	6	–	9	15	30	32
College Requirement	0	–	–	–	-	0

Program Requirement	33	15	16	–	64	68
Credits	39	15	25	15	94	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Science and Information Systems section in this catalog.

II. College Requirements

The diversity of the programs precludes the identification of College requirements that are common to all programs offered by the CSIS.

III. Program Requirements

A. Mandatory Requirements

Mathematics requirements

The mathematics requirement courses are listed in the table below.

Course #	Title	Credits	Prerequisites
MATH 210	Discrete Mathematics	3	
MATH 211	Calculus III	4	
MATH 311	Linear Algebra	3	MATH 211

Business requirements

The business requirement courses are listed in the table below.

Course #	Title	Credits	Prerequisites
BMKT 200	Introduction to Marketing	3	
BMGT 300	Project Management	3	Senior Standing

Major requirements

The CS mandatory core courses are listed in the table below.

Course #	Title	Credits	Prerequisites
CCEE 426	Design of Embedded Systems	3	COSC 351
CCEE 426 L	Design of Embedded Systems Lab	1	Co-req: CCEE 426
COSC 215	Advanced Programming and Data Structures	3	COSC 214
COSC 231	Database Management Systems	3	COSC 214

COSC 316	Design and Analysis of Algorithms	3	COSC 215
COSC 333	Web Programming	3	COSC 231
COSC 341	Software Engineering	3	COSC 214
COSC 351	Logic Design	3	
COSC 351 L	Logic Design Lab	1	Co-req: COSC 351
COSC 360	Networking	3	COSC 214
COSC 399	Co-op Training Experience	1	ENGL 217; Senior Standing
COSC 451	Operating Systems	3	COSC 214
COSC 490	Summative Learning Experience	3	ENGL 217

B. Technical Electives

As part of the program for the Bachelor of Science in Computer Science, the student is required to study 15 credit hours of technical elective courses. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. The student can also mix and match elective courses from the different areas to get a more general exposure to the different Computer Science disciplines. The student should select, in cooperation with the academic advisor, the list of electives that best meet his or her needs and aspirations. The listed technical elective courses and other courses from engineering programs, in addition to the required program courses, are designed to allow the student to develop in-depth knowledge and understanding in the following areas:

1. Software Engineering and Quality Assurance
2. Network Administration and Security
3. Computer Architecture

Course #	Title	Credits	Prerequisites
CCEE 430	Multimedia Systems	3	COSC 214
CCEE 323	Computer Architecture	3	COSC 353
COSC 353	Computer Organization	3	COSC 351
COSC 417	Java Programming	3	COSC 214
COSC 434	Advanced Web Programming	3	COSC 333
COSC 435	Mobile Application Development	3	COSC 214
COSC 436	Game Design and Development	3	COSC 214
COSC 438	Introduction to Software Testing	3	COSC 341
COSC 461	Advanced Networking	3	COSC 360
COSC 480	Machine Learning and Data Mining	3	COSC 215 and MATH 351
COSC 498	Special Topics in Computer Science	3	Senior standing
MATH 314	Ordinary Differential Equations	3	MATH 211
MATH 421	Numerical Analysis	3	MATH 314

C. Summative Learning Project

Students must complete a 3- credit hours course in which they work preferably in groups on a problem of concern to industry or the community at large, or to innovate a promising idea. The SLP could be an extension of the projects students had worked on computing courses to bring it to a more useful outcome.

D. Co-op Training Experience

Each student must complete 8 weeks of practical training in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits and ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are required to submit a formal report, a poster and make a formal presentation about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Course Coding

The courses offered in the CS program are designated code numbers in the form of (COSC abc) where:

-
- a Designates year/level
 - b Designates area as follows:
 1. Software Engineering and Quality Assurance; 2. Network Administration and Security; 3. Computer Architecture
 - c Designates course sequence in an area
-

For example COSC 360 is the first course in the area of Network Administration and Security offered by the computer science program in the second year.

Study Plan

The Bachelor of Science in Computer Science encompasses 94 credit hours that are spread over 6 semesters and two summer sessions. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Semester 1 (15 Credits)			
COSC 214	Introduction to Programming	3	
ENGL 210	English Composition and Rhetoric	3	

MATH 210	Discrete Mathematics	3	
BMKT 200	Introduction to Marketing	3	
	Sciences/Technology Elective	3	
Year 1, Semester 2 (16 Credits)			
COSC 215	Advanced Programming and Data Structures	3	COSC 214
COSC 231	Database Management Systems	3	COSC 214
MATH 211	Calculus III	4	
ENGL 217	Professional English Writing	3	ENGL 210
	Humanities/Fine Arts Elective I	3	
Summer Session (3 Credits)			
	Humanities/Fine Arts Elective II	3	
Year 2, Semester 1 (15 Credits)			
COSC 316	Design and Analysis of Algorithms	3	COSC 215
MATH 351	Probability and Statistics	3	
COSC 351	Logic Design	3	
COSC 360	Networking	3	COSC 214
	Social Science/Culture Elective I	3	
Year 2, Semester 2 (16 Credits)			
COSC 333	Web Programming	3	COSC 231
MATH 311	Linear Algebra	3	MATH 211
COSC 341	Software Engineering	3	COSC 214
COSC 351 L	Logic Design Lab	1	COSC 351
	CS Major Elective I	3	
	CS Major Elective II	3	
Summer Session (1 Credit)			
COSC 399	Co-op Training Experience	1	ENGL 217; Senior Standing
Year 3, Semester 1 (16 Credits)			
COSC 451	Operating Systems	3	COSC 214
CCEE 426	Design of Embedded Systems	3	COSC 351
CCEE 426 L	Design of Embedded Systems Lab	1	Co-req: CCEE 426
BMGT 300	Project Management	3	Senior Standing
GRDS 440	Design and Social Impact	3	Senior Standing
	CS Major Elective III	3	
Year 3, Semester 2 (12 Credits)			
COSC 490	Summative Learning Experience	3	ENGL 217
	CS Major Elective IV	3	
	CS Major Elective V	3	

	Social Sciences/Culture Elective II	3	
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Course Description

Mandatory Courses

Descriptions of the major mandatory courses are given below.

CCEE 426	Design of Embedded Systems	3(3,0)
This course addresses the design of embedded real-time systems, models of computation, validation techniques, and automatic synthesis. Finite state machines, synchronous languages, data flow networks, petri nets, software optimization and performance estimation, operating systems and scheduling, system-level simulation, and interface-based design. Prerequisite: CCEE 221.		

CCEE 426L	Design of Embedded Systems Lab	1(0,2)
This lab complements topics covered in the CCEE 426 course. It involves design of embedded real-time systems, models of computation, validation techniques, and automatic synthesis. Experiments include: Design using finite state machines, synchronous languages, data flow networks, petri nets, software optimization and performance estimation, scheduling, system-level simulation, and interface-based design. Co-requisite: CCEE 426.		

COSC 214	Introduction to Programming	3(2,2)
This course presents the fundamentals of structured programming concepts. It covers primitive data types, expressions, control statements, functions, arrays and basic searching, and sorting algorithms. Prerequisite: None. Equivalent to CCEE 214.		

COSC 215	Advanced Programming and Data Structures	3(2,2)
A continuation of COSC 214, this course fully covers the basics of Object Oriented Programming (OOP) languages and data structures. It covers pointers, classes, constructors/destructors, object instantiation, inheritance, polymorphism, and templates. The course also covers fundamental data structures and applications such as stacks, queues, and lists. Prerequisite: COSC 214. Equivalent to CCEE 316.		

COSC 231	Database Management Systems	3(3,0)
This course exposes students to the fundamental concepts necessary for designing, using and implementing database systems. It covers database concepts, data modeling, relations, normalizations, and data manipulation languages. Prerequisite: COSC 214. Equivalent to CCEE 315.		

COSC 316	Design and Analysis of Algorithms	3(3,0)
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This course consolidates algorithm design and programming techniques. It provides a detailed study of data structures and data abstraction, an introduction to complexity considerations, and software design pattern. It covers managing complexity, abstraction, vectors, lists, queues, stacks, trees, and graphs. **Prerequisite:** COSC 215.

COSC 333	Web Programming	3(3,0)
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This course teaches students how to develop and implement web based programs with emphasis on interface programming. It introduces students to web development and to different client side languages and styles needed to develop adequate and responsive websites. The course covers HTML5, CSS3, JavaScript/jQuery and responsive design. **Prerequisite:** COSC 231. Equivalent to CCEE 411.

COSC 341	Software Engineering	3(3,0)
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This course provides a deep and comprehensive understanding of the fundamentals of software engineering. The course initiates students to the different software process models, project management, software requirements, and engineering process. The course covers SDLC stages, UML diagrams, PERT/CPM Charts, Human-Computer Interaction, introduction to software testing, and the use of CASE tools. **Prerequisite:** COSC 214. Equivalent to CCEE 417.

COSC 351	Logic Design	3(3,0)
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This course addresses Boolean algebra and logic simplification techniques, data representation, and the design of combinational logic networks for decoders, encoders, multiplexers, and demultiplexers. Design of sequential logic devices including flip-flops, registers, and counters, as well as analysis of devices used to build logic networks, including programmable logic devices. **Prerequisite:** None. Equivalent to CCEE 221.

COSC 351L	Logic Design Lab	1(0,2)
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This Lab covers design techniques and implementation of combinational and sequential logic circuits. Experiments include: logic gates, design and implementation of logic circuits, combinational logic circuits (decoders, encoders, multiplexers, demultiplexers and adders), and design of sequential logic devices using flip-flops, registers, and counters. **Prerequisite:** COSC 351. Equivalent to CCEE 221 L.

COSC 360	Networking	3(3,0)
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This course enables students to gain fundamental knowledge of computer networks, appreciate various tradeoffs and choices in networking, learn to design and analyze protocols, build client/server networking applications using sockets, and get ready for studying advanced topics in the field of networks. **Prerequisite:** COSC 214. Equivalent to CCEE 454.

COSC 399	Co-op Training Experience	1(1,0)
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Each student must complete 8 weeks of practical training in an area related to his/her field of interest. This Co-op work experience is usually fulfilled during the summer term of the third year into the program. Students are required to submit a formal report, and/or poster, and make a formal presentation about their Co-op experience. **Prerequisite:** ENGL 217 and Senior Standing.

COSC 451	Operating Systems	3(3,0)
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Students learn the concepts of operating systems theory and their implementations. The course covers computer and operating system structures, process and thread management, process management and synchronization, deadlocks, security and protection, inter-process communication, memory management, and I/O control system. A case study of a UNIX operating system will accompany the course. **Prerequisite:** COSC 214. Equivalent to CCEE 412.

COSC 490	Summative Learning Experience	3(3,0)
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This is a whole year graduation project directed on individual problems and research. Each student will have to complete it in her/his emphasis area. **Prerequisite:** ENGL 217.

Business Required Courses

The COSC program requires two business course, BMKT 200 and BMGT 300 described below.

BMGT 300	Project Management	3(3,0)
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This course provides the students the necessary skills to manage their business projects using effective techniques in leading, organizing, scheduling, and controlling the tasks contributing to the project goals. Topics include selection and statement of work of projects; skills of project managers, and task break down structure, PERT/CPM scheduling and budgeting. **Prerequisite:** Junior Standing.

BMKT 200	Introduction to Marketing	3(3,0)
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This course introduces the basic principles, theories, and practices of marketing in our modern ever-changing business environment. It discusses the marketing mix and how to create, communicate, and deliver customer value. The course also covers the full spectrum of Lebanese and international marketing of consumer products and services including market segmentation, targeting, and positioning, along with the study of consumer behavior.

Elective Courses

Descriptions of the major elective courses are given below.

COSC 353	Computer Organization	3(3,0)
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This course exposes students to computer system organization and design, implementation of CPU data path and control, instruction set design, memory hierarchy (caches, main memory,

virtual memory) organization and management, input/output subsystems (bus structures, interrupts, DMA), performance evaluation, and pipelined processors. **Prerequisite:** COSC 351. Equivalent to CCEE 222.

COSC 417	Java Programming	3(2,2)
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This course is designed for students who want to learn how to use Java to write object-oriented programs, how to use Java polymorphism with inheritance and interfaces, and how to program with exceptions, stream input/output and graphical AWT and Swing components. The course also covers Java threads, sockets and database manipulation. **Prerequisite:** COSC 214.

COSC 434	Advanced Web Programming	3(3,0)
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This course focuses on the server side programming. It allows students to get to know how to connect their website or web application to a database, and how to save and retrieve data from that database. The course exposes students to web controls, validation controls, data source controls, data bind controls, state management, as well as working with a third party medium like XML and web services. **Prerequisite:** COSC 333. Equivalent to CCEE 514.

COSC 435	Mobile Application Development	3(2,2)
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This course examines the principles of mobile application design, development and testing. It covers memory management, user interface design, input methods, data handling, and network techniques. Students are expected to work on a project that produces a professional-quality mobile application. Projects will be deployed in real-world applications. **Prerequisites:** COSC 214, Senior standing. Equivalent to CCEE 510.

COSC 436	Game Design and Development	3(2,2)
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This course presents an overview of the software technologies related to game development. It provides the students with a conceptual understanding of the field of game design along with practical exposure to the process of creating a game. **Prerequisite:** COSC 214; Senior standing.

