



Rafik Hariri University
جامعة رفيق الحريري

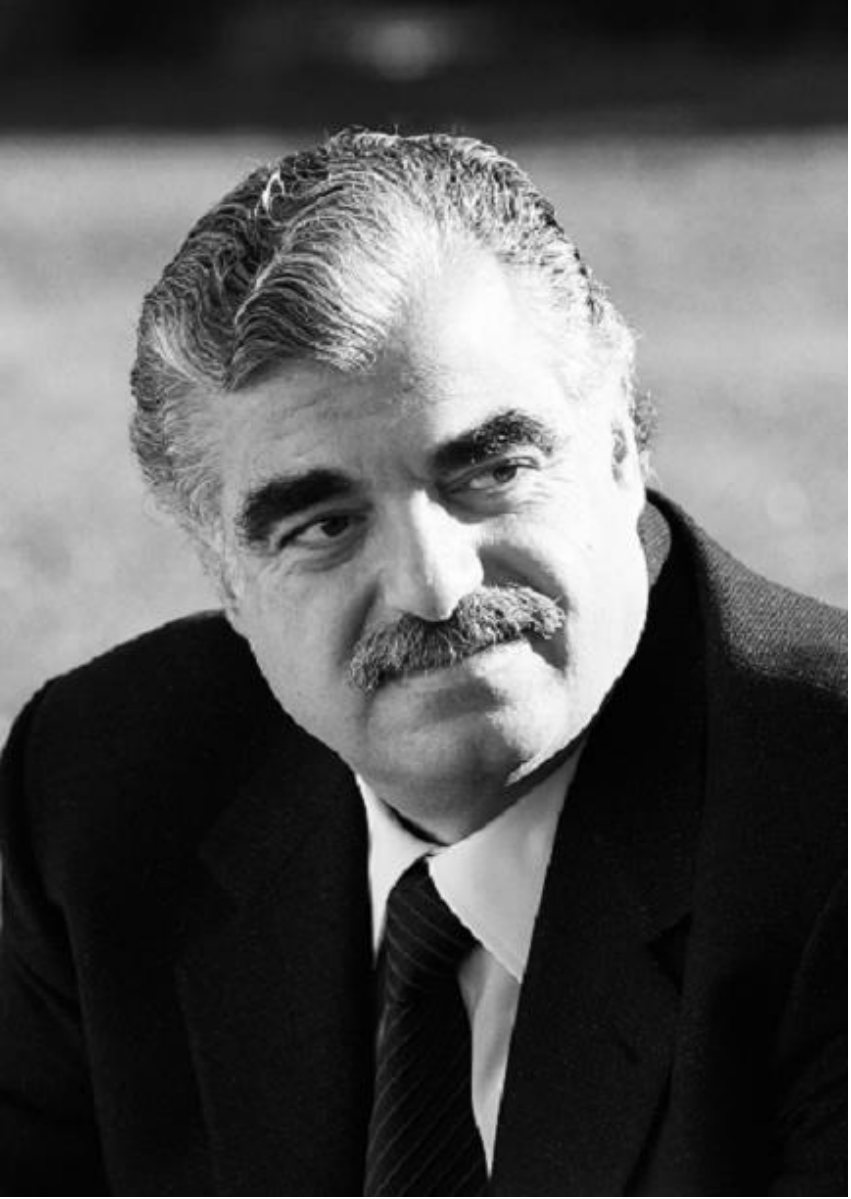
Graduate Catalog — 2026-2027



**RHU for All,
RHU is Here to Stay**

GRADUATE CATALOG

2026-2027



"إن أمني هو فتح أبواب الجامعات والمعاهد العليا أمام المواهب والكفاءات المغمورة"

Notice

The information in this catalog applies to the academic year 2026-2027 as of September 1, 2026. The University reserves the right to make changes to the programs, course offerings, academic requirements, and teaching staff as it deems in the best interests of students, without prior notice.

This catalog conforms to applicable Lebanese laws and the 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 the students from the ramifications **or** penalties that could be incurred due to ignorance.

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You can also view this catalog on the RHU website at:
<https://www.rhu.edu.lb/academics/student-catalog>.

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MESSAGE FROM THE PRESIDENT

As we celebrate our silver anniversary and lay the foundation for our golden anniversary and beyond, a new dawn is rising over Rafik Hariri University (RHU). This dawn brings new winds of change, designed to transform RHU into a stronger and more formidable institution.

The waves of change are at full speed and in constant motion. Soon, RHU will conclude its self-assessment journey and continue reinventing itself and its business model to become a sustainable, agile, and nimble institution.

Guided by a strong vision handed to us by our founder, Prime Minister Rafik Hariri, and overseen by our astute President of the Board of Trustees, Mrs. Nazik Rafik Hariri, RHU affirms its determination to embrace best practices and to become a leading institution of higher learning in Lebanon, the region, and beyond.

At RHU, the student is our number one priority. We are determined to shape futures, impact life journeys, create hopes and opportunities, and inspire students to achieve their dreams. We want students to lead full, rich lives while radiating positive energies. RHU offers more than a great learning experience. RHU broadens horizons and challenges assumptions.

RHU provides world-class curricula in all its Colleges. Our academic programs are second to none and are accredited by the highest bodies in their respective disciplines (ABET, ACBSP, and many more). The RHU Board of Trustees and the institution's leadership are seriously exploring the option of obtaining university-wide accreditation from the top higher education bodies in the United States.

RHU's positive work environment has enabled us to see, hear, and engage one another in a constructive dialogue about the present and future of the university. Such a collegial environment enables our students to observe, acquire, and develop the soft skills (communication, thoughtful inquiry, and responsible leadership) that are increasingly vital in modern workplaces.

Our world-class faculty will continue to raise the bar for academic excellence. New courses, areas of study, and specializations are offered, all intended to equip our students with the necessary skill sets (quantitative, analytical, technical, digital, and intellectual) to be marketplace-ready.

Our alumni continue to make RHU proud. They are entrepreneurs, scientists, researchers, and innovators, and some assume top faculty positions at world-leading institutions. I am humbled by the collective and ongoing contributions of RHU's faculty, staff, students, alumni, and administrators to position RHU as a beacon of hope and excellence.

RHU is determined to build bridges and form new partnerships and strategic alliances with all its internal and external stakeholders. The mission of RHU shall be embedded in and integral to our souls. In due time, we shall all become the change agents Prime Minister Hariri aspired for, capable of turning around individuals who make the world a better place for us all.

I encourage you to take advantage of our open-door policy. Visit our campus, drop by the office of the president, contact us electronically, speak with an advisor, and learn more about the opportunities available to you at Rafik Hariri University.