COSC 438	Introduction to Software Testing	3(3,0)
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This course will introduce the students into the field of software testing; its importance, goals, approaches, and major player's roles (developers, testers, and users). Students will learn about software testing life cycle, standards, types of testing (manual vs automated testing), testing methods (black box vs white box), testing levels (functional, unit testing...), and documentation. A hands-on experience on automated testing tools will be also covered in this course. **Prerequisite:** COSC 341

COSC 461	Advanced Networking	3(3,0)
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This course prepares students to act as a System and Network Administrator by implementing Active Directory Directory Service ADDS in distributed environments that can include complex network services and domain controllers. The covered materials assist students to efficiently automate the administration of users, groups, and computers. **Prerequisite:** COSC 360.

COSC 480	Machine Learning and Data Mining	3(3,0)
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This course introduces students to the basic knowledge representation and learning techniques. The emphasis consists of understanding the data mining process, as well as being able to practically apply the corresponding approaches in solving practical problems and developing intelligent software applications. The course covers several topics that lie within classification, prediction and clustering. **Prerequisites:** COSC 215 and MATH 351. Equivalent to CCEE 564.

COSC 498	Special Topics in Computer Science	1-3 cr.
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A special topic course to be defined based on current trends and departmental special interests. It may incorporate technical seminars, advanced readings and special projects as required/approved by the department. **Prerequisite:** Senior standing.

COMPUTER SCIENCE MINOR

Rationale

The CSIS department offers a minor in Computer Science for RHU students. It is designed for students who want to include basic proficiency in computer science to enhance or supplement their major program.

Program Objectives

The aims of a minor in Computer Science are:

- Provide RHU graduates with a basic proficiency in computer science
- Support RHU graduates with essential computing skills desired/demanded by the market

Learning Outcomes

At the end of this minor, the student is expected to demonstrate:

- An ability to analyze a problem, identify and define the computing requirements appropriate to its solution
- An ability to use current techniques, skills, and tools necessary for computing practices
- An ability to develop programming skills using modern programming languages

Entrance Requirements

This minor is offered to all RHU students except CCE and Business Information Technology Management students.

Early in their major, interested RHU students need to fill the appropriate form declaring that they will be minoring in Computer Science while completing their regular major.

Computer Science Minor Policies

- A minimum CGPA of 70 % is required for the six courses to fulfill the minor requirements
- Overlapped courses between student major requirements and CS minor requirements are counted to fulfill the CS minor requirements

Career Options

This minor allows its holders to seek careers in a variety of sectors no matter what a student's major is. Graduates from this minor can seek jobs related to software engineering, web and

mobile development, database/system administration, network engineering/administration, and IT consultancy.

Curriculum and Program

The Computer Science minor consists of six courses (18 credits) in which two are mandatory and four are elective, selected to satisfy the requirements of the proposed program objectives and learning outcomes.

Mandatory Courses

The two mandatory courses (6 credits) are:

COSC 214	Introduction to Programming	3(2,2)
COSC 215	Advanced Programming and Data Structures	3(2,2)

Elective Courses

The elective courses will be chosen with the Computer Science minor advisor based on students' needs and background. Students may choose four elective courses (12 credits) from the following list.

COSC 231	Database Management Systems	3(3,0)
COSC 316	Design and Analysis of Algorithms	3(3,0)
COSC 333	Web Programming	3(3,0)
COSC 341	Software Engineering	3(3,0)
COSC 360	Networking	3(3,0)
COSC 434	Advanced Web Programming	3(3,0)
COSC 435	Mobile Application Development	3(2,2)
COSC 436	Game Design and Development	3(3,0)
COSC 438	Introduction to Software Testing	3(3,0)
COSC 451	Operating Systems	3(3,0)
COSC 461	Advanced Networking	3(3,0)
Any other approved CS elective course		

HEALTHCARE INFORMATION SYSTEMS PROGRAM

Mission

The HCIS program mission is to provide students with state of the art curricula, establish and maintain persistent relationships with industry in order to cultivate opportunities for students and faculty, and provide the environment and educational experiences that will enable our students to be innovative generations for the society.

Objectives

In pursuit of its mission, the HCIS objectives are to:

- Graduate competent professionals that meet the expectations of the workplace.
- Continuous review and development of the program to keep up with the current technological advances.
- Recruit, mentor and retain dedicated faculty members who are committed to achieving the college mission.
- Establish a research environment that recognizes, enhances, and enables scholarly and innovative research work.
- Build and maintain strong relationships with other universities and industries locally and internationally.

Program Outcomes

Upon successful completion of the BS degree in Healthcare Information Systems, graduates should demonstrate:

- a. An ability to apply knowledge of health information systems and use current technologies, techniques, skills, and tools necessary for effective delivery of healthcare services appropriate to healthcare organizations;
- b. An ability to apply health analytic methods to influence the planning, organizing, administering and policy creation of healthcare organizations;
- c. An ability to design, implement, and evaluate a healthcare systems, processes, and procedures to meet desired needs;
- d. An ability to evaluate healthcare processes, practices, management of data, technologies, and conditions to ensure compliance with established quality and professional standards;
- e. An ability to function effectively on teams to accomplish a common goal;
- f. An understanding of professional, ethical, legal, security and social issues and responsibilities;
- g. An ability to communicate effectively with a range of audiences.

- h. A Recognition of the need for and an ability to engage in continuing professional development.

Career Opportunities

With a Healthcare Information Systems degree at Rafik Hariri University, students will gain the foundational knowledge for the development and application of information technologies and systems in meeting the growing needs of healthcare organizations. Given the importance of information accuracy, privacy and security, HCIS graduates will be prepared for involvement in regulatory compliance and quality assessment activities designed to ensure that health information systems support patient care and safety. HCIS graduates can work with nurses, physicians, other healthcare providers, managers and technical specialists in a variety of settings such as hospitals, long-term-care facilities, insurance and managed care organizations, government agencies and vendor firms.

Program Overview

RHU's Healthcare Information Systems (HCIS) program combines concepts of healthcare, information technology, and leadership practice to prepare graduates with the required knowledge and skills to be valuable designers and developers of health information systems. HCIS program at RHU develops students' computational and critical thinking skills to create, not simply use, new healthcare technologies and systems. Students learn how to think and solve problems in a logical way by acquiring the fundamentals principles of sciences as well as advanced techniques that are currently used for practical systems development. They also learn oral communication and presentational proficiencies, as well as how to work on individual and team projects to develop new systems which enhance time management and team coordination skills. Graduates of RHU's HCIS program are lifetime learners; they are able to adapt quickly to this ever-changing challenging field.

To obtain a Bachelor of Science degree in HCIS, the student must complete a total of 99 credit hours. These hours span University requirements (UR), College requirements (CR) and Program requirements (PR). The allocation of the credit hours is shown in the following table:

BS in Healthcare Information Systems (99 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	9	–	9	12	30	30
College Requirement	–	–	–	–	–	–
Program Requirement	41	12	16	–	69	70
Credits	50	12	25	12	99	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Science and Information Systems section in this catalog.

II. College Requirements

The diversity of the programs precludes the identification of College requirements that are common to all programs offered by the CSIS.

III. Program Requirements

A. Mandatory Requirements

Mathematics

The mathematics requirement courses are listed in the table below.

Course #	Title	Credits	Prerequisites
MATH 210	Discrete Mathematics	3	
MATH 211	Calculus III	4	
MATH 311	Linear Algebra	3	MATH 211

Business Requirements

The business requirement courses are listed in the table below.

Course #	Title	Credits	Prerequisites
BMGT 300	Project Management	3	Senior Standing
BMKT 200	Introduction to Marketing	3	

Major Requirements

The HCIS mandatory core courses are listed in the table below.

Course #	Title	Credits	Prerequisites
COSC 215	Advanced Programming and Data Structures	3	COSC 214
COSC 231	Database Management Systems	3	COSC 214
COSC 316	Design and Analysis of Algorithms	3	COSC 215
COSC 333	Web Programming	3	COSC 231
COSC 341	Software Engineering	3	COSC 214
COSC 360	Networking	3	COSC 214
COSC 480	Machine Learning and Data Mining	3	COSC 215, MATH 351
HCIS 240	Medical Terminology	3	
HCIS 341	Health Information Systems I	3	BIOL 210
HCIS 342	Health Information Systems II	3	HCIS 341

HCIS 343	Information Security and Privacy in Healthcare	3	HCIS 341
HCIS 399	Co-op Training Experience	1	ENGL 217; Senior Standing.
HCIS 444	Healthcare Business Intelligence & Data Analysis	3	HCIS 341
HCIS 445	Research in Healthcare Information Systems	1	Senior Standing
HCIS 490	Summative Learning Experience	3	ENGL 217

B. Technical Electives

As part of the program for the Bachelor of Science in Healthcare Information Systems (HCIS), the student is required to study 12 credit hours of technical elective courses. These courses allow the student to focus on a specific area for in-depth knowledge and understanding. The student can also mix and match elective courses from the different areas to get a more general exposure to the different HCIS disciplines. The student should select, in cooperation with the academic advisor, the list of electives that best meet his or her needs and aspirations. The listed technical elective courses and other courses from engineering programs, in addition to the required program courses, are designed to allow the student to develop in-depth knowledge and understanding in areas of interest.

Course #	Title	Credits	Prerequisites
BIOM 520	Health-care Facility Management	3	HCIS 341
BIOM 565	Introduction to E-Healthcare	3	HCIS 341
CCEE 430	Multimedia Systems	3	COSC 214
CCEE 426	Design of Embedded Systems	3	COSC 351
COSC 417	Java Programming	3	COSC 214
COSC 434	Advanced Web Programming	3	COSC 333
COSC 461	Advanced Networking	3	COSC 360
COSC 435	Mobile Application Development	3	COSC 214; Senior Standing
COSC 436	Game Design and Development	3	COSC 214
COSC 438	Introduction to Software Testing	3	COSC 341
COSC 451	Operating Systems	3	COSC 214
HCIS 498	Special Topics	3	Senior Standing
MATH 314	Ordinary Differential Equations	3	MATH 211
MATH 421	Numerical Analysis	3	MATH 314

* List of electives courses is subject to change.

C. Summative Learning Project

Students must complete a 3- credit hours course in which they work preferably in groups on a problem of concern to industry or the community at large, or to innovate a promising idea. The SLP could be an extension of the projects students had worked on in the Engineering for the community course to bring it to a more useful outcome.

D. Co-op Training Experience

Each student must complete 8 weeks of practical training in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member is assigned to mentor the student and follow up on his/her progress throughout the Co-op period by conducting field visits and ensure alignment of the student's performance with his/her aspirations and employer's needs. Students are required to submit a formal report, a poster and make a formal presentation about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Course Coding

The courses offered in the HCIS program are designated code numbers in the form of (HCIS abc) where:

-
- a Designate the year (level)
 - b Designate focus area as follows:
 1. Software Engineering and Quality Assurance;
 2. Network Administration and Security;
 3. Healthcare
 - c Course the course sequence in a focus area
-

For example COSC 360 is the first course in the area of Network Administration and Security offered by the HCIS program in the second year.

Study Plan

The Bachelor of Science in Healthcare Information Systems encompasses 99 credit hours that are spread over 6 semesters and two summer sessions. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (15 Credits)			
HCIS 201	Environmental Health	3	
BIOL 210	Human Anatomy and Physiology	3	
COSC 214	Introduction to Programming	3	
ENGL 210	English Composition and Rhetoric	3	
MATH 210	Discrete Mathematics	3	
Year 1, Spring Semester (16 Credits)			
HCIS 240	Medical Terminology	3	
COSC 231	Database Management Systems	3	COSC 214

COSC 215	Advanced Programming and Data Structures	3	COSC 214
MATH 211	Calculus III	4	
BMKT 200	Introduction to Marketing	3	
Year 1, Summer term (6 Credits)			
ENGL 217	Professional English Writing	3	ENGL 210
	Humanities/Fine Arts Elective I	3	
Year 2, Fall Semester (18 Credits)			
HCIS 341	Health Information Systems I	3	BIOL 210
COSC 316	Design and Analysis of Algorithms	3	COSC 215
COSC 360	Networking	3	COSC 214
COSC 333	Web Programming	3	COSC 231
COSC 341	Software Engineering	3	COSC 214
	Humanities/Fine Arts Elective II	3	
Year 2, Spring Semester (15 Credits)			
HCIS 342	Health Information Systems II	3	HCIS 341
HCIS 343	Information Security and Privacy in Healthcare	3	HCIS 341
MATH 351	Probability and Statistics	3	MATH 211
	HCIS Major Elective I	3	
	HCIS Major Elective II	3	
Year 2, Summer term (1 Credits)			
HCIS 399	Co-op Training Experience	1	ENGL 217; Senior Standing
Year 3, Fall Semester (16 Credits)			
HCIS 444	Healthcare Business Intelligence and Data Analysis	3	HCIS 341
COSC 480	Machine Learning and Data Mining	3	COSC 215; MATH 351
HCIS 445	Research in Healthcare Information Systems	1	Senior Standing
BMGT 300	Project Management	3	Senior Standing
	HCIS Major Elective III	3	
	Social Science/Culture Elective I	3	
Year 3, Spring Semester (12 Credits)			
MATH 311	Linear Algebra	3	MATH 211
HCIS 490	Summative Learning Experience	3	ENGL 217
	HCIS Major Elective IV	3	
	Social Sciences/Culture Elective II	3	

Course Description

Mandatory Courses

Descriptions of the major mandatory courses are given below.

COSC 214	Introduction to Programming	3(2,2)
This course presents the fundamentals of structured programming concepts. It covers primitive data types, expressions, control statements, functions, arrays, basic searching, and sorting algorithms. Prerequisite: None. Equivalent to CCEE 214.		

COSC 215	Advanced Programming and Data Structures	3(2,2)
A continuation of COSC 214, this course fully covers the basics of Object Oriented Programming (OOP) languages and data structures. It covers pointers, classes, constructors/destructors, object instantiation, inheritance, polymorphism, and templates. The course also covers fundamental data structures and applications such as stacks, queues, and lists. Prerequisite: COSC 214. Equivalent to CCEE 316.		

COSC 231	Database Management Systems	3(3,0)
This course exposes students to the fundamental concepts necessary for designing, using and implementing database systems. It covers database concepts, data modeling, relations, normalizations, and data manipulation languages. Prerequisite: COSC 214. Equivalent to CCEE 315.		

COSC 316	Design and Analysis of Algorithms	3(3,0)
This course consolidates algorithm design and programming techniques. It provides a detailed study of data structures and data abstraction, an introduction to complexity considerations, and software design pattern. It covers managing complexity, abstraction, vectors, lists, queues, stacks, trees, and graphs. Prerequisite: COSC 215.		

COSC 333	Web Programming	3(3,0)
This course teaches students how to develop and implement web based programs with emphasis on interface programming. It introduces students to web development and to different client side languages and styles needed to develop adequate and responsive websites. The course covers HTML5, CSS3, JavaScript/jQuery and responsive design. Prerequisite: COSC 231. Equivalent to CCEE 411.		

COSC 341	Software Engineering	3(3,0)
This course provides a deep and comprehensive understanding of the fundamentals of software engineering. The course initiates students to the different software process models, project management, software requirements, and engineering process. The course covers SDLC stages, UML diagrams, PERT/CPM Charts, Human-Computer Interaction, introduction to software testing, and the use of CASE tools. Prerequisite: COSC 214. Equivalent to CCEE 417.		

COSC 360	Networking	3(3,0)
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This course enables students to gain fundamental knowledge of computer networks, appreciate various tradeoffs and choices in networking, learn to design and analyze protocols, build client/server networking applications using sockets, and get ready for studying advanced topics in the field of networks. **Prerequisite:** COSC 214. Equivalent to CCEE 454.

COSC 480	Machine Learning and Data Mining	3(3,0)
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This course introduces students to the basic knowledge representation and learning techniques. The emphasis consists of understanding the data mining process, as well as being able to practically apply the corresponding approaches in solving practical problems and developing intelligent software applications. The course covers several topics that lie within classification, prediction and clustering. **Prerequisites:** COSC 215 and MATH 351. Equivalent to CCEE 564.

HCIS 240	Medical Terminology	3(3,0)
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This course introduces elements of medical terminology such as foundations of words used to describe the human body and its conditions, terminology for medical procedures, and names of commonly prescribed medications. Spelling, pronunciation and meanings of terms used in a professional healthcare system are covered in addition to the recognition of common abbreviations. **Prerequisite:** None.

HCIS 341	Health Information Systems I	3(3,0)
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This course introduces healthcare medical and business processes from a software design perspective. Topics include history of – and current topics related to – the healthcare delivery process; healthcare functions supported by hospital IT departments; and interaction between healthcare and business data domains and medical and allied health professionals. **Prerequisite:** BIOL 210.

HCIS 342	Health Information Systems II	3(3,0)
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In this course, students explore current technologies, regulations, and standards, including picture archiving and communication systems (PACS); the Health Insurance Portability and Accountability Act (HIPAA); 21CFR Part 11; FDA General Principles of Software Validation; and Health Level Seven (HL7), and examine their effects on software development. Other topics include information technologies used to store data, maintain data quality, ensure safety, and enforce security; and electronic health record systems. **Prerequisite:** HCIS 341.

HCIS 343	Information Security and Privacy in Healthcare	3(3,0)
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This course is designed to provide students with an introduction to current and emerging issues in healthcare information security, privacy and regulatory compliance. It also provides the students with a substantive overview and analysis of relevant information security subject matter that is having a direct and material impact on the healthcare system. **Prerequisite:** HCIS

341.

HCIS 399 | **Co-op Training Experience** | **1(1,0)**

Each student must complete 8 weeks of practical training in an area related to his/her field of interest. This Co-op work experience is usually fulfilled during the summer term of the third year into the program. Students are required to submit a formal report, and/or poster, and make a formal presentation about their Co-op experience. **Prerequisites:** ENGL 217 and Senior Standing.

HCIS 444 | **Healthcare Business Intelligence and Data Analysis** | **3(3,0)**

This course enables students to learn how Healthcare Analytics and Health Information Exchange (HIE) solutions can help uncover new opportunities for growth, as well as gain an advantage in the profitable healthcare technology market. Other areas covered include: how to provide quality patient care while complying with government regulations and controlling costs; and how to increase your organization's visibility in a crowded healthcare field. **Prerequisite:** HCIS 341.

HCIS 445 | **Research in Healthcare Information Systems** | **1(1,0)**

This course focuses on current research trends in the field of healthcare information systems. It may incorporate technical seminars, advanced readings and special projects as required/approved by the department. **Prerequisite:** Senior Standing.

HCIS 490 | **Summative Learning Experience** | **3(3,0)**

This is a graduation project directed on individual problems and research. Each student will have to complete it in her/his emphasis area. **Prerequisite:** ENGL 217.

Business Required Courses

The HCIS program requires two business course, BMKT 200 and BMGT 300 described below.

BMGT 300 | **Project Management** | **3(3,0)**

This course provides the students the necessary skills to manage their business projects using effective techniques in leading, organizing, scheduling, and controlling the tasks contributing to the project goals. Topics include selection and statement of work of projects; skills of project managers, and task break down structure, PERT/CPM scheduling and budgeting, resource analysis, project crashing, project monitoring, and project control. **Prerequisite:** Junior Standing.

BMKT 200 | **Introduction to Marketing** | **3(3,0)**

This course covers the full spectrum of Lebanese and international marketing of consumer products and services including market-segmentation, consumer behavior, products, and

packaging distribution and promotion. Students will analyze case problems and prepare a marketing plan about a “real-life” product or service. Videos, guest speakers, and class interaction on marketing topics will assist in the learning experience.

Elective Courses

Descriptions of the major elective courses are given below.

COSC 417	Java Programming	3(2,2)
This course is designed for students who want to learn how to use Java to write object-oriented programs, how to use Java polymorphism with inheritance and interfaces, and how to program with exceptions, stream input/output and graphical AWT and Swing components. The course covers also Java threads and sockets. Prerequisite: COSC 214.		

COSC 434	Advanced Web Programming	3(3,0)
This course focuses on the server side programming. It allows students to get to know how to connect their website or web application to a database, and how to save and retrieve data from that database. The course exposes students to web controls, validation controls, data source controls, data bind controls, state management, as well as working with a third party medium like XML and web services. Prerequisite: COSC 333. Equivalent to CCEE 514.		

COSC 435	Mobile Application Development	3(2,2)
This course examines the principles of mobile application design, development and testing. It covers memory management, user interface design, input methods, data handling, and network techniques. Students are expected to work on a project that produces a professional-quality mobile application. Projects will be deployed in real-world applications. Prerequisites: COSC 214, Senior standing. Equivalent to CCEE 510.		

COSC 436	Game Design and Development	3(2,2)
This course presents an overview of the software technologies related to game development. It provides the students with a conceptual understanding of the field of game design along with practical exposure to the process of creating a game. Prerequisites: COSC 214, Senior standing.		

COSC 438	Introduction to Software Testing	3(3,0)
This course will introduce the students into the field of software testing; its importance, goals, approaches, and major player’s roles (developers, testers, and users). Students will learn about software testing life cycle, standards, types of testing (manual vs automated testing), testing methods (black box vs white box), testing levels (functional, unit testing...), and documentation. A hands-on experience on automated testing tools will be also covered in this course. Prerequisite: COSC 341.		

COSC 451	Operating Systems	3(3,0)
Students learn the concepts of operating systems theory and their implementations. Covered topics include: computer and operating system structures, process and thread management, process management and synchronization, deadlocks, security and protection, inter-process communication, memory management, and I/O control system. A case study of a UNIX operating system will accompany the course. Prerequisites: COSC 214. Equivalent to CCEE 412.		

COSC 461	Advanced Networking	3(3,0)
This course prepares students to act as a System and Network Administrator by implementing Active Directory Directory Service ADDS in distributed environments that can include complex network services and domain controllers. The covered materials assist students to efficiently automate the administration of users, groups, and computers. Prerequisite: COSC 360.		

MATHEMATICS

Mission

The mathematics degree is aimed at broadening foundation in the main branches of the subject to subsequently enhance knowledge of mathematics at advanced level. This can be achieved through reasoning and manipulation using many examples. It is also constructed to strengthen the ability to think logically and critically, and to express ideas clearly. It fosters the development of confidence, knowledge and skills in mathematics, and an appreciation of the beauty of mathematical ideas and the power of their applications. Eventually, graduates will be well armed academically to meet the needs of educational and industrial institutions in the region.

Objectives

In pursuit of its mission, the strategic objectives of the Mathematics program are to:

- Prepare graduates who are committed to the quality and improvement of teaching math at all school levels.
- Prepare graduates to pursue advanced studies in mathematics or other related fields.
- Recruit, mentor and retain dedicated faculty members who are committed to achieving the college mission.
- Establish a research environment that recognizes, enhances, and enables scholarly and innovative research work.
- Build and maintain strong relationships with other universities and industries locally and internationally.

Program Outcomes

Upon successful completion of the BS program in Mathematics, an RHU graduate in Mathematics should demonstrate ability to:

- a. Show strong commitment to compete at the graduate level and pursue graduate degrees in mathematics.
- b. Teach mathematics at the secondary (high school) level.
- c. Use technology in particular Matlab to support the proofs of mathematical problems.
- d. Handle problems related to various mathematical fields at the undergraduate level.
- e. Analyze mathematical problems, and identify the appropriate references to get full understanding of their natures.
- f. Offer adequate mathematical knowledge that can be applied to various technical fields.
- g. Provide the appropriate algorithms to computer programs of various languages.

- h. Have an understanding of professional, ethical, legal, security and social issues and responsibilities.
- i. Communicate effectively with a range of audiences.

Career Opportunities

Mathematics major opens up various opportunities and prepares students for careers in teaching, banking and finance, computing and statistical works. It also prepares students to pursue graduate studies in mathematics, applied mathematics, or other related fields.

Program Overview

The mathematics Program at Rafik Hariri University develops students' mathematical and critical thinking skills and enhances their abilities to use new technology to supplement their mathematical assertions. The program also focuses on instilling the spirit of math teaching by insisting on providing adequate reasoning to assure full understanding of mathematical proofs.

BS in Mathematics (91 Credits)						
Courses Category	Major		Non-Major		Credits	Percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	3	–	12	15	30	33
College Requirement	–	–	–	–	–	0
Program Requirement	52	3	3	3	61	67
Credits	55	3	15	18	91	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Science and Information Systems section in this catalog.

II. College Requirements

The diversity of the programs precludes the identification of College requirements that are common to all programs offered by the CSIS.

III. Program Requirements

A. Major Requirements

The mathematics program mandatory courses are listed in the table below.

Course #	Title	Credits	Prerequisites
MATH 210	Discrete Mathematics	3	
MATH 211	Calculus III	4	

MATH 215	Advanced Calculus	3	MATH 211
MATH 311	Linear Algebra with Applications	3	
MATH 312	Abstract Algebra	3	MATH 311
MATH 314	Ordinary Differential Equations	3	MATH 211
MATH 316	Introduction to Analysis	3	MATH 215
MATH 317	Partial Differential Equations	3	MATH 314
MATH 318	Vector Calculus	3	MATH 215, MATH 311
MATH 320	Advanced Modern Algebra	3	MATH 312
MATH 412	General Topology	3	MATH 316
MATH 416	Number theory	3	MATH 316
MATH 421	Numerical Analysis	3	MATH 314
MATH 425	Introduction to Complex Variables	3	MATH 215
MATH 430	Dynamical System	3	MATH 316, PHYS 211
MATH 432	Measure Theory	3	MATH 412, MATH 425
MATH 440	Theory of Matrices	3	MATH 311
PHYS 410	Quantum Mechanics I	3	MATH 211, PHYS 211

B. Technical Electives

As part of the program for the Bachelor of Science in Mathematics, the student is required to study 3 credit hours of technical elective courses.