Sincerely,

Said M. Ladki
President

BOARD OF TRUSTEES

Mrs. Nazik Rafik Hariri, Chairperson

HE Charles Rizk

HE Ghazi Youssef

Dr. Daoud Sayegh

Mr. Mohamad El-Hout

Dr. Farah Tamim Mekkawi

Mr. Fadi Fawaz

Mr. Maroun Al Asmar

Mr. Adib Bassatni

Mr. Ahmad Hijazi

Mr. Ouday El-Sheikh

Dr. Said Ladki, RHU President

ACADEMIC CALENDAR 2026-2027

Fall Semester

Thu	Aug 27	Orientation and Registration / New Students Fall 2026
Mon	Aug 31	Deadline for Payment of Fall 2026 Tuition and Fees
Tue	Sep 1	Classes Begin
Tue - Wed	Sep 8-9	Drop and Add Period
Sun	Nov 1	Founder's Day (Celebrated on Monday, November 2, 2026)
Mon - Fri	Nov 2-6	Advising Week / Spring 2027 for Continuing students
Fri	Nov 6	Last Day to Withdraw from Courses
Mon - Fri	Nov 9-13	Registration Week / Spring 2027 for Continuing students
Sun	Nov 22	Independence Day / Holiday
Tue – Wed	Dec 1-2	Orientation and Registration / New Students Spring 2027
Wed	Dec 9	Last Day of Classes
Thu - Fri	Dec 10-11	Reading Period
Sat – Sat	Dec 12-19	Final Examinations Period
Fri	Dec 25	Christmas / Holiday
Fri	Jan 1	New Year / Holiday

Spring Semester

Wed	Jan 6	Armenian Christmas / Holiday
Fri	Jan 8	Deadline for Payment of Spring 2027 Tuition and Fees
Mon	Jan 11	Classes Begin
Mon-Tue	Jan 18-19	Drop and Add Period
Tue	Feb 9	Saint Maroon's Day / Holiday
Sun	Feb 14	H.E.P.M Rafik Al Hariri Commemoration Day
Tue-Wed	Mar 9-10	Eid Al-Fitr/ Holiday*
Mon – Fri	Mar 15-19	Advising Week / Summer–Fall 2027 for Continuing students
Fri	Mar 19	Last Day to Withdraw from Courses
Mon – Wed	Mar 22-31	Registration Week / Summer –Fall 2027 for Continuing students
Thu	Mar 25	Annunciation Day / Holiday
Fri – Mon	Mar 26-29	Easter Latin / Holiday
Tue	Apr 21	Last Day of Classes
Wed-Thu	Apr 21-22	Reading Period
Fri – Tue	Apr 23 – May 4	Final Examinations Period
Fri – Mon	Apr 30-May 3	Easter Greek Orthodox / Holiday
Sat	May 1	Labor's Day/ Holiday
Fri	May 14	Deadline for Payment of Summer 2027 Tuition and Fees
Sat	Jun 19	Commencement Exercise (Tentative)

Summer Semester

Sun-Tue	May 16-18	Eid El Adha/ Holiday*
Wed	May 26	Classes and Co-op Work Experience Begin
Thu	May 27	Drop and Add Period
Sun	Jun 6	Hijra New Year/ Holiday*
Wed	Jun 30	Last Day to Withdraw from Courses / Co-op
Tues	Jun 15	Ashoura Day / Holiday*
Thu	Jul 15	Classes and Co-op Work Experience End
Mon - Tue	Jul 19-20	Final Examinations Period
Sun	Aug 15	Assumption Day / Holiday

* Tentative dates are pending moon sightings.

P.S. Any changes in public and religious holidays shall be reflected on our calendar in due time.

DIRECTORY

	Location	Extension
President	Block E	400-401
President's Office	Block E	441/442
Vice President for Academic Affairs	Block E	404
Vice President for Development and Information Technology	Block E	403
Vice President for Administration and Finance	Block E	402
Admissions Office	Block E	405/406/407
College of Business Administration	G 101 J	301
College of Engineering	C 103	501
College of Arts and Sciences	I 201	701
Communication and Alumni Relations	B 201	754/755/603
Co-op and Career Services	Block E	414
Digital Media and Design Division	Block I	711/741
Dorm Supervisor	A 112	112
Finance Department	Block E	424/417-419
Graduate Studies and Research	Block B	611
Gymnasium	Block G	330
Health Clinic	I 119	751
Help Desk	Block G	333/334
Human Resources	Block E	787/786
Library	Block E	435
Media Center	Block B	754/755/603
Operator	Block E	0
Purchasing and Procurement Department	Block E	744
Quality Assurance and Institutional Advancement	Block E	443
Registrar's Office	B 102	615/618
Security		290
Store	Block I	752
Student Affairs Office	Block E	770/777
Support Services Department	I 110	740/741



THE UNIVERSITY OVERVIEW

UNIVERSITY ADMINISTRATION

Said Ladki, President

Mahmoud Halablab, Vice President for Academic Affairs

Ibrahim Akkawi, Vice President for Administration and Finance

Board of Deans

Mahmoud Halablab, Vice President for Academic Affairs

Mohammad Taha, Dean – College of Engineering

Anis El Khatib, Dean – College of Business Administration

Houssam Salameh, Dean –College of Arts and Sciences

Admission

Zeina Tannir, Director

Communication and Alumni Relations

Rafal Tabbaa Khayat, Director

Finance Department

Marwa Khanji, Assistant Director of Finance

Human Resources Department

Doriah Naboulsi, Associate Director

Information Technology

Abdul Ghani Baba, Director of IT

Wassim Mallah, Director of Systems

Lina Basho, Assistant Director of IT HelpDesk

Library

Bassima Katerji, Circulation Librarian

Quality Assurance and Institutional Advancement

Mirna Talhouk, Associate Director

Registrar

Nidal Khalaf, Registrar

Student Affairs

Sahar Hallak, Associate Director of Student Affairs

Campus Facilities

Ahmad Sabeh Ayoun, Director

THE UNIVERSITY

History

Establishing an educational institution that was financially and geographically accessible to all was a pressing dream for His Excellency, Prime Minister Rafik Hariri. In the early 1980s, PM Hariri chose Kfar Falous, an area between the South, the Bekaa, and the mountains, to establish a hospital and a university in collaboration with the University of Saint Joseph. However, the 1982 Israeli invasion destroyed the university and stole its equipment.

In 1984, the dream took a different turn with the establishment of the Rafik Hariri Foundation. It is a non-profit organization whose primary goal is to provide Lebanese youth with opportunities for higher education at 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.

Following the end of the civil war in Lebanon, the Rafik Hariri Foundation sought to revive the dream of establishing an affordable and accessible university. Such a massive undertaking required the expertise of a country that had made significant strides in education. Although several educationally advanced countries were considered, Canada was eventually chosen for this collaboration. The programs of study at Rafik Hariri University were developed in association with several Canadian institutions, including the Canadian Bureau of International Education, the Canadian International Development Agency, Capilano University, and Memorial University.

Rafik Hariri University opened its doors for the first time on September 15, 1999, with the College of Business Administration, in accordance with the 1947 Presidential Decree. It began with an initial enrollment of 75 students. After the Colleges of Engineering and Sciences 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. It strives to foster quality, institute authentic learning conditions, and support 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 quality education by committing to due process, academic excellence, and distinction. It shall create conditions conducive to fulfilling dreams,

stimulate imagination, and cultivate a passion for lifelong learning. It shall instill the values of responsible behavior, tolerance, and freedom of self-expression and thought and align learning outcomes with emergent community needs to transcend students' potential, possibilities, and contributions beyond time and distance.

Values

When it comes to values, RHU does not merely pay lip service. It is indeed deeply committed to several core values that it upholds and fulfills:

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 to the promotion of teaching excellence and administrative support.

Integrity. Sustain a community of trust and operate with fairness, honesty, openness, and the highest ethical standards.

Diversity and Tolerance. Create a community that prioritizes diversity and tolerance in academic and civic life.

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

Purposeful Learning. Engage students in a learning experience congruent with individual aspirations and community needs.

Location

RHU enjoys a superb location atop a seaside mountain overlooking the Mediterranean Sea in Mechref, Damour, a short drive from Beirut, Saida, and Mount Lebanon, in the heart of a prestigious gated community.

The RHU campus is 20 kilometers south of Beirut. It covers an area of 54,000 square meters and comprises nine buildings. Seven buildings are used for educational purposes, one for administration, and one for faculty and student residences. The campus also features basketball and volleyball courts, parking areas, a long row of Washingtonian Palm trees, vegetable gardens, a greenhouse, and beautiful open green areas.

RHU began its vegetable gardens in 2021 and selected locations behind Block A, the Dormitory Facility building, and Block G, the College of Business Administration. The landscaping team at RHU leveled the ground reasonably to prevent soil erosion and built a greenhouse for growing warm-season vegetables.

RHU's decision to grow crops is part of its sustainable campus initiative and its efforts to care for the environment. In addition to their aesthetic benefits, plants offer numerous

advantages, including carbon sequestration, oxygen production, flood mitigation, and improved air quality. This also helps reduce the impact of global warming.

RHU's electricity supply comes via three routes: Mains Electrical from the EDL Grid, self-run diesel-oil generators, and the daytime-use RHU Solar-PV plant. A 100-kW-rated solar PV plant is located on the top of three of RHU's buildings, Blocks F, G, and H.

Climate

The Mechref Village in Damour is a residential project spanning elevations ranging from 30 to 560 meters above sea level. The climate is moderately cold from December to March and hot from June to September. Although the classrooms have heaters and air conditioners, students are advised to wear warm clothing during the cold season.

The lush greenery of the RHU campus creates a refreshing atmosphere and further motivates 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 magnificent.

Directions and Map

From Beirut

Take the Beirut Saida Highway south (towards Saida)

Take the Damour main exit (towards Deir Al-Qamar)

Go left at 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 the Campus

From Saida

Take the Beirut Saida Highway north (towards Beirut)

Take the Damour main exit (towards Deir Al-Qamar)

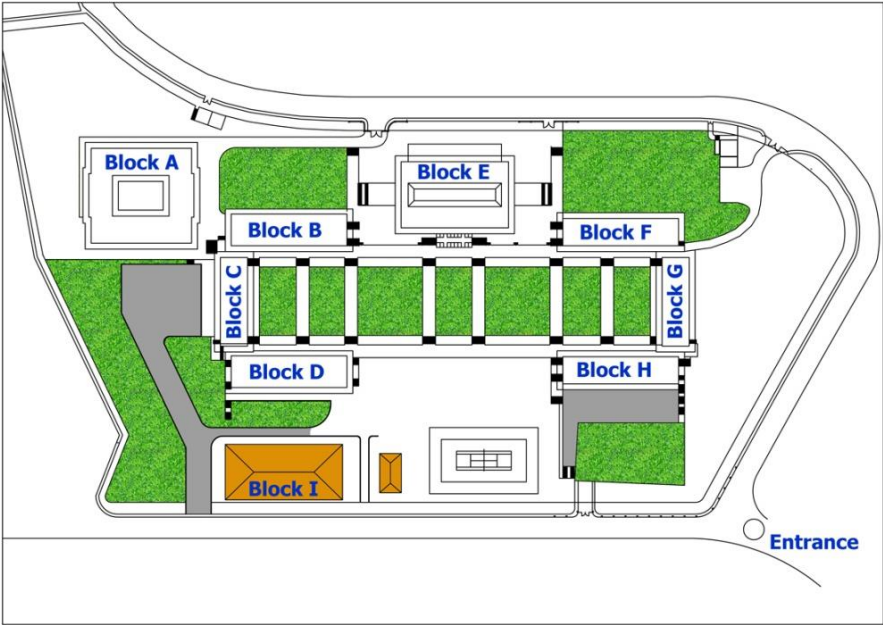
Go left at the roundabout (follow the Mechref Village road sign)

Drive for 300 meters

Take a right at the Mechref Village main gate

Follow the RHU signs leading to the Campus

Map of the RHU Campus



GRADUATE PROGRAMS AND DEGREES

Graduate programs at RHU aim to provide qualified students with a graduate-level experience that helps them realize their potential as they pursue further education. The College of Business Administration grants a general Master of Business Administration (MBA) degree and a Master of Business Administration (MBA) in Oil and Gas. The College of Engineering grants Master of Science (MS) degrees in six engineering programs

The number of credits required to earn an MBA is 36, after completing the 99 credits required for a Bachelor of Business Administration degree.

The minimum number of credits required to earn an MS degree in engineering depends on the undergraduate degree and whether a student follows a thesis or non-thesis path. The programs and the number of credits required for graduation beyond a bachelor's degree are summarized below.

Minimum MS Degree Requirements			
Undergraduate studies		MS Degree Minimum Credits Requirements	
Degree	Credits Earned	Thesis Option	Non-Thesis Option
Bachelor of Science	118 Credits	52 Credits	55 Credits
Bachelor of Engineering	152 Credits	18 Credits	21 Credits

Details on the existing graduate programs, graduation requirements, and pertinent regulations are presented in this catalog.

ADMISSION

Zeina Tannir, Director of the Admissions Office
Sawsan Sheikh Younes, Associate Director of the Admissions Office
Block E
Phone: 00961 25 603090; Ext 405/406/407
E-mail: admissions@rhu.edu.lb
www.rhu.edu.lb/admission

Admission to graduate programs is based on merit. It is offered to applicants holding undergraduate degrees from RHU or other recognized 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 website: www.rhu.edu.lb

The Admissions Office receives applications, communicates with applicants to complete their application dossiers, responds to inquiries, coordinates with academic units and the University Graduate Studies and Research Committee, and conveys admission decisions and related stipulations to applicants. Admission to a graduate program is competitive, and early admission may be offered to students with strong undergraduate records. Applications may be submitted via mail, online, or in person. For details on admission requirements, application deadlines, procedures, and fees for various university programs, please refer to the admission section in this catalog or visit www.rhu.edu.lb/admission/.

Admission Criteria

An applicant with a bachelor's degree from RHU or another recognized institution will be admitted to graduate studies at RHU if the college the applicant proposes to attend deems the applicant to have a high potential for success in the graduate program. Applications are reviewed, and final recommendations are made by the concerned college on a case-by-case basis.

Depending on the record, an applicant is admitted either regularly or on probation.

Regular Admission

Regular admission to a Master's program is granted to a student who:

- Attained an average of 80 at RHU or its equivalent at a recognized institution as determined by the college;
- Has adequate English proficiency as established by the University;
- At least two letters of recommendation from faculty or supervisors familiar with the applicant's academic ability.

Note that the English Proficiency requirement may be waived for students with bachelor's degrees from an English-teaching institution.

Admission on Probation

Acceptance on Probation may be granted to an applicant who meets the regular admission requirements stated above but has an undergraduate CGPA below 80 at RHU or equivalent at other universities as determined by the college. Students admitted on probation may be asked to take prerequisite courses to improve their prospects for success in graduate studies. Credits for background courses do not count toward completing the graduation requirements but are included in the CGPA.