Course #	Title	Credits	Prerequisites
MATH 442	Introduction to Graph Theory	3	MATH 316, MATH 210
MATH 445	Fourier Series	3	MATH 314
MATH 450	Game Theory	3	MATH 212, MATH 351

Study Plan

Course #	Title	Credits	Prerequisites
Year 1, Semester 1 (15 Credits)			
MATH 205	Mathematics for the Environment	3	
MATH 210	Discrete Mathematics	3	
MATH 211	Calculus III	4	
PHYS 211	General Physics	3	
ENGL 210	English Composition and Rhetoric I	3	
Year 1, Semester 2 (15 Credits)			
MATH 215	Advanced Calculus	3	Math 211
MATH 311	Linear Algebra with Applications	3	
COSC 214	Introduction to Programming	3	
ENGL 217	Professional English Writing	3	ENGL 210

	Physics/CS Elective 1	3	
Year 2, Semester 1 (16 Credits)			
MATH 312	Abstract Algebra	3	MATH 311
MATH 316	Introduction to Analysis	3	MATH 215
MATH 314	Ordinary Differential Equations	3	MATH 211
MATH 351	Probability and Statistics	3	MATH 211
	Humanities/Fine Arts Elective I	3	
Year 2, Semester 2 (16 Credits)			
MATH 317	Partial Differential Equations	3	MATH 314
MATH 318	Vector Calculus	3	MATH 215 & MATH 311
MATH 320	Advanced Modern Algebra	3	MATH 312
PHYS 410	Quantum Mechanics I	3	MATH 211 & PHYS 211
	Humanities/Fine Arts Elective II	3	
Year 3, Semester 1 (15 Credits)			
MATH 416	Number Theory	3	MATH 316
MATH 412	General Topology	3	MATH 316
MATH 421	Numerical Analysis	3	MATH 314
MATH 425	Introduction to Complex Variables	3	MATH 215
	Social Science/Culture Elective I	3	
Year 3, Semester 2 (15 Credits)			
MATH 430	Dynamical System	3	MATH 316 & PHYS 211
MATH 432	Measure Theory	3	MATH 412 & MATH 425
MATH 440	Theory of Matrices	3	MATH 311
	Math Major Elective	3	
	Social Science/Culture Elective II	3	

Course Description

Mandatory Courses

MATH 205	Mathematics for the Environment	3(3,0)
A truly interdisciplinary, concrete study of mathematics, this classroom-tested text discusses the importance of certain mathematical principles and concepts, such as fuzzy logic, feedback, deductive systems, fractions, and logarithms, in various areas other than pure mathematics. It teaches students how to make informed choices using fundamental mathematical tools, encouraging them to find solutions to critical real-world problems.		

MATH 210	Discrete Mathematics	3(3,0)
Logic, propositional equivalences, predicates and quantities, methods of proof, sets, set		

operations, functions, proof strategy, mathematical induction, recursive definitions and structural induction, the basics of counting, permutations and combinations, relations and their properties, representing relations, equivalence relations, introduction to graphs, graph terminology, introduction to trees.

MATH 211	Calculus III	4(4,0)
Hyperbolic functions, Infinite sequences and series, Parametric equations and polar coordinates, Functions of several variables, Partial derivatives, Multiple integrals in rectangular-cylindrical-spherical coordinates, Vector fields.		

MATH 215	Advanced Calculus	3(3,0)
Topics in calculus with emphasis on proof, The (ϵ, δ) definition of limit, differentiation rules, the chain rule, Rolle's theorem, Mean value theorem, Fundamental theorem of calculus, sequence convergence using the (ϵ, L) definition, convergence theorem for power series, The (ϵ, δ) definition of limit for a function of two variables, chain rule for a function of two variables, conservative and gradient fields, Green's theorem, and Stoke's theorem. Prerequisite: MATH 211.		

MATH 311	Linear Algebra with Applications	3(3,0)
Linear equations in linear algebra, matrix algebra, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality and least squares, symmetric matrices and quadratic forms.		

MATH 312	Abstract Algebra	3(3,0)
Introduction to groups, subgroups, cyclic groups, permutation groups, isomorphisms, cosets and Lagrange's theorem, external direct products, normal subgroups and factor groups. Prerequisite: MATH 311.		

Math 314	Ordinary Differential Equations	3(3,0)
First order equations, existence and uniqueness theorem, separation of variables, higher order linear equations, Series solutions of second order linear equations, Laplace transforms, systems of first linear equations. Prerequisite: MATH 211.		

MATH 316	Introduction to Analysis	3(3,0)
Ordered, finite countable and uncountable sets, sequences, subsequences, Cauchy sequences, upper and lower limits, series, limits of sequences of functions, continuity and compactness, connectedness, infinite limits, and limits at infinity, differentiation of vector-valued functions, series of functions, uniform convergence and continuity, functions of several variables, the inverse function and the implicit function theorems, the rank theorem. Prerequisite: MATH 215.		

MATH 317	Partial Differential Equations	3(3,0)
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Ordinary differential equations arising from partial differential equations by means of separation of variables, method of characteristics for first order PDEs, boundary value problems for ODEs, partial differential equation and Fourier analysis and applications, comparative study of heat equation, wave equation and Laplace's equation by separation of variables and numerical methods, further topics in numerical solution of ODEs. **Prerequisite:** MATH 314.

MATH 318	Vector Calculus	3(3,0)
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Theory of vector-valued functions, divergence, gradient, curl, vector fields, path integrals, surface integrals, constrained extrema and Lagrange multipliers. Implicit function theorem. Green's and Stokes' theorems, introduction to differential geometry. **Prerequisites:** MATH 215 and MATH 311.

MATH 320	Advanced Modern Algebra	3(3,0)
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Groups and their structure, quotient groups and homomorphism, symmetric-alternating-dihedral groups, free groups, Krull-Schmidt theorem, rings and their structure, rings of quotients, rings of polynomials, modules, free modules, tensor products, fields and their structure, finite fields, separability, cyclic extensions. **Prerequisite:** MATH 312.

MATH 351	Probability and Statistics	3(3,0)
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Probability and conditional probability, random variable and distribution, continuous and marginal distributions, expectation, variance-moment-mean-median-covariance and correlation, conditional expectation, the sample mean, special distribution, Bernoulli and binomial distribution, Poisson and Gamma distribution. **Prerequisite:** Math 211.

MATH 412	General Topology	3(3,0)
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Topological spaces, neighborhoods, bases and subspaces, continuous functions, product spaces, quotient spaces, nets and filters, normal spaces, compact and locally compact spaces, connectedness, and metric spaces. **Prerequisite:** MATH 316.

MATH 416	Number Theory	3(3,0)
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Theory of congruencies, Fermat's factorization method, quadratic reciprocity, finite fields, quadric forms, Diophantine equations, number theoretic functions. **Prerequisite:** MATH 316.

MATH 421	Numerical Analysis	3(3,0)
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Error Analysis, solutions of nonlinear equations using fixed point-Newton-Raphson-Muller's methods, solution of linear system using Gaussian elimination-iterative methods, interpolation and approximation using Taylor series-Lagrange approximation-Newton polynomials, numerical differentiation and integration, numerical optimization, solutions of ordinary and partial differential equations using Euler's and Heun's and Rung-Kutta methods. **Prerequisite:** MATH 314.

MATH 425	Introduction to Complex Variables	3(3,0)
Complex numbers and geometric representation, analytic functions, real line integrals, complex integration, power series, residues, poles, conformal mappings. Prerequisite: MATH 215.		

MATH 430	Dynamical Systems	3(3,0)
One-dimensional dynamics, Sarkovskii's theory, routes to chaos, symbolic dynamics, higher-dimensional dynamics, attractors, bifurcations, quadratic maps, Julia and Mandelbrot sets. Prerequisites: MATH 316 and PHYS 211.		

MATH 432	Measure Theory	3(3,0)
Measures, outer measures, Lebesgue measure, completeness and regularity, measurable real-valued functions, Riemann Integral, measurable complex \mathbb{C} -valued functions, image measures, normed spaces, L^p and L^p spaces, dual spaces, product measures, Fubini's Theorem. Prerequisites: MATH 412 and Math 425.		

MATH 440	Theory of Matrices	3(3,0)
Congruence (Hermitian), Similarity, orthogonality, matrices with polynomial elements and minimal polynomials, Cayley-Hamilton Theorem, bilinear and quadratic forms, eigenvalues. Prerequisite: MATH 311.		

Elective Courses

MATH 442	Introduction to Graph Theory	3(3,0)
Combinatorics through graph theory. Topics include connectedness, factorization, Hamiltonian graphs, network flows, Ramsey numbers, graph coloring, automorphisms of graphs and Polya's Enumeration Theorem. Prerequisites: MATH 316 and Math 210.		

MATH 445	Fourier Series	3(3,0)
Fourier transforms and discrete Fourier transforms. The calculus of Fourier transforms. Operator algebraic formalism. Hartley transforms. Tempered distributions. Signal processing, probability and differential equations. Prerequisite: Math 314.		

MATH 450	Game Theory	3(3,0)
Game theory is the theory of mathematical modeling of strategic agents' interactions such as modeling of nations' conflicts and political campaigns. Topics of this course include mixed-strategy Nash equilibria, extensive-form games, coalitional games, and Bayesian games. Prerequisites: Math 212 and Math 351.		

MATHEMATICS MINOR

Rationale

The CIS department offers a minor in Mathematics for RHU students. It is designed to give students a solid foundation in mathematics as well as some experience in the discipline at an advanced level.

Program Objectives

The aims of a minor in Mathematics are:

- Provide RHU graduates with a basic proficiency in Mathematics to compete at the university level.
- Support RHU graduates with essential mathematical skills to enhance their knowledge and understanding in their respective majors.

Learning Outcomes

At the end of this minor, the student is expected to demonstrate:

- An ability to analyze mathematically experimental or physical results
- An ability to use mathematical techniques, skills, and facts in their respective research

Computer Science Minor Policies

- A minimum CGPA of 70 % is required for the six courses to fulfill the minor requirements
- Overlapped courses between student major requirements and mathematics minor requirements are counted to fulfill the CS minor requirements

Career Options

This minor allows its holders to seek careers in a variety of sectors no matter what a student's major is. Graduates from this minor can seek jobs related to teaching, banking and finance, computing and statistical works.

Program Requirements

To successfully complete the Minor in Mathematics, a student must

- 5) Declare a Minor in Mathematics by completing the Minor Declaration Form;

- 6) Obtain the approval of the dean of the college major and the dean of the College of Business Administration;
- 7) Obtain a Minor Cumulative Grade Point Average (MCGPA) of no less than 70 %.
- 8) Complete 19 credits of Mathematics coursework as specified below.

Mandatory Courses

The Mathematics minor consists of six courses (19 Cr.) Four are required and two are elective.

Course #	Title	Credits	Prerequisites
MATH 211	Calculus 3	4	
MATH 215	Advanced Calculus	3	MATH 211
MATH 311	Linear Algebra with Applications	3	
MATH 314	Ordinary Differential Equations	3	MATH 211

Elective Courses

The two elective courses will be chosen out of the following courses after consultation with a Mathematics advisor and based on the students' majors.

Course #	Title	Credits	Prerequisites
MATH 210	Discrete Mathematics	3	
MATH 316	Introduction to Analysis	3	MATH 215
MATH 317	Partial Differential Equations	3	MATH 314
MATH 318	Vector Calculus	3	MATH 215 & MATH 311
MATH 351	Probability and Statistics	3	MATH 211
MATH 421	Numerical Analysis	3	MATH 314
MATH 425	Introduction to Complex Variables	3	MATH 215
MATH 442	Introduction to Graph Theory	3	MATH 316, MATH 210

DEPARTMENT OF DESIGN

Faculty Members

Chairperson:	Serene Srouji
Assistant Professors:	Serene Srouji
Lecturers:	Hadi Bizri
Adjunct Faculty:	Larissa Vasilchenko, Dahlia Khodur, and Janin Khawand

Vision

The Department of Design at Rafik Hariri University strives to be the leader in high standard, progressive education in Lebanon and the region. It aims at developing creative, well-informed, skilled professionals aware of their responsibility in solving visual problems in a dynamic global society. Our vision is a future where RHU faculty, students, and alumni become trendsetters and innovators in the design world, both theoretically and practically.

Programs Offered

The Department of Design offers two programs each leading to a Bachelor of Science degree in Graphic Design and Bachelor of Fine Arts degree in Interior Design. Details of each program will follow.

GRAPHIC DESIGN PROGRAM

Mission

Our mission is to educate students to become successful thinkers and creative designers who can enhance human experience and improve communication. This is achieved through:

- Providing high standard teaching methods and progressive curricula that deliver professional excellence.
- Educating designers to be socially and ethically responsible in order to serve for a better community.
- Promoting growth and innovation both personally and academically to become successful leaders in the workplace.
- Mentoring students to tackle design challenges with a creative innovative approach while adhering to design principles.
- Providing students with coverage through diverse media forums, exhibitions and events.
- Providing students with design perspectives from designers and thinkers outside of RHU through juries, workshops, lectures and seminars.
- Establishing and maintaining close relationships with the industry and other academic institutions to improve the curriculum, expand collaboration and increase job opportunities for our students.

Objectives

- Provide students with both print and multi-media design courses.
- Provide students with the necessary thinking, planning and execution skills to succeed in the workplace.
- Provide students with the key elements to develop a portfolio and CV that stands out in the market.
- Allow students to explore various platforms through personal creative skills.
- Emphasize both theoretical and practical aspects of design, which will in turn present a complete understanding of the design field.
- Explore the diverse roles of designers as effective visual creators, ethical and social beings and problem solvers.

Program Outcomes

Upon successful completion of the BS program in Graphic Design, graduates will:

- Effectively communicate messages through the juxtaposition of images and type to a specific target audience.
- Acquire, articulate, and apply specialized terminology and knowledge relevant to graphic design including relationships to other disciplines and to contemporary global issues.
- Implement creative solutions from concept through completion using a formal process.
- Display competency in technical skills applicable to graphic design.
- Demonstrate the ability to use design-thinking strategies in an iterative design process.
- Apply the principles of design to develop strategic marketing and communication solutions to companies, products and services.
- Be able to analyze, synthesize, and develop successful solutions.
- Become conceptual thinkers aware of social, cultural and ethical issues...
- Access information through traditional and new technologies, and synthesize this information for problem solving activities.
- Understand the relationship of graphic design to other disciplines and to society.
- Develop a professional resume, business card, and portfolio, as well as, learn how to conduct a job search. They will also gain familiarity with the types of jobs available in the graphic design industry.