A student accepted on probation must complete at least 12 credits of background (if required) and graduate-level courses, or nine credits of graduate courses, in no more than two regular semesters, pass all courses, and attain a CGPA of at least 80.

Special Admission Consideration

A holder of a bachelor's degree who does not meet the RHU graduate admission criteria but has considerable practical experience is requested to sit for an interview with the College Graduate Studies Committee (CGSC), formed and chaired by the Dean. Based on the assessment of the candidate's aptitude for graduate studies, the CGSC may make one of the following recommendations:

Accept the applicant on probation and require them to take a set of background courses and attain a CGPA of 80 in these courses to continue as a regular student.

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:

Standardized English Exam	Minimum Scores
Institutional TOEFL (ITP)/ RHU In-House TOEFL	550
Internet-Based TOEFL (IBT)	80
IELTS	6.5
SAT Reading and Writing Evidence-Based	22/ 530+

Students who fail to attain the requisite score must enroll in the Intensive English Language Program (IELP) to achieve the required level of English proficiency. The IELP consists of four levels, and the student is placed at the appropriate level based on the English proficiency examination score. A student can skip ENGL 101 if they attain the required score for ENGL 210 stated above.

RHU recognizes an Institutional TOEFL score as valid for 1 year from the date the test was taken. However, the IBT score, SAT (writing section), Digital SAT, and IELTS score are valid for 2 years.

When registering for TOEFL and SAT, applicants must specify the RHU code 4438 for the results to be sent to the RHU Admissions Office.

Transfer of Credits

Transfer Graduate Students

Graduate credits earned in a recognized institution other than RHU can be transferred subject to the following rules on a case-by-case basis:

- Attained a grade of 80 or above;
- A maximum of 12 credits is transferred for graduate credits beyond a Bachelor of Science in Engineering or a Bachelor of Business Administration.

Transfer of Credits from One Master's Degree to Another

Graduate courses taken beyond the courses required for a master's degree at RHU may be transferred to another master's degree program at RHU. The following conditions apply: (1) The applicant earns an 80 or above in the courses to be transferred; (2) A maximum of six credits may be transferred if courses are relevant to the new graduate program. Approval from the department concerned and the GSRC is required for all transfers.

Application Package

To be considered for admission to graduate studies at RHU, applicants must submit the following documents (RHU graduates are not required to submit the documents of items 1 through 5):

1. A certified copy of the undergraduate degree and its equivalence from MoHE;
2. Official transcripts attested recently by MoHE and the university catalog;
3. A certified copy of the Lebanese Official High School Certificate or its equivalent;
4. Sit for the RHU English Entrance Exam or submit one of the standardized English Competency Exams.
5. Two letters of recommendation;
6. Certified copy or Original Personal Civil Status Record (for Lebanese applicants);
7. Copy of Lebanese Identity card.
8. Photocopies of passport and residence permit (for non-Lebanese Applicants);
9. Three identical recent passport-size colored photos;
10. A non-refundable application fee of USD 30 is paid in cash at RHU or any branch of BankMed.

Tuition Fees

The Board of Trustees determines the University's tuition and fees annually. Tuition and fees may increase annually without prior notice. Tuition and fees are currently posted on the University's website: www.rhu.edu.lb.

Tuition	LBP	USD
College of Business Administration		
Undergraduate Program		
<i>Per credit</i>	4,000,000	176
Graduate Program		
<i>Per credit</i>	5,300,000	226
College of Engineering		
Undergraduate Program		
<i>Per credit</i>	5,800,000	268
Graduate Program		
<i>Per credit</i>	8,100,000	295
College of Arts and Sciences		
Undergraduate Program		
<i>Per credit</i>		
Graphic Design	4,500,000	205
Computer Science; Health Care Information Systems	4,000,000	189
Other Programs		
Freshman Program (Sciences /Arts)		
<i>Per credit</i>	4,000,000	173
Intensive English Language Program (IELP)		
<i>Per level</i>		
IELP 085	5,800,000	340
IELP 095	5,800,000	340
IELP 100	4,000,000	200
Fees		
Enrollment ¹		150
Deposit ²		150
NSSF ³	8,400,000	
Service Fees		
<i>Per semester</i>		250
<i>Per summer session</i>		125
Deferred Payment ⁴		
<i>Per semester</i>		20
CO-OP		220
BADM 290		220
Late Registration		20

Late Payment ⁵		
On each installment	3,000,000	30
Transportation / Parking (Optional)		
Regular Shuttle ⁶		
<i>Per semester (Deferred over two installments)</i>		480
<i>Per summer session</i>		240
Parking Fee		
<i>Per semester Car/Motorbike</i>		80/20
<i>Per summer session Car/Motorbike</i>		40/10
Dormitory/Housing (Optional)		
Double room in a shared apartment, fall or spring semesters (Block- A)		850
Double room in a shared apartment- summer semester (Block A)		425
Single room -fall or spring semesters (Block A)		1100
Single room - summer semester (Block A)		550
Single room -fall or spring semester (Block F)		1200
Single room - summer semester (Block F)		600
Dorm Deposit ⁷		100
Dorm Late Payment Fees (minimum) ⁸		25

¹ Enrollment: fee paid by new students upon the decision to join RHU and credited to the statement of fees of the first semester.

² Deposit: Paid by new students upon the decision to join RHU and refunded only upon graduation.

³ NSSF subscription: An annual fee payable by Lebanese students who are not registered with NSSF.

⁴ Deferred Payment: Payments of tuition fees will be scheduled over four installments for the fall and spring semesters and two installments for the summer semester

⁵ Late Payment Fee: An additional charge for any installment not paid by the established deadline.

⁶ Regular Shuttle Fee: Beirut <-> RHU ; Saida <-> RHU ; (Mokhtara <-> RHU ; Iqlim <-> RHU when applicable).Non-refundable from week two.

⁷ Dorm Deposit Fee: Refunded to the student upon the decision to leave the facility and only when the room furniture and assets are handed in free of damage.

⁸ Dorm Late Payment: An additional Charge that may reach \$100 upon excessive delay in payment. If the due fees are not paid, the residency will not be renewed.

Payment Methods

Students must pay all tuition balances and other university fees by the announced deadlines to avoid late payment fees and the risk of courses being dropped. Once the student registers for a course, he/she shall remain accountable for all applicable tuition 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 in cash by the announced deadlines through one of the following methods:

1. At any branch of Bank Med

2. RHU Finance Department

Each student must download the statement of fees from RHU's Student Information System (SIS), print it, and present it to the Bank/Finance Department at the time of payment.

All student payments will be automatically deferred over four payments for the fall and spring semesters and over two for the summer semester.

Tuition Refund

In case any student has decided to drop an **already** paid course (s), the following will be applied:

1. During the drop-and-add period, paid fees for dropped course(s) will be credited to the student's statement of fees in full.
2. After the drop-and-add period, no refund will be applied unless the student withdraws due to emergent circumstances. Refer to the withdrawal section of the catalog for more information.