Career Opportunities

Graphic designers attain a broad spectrum of knowledge and skills that highly equip them to enter the professional field. Graphic Design opens up vast opportunities in various fields that include TV stations, advertising agencies, design and packaging firms, editorial firms and magazines, branding agencies, interactive design firms (web and applications), 3D animation studios, photography studios, printing presses, illustration firms and publishing houses. Furthermore, a high number of NGOs, banks and other business companies require in-house graphic designers. In addition to working as a full-timer, freelance projects, both locally and internationally, are available for extra income and independent work due to high market demand.

Graphic Design also serves as an excellent foundation for careers in product management and marketing.

Program Overview

The Graphic Design (GRDS) Program at RHU is dedicated to providing excellent teaching standards based on academic and creative research as well as professional practice. The graphic design department at RHU presents students with a great opportunity to grow as individuals, nurture their unique style and increase their self-confidence. Various forums in the design field are explored and students are taught skills related to client communication and succeeding in the workplace.

The graphic design program is based on a student-centered approach where students gain extensive knowledge in design theory, and a thinking approach that is essential in all problem-solving issues. The program's curriculum, facilities and committed faculty members ensure students' academic and personal growth in an environment that inspires learning and drives creativity.

BS in Graphic Design (111 Credits)						
Courses Category	Major		Non-Major		Credits	percent
	Mandatory	Electives	Mandatory	Electives		
University Requirement	12	-	6	12	30	27
College Requirement	-	-	-	-	-	0
Program Requirement	51	6	21	3	81	73
Credits	63	6	27	15	111	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Science and Information Systems section in this catalog.

II. College Requirements

The diversity of the programs precludes the identification of College requirements that are common to all programs offered by the CSIS.

III. Program Requirements

A. Fine Arts Requirements (18 credits)

As part of the program of the Bachelor of Science in Graphic Design, students are required to take 18 credit hours of Fine Arts requirement courses, which are listed in the table below. These courses build a solid artistic and technical foundation that help students excel in the design field.

Course #	Title	Credits	Prerequisites
FADR 200	Drawing I	3	
FADR 202	Drawing II	3	FADR 200
FADR 210	Rendering & Perspective Techniques	3	
FADR 215	History of Art	3	
FADR 220	Fundamentals of 2D	3	
FADR 222	Fundamentals of 3D	3	FADR 220

B. Business Requirement

The business requirement consists of a three-credit course listed in the table below.

Course #	Title	Credits	Prerequisites
BMKT 200	Introduction to Marketing	3	

C. Mandatory Requirements

The set of mandatory graphic design courses encompasses the 51 credits listed in the table below.

Course #	Title	Credits	Prerequisites
GRDS 203	Introduction to Graphic Design	3	GRDS 205
GRDS 205	Type I	3	GRDS 220
GRDS 222	Computer II	3	GRDS 220
GRDS 230	Photography I	3	
GRDS 300	Illustration	3	GRDS 220, FADR 202
GRDS 305	Type II	3	GRDS 205
GRDS 306	Type III	3	GRDS 222, GRDS 305
GRDS 310	Design I	3	GRDS 203, GRDS 220
GRDS 311	Design II	3	GRDS 310
GRDS 335	Production	3	GRDS 222
GRDS 345	History of Graphic Design	3	FADR 215
GRDS 399	Co-op Training Experience	1	ENGL 217; Senior Standing.
GRDS 409	Design Writing Research	3	GRDS 311; Co-req: GRDS 411
GRDS 411	Design III	3	GRDS 311, GRDS 306
GRDS 412	Design IV	3	GRDS 411, GRDS 409
GRDS 423	Computer III	3	GRDS 222
GRDS 424	Computer IV	3	GRDS 423
GRDS 450	Branding and Advertising	3	GRDS 411
GRDS 452	Digital Illustration	2	GRDS 222, GRDS 300

D. Major Elective Requirements

Students are required to take 6 credit hours of major elective courses to increase their knowledge in innovative disciplines and current issues related to the field of design.

Course #	Title	Credits	Prerequisites
GRDS 330	Photography II	3	GRDS 230
GRDS 331	Digital Processing	3	GRDS 222
GRDS 350	3D Printing & Prototyping	3	GRDS 222
GRDS 355	Calligraphy	3	GRDS 305
GRDS 375	3D Animation	3	GRDS 423

GRDS 381	Book Binding	3	Junior Standing
GRDS 402	Silkscreen	3	GRDS 300
GRDS 403	Painting	3	FADR 202
GRDS 431	Critical Theory	3	GRDS 305, GRDS 310

E. Humanities Elective Requirement

Students are required to take an extra 3 credit hours humanities elective course to fulfill the 5 courses of humanities and social sciences required for accreditation.

F. Co-op Training Experience

Each student must complete 8 weeks of practical training in an area related to his/her field of interest. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits to ensure that the student's performance is aligned with his/her aspirations and employer's needs. Students are required to submit a formal report, poster and a formal presentation about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Study Plan

The Bachelor of Science in Graphic Design encompasses 111 credit hours that are spread over 6 semesters and three summer sessions, the last of which is dedicated to the CO-OP experience. The following study plan serves as a roadmap for the student's smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Semester 1 (15 Credits)			
FADR 200	Drawing I	3	
FADR 215	History of Art	3	
FADR 220	Fundamentals of 2D	3	
GRDS 220	Computer I	3	
ENGL 210	English Composition & Rhetoric	3	
Year 1, Semester 2 (15 Credits)			
FADR 202	Drawing II	3	FADR 200
FADR 210	Rendering & Perspective Techniques	3	
FADR 222	Fundamentals of 3D	3	FADR 220
GRDS 205	Type I	3	Co- Requisite GRDS 220
GRDS 222	Computer II	3	GRDS 220

Summer Session (9 credits)			
GRDS 203	Introduction to Graphic Design	3	GRDS 205
GRDS 230	Photography I	3	
	Humanities Elective/Fine Arts I	3	
Year 2, Semester 1 (18 Credits)			
GRDS 300	Illustration	3	GRDS 220, FADR 202
GRDS 305	Type II	3	GRDS 205
GRDS 310	Design I	3	GRDS 203, GRDS 220
BMKT 200	Introduction to Marketing	3	
ENGL 217	Professional Communication Skills	3	ENGL 210
	Humanities Elective/Fine Arts II	3	
Year 2, Semester 2 (15 Credits)			
GRDS 306	Type III	3	GRDS 222, GRDS 305
GRDS 311	Design II	3	GRDS 310
GRDS 423	Computer III	3	GRDS 222
GRDS 335	Production	3	GRDS 222
GRDS 345	History of Graphic Design	3	FADR 215
Summer Session (9 Credits)			
GRDS 360	Visual Perception & Infographics	3	GRDS 311
	Social Sciences / Culture Elective I	3	
	Social Sciences / Culture Elective II	3	
Year 3, Semester 1 (15 Credits)			
GRDS 411	Design III	3	GRDS 311, GRDS 306
GRDS 424	Computer IV	3	GRDS 423
GRDS 409	Design Writing Research	3	GRDS 311; Co-req: GRDS 411
GRDS 440	Design & Social Impact	3	Senior standing
	Major Elective I	3	
Year 3, Semester 2 (14 Credits)			
GRDS 412	Design IV	3	GRDS 411, GRDS 409
GRDS 452	Digital Illustration	2	GRDS 222, GRDS 300
GRDS 450	Branding & Advertising	3	GRDS 411
	Social Sciences / Culture	3	
	Major Elective II	3	
Summer Session (1 Credit)			
GRDS 399	Co-op Training Experience	1	ENGL 217; Senior Standing

Course Description

I. Mandatory Requirements

Fine Arts Courses

Descriptions of the Fine Arts Requirement courses are given below.

FADR 200	Drawing I	3(2,2)
<p>This course is a comprehensive introduction to the art of drawing. Students learn how to represent accurately and proportionally objects, planes, and volumes by developing hand-to-eye coordination with lines, shades and tones; as well as, wet and dry media. The course introduces a wide range of drawing techniques, composition principles, perspective basics and various media to prepare students with the essential ingredients needed to grow in the design field.</p>		

FADR 202	Drawing II	3(2,2)
<p>This drawing course focuses on teaching students the basics of drawing the human figure by studying the human anatomy and its proportions. It emphasizes the use of the human figure in space as a compositional element. Students will explore the potential and limits of media and materials. Students will begin to form a personal approach to drawing and even develop a personal drawing/illustrating style. Prerequisite: FADR 200.</p>		

FADR 210	Rendering & Perspective Techniques	3(2,2)
<p>This course introduces students to perspective techniques in the rendering of three-dimensional objects, and scenes on two-dimensional surfaces. Students learn how to apply perspective drawing, composition and conceptualization as a means of developing visual communication skills. Design, composition, light rendering and perspective are explored to enhance the students drawing and rendering techniques.</p>		

FADR 215	History of Art	3(3,0)
<p>This course explores the major forms of artistic expression from the ancient world to the present from a variety of cultural perspectives. Students learn how to look at and analyze works of art within their historical context, and how to articulate what they see or experience in a meaningful way. This course covers Pre Renaissance, Renaissance, Post Renaissance and the rich layers of 19th and 20th Century Modern Art up until the manifestations of our present day.</p>		

FADR 220	Fundamentals of 2D	3(2,2)
<p>This course focuses on the student's visual awareness through an introduction to the fundamentals of 2-D design elements, which include: line, texture, pattern, tone, form, color, light, partial illusion, balance and proportion. Students also explore and experiment with design principles such as repetition, variety, emphasis and movement. This course broadens the understanding of compositional devices, dynamics and methods. It also aims at developing</p>		

a clear understanding of visual organization, shape interaction and color theory.

FADR 222	Fundamentals of 3D	3(2,2)
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This course is an extension of two-dimensional design concepts into volumetric relationships emphasizing design concepts through structural and sculptural form. Students will work in various media including paper, cardboard, wood, wires, metal and plaster to explore concepts of modularity, sequence and series, relief, contour, structure, symmetry and asymmetry as they relate to the study of forms in nature. Students will also examine the function of space, volume, mass, plane, and line. The main emphasis of this course is the development of critical thinking skills, technical skills and visual aesthetic skills. **Prerequisite:** FADR 220.

Business Course Requirement

The Graphic Design program requires one business course, BMKT 200 described below.

BMKT 200	Introduction to Marketing	3(3,0)
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This course covers the full spectrum of Lebanese and international marketing of consumer products and services including market-segmentation, consumer behavior, products, and packaging distribution and promotion. Students will analyze case problems and prepare a marketing plan about a “real-life” product or service. Videos, guest speakers, and class interaction on marketing topics will assist in the learning experience.

Major Graphic Design Courses

Description of the Graphic Design courses follows.

GRDS 203	Introduction to Graphic Design	3(3,0)
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Graphic design is a creative process that combines art and technology to visually communicate ideas. This course introduces students to the discipline of graphic design by exploring the elements, principles and design process. It focuses on the process of design from the initial stage of choosing a topic through the intermediary working stages till the final presentation. It is a theoretical course that includes practical exercises in visual communication, organization and perception. Projects explore the various dimensions of design to fully comprehend its expressive power as a visually communicative tool and a problem solving method. **Prerequisite:** GRDS 205.

GRDS 205	Type I	3(3,0)
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Type, characters and letterforms are the essential building blocks of visual communication. In this course, students learn how to express ideas not only through the meaning of words but also through manipulating the shape of a typographic character, which improves the quality of information and communication. This introductory course teaches students the anatomy of type, essential type terminology, history of type categorization and standardization; as well as, the difference between calligraphy and typography. **Prerequisite:** GRDS 220.