If a student decides to withdraw from the University officially, then the following will be applied:

1. If a student had paid the full tuition and fees:
 - Before the official beginning of classes, 75% of the tuition and fees are refunded
 - On the first day of classes and during the Drop and Add period, 50% of the tuition and fees are refunded
 - After the Drop and Add Period, no refund
2. If a student is benefiting from the deferred payment program, no refund of tuition and fees is applicable

Clearance and general deposit refund

Upon completing the graduation requirements, the student must fill out a clearance form, which can be obtained from the registrar's office. The general deposit can be refunded upon completing the form and securing the required signatures.

The dorm deposit is refundable upon graduation & leaving the dormitory facility.

P.S. All deposits will be refunded after deducting any outstanding balances.

REGISTRAR'S OFFICE

Nidal Khalaf, Registrar
Amani Baasiri, Assistant Registrar
Block B
Phone: 00961 25 603090, Ext: 615/618.
Email: 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 the CampusVue Student 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 secure 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

After consulting with their academic advisors, students must register for the courses they intend to take during the registration period noted in the academic calendar, as presented in this catalog and posted on the University website at www.rhu.edu.lb/. During the registration period, academic advisors assist students in preparing course schedules by completing the Course Registration Forms and activating their personal online CampusVue registration. Copies of the Course Registration Forms must be sent to the Registrar's Office after the drop/add period to verify students' schedules and for 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 registration, the student must print the statement of fees and pay all applicable tuition and fees by the announced deadlines. Failure to meet financial commitments may result in the class being dropped from the schedule.

National Social Security Fund (NSSF)

The Lebanese Law mandates that all Lebanese students be registered with the NSSF. This requirement does not apply to non-Lebanese students. A Lebanese student admitted to RHU must complete the Social Security Application form 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 the Student Services section for more information on NSSF matters.

Passport and Visa

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

ACADEMIC REGULATIONS

Once accepted into a graduate studies program, the following regulations apply:

Period of Study

All requirements for the master's degree must be completed within a maximum period of four years after admission to the graduate program. Extension beyond the maximum allowed study period requires justification and approval by the CGSC and the VP of Academic Affairs.

Orientation

During the first semester of graduate studies, the relevant department will arrange a meeting to explain graduate studies policies and help graduate students become acquainted with the faculty and their research interests. This is intended to help expedite students' selection of a project topic and advisor.

Supervision

During the first semester of graduate studies at RHU, the relevant department shall designate an interim academic adviser to guide students in planning their course of study for the semester and acquaint them with the graduate studies policies and procedures. By the end of the first semester, each student must choose an advisor, prepare a study plan, and complete the GS-1 form.

Courses and Grades

Courses taken as part of a student's graduate study program fall into two categories: background and graduate courses.

Background Courses

Students accepted to a graduate program may be required to take a set of background courses, usually undergraduate courses that do not carry graduate credit but are required to address any deficiencies in the student's background. The following conditions apply to background courses:

- The number and level of prerequisite courses are part of the plan of study set by the college at the time of admission.
- Background courses must be registered for first if offered.
- A student may repeat a course for which a grade less than 80 is earned only once.
- A maximum of two background courses may be repeated for grade improvement.

Failure to meet these conditions results in the student's automatic dismissal from the graduate program.

Graduate Level Courses

The minimum passing grade for a graduate course is 70. Students in the graduate program must maintain a cumulative average of at least 80 in all courses taken for graduate credit.

Course Load

The maximum course load for a graduate student is 12 graduate credits per regular semester. Students on probation may register for up to 9 credit hours per semester. Students employed during their graduate studies are strongly advised not to take more than six credits.

Plan of Study

By the end of the first semester, a graduate student and their Academic Advisor must complete the Proposed Program of Study form (GS-1), including a tentative study plan. This program of study is submitted to the Chairperson of the concerned Department for approval and then to the Dean of the College. Once approved, this document becomes part of the student's permanent record.

Academic Standing

Regular Standing

Regular standing status is attributed to a graduate student who maintains a cumulative GPA of 80 or above and has not failed any course.

Warning

A student receives an academic warning if their SGPA in any regular semester falls below 75, provided they maintain a CGPA of 80 or above and have not failed any course.

Academic Probation

Academic Probation is imposed on a student who fails a course taken for graduate credit and/or has a CGPA below 80. After being placed on probation, academic probation must be removed in two regular semesters. During this period, all failed courses must be repeated and successfully passed. If a failed course was not offered during the probation removal period, it must be successfully repeated upon its first offering.

Repeated Courses

A graduate course may be repeated only once.

Dismissal

Dismissal from the graduate program applies to a student who:

- Attains a Semester GPA less than 70;
- Fails to remove probation in two consecutive regular semesters, irrespective of the number of earned graduate credits;
- Failed a course more than once;
- Placed on probation more than once.

Graduate Assistantship

Rafik Hariri University (RHU) offers limited merit-based assistantships to graduate students under the Graduate Assistant (GA) Program every term, excluding summer. This scholarship provides limited financial support to qualified graduate students in recognition of the services they render to the University. Refer to the department chairperson for more information and to submit an application.

Graduation Requirements

To be eligible for graduation with a master's degree, a graduate student must have:

- Completed the credit hours of coursework required by the program;
- Completed the thesis/project requirements and submitted a copy of the thesis/project to the library;
- Met the period of study requirements;
- Passed all courses; and
- Attained a CGPA of at least 80.

Note: Please refer to the related college section for additional college requirements that may apply.

LIBRARY

Block E

Phone: 00961 25 603090; Ext: 435

E-mail: library@rhu.edu.lb

www.rhu.edu.lb/library

The Library at Rafik Hariri University supports students, faculty, and staff with the resources and services they need to succeed in their educational and research undertakings. The library was founded in 1999. The building occupies more than 650 square meters of space, offering users ample study and computing commons, halls for meetings, seminars, conferences, and classrooms. The library adheres to international standards and implements modern technologies across all functions and services. The RHU library provides academic programs with books, journals, and multimedia resources. It also has a modern IT infrastructure, which includes:

- An integrated library system, WMS (WorldShare Management Services)/ OCLC, that embeds all library functions, services, and auxiliary tools that can be accessed on and off campus.
- Workstations located in the reference area and connected to the Internet to access online catalogs, e-databases, Turnitin, and other resources
- A multimedia room equipped with state-of-the-art modern tools, computers, video projectors, data shows, CD writers, scanners, etc.
- Wireless connectivity covers all library spaces.

RHU continues to develop branding and library resources and services in response to changes and emergent needs, participates proactively in the enrichment of the educational experience, improves information technology and multimedia assets, repurposes available space to accommodate changing library roles, improves community outreach and branding, and improves administrative structure and commits to due process.

Information Resources

The RHU Library collections 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, such as books and periodicals, the library holds a collection of electronic resources and multimedia materials (including open-access databases). The library home page provides links to full-text online databases, e-journals, e-books, research databases, and online catalogs. 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 cataloged according to Dewey Decimal Classification 21 and MARC21 formats and standards for building bibliographic databases.

Library Services

The library staff assists users in using library resources and responds to inquiries received in person, by phone, by email, or through the library home page electronic forms. The staff also organizes specific training sessions to help users improve their skills in searching and retrieving relevant information. Faculty, students, and staff with valid ID cards may borrow library materials in accordance with the circulation policy. Faculty members may request books and other materials to be placed on reserve for students to use within the library premises for a period of time. Computer commons provide users with on-site access to and retrieval of resources. Media resources, copiers, and printers are available inside the RHU Library. Prepaid cards may be purchased to use the printing and photocopying machines.