GRDS 220	Computer I	3(3,0)
<p>In this course, students will develop a solid foundation of Adobe Illustrator and Adobe Photoshop tools and techniques. Students will learn the difference between vector based and pixel based programs and how to integrate both work fields to produce creative graphics. Moreover, students will receive a brief introduction about Adobe InDesign: work space, function and tools.</p>		

GRDS 222	Computer II	3(3,0)
<p>The first section of the course teaches students advanced tools and techniques in Adobe Illustrator (mesh 3D) and Adobe Photoshop (masks). The second part emphasizes on learning technical skills in Adobe InDesign, which is a computer based page layout software. Students will learn how to use master pages, style sheets, typographic controls, flowing and formatting text, placing and manipulating images, combining images and text, creating tables, gradients and PDF's and correctly preparing digital files for offset printing. Prerequisite: GRDS 220.</p>		

GRDS 230	Photography I	3(2,2)
<p>This course teaches students the basics of black & white digital photography. It is a lecture-based course with extensive hands on practical training. Students learn how to develop an eye for taking pictures and framing objects. They also enhance their knowledge about the different parts of a camera and the mechanism of printing and developing films while continuously scanning other photographers from contemporary and historical scenes.</p>		

GRDS 300	Illustration	3(2,2)
<p>This class is designed to introduce students to the art of illustration and visual story telling. It teaches students various technical skills to enhance their ideas and creativity. This class allows students to discover their personal style through line quality, colors and shapes. Students will be aided to develop their own 'style' through visual analysis and personal visions. Hands on projects will help enhance ideas and techniques such as ink and brush, scraperboard, mono prints, watercolor, relief printing, and collage. Prerequisites: GRDS 220; FADR 202.</p>		

GRDS 305	Type II	3(3,0)
<p>This is an intermediate level course devoted to the study of the marriage of Latin and Arabic typography. This course develops the student's ability to create typographic designs by visually and aesthetically merging Arabic and Latin Fonts. This multi-script combination targets the needs of our direct Arab and Lebanese market. Students will learn how to dissect fonts, create modules, experiment with type, generate Arabic adaptations and construct typographical patterns that evolve into 3D objects. The student further learns the rules of the typographic grid system in order to be able to experiment with breaking the Grid while designing layouts, spreads and posters. Prerequisite: GRDS 205.</p>		

GRDS 306	Type III	3(3,0)
<p>This course focuses on Arabic typography; its history and the modern approaches applied to enhance our Arabic fonts. Students will learn the anatomy of Arabic type in order to be able to creatively manipulate its parts. Projects will include the creation of: Experimental Display Arabic font, arabesques, Arabic graffiti, and Arabic adaptations. The skills acquired in previous type classes will give the students the necessary techniques to further explore how typography and mainly Arabic typography can function as a pure communicative tool. Prerequisites: GRDS 222; GRDS 305.</p>		
GRDS 310	Design I	3(2,2)
<p>This course is an investigation of the creative process that the designer goes through while designing the main elements of visual communication: symbols, pictograms, icons and logos. Students will be asked to create their own visual vocabulary (corporate identity) that has enough credibility to convince the target audience to purchase a certain service or product. It is an intensive insight into planning and developing a corporate image: logos and other business communication applications. In addition, students learn to design a complete restaurant branding image from initial concept to final execution. Prerequisites: GRDS 203; GRDS 220.</p>		
GRDS 311	Design II	3(2,2)
<p>This course provides a general overview of design principles for the structure and visual aspects of packaging design; as well as, the history of packaging and the psychology of consumer decision-making. The imposition of graphic images and innovative diecuts of various packages and package materials will be examined. Key course concepts will include researching and designing 3D packages, understanding ecofriendly and sustainable packages, experimenting with playful and conceptual design packaging as well as defining the target audience to design the best solution for a package. Prerequisite: GRDS 310.</p>		
GRDS 335	Production	3(3,0)
<p>In this course, students will develop an understanding of the “process flow” in contemporary methods of print production. The course covers the entire timeline of production: Prepress-Press-Post Press. In addition to printing technologies, students will learn about various types of ink and paper, binding, varnishes, finishing techniques and the effect of the printing process on the end product. Students will also learn how to handle projects and deal with clients as freelance designers or as designers working for companies. Prerequisite: GRDS 222.</p>		
GRDS 345	History of Graphic Design	3(3,0)
<p>This course covers the evolution of graphic communication from prehistory through postmodern design and the digital revolution. This course provides graphic design students with the knowledge and understanding of the places, people, and events; as well as historical and cultural factors and technological innovations that have influenced the development of</p>		

graphic design into the practice known today. Historical awareness provides a meaningful context for young designers to evolve and contribute in positive ways to the cultures in which they live and work in. **Prerequisite:** FADR 215.

GRDS 360	Visual Perception & Infographics	3(3,0)
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Visual perception is the ability to interpret information from our surroundings through visible light that reaches the eye. This course will explore the various theories of visual perception with an emphasis on Gestalt theory and its relation to Graphic Design. It will create an understanding of our human visual perception and its limitations. Students will also be given projects in which they will apply Gestalt principles and the learned theories. In addition to visual perception theories, students will learn 2 key disciplines in design: Infographics and Wayfinding. **Prerequisite:** GRDS 311.

GRDS 399	Co-op Training Experience	1(1,0)
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Each student must complete 8 weeks of practical training in an area related to his/her field of interest. This Co-op work experience is usually fulfilled during the summer term of the third year into the program. Students are required to submit a formal report, and/or poster, and make a formal presentation about their Co-op experience. **Prerequisites:** ENGL 217 and Senior Standing.

GRDS 409	Design Writing Research	3(3,0)
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In this course, students will explore various research methodologies to acquire the necessary skills needed to write a well-rounded research paper for their final year design project. They will be exposed to the tools of visual analysis, which will enable them to articulate their understanding and appreciation of a given visual. Students will engage in writing exercises focused on various topics in the design field. By the end of this course, students should develop their senior project research proposal. **Prerequisite:** GRDS 310.

GRDS 411	Design III	3(2,2)
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This course prepares students for the design challenges faced in designing and producing professional-looking layouts in editorials (newsletters, reports, books, & magazines) and on screen (websites and web applications). Students learn how to create multi-page publications and on screen interfaces with effective typography, images, illustrations, and layouts. The core focus of this course is working with user interactivity, composition, layout, format, negative space, grids, type and graphical elements. **Prerequisite:** GRDS 311, GRDS 306.

GRDS 412	Design IV	3(2,2)
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This course focuses on creating a final year project that forges a bridge between the theory and practice of visual communication through the extensive exploration of the design process. Students will research, develop and design their individual senior project to demonstrate their ability of visual communication. This class provides the students with a forum to showcase

their talent and skills. Emphasis is placed on creativity and quality of work. **Prerequisite:** GRDS 411, GRDS 409.

GRDS 423	Computer III	3(3,0)
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A rapidly expanding and thriving field, motion graphics gives designers new opportunities to work in television, film, and web design. This course focuses on motion graphics and its diverse methodologies to lay down the necessary specialized essentials. Adobe After Effects and Flash are utilized to teach the foundations of compositing, video editing and special effects. Assignments center on upholding a certain amount of experimentation and are process-oriented. Students will learn how to animate graphics and type as a technique to better communicate ideas visually. **Prerequisite:** GRDS 222.

GRDS 424	Computer IV	3(3,0)
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As the World Wide Web became a fundamental fixture of life, it became essential for design to play a vital role in ensuring that any interface is accessible, exciting and effective. This course examines the constantly developing medium of User Interface and User Experience Design. It combines web and application design as a communication medium with a distinctive user experience. Instruction focuses on attaining a crucial equilibrium between form and function, and between visual design and effective, as well as accessible navigation and communication. **Prerequisite:** GRDS 423.

GRDS 440	Design and Social Impact	3(3,0)
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This course prepares students to become leading agents of social change through community engagement. It aims at promoting collaborative work between computer science and graphic design students to design effective solutions to existent community issues. The course is structured on a balance between classroom theory learning, extensive field research and implementation of a real-world solution using both expertise. **Senior Standing.**

GRDS 450	Branding & Advertising	3(3,0)
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This course explains both branding & advertising and their relationship to each other. It explores the history of advertising and discusses the most influential and altering periods that advertising went through (from billboards to radio and TV and recently social media). It also emphasizes the importance of advertising in defining and differentiating a product within our contemporary mass market. This course includes hands on experience by applying advertising and branding concepts and techniques in a complete campaign: creating a product, finding its competitors, defining the target audience, writing the marketing research designing the package; as well as the ad campaign from press ads to billboards...). **Prerequisite:** GRDS 411.

GRDS 452	Digital Illustration	2(1,2)
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Digital illustration uses digital tools, software, and applications to create complex graphical illustrations and images. In this course, students will learn various techniques and directions to

produce fresh creative aesthetical illustrations. Students will receive hands-on training with basic drawing/painting, manipulating and creating vector based graphics, illustrations and digital paintings. Projects include various areas from comic strips to 3-D rendering.

Prerequisites: GRDS 222; GRDS 300.

II. Elective Courses

Descriptions of the major elective courses are given below.

GRDS 330	Photography II	3(2,2)
<p>This course emphasizes the development of a critical eye and the use of photography as a form of self-expression and an artistic medium. Students are expected to have a working knowledge of the photographic process. Students will produce photographs as fine art and refine advanced technical and printing techniques. Prerequisite: GRDS 230.</p>		
GRDS 331	Digital Processing	3(2,2)
<p>Digital photography is now a standard set from compacts to medium format sensor size camera range. Through Adobe Photoshop and Adobe Light Room, this course shall give a wider understanding of digital processing along with important attributes regarding that matter. An image taken from the camera certainly needs modifications to get the best out of it. By that, pictures will look the way we intend them to be, following precise adjustments with an understanding of why and what shall be the result. Prerequisite: GRDS 222.</p>		
GRDS 350	3D Printing & Prototyping	3(2,2)
<p>This course focuses on the fundamental process used in 3D design and model making. It will follow the process industrial designers go through to create 3D printed products. The course will cover the design thinking process to bring initial sketch ideas to life while taking into consideration the limitations at hand. Multiple software applications in the process will be used in designing the 3D models including Adobe Photoshop, Autodesk Maya and Pixalologic Zbrush.</p> <p>Prerequisite: GRDS 222.</p>		
GRDS 355	Calligraphy	3(2,2)
<p>In this course, students will learn the basics of Arabic calligraphy as defined by Ibn Muqla. The variations of the main Arabic scripts are explained through a set of visual examples. The course touches upon Islamic calligraphy as a communicative and embellishing technique used in the visual arts. The practical aspect of the course explores the techniques and rules of drawing letters of the main standardized Arabic Script. Calligraphy will also be used to create modern visual expressions. Prerequisite: GRDS 305.</p>		
GRDS 375	3D Animation	3(3,0)

In the first section of this course students will learn AutoDesk Maya. They will explore 3D form and space with an emphasis on digital modeling of real life objects. They will develop and construct 3D objects intended graphically for any design or animation use. The course covers skills from basic to intermediate 3D modeling with an emphasis on texturing and lighting. In the second part of this course Maxwell Realflow, which has become one of the industry standards when it comes to fluid simulation, will be covered. Water simulation and dynamics will be taught and integrated into Maya for rendering. **Prerequisite:** GRDS 423.

GRDS 381	Bookbinding	3(2,2)
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This class teaches students various bookbinding techniques: Japanese binding, accordion folding, and signature binding. This course will cover the process of bookbinding from initial concept to the final finished and bound book. Multiple types of bookmaking will be covered along with a detailed explanation of the advantages and disadvantages of each type of binding. Creatively approaching a design problem using book design will be addressed as well as using book design as a form of art.

GRDS 402	Silkscreen	3(2,2)
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Silkscreen is one of the most flexible and widely used types of printmaking. The class focuses on various silkscreen techniques taught through demonstrations and specific projects. Images and graphic visuals will be made using hand drawn separations, photographic film, digital separations and photocopied images. Water-based silkscreen inks are used, allowing for soap-and-water cleanup. Students will be encouraged to experiment with multiple techniques and combinations of traditional and contemporary methods. **Prerequisite:** GRDS 300.

GRDS 403	Painting	3(2,2)
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This course is an introduction to various painting materials, skills and techniques. It helps students develop an artistic potential to create various moods. Students will learn how to use the brush to create different strokes and how to manipulate color to suit their concepts. Color theory will be discussed in class. The course includes detailed studies from still life, landscape, and the human figure. **Prerequisite:** FADR 202.

GRDS 431	Critical Theory	3(3,0)
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This course is an introduction to graphic design theory. It explores the aesthetic and social purposes of design practice through written selections across a century of design evolution. Students will read about design in order to stimulate growth and change in their own work. Students will also learn how to analyze and critically write essays about design. This course also puts theory into practice where students will be able to manually experiment using past and present theories. **Prerequisites:** GRDS 305; GRDS 310.

INTERIOR DESIGN PROGRAM

Mission

The mission of the Interior Design (INDS) program is to educate and improve career prospects of skilled designers and planners who will successfully enhance the human experience and improve the natural, social and built environment. By fostering creativity, logical thinking, and contemporary problem solving strategies through teaching excellence and progressive curricula, we aim to deliver a generation of innovative and human-centered designers capable of creating human habitation spaces that are healthy, safe, and inspiring.

Objectives

- Provide students with the necessary thinking, planning and execution skills to succeed in the workplace.
- Provide students with the key elements to develop a portfolio and CV that stands out in the market.
- Allow students to explore various platforms through personal creative skills.
- Emphasize both theoretical and practical aspects of design, which will in turn present a complete understanding of the design field.
- Explore the diverse roles of designers as effective visual creators, ethical and social beings and problem solvers.
- Provide students with the ability to integrate broad-based knowledge of standards and models related to sustainable practice, material research, environmental quality, aesthetics and technology in the design of interior spaces.
- Provide students with the ability to develop a sensitivity to the concerns of people, sustainable design practices and the social, economic and cultural differences in interior design.
- Engage students in multi-disciplinary collaborations.

Program Outcomes

Upon successful completion of the BS program in Interior Design, graduates will acquire:

- An ability to apply systematic design process, design principles, Psychology of design theory, and color style in order to solve abstract and real interior design problems for various market sectors.
- An ability to produce competent construction documents for residential building project utilizing manual and digital drafting techniques.

- An ability to apply relevant building codes, laws, regulations, sustainability and universality to human welfare and safety when designing interior spaces.
- An ability to apply current industry practices and methods to select materials of interior finishes and furnishings for interior design projects
- An ability to reinforce design ideas with empirical evidence, qualitatively and quantitatively.
- An ability to apply contemporary tools to communicate design ideas and concepts.
- An ability to collaborate effectively with others to achieve common goals.
- An ability to uphold best in class business practices and professional and ethical conduct.
- An ability to develop a professional portfolio.

Career Opportunities

Interior Design graduates attain the competencies and skills to create the physical environments that are functional, sustainable, stimulating and healthy. Interior Design graduates can pursue rewarding careers in a wide spectrum of firms and industries involved in the design for built environments including residential buildings, hospitality venues (hotels and restaurants), healthcare facilities, office, retail, corporate and industrial space, educational institutions, furniture manufacturing, lighting, exhibit space, as well as, entertainment and commercial entities. The high market demand for interior designers provide opportunities to work on freelance projects or establish independent design firm.

Program Overview

The INDS program is an applied-oriented, multi-faceted program curated to nurture creativity, instill intellectual curiosity and ignite passion to create safe, beautiful, healthy, functional, sustainable and inspiring interior spaces. The program emphasizes fundamental design theories, conceptual explorations, systematic design thinking, cultural, ethical and ecological awareness, aesthetic expressions, professional standards and sustainable practices. While exploring the various forums in the design field, the student-centered approach nurtures individual's unique style, fosters self-confidence, cultivates effective client communication, and builds a strong technical foundation, knowledge of the business side of design and collaborative problem solving skills to pursue practical design projects.

The interior design curriculum features blended lecturing, studio, critique discussion, and computer lab instructions; independent and collaborative projects; formal and informal presentations; field trips; a Co-op learning experience; and a summative learning project. The general education courses and elective study are structured to offer a multitude of skills that extend student's curiosity for learning beyond the degree.

BA in Interior Design (111 Credits)

Courses Category	Major	Non-Major	Credits	Percent
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	Mandatory	Electives	Mandatory	Electives		
University Requirement	9	-	6	15	30	27
College Requirement	-	-	-	-	-	-
Program Requirement	51	6	21	3	80	73
Credits	60	6	27	18	111	100

I. University Requirements

The list of the University required courses and their descriptions are presented in the introductory pages of the College of Science and Information Systems section in this catalog.

II. College Requirements

The diversity of the programs precludes the identification of College requirements that are common to all programs offered by the CSIS.

III. Program Requirements

A. Fine Arts Requirements

As part of the program of the Bachelor of Fine Arts in Interior Design, students are required to take 18 credit hours of Fine Arts requirement courses, which are listed in the table below. These courses build a solid artistic and technical foundation that help students excel in the design field.

Course #	Title	Credits	Prerequisites
FADR 200	Drawing I	3	
FADR 204	Drawing II - Drafting	3	FADR 200
FADR 210	Rendering & Perspective Techniques	3	
FADR 215	History of Art	3	
FADR 220	Fundamentals of 2D	3	
FADR 222	Fundamentals of 3D	3	FADR 220

B. Business Requirement

The business requirement course (3cr) is listed in the table below.

Course #	Title	Credits	Prerequisites
BMKT 200	Introduction to Marketing	3	

C. Mandatory Requirements (51 credits)

Course #	Title	Credits	Prerequisites
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INDS 203	Introduction to Interior Design	3	INDS 222
INDS 230	Photography I	3	
INDS 245	History of Architecture & Interior Design	3	FADR 215
INDS 300	Color Theory	3	
INDS 310	Design Studio I: Residential Spaces	3	INDS 203
INDS 311	Design Studio II: Commercial Spaces	3	INDS 310
INDS 315	Methods of Construction & Building Technology	3	INDS 203
INDS 320	Digital Rendering for Interior Design	3	INDS 222
INDS 325	Lighting & Mechanics	3	INDS 315
INDS 330	Furniture Design	3	INDS 315
INDS 340	Textiles, Materials & Finishes	3	INDS 311
INDS 399	Co-op Training Experience	1	ENGL 217; Senior Standing.
INDS 411	Design Studio III: Space, Practicality & Ethics	3	INDS 311
INDS 412	Design Studio IV: Senior Project	3	INDS 411
INDS 415	Senior Project Proposal	3	INDS 311; Co-req: INDS 411
INDS 420	Exhibition Design	3	INDS 320
INDS 425	Professional Practice	3	INDS 411
INDS 430	Product Design	2	INDS 320

D. Elective Requirements

Students are required to take 6 credit hours of elective courses to increase their knowledge in innovative disciplines and current issues related to the field of design.

Course #	Title	Credits	Prerequisites
FADR 230	Ceramics	3	
FADR 300	Painting	3	FADR 220; FADR 204
FADR 310	Silkscreen	3	
FADR 316	History of Islamic Art & Architecture	3	FADR 215
FADR 320	Sculpture	3	FADR 222
GRDS 220	Computer I	3	
GRDS 355	Calligraphy	3	
INDS 232	Photography II	3	INDS 230
INDS 350	Environmental Design & Wayfinding	3	INDS 311
INDS 355	Economics of Taste and Style	3	
INDS 360	Feng Shui Interior Design	3	INDS 311

E. Humanities Elective Requirement

Students are required to take an extra 3 credit hours humanities elective course to fulfill the 5 courses of humanities and social sciences required for accreditation.

F. Co-op Training Experience

Each student must complete 8 weeks of practical training in a professional design outlet mentored by practical designers as they apply the program's outcomes. The Co-op experience is usually fulfilled during the summer term of the third year into the program. The Co-op office matches the Co-op assignment with the student's field of study and employer's interest and need. A faculty member follows up on student's progress throughout the Co-op period by conducting field visits and ensure that student's performance is aligned with his/her aspirations and employer's needs. Students are required to submit a formal report, a poster and makes a formal presentation about their Co-op experience. While ENGL 217 and Senior Standing are the essential prerequisites to pursue the co-op training, the program has the mandate to require stipulate additional conditions.

Study Plan

The Bachelor of Science in Interior Design encompasses 111 credit hours that are spread over 6 semesters and three summer sessions, the last of which is dedicated to the Co-op experience. The following study plan serves as a roadmap for the student's smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
Year 1, Fall Semester (15 Credits)			
FADR 200	Drawing I	3	
FADR 215	History of Art	3	
FADR 220	Fundamentals of 2D	3	
INDS 220	Computer Design I	3	
ENGL 210	English Composition and Rhetoric	3	
Year 1, Spring Semester (18 Credits)			
FADR 204	Drawing II: Drafting	3	FADR 200
FADR 222	Fundamentals of 3D Design	3	FADR 220
FADR 210	Rendering & Perspective Techniques	3	
INDS 222	Computer Design II	3	INDS 220
INDS 245	History of Architecture & Interior Design	3	
ENGL 217	Professional English Writing	3	ENGL 210
Year 1, Summer Semester (9 Credits)			
INDS 203	Introduction to Interior Design	3	INDS 222
INDS 230	Photography I	3	
	Natural Science	3	

Year 2, Fall Semester (15 Credits)			
INDS 310	Design Studio I: Residential Spaces	3	INDS 203
INDS 315	Methods of Construction & Building Technology	3	INDS 203
INDS 300	Color Theory	3	
BMKT 200	Introduction to Marketing	3	
	Humanities Elective/Fine Arts I	3	
Year 2, Spring Semester (15 Credits)			
INDS 311	Design Studio II: Commercial Spaces	3	INDS 310
INDS 335	Design Issues & Sustainability	3	
INDS 325	Lighting & Mechanics	3	INDS 315
INDS 320	Digital Rendering for Interior Design	3	INDS 222
INDS 330	Furniture Design	3	INDS 315
Year 2, Summer Semester (9 Credits)			
INDS 340	Textiles, Materials & Finishes	3	INDS 311
	Humanities Elective/Fine Arts II	3	
	Social Science / Culture Elective I	3	
Year 3, Fall Semester (15 Credits)			
INDS 411	Design Studio III: Space, Practicality and Ethics	3	INDS 311
INDS 415	Senior Project Proposal	3	INDS 311; Co-req: INDS 411
INDS 420	Exhibition Design	3	INDS 311
	Major Elective I	3	
	Social Science / Culture Elective II	3	
Year 3, Spring Semester (14 Credits)			
INDS 412	Design Studio IV: Senior Project	3	INDS 411
INDS 425	Professional Practice	3	INDS 411
INDS 430	Product Design	2	INDS 320
	Major Elective II	3	
	Social Science / Culture Elective II	3	
Year 3, Summer Semester (1 Credits)			
INDS 399	Co-op Training Experience	1	ENGL 217; Senior Standing

Course Description

I. Mandatory Requirements

Fine Arts Courses Requirements

Descriptions of the Fine Arts requirement courses are given below.

FADR 200	Drawing I	3(2,2)
<p>This course is a comprehensive introduction to the art of drawing. Students learn how to represent accurately and proportionally objects, planes, and volumes by developing hand-to-eye coordination with lines, shades and tones; as well as, wet and dry media. The course introduces a wide range of drawing techniques, composition principles, perspective basics and various media to prepare students with the essential ingredients needed to grow in the design field.</p>		
FADR 204	Drawing II: Drafting	3(2,2)
<p>This course introduces the students to the basic skills in architectural drawing employed by architects and interior designers to communicate their designs to clients and contractors. Students will learn to use traditional drafting tools and equipment to create presentation and construction drawings. Through a series of exercises and projects, students will develop the ability to visualize their designs and create line-work and lettering required to present those designs in a professional manner. Prerequisite: FADR 200.</p>		
FADR 210	Rendering and Perspective Techniques	3(2,2)
<p>This course introduces students to perspective techniques in the rendering of three-dimensional objects, and scenes on two-dimensional surfaces. Students learn how to apply perspective drawing, composition and conceptualization as a means of developing visual communication skills. Design, composition, light rendering and perspective are explored to enhance the students drawing and rendering techniques.</p>		
FADR 215	History of Art	3(3,0)
<p>This course explores the major forms of artistic expression from the ancient world to the present from a variety of cultural perspectives. Students learn how to look at and analyze works of art within their historical context, and how to articulate what they see or experience in a meaningful way. This course covers Pre Renaissance, Renaissance, Post Renaissance and the rich layers of 19th and 20th Century Modern Art up until the manifestations of our present day.</p>		
FADR 220	Fundamentals of 2D	3(2,2)
<p>This course focuses on the student's visual awareness through an introduction to the fundamentals of 2-D design elements, which include: line, texture, pattern, tone, form, color, light, partial illusion, balance and proportion. Students explore and experiment with design principles such as repetition, variety, emphasis and movement. This course broadens the understanding of compositional devices, dynamics and methods. It also aims at developing a clear understanding of visual organization, shape interaction and color theory.</p>		

FADR 222	Fundamentals of 3D	3(2,2)
<p>This course is an extension of two-dimensional design concepts into volumetric relationships emphasizing design concepts through structural and sculptural form. Students will work in various media including paper, cardboard, wood, wires, metal and plaster to explore concepts of modularity, sequence and series, relief, contour, structure, symmetry and asymmetry as they relate to the study of forms in nature. Students will also examine the function of space, volume, mass, plane, and line. The main emphasis of this course is the development of critical thinking skills, technical skills and visual aesthetic skills. Prerequisite: FADR 220.</p>		

Business Course Requirement

The Interior design program requires one business course, BMKT 200 described below.

BMKT 200	Introduction to Marketing	3(3,0)
<p>This course covers the full spectrum of Lebanese and international marketing of consumer products and services including market-segmentation, consumer behavior, products, and packaging distribution and promotion. Students will analyze case problems and prepare a marketing plan about a “real-life” product or service. Videos, guest speakers, and class interaction on marketing topics will assist in the learning experience.</p>		

Major Interior Design Courses

Description of the Interior Design courses are given below.

INDS 203	Introduction to Interior Design	3(3,0)
<p>This course introduces students to the fundamental concepts and terminology of interior design through the exploration of basic elements and principles in the field. It focuses on the analysis of space, form and order and its relation to the study and practice of interior design theory and human factors. Students will learn how to develop a design process in order to evaluate and understand existing structures; as well as, increase their technical skills to sketch and actualize their ideas. This course also offers an understanding of the occupational opportunities and the responsibilities of the profession. It is a theoretical and practical course that includes projects as a method of artistic creation. Prerequisite: INDS 222.</p>		

INDS 220	Computer Design I	3(3,0)
<p>This course is an introduction to the principles and uses of computer-aided drafting and design using the most recent version of the AutoCAD software. Students will acquire the technical skills needed to draft 2D architectural plans, sections, elevations, and details.</p>		

INDS 222	Computer Design II	3(3,0)
<p>This course, which is a continuation of Computer Design I, teaches students advanced tools in AutoCAD to create 3-dimensional representations. Students will learn wireframe and solid modeling operations to construct 3-dimensional buildings and spaces using coordinate</p>		

systems, commands and protocols to create realistic perspective drawings and rendered model assemblies. *Prerequisite: INDS 220.*

INDS 230	Photography I	3(2,2)
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This course teaches students the basic principles of digital photography as well as the utilization of photography as a means of documentation for design projects and portfolio pieces. It is a lecture-based course with extensive hands on practical training that covers the basic principles for lighting and setup. Students will learn how to develop an eye for taking pictures of 2D and 3D objects. They will also enhance their knowledge about the different parts of a camera and the mechanism of printing and developing films while continuously scanning other photographers from contemporary and historical scenes.

INDS 245	History of Architecture & Interior Design	3(3,0)
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This course covers the evolution of architecture, interiors, furniture and design from antiquity till present. It includes style developments, significant structures, important contributors as well as the social, political and cultural background. **Prerequisite:** FADR 215.