Also, to expand resources beyond those available on campus, improve services, and support research, the RHU Library joined the Interlibrary Loan Consortium and signed an agreement with the Baakline National Library. These agreements will facilitate resource sharing among libraries by supplying books, e-book chapters, articles, and other materials.

Interlibrary Loan

RHU students can borrow free of charge books, documents, and articles that are available in the libraries of the American University of Beirut, Beirut Arab University, Haigazian University, Lebanese American University, Middle East University, Notre Dame University-Louaize, United Nations - Economic and Social Commission for Western Asia, Université Saint-Esprit de Kaslik, Kaslik, Université Saint-Joseph de Beyrouth, and University of Balamand.

Baakline National Library

RHU students can visit the Baakline National Library and borrow books, documents, and articles free of charge.

Library Clearance

To obtain library clearance, all graduates must submit a soft copy of their senior projects in RHU Library format (Turabian format). Graduates should also ensure that all books and other borrowed materials are returned to the library before clearance.

INFORMATION TECHNOLOGY DEPARTMENT

IT Helpdesk
Phone: 00961 25 603090 Ext: 333
E-mail: 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. It actively engages the teaching and learning processes by introducing multimedia solutions and mobile technologies, creating a smart classroom environment, and supporting effective utilization of the learning management system.

The IT Department is dedicated to supporting the administrative divisions by adopting technologies that enhance users' productivity in executing University functions and managing all University information systems. A key part of this support is the department's responsibility for maintaining and upgrading all hardware, software, and applications that run the University's academic and administrative functions. The IT Department also oversees infrastructure planning and maintenance, as well as related projects.

Operation and Network Services

The IT Department operates a cutting-edge Data Center that serves as the backbone of our IT infrastructure. This center houses the computers and related telecommunications and storage systems, including the latest-generation servers, Virtual Desktop Infrastructure, Storage Area Networking, and Intrusion Prevention System. It operates redundant power sources, data communications connections, and security devices, ensuring the reliability and security of our IT services.

The center includes numerous servers that provide all students, faculty, and staff with 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, and student and faculty dorms. The Gigabit Ethernet fiber-optic backbone network is connected to the Internet via a 150 Mbps line to provide bandwidth for quality services. The network has over 840 voice/data points and 40 or more wireless access points covering all university buildings. At present, nearly 400 computers make up 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,

administering, supporting, and providing service management for the University Enterprise Resource Planning (ERP), including the Student Information System (CampusVue), student accounting, finance, payroll, human resources systems, library and archiving systems, staff work log system, and an ID card system. Furthermore, the MIS manages information flow and generates reports for various university divisions to support planning and decision-making.

University Website

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

Management of the website through a 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 a Student Information System, Moodle, an Online Payment System, Surveys and Voting, an Alumni Section, the latest Press Releases, Events and News, Careers, Downloadable Applications, and more.

Instructional and Classroom Technologies

A team of dedicated specialists provides technology-aided teaching that meets the learning needs of faculty and students. It maintains multimedia assets in more than 32 classrooms and intelligent classrooms. The team manages Moodle – a Learning Management System (LMS) - which provides the platform through which faculty and students actively engage with course material and improve students' ability to attain expected learning outcomes. New tools simplify the creation of online courses and enable the conversion of documents into dynamic objects.

IT Helpdesk Support Services

The IT Helpdesk team provides a wide range of support services for RHU students, faculty, and staff to ensure that technology-aided teaching, learning, and administrative processes run smoothly. These services include, but are not limited to, support for all IT peripherals (hardware and software) in offices, classrooms, and computer labs; user account management; e-mail services; internet and Wi-Fi services; file-sharing management; surveillance camera management; access control management; ID card printing; etc.

The Helpdesk team utilizes the Ticket Management System “TMS” as the primary communication channel with RHU faculty and staff members. TMS provides a transparent and interactive platform for staff and faculty members to send and save

requests (tickets) to report incidents and follow up on them. Also, TMS provides a space for end-users to provide satisfaction feedback on the service they receive from the ITC personnel in each ticket.

QUALITY ASSURANCE AND INSTITUTIONAL ADVANCEMENT

Ms. Mirna Talhouk, Associate Director
Block E
Phone: 00961 25 603090, Ext. 443
E-mail: gaia@rhu.edu.lb
www.rhu.edu.lb/gaia

Established in 2014, the Quality Assurance and Institutional Advancement (QAIA) Office plays a pivotal role in fostering a culture of excellence, accountability, and continuous improvement across the university. The office is dedicated to enhancing institutional effectiveness through evidence-based decision-making, strategic planning, and rigorous quality assurance practices.

QAIA serves as a central hub for collecting, analyzing, and utilizing institutional data to support academic and administrative units in achieving their goals. By aligning quality assurance efforts with institutional priorities, QAIA ensures consistency, transparency, and innovation in all aspects of university operations.

Core Functions

- **Institutional Research & Data Analytics**
Design and implement surveys, focus groups, and assessment tools to gather and analyze data that informs strategic decisions using the “Blue” system.
- **Reporting & Insights**
Develop comprehensive reports for university leadership to guide planning, policy development, and performance evaluation.
- **Institutional Effectiveness Coordination**
Harmonize assessment activities across academic and administrative units to ensure alignment with institutional outcomes and standards.
- **Data Quality & Governance**
Identify gaps in data collection and utilization and establish protocols to ensure data integrity and reliability.
- **Knowledge Management**
Promote the effective use of internal and external assessment data to support continuous improvement and informed decision-making.
- **Evaluation & Assessment Frameworks**
Design and update evaluation methodologies tailored to different program categories and validate development plans for quality assurance.
- **Accreditation Support**
Provide guidance and resources to academic units in preparing for national and international accreditation processes.

STUDENT AFFAIRS

Mrs. Sahar Hallak, Assistant Director
Block E
Phone: 00961 25 603090 Ext. 770/777
Email: studentaffairs@rhu.edu.lb
www.rhu.edu.lb/studentaffairs

The Student Affairs Office is responsible for many functions that support the nonacademic aspects of university life, improve students' potential for academic success, and help them attain a meaningful, holistic experience. The Office manages student clubs, 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 handling Work-Study and Financial Aid Programs. A brief overview of the various functions and services is presented below.

Cultural, Social, and Artistic Activities

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

Counseling and Coaching

The Student Affairs Office aims to create conditions that promote students' social and psychological comfort, essential to achieving academic success. The Student Affairs Office supports students in overcoming obstacles and challenges during their university experience. The office organizes seminars and workshops to raise students' awareness and help them develop skills to cope with social, psychological, and emotional challenges. The office also provides one-to-one counseling to help students address personal issues and anxieties and make appropriate decisions. For more information, please contact the Student Affairs Office at studentaffairs@rhu.edu.lb or 00961 25 603090, Ext: 777.

Student Representations

We at RHU strongly believe in students' participation in the decision-making process on issues that matter to them. The Student Representative Committee (SRC) was

established to ensure that students' voices, opinions, and concerns are heard and influence the outcomes of related decisions. Elections are held annually, and students choose their representatives on the SRC transparently and democratically.

Student Housing

There are two 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 provide comfortable, safe housing for international students and dorm 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 broadband WiFi coverage.

The University is keen to make the on-campus living experience an opportunity to strengthen ties and build lifelong friendships among all students. The Student Affairs Office organizes sports, cultural, and social events exclusively for students living on campus. For more information on housing services, please contact us at studentaffairs@rhu.edu.lb or 00961 25 603090, Ext: 777.

Athletics and Recreation

RHU's indoor sports center and outdoor tennis, football, and basketball courts provide ample opportunities for students, faculty, and staff to participate in their favorite sports and hobbies and to train. 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 the Athletic Department at 00961 25 603090, Ext: 330.

Ushers

This program trains student volunteers and involves them in organizing university-sponsored events and conferences on and off campus. Ushers play a vital role in the success of open-house activities, graduation ceremonies, and orientation for new students. Ushers are trained to guide students, parents, and guests and make them feel at ease during their visit to the campus. Contact us at studentaffairs@rhu.edu.lb or 00961 25 603090; Ext: 777.

Transportation

Free bus shuttles transport students from the dormitory to the highway in Damour. Shuttle bus services are available to transport students to and from the RHU campus from several areas in Lebanon.

The buses run the routes several times per day. For more information about the bus schedule, please contact the Student Affairs Office at studentaffairs@rhu.edu.lb or 00961 25 603090, Ext: 777.

Student Centers

There are student lounges where students can relax and enjoy activities such as chess, ping-pong, and other forms of entertainment. Each dorm also has two common rooms, one for social gatherings and the other for studies.

Food Services

The cafeteria at Rafik Hariri University serves a variety of traditional and international cuisines at reasonable prices throughout the day and into the evening. RHU also has ample, comfortable indoor seating areas where you can enjoy your meal amid picturesque natural surroundings.

Health Care

The University Medical Clinic has a resident nurse who provides preliminary healthcare services to RHU students, faculty, and staff around the clock. The clinic is in Block “I” next to the bookstore. Ambulance services are also available around the clock if 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 be informed of any modifications after that,
- receive constructive feedback on coursework within a reasonable timeframe;
- be assessed on the merits of academic performance without prejudice or other discrimination;
- ensure the confidentiality of academic and personal information;
- access all information and documents;
- express an opinion and convey grievances without fear of retribution; and
- protest the violation of rights, appeal a judgment deemed unfair, and receive and understand related decisions;

And expects students to accept ***the responsibility to:***

- understand, comply with, and safeguard the University by the laws and the student code of conduct;
- set a purpose and drive to achieve it;
- study hard to learn and commit to forever learning;
- know the 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 of 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 use natural resources wisely; and
- Represent the University with honor and professionalism.

Expected Conduct

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

1. Work hard and intently engage in the educational experience.
2. Speak out respectfully 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 benefit.
7. Never cheat or claim credit for work that is not your 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

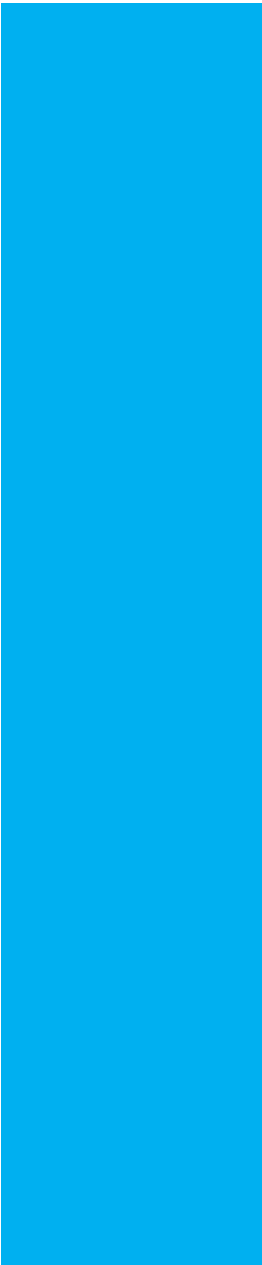
The University allows students to partially support themselves by working up to 8 hours per week. In addition to earning a modest income, the Work Study (WS) program helps students gain work experience, improve communication skills, and increase future job prospects. For more information, please contact the Office of Student Affairs at studentaffairs@rhu.edu.lb or call 00961 25 603090, Ext: 777.

Financial Aid Program

RHU believes every student should have the full opportunity to continue their education, regardless of their living conditions. For that purpose, RHU offers financial assistance to qualified students who cannot afford their tuition. For inquiries about this program, please contact the Student Affairs Office at studentaffairs@rhu.edu.lb or call 00961 25 603090, Ext: 777.

RESEARCH

In line with its mission, RHU aims to create conditions that promote quality research with the potential to advance knowledge and improve human conditions. Upon the recommendation of the Vice President for Academic Affairs (VPAA), the President appoints a graduate studies and research coordinator (GSRC) to ensure the achievement of that aim. The GRSC, while working closely with academic units, shall coordinate graduate studies and research efforts, follow up on graduate students' progress and needs, identify and seek both internal and external multidisciplinary collaborative research routes, manage the evaluation of the research proposals submitted by faculty members for university and external funding, tap external funding opportunities, and assist the VPAA in articulating and enforcing graduate studies and research policies.



COLLEGE OF BUSINESS ADMINISTRATION

COLLEGE OF BUSINESS ADMINISTRATION (CBA)

Officers of the College

Said Ladki	President
Mahmoud Halablab	Vice President for Academic Affairs
Anis El Khhatib	Dean

Contact Information

Ms. Alaa Hariri
Administrative Assistant
Building G, Room 101-G
Phone: 00961 25 603090, Ext. 301
Email: da_bus@rhu.edu.lb

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 now offers six undergraduate business programs: Accounting, Business IT Management, Finance and Banking, Human Resources Management, Management, and 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 in Oil and Gas Management.

The faculty is active in applied research across several business domains and related areas, focusing on developing solutions to real-world community problems. To that end, and in partnership with governmental entities, civil society, trade associations, and the private sector, the College actively engages in outreach initiatives to support community development and prosperity.

In 2019, the CBA became the first Lebanese university to earn full ACBSP accreditation for all its degrees and programs. This great achievement represents an internationally recognized certificate of rigorous, high-quality education in accordance with international standards and best practices.

Finally, the CBA distinguishes itself by its systematic COOP Work Experience program, which allows its students to gain real-world work experience, and its Community Engagement Experience program, which enables students to develop leadership skills through hands-on 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 students' lives through graduate and undergraduate business education, advance knowledge through applied research, and positively impact society's pursuit of development and prosperity.

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

The College undertakes its mission within a higher education philosophy that emphasizes proficient technical know-how in a specialized area, reinforced by core knowledge of key business functional areas, and grounded in the 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 pursuing excellence in everything we do. Key to this pursuit are our innovative initiatives, ideas, and efforts.

Ethical and Socially Responsible Conduct

The College makes every effort to ensure awareness of and adherence to ethical and socially responsible norms.

Tolerance and Diversity

The College is committed to highlighting and raising awareness of tolerant mentalities that accept and respect differences. Moreover, the College recognizes and promotes the enrichment that comes from diverse individuals, communities, ideas, and perspectives.

Personal Initiative and Individual Responsibility

Leaders and professionals dare 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 conducting its affairs in the spirit of teamwork and collaboration. Furthermore, the College opens 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.