INDS 300	Color Theory	3(3,0)
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This course explores the power of color and its effect on human experience. The basic elements and principles of color are tackled in order to develop the ability to perceive, express and apply color in design contexts. Students will learn how to choose the appropriate color schemes and combinations for each design project.

INDS 310	Design Studio I: Residential Spaces	3(2,2)
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This studio course focuses on space utilization and organization of residential interior spaces; as well as highlights the importance of integrating the theories of human behavior into the design plan. Students will analyze and understand residential spaces (living spaces, kitchens, bathrooms and support spaces) through projects that include research, concept development, sketching, space planning and design exploration. Students will also acquire knowledge in preparing residential boards, developing their problem-solving skills and enhancing their verbal presentation techniques. **Prerequisite:** INDS 203.

INDS 311	Design Studio II: Commercial Spaces	3(2,2)
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This studio course focuses on space utilization and organization of public and commercial spaces; as well as, highlights the effect of human interaction and visual impact on spatial environments. Students will analyze and understand public and commercial spaces (business, medical, restaurant, hospitality and retail environments) through projects that include research, concept development, sketching, space planning, and design exploration. Through this process, students will be able to investigate spaces, analyze user needs, propose appropriate building and decoration materials and initiate creative solutions to spatial problems while considering cultural, social and aesthetic values. **Prerequisite:** INDS 310.

INDS 315	Methods of Construction & Building Technology	3(3,0)
<p>This course is an overview study of the methods and materials utilized in construction, installation and design of structural and environmental support systems. Students will learn to apply the underlying technical requirements for building systems (mechanical, electrical thermal and moisture protection and fire detection) and how they impact interior design decisions and construction drawings. They will also learn how to evaluate building sites, write surveys, review technical drawings and specifications, estimate budgets and apply the best practices and most efficient materials. In addition, students will explore the implications of design realities, material capabilities, construction tolerances and code limitations and regulations in the construction process. Prerequisite: INDS 203.</p>		
INDS 320	Digital Rendering for Interior Design	3(3,0)
<p>In this course, students will learn to use a variety of professional level computer rendering software programs (AutoCAD, 3D Studio Max, Sketch Up and Adobe Photoshop) to enhance their ability to produce realistic illustrations of 3-dimensional models. It focuses on the production of detailed drawings that accurately represent materiality and spatial quality through realistic lighting and environmental influences. Students will also learn to use computer modeling and rendering as a tool to investigate and evaluate design solutions as part of the design process. Prerequisite: INDS 222.</p>		
INDS 325	Lighting & Mechanics	3(3,0)
<p>This course is a comprehensive study of the principles and theories of both lighting systems and mechanics. Students will learn about the applications of lighting design, lighting specifications, in-depth lighting mathematical calculations, available equipment and fixtures and aesthetic considerations needed to complete installation. Additionally, students will become familiar with different types of heating, ventilation, Ac systems, their installation, design considerations and needs, in addition to plumbing and sanitary systems. Prerequisite: INDS 315.</p>		
INDS 330	Furniture Design	3(2,2)
<p>This course gives an insight into the history of furniture design as well as covers the various construction methods and techniques used in the creation of custom-designed furnishings. Students will acquire the skills needed to design and build furniture that reflect contemporary trends through the exploration of various materials and textiles. Concept, function, form, and materiality are explored through projects and workshops. Prerequisite: INDS 315.</p>		
INDS 335	Design Issues & Sustainability	3(3,0)
<p>This course investigates theoretical and philosophical constructs and design issues related to the study of architecture and design. It highlights the interaction between interior design and other disciplines such as humanities, social sciences and natural/physical sciences. It also</p>		

focuses on the examination of the philosophical and practical principles of sustainable design through exploration of environmental issues, sustainable materials and methods, and professional practice. Students will develop awareness of the implications of design decisions upon the environment and will gain a foundation for evaluation of materials, processes and practices according to the principles of sustainable and environmentally responsible design.

INDS 340	Textiles, Materials & Finishes	3(3,0)
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This course looks into the ways in which interior textiles, materials and surface design change the spaces around us. Students explore various materials as well as construction techniques, finishes, consumer protection and textile specifications for residential and non-residential end-users. The designer's responsibility as related to consumer health, safety and welfare is also explored. Students are required to collect a database for textiles and materials. **Prerequisite:** INDS 311.

INDS 399	Co-op Training Experience	1(1,0)
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Each student must complete 8 weeks of practical training in an area related to his/her field of interest. This Co-op work experience is usually fulfilled during the summer term of the third year into the program. Students are required to submit a formal report, and/or poster, and make a formal presentation about their Co-op experience. **Prerequisite:** ENGL 217 and Senior Standing.

INDS 411	Design Studio III: Space, Practicality & Ethics	3(2,2)
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This course aims at preparing students for the real-life through projects that reveal the various technical and creative considerations that should be looked into. Limitations and restrictions of projects such as client needs, municipal codes & regulations, and others are explored in order to present a clear image of work. Concept development and an understanding of intricate spatial and programmatic requirements are achieved. Students also investigate moving spaces, which are mobile, deployable and compact. **Prerequisite:** INDS 311.

INDS 412	Design Studio IV	3(2,2)
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This course focuses on the full development of the concept proposal written in the senior project proposal course. The senior project should be a comprehensive design, a complete set of architectural drawings, selected details, 3D renderings, and a presentation model. The Senior Project is intended to prepare the student for the demands of the professional market. **Prerequisite:** INDS 411.

INDS 415	Senior Project Proposal	3(3,0)
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In this course, students will research and develop an advanced conceptual framework to inform the direction of the design and presentation of their senior project. It focuses on the development of a comprehensive design concept that is integrated theoretically and spatially through the preliminary development of schematic diagrams and sketches, architectural

drawings and a presentation model. Students will investigate a selected topic in the field of interior design and will conduct an extensive research to propose a final project and present a proper academic paper. **Prerequisite:** INDS 311; **Co-req:** INDS 411.

INDS 420	Exhibition Design	3(3,0)
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This course focuses on the essential technical and professional knowledge and skills needed to create exhibition and conference spaces that effectively disseminate information and content to the public. Exhibition design is based on the psychology of the audience; therefore thinking and behavior have significant impact on the design process. Students learn booth, installation and space layout design; as well as visual communication, lighting and integration of high-tech products. **Prerequisite:** INDS 311.

INDS 425	Professional Practice	3(3,0)
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This course prepares students for office practices and design project management. Students are introduced to the business aspect of the design practice that includes contract documents, associated legal aspects, marketing strategies, professional ethics, staff personnel practices and career planning. Financing, cost-estimate and budgeting are also explored. Students by the end of this course will develop an effective portfolio that has impact in the work field. **Prerequisite:** INDS 411.

INDS 430	Product Design	2(1,2)
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This studio course teaches students to design interior objects while considering form and functionality. The spatial relationship between humans and their environment as well as physical and psychological human factors will be examined to produce products that answer to consumers. Students will learn the product design process, including style, concept, mindset, tradition, culture, and products' meanings and symbols. **Prerequisite:** INDS 320.

II. Elective Courses

Descriptions of the major elective courses are given below.

GRDS 220	Computer I	3(3,0)
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In this course, students will develop a solid foundation of Adobe Illustrator and Adobe Photoshop tools and techniques. Students will learn the difference between vector based and pixel based programs and how to integrate both work fields to produce creative graphics. Moreover, students will receive a brief introduction about Adobe InDesign: work space, function and tools.

FADR 230	Ceramics	3(2,2)
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An introductory studio course that teaches students hand-made and wheel methods of construction for clay. The course includes an examination of clay, glaze, decoration methods,

and firing process. Students will acquire knowledge in making functional as well as sculptural pieces using a variety of techniques. Well thought out forms, designs and functional uses along with good craftsmanship are emphasized.

FADR 310	Silkscreen	3(2,2)
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Silkscreen is one of the most flexible and widely used types of printmaking. The class focuses on various silkscreen techniques taught through demonstrations and specific projects. Images and graphic visuals will be made using hand drawn separations, photographic film, digital separations and photocopied images. Water-based silkscreen inks are used, allowing for soap-and-water cleanup. Students will be encouraged to experiment with multiple techniques and combinations of traditional and contemporary methods.

FADR 316	History of Islamic Art & Architecture	3(3,0)
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This course studies the cultural history of Islamic societies as expressed by their art and architecture from the 7th century to the present. Changes in artistic styles, secular and religious architectural advances and expression of the written word will be compared across time and geography in social and economic contexts. Student will acquire knowledge of the history and development of Islamic art and architecture and will learn how to analyze relationships between artistic form and ideological function. **Prerequisite:** FADR 215.

FADR 320	Sculpture	3(2,2)
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This course explores three-dimensional sculptural forms by modeling, carving, and casting. Students will learn to develop their individual styles and experience the use of various materials and mediums in sculpting. The course focuses on the production of free standing and relief sculptures for specific sites and purposes. **Prerequisite:** FADR 222.

GRDS 355	Calligraphy	3(2,2)
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In this course, students will learn the basics of Arabic calligraphy as defined by Ibn Muqla. The variations of the main Arabic scripts are explained through a set of visual examples. The course touches upon Islamic calligraphy as a communicative and embellishing technique used in the visual arts. The practical aspect of the course explores the techniques and rules of drawing letters of the main standardized Arabic Script. Calligraphy will also be used to create modern visual expressions.

INDS 232	Photography II	3(2,2)
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This course emphasizes the development of a critical eye and the use of photography as a form of self-expression and an artistic medium. Students are expected to have a working knowledge of the photographic process. Students will produce photographs as fine art and refine advanced technical and printing techniques. Students will also learn to use Adobe Photoshop and Adobe Light Room to modify images and enhance their quality. **Prerequisite:** Photography

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FADR 300	Painting	3(2,2)
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This course is an introduction to various painting materials, skills and techniques. It helps students develop an artistic potential to create various moods. Students will learn how to use the brush to create different strokes and how to manipulate color to suit their concepts. Color theory will be discussed in class. The course includes detailed studies from still life, landscape, and the human figure. **Prerequisite:** FADR 220, FADR 204.

INDS 350	Environmental Design & Wayfinding	3(3,0)
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This course highlights the role of design in the field of environmental and architectural work. Students will be exposed to a survey of environmental graphic design to include way finding systems, architectural graphics, signage, exhibit design, identity graphics, civic design, pictogram design, retail and store design, mapping and theme environments. Discourse will focus on form and user experience as it relates to information, environment and cultural context. Students will learn how to design and implement navigational systems for both virtual and physical spaces. **Prerequisite:** INDS 311.

INDS 355	Economics of Taste & Style	3(3,0)
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This course explores international political and environmental factors that influence trends in interior design, architecture and the world of fine and decorative arts. It is an introduction to the market in the fine and decorative arts. Students will learn the differences between cost, value and quality in period furniture, ceramics, glass and textiles and will gain insight into the range of factors that influence purchasing or collecting these objects; such as changing fashions, scarcity, mass-market adaptations, provenance and condition.

INDS 360	Feng Shui Interior Design	3(3,0)
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This course explores the language of Feng Shui and how it can be applied to space planning. Students learn to apply Feng Shui principles like simplicity, chi, bagua, Yin and Yang and five room elements to space design projects. Feng Shui principles increase health and well-being to any space. **Prerequisite:** INDS 311.

FACULTY LIST

Abou Orm, Lara; Lecturer, Ph.D. in Mathematics, 2013, Ecole Nationale supérieure des Mines de Saint Étienne, Saint Étienne.

Al Fatairi, Nour; Instructor, M.Sc., Computer Science, 2011, American University of Beirut Lebanon.

Al Ladan, Mohamad; Professor and Dean, Ph.D. in Computer Engineering, 1995, Syracuse University, USA.

Azzam, Marios; Instructor, M.Sc., Computer Science, 2011, Notre Dame University Lebanon.

El-Abed, Mohamad; Assistant Professor and Chairman, Ph.D., Computer Science, 2011, University of Caen Lower Normandy France.

Bizri, Hadi; Lecturer, MA. Animation, 2010, Savannah College of Arts, Savannah, USA.

Halablab, Mahmoud; Professor, Ph.D. in Microbiology, King's College London, University of London, UK.

Khawand, Janin; Instructor, MFA. Visual Arts, 2011, Alba – Balamand, Lebanon.

Khodur, Dahlia; Instructor, MFA. Fine Arts and Illustration, 2013, Lebanese University, Lebanon.

Muhieddine, Mohamad; Lecturer, Ph.D. in Computer Science, 2009, Rennes 1 University, Rennes – France.

Nasreddine, Elissar; Lecturer, Ph.D. in Applied Mathematics, 2013, Toulouse University, Paul Sabatier, Toulouse – France.

Salami, Houssam; Assistant Professor, Ph.D. in Physics 2007, Lyon 1 University, Claude Bernard, Lyon – France

Srouji, Serene; Chairperson, Assistant Professor, MFA. Design, 2007, University of Texas at Austin, Austin, USA.

Wehbe, Houssein; Instructor, Ph.D., Computer Science, 2011, University of Rennes 1 France.

Vasilchenko, Larissa; Lecturer, Ph.D., in Education, 2007, Kharkov National Pedagogical University, Ukraine.

Zahereddine, Ziad; Professor, Ph.D. in Mathematics 1983, University of London.

Zahrn, Mohamad; Associate Professor, Ph.D. in Mathematics 1995, University of North Texas, Denton - Texas USA.