College Learning Goals

In line with 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 outcome of this transformation: graduates capable of becoming agents of human progress.

Accordingly, the College's general learning objective is to equip its students with the values, knowledge, competencies, and skills needed to make a positive impact in whatever they do in life. These values, knowledge, competencies, and skills are as follows:

General and Specialized Knowledge

Knowledge of the main business functional areas (CLG1)	Students will acquire basic knowledge of the main functional areas of business, which is necessary to understand the general business environment and its interrelationships.
Specialized knowledge (CLG2)	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.

Communication

Effective communication (CLG3)	Students will acquire the ability to communicate effectively, orally and in writing, across various professional environments and settings.
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Critical Thinking

Analysis and critical thinking (CLG5), 4	Programs and activities in the College will involve learning settings that require students to apply analytical and critical thinking tools and methods.
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Ethics and Social Responsibility

Ethical and socially responsible conduct	The college will ensure that its students are exposed to learning opportunities that will allow them to
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CLG5	improve their recognition and awareness of ethical dilemmas and socially responsible behaviors.
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MBA PROGRAM

Program Overview

The Master of Business Administration (MBA) program at the College of Business Administration (CBA) is a graduate program, carefully crafted and continuously reviewed and updated, to enable students interested in advanced studies to pursue their ambitions while contributing to the betterment of society and humanity.

The program blends contemporary theories with real-world applications and best practices, aligned with international standards and expectations. Accordingly, teaching methods and approaches emphasize the case method, learning by doing, and thoughtful integration of online and information technologies.

Moreover, the program's breadth and depth are designed to ensure that graduates may join the business world upon graduation or pursue more advanced academic and/or applied studies.

Mission

The MBA program's mission is to create a sustainable learning environment conducive to developing professional managerial leaders who are able and willing to add economic and social value to society and humanity in whatever contexts they live or serve.

Specialization Options

Students admitted to the MBA Program may choose their emphasis as either General Business Management or Oil and Gas Management. An undergraduate degree in business is not necessary to pursue studies in either emphasis area, as background and/or remedial courses may be provided to compensate for a possible lack of fundamental business knowledge, in accordance with the admission requirements specified below.

General Business Management: Student Learning Goals and Outcomes

Managerial Dimension

Goal 1: Demonstrate knowledge of contemporary and modern strategic planning and management.

Outcome 1: Use strategic management tools such as SWOT to evaluate the strategic position of a business organization.

Professional Dimension

Goal 2: Demonstrate the ability to tackle business problems and communicate business information effectively.

Outcome 2: Apply problem-solving tools to various business situations.

Outcome 3: Prepare and deliver presentations, projects, and research reports.

Economic Value Dimension

Goal 3: Demonstrate the ability to integrate aspects from various functional business domains to arrive at plausible solutions.

Outcome 4: Identify and assess the various functional aspects of a business case or situation and propose appropriate solutions.

Social Value Dimension

Goal 4: Demonstrate awareness of the necessity to contribute to the betterment of society.

Outcome 5: Reflect on how business can contribute to society's well-being.

Oil and Gas Management: Student Learning Goals and Outcomes

Managerial Dimension

Goal 1: Demonstrate knowledge of contemporary and modern strategic planning and management, especially concerning the petroleum industry.

Outcome 1: Use strategic management tools, such as SWOT, to evaluate the strategic position of a business organization, with an emphasis on the petroleum industry.

Professional Dimension

Goal 2: Demonstrate the ability to tackle business problems in the petroleum industry and the skills to communicate business information effectively.

Outcome 2: Apply problem-solving tools to various business situations in the petroleum industry.

Outcome 3: Prepare and deliver presentations, projects, and research reports.

Economic Value Dimension

Goal 3: Demonstrate the ability to integrate insights from various functional business domains to develop plausible solutions to problems in the petroleum industry.

Outcome 4: Identify and assess the various functional aspects of a business case or situation and propose appropriate solutions.

Social Value Dimension

Goal 4: Demonstrate awareness of the necessity to contribute to the betterment of society.

Outcome 5: Reflect on how business can contribute to society's well-being.

Admission Requirements

All applicants to the MBA program must first satisfy the university graduate admission requirements specified in this catalog.

Regular Admission

Applicants with a Bachelor of Business Administration degree or equivalent in any business area who meet the university graduate admission requirements for regular admission will be granted regular admission to the MBA program and will be exempt from any background and/or remedial courses.

Admission on Probation

Applicants admitted on probation to either of the two emphasis options may be required to take up to three background and/or remedial courses, in addition to the MBA program requirements, to improve their chances of completing the MBA program. The number and nature of background and/or remedial courses are determined by the College's graduate admission committee on a case-by-case basis, depending on the strength of the applicant's file, professional work experience, and undergraduate transcript.

Admission to Students with Non-Business Undergraduate Degrees

Applicants with undergraduate degrees in areas other than business may be required to take up to 6 background and/or remedial courses, in addition to the MBA program requirements, to ensure they have the foundational business knowledge needed to complete the MBA program successfully.

The five courses generally include one foundational course in each of the following areas: Accounting, Finance, Economics, Management, Marketing, and Quantitative Methods. The number and nature of background and/or remedial courses are determined by the College's graduate admission committee on a case-by-case basis, depending on the strength of the applicant's file, professional work experience, and undergraduate transcript.

Program Requirements

MBA program requirements consist of mandatory core business knowledge courses (21 credits), elective specialization courses (12 credits), and an MBA capstone research project (3 credits). Moreover, students majoring in oil and gas management are required to complete a 1- to 2-month practical training period at various petroleum industry companies and organizations. All in all, students are required to complete 36 credits to graduate. The mandatory Core Business Knowledge Courses (21 Credits) are listed below:

Course	Title	Credits
BADM 505	Business Research Methods	3
BADM 515	Quantitative Modeling for Business	3
BECN 500	Applied Business Economics	3
BFIN 520	Corporate Financial Planning	3
BMGT 500	Strategic Planning and Business Policy	3
BMKA 510	Strategic Marketing Management	3

In addition to the above six mandatory courses, students on the General Business Management track must take BACC 500 – Strategic Managerial Accounting, and students on the Oil and Gas Management track must take BACC 505 - Accounting for Oil and Gas.

MBA Research Project

Students in any MBA program are expected to complete their MBA studies by completing a capstone research project. The project topic is selected by the students and the project advisor and is expected to involve research into a pertinent contemporary issue. The student must present their work in a formal report.

Study Plans

MBA: General Business Management

Course	Title	Credits
Year 1, Fall Semester (9 Credits)		
BECN 500	Applied Business Economics	3
BADM 505	Business Research Methods	3
	Business Management Elective	3
Year 1, Spring Semester (9 Credits)		
BFIN 500	Corporate Financial Planning	3
BACC 500	Strategic Managerial Accounting	3
	Business Management Elective	3
Year 2, Fall Semester (9 Credits)		
BADM 515	Quantitative Modeling for Business	3
BMGT 500	Strategic Planning and Business Policy	3
	Business Management Elective	3
Year 2, Spring Semester (9 Credits)		
BMKA 510	Strategic Marketing Management	3
BADM 590	MBA Research Project	3
	Business Management Elective	3

MBA: Oil and Gas Management

Course	Title	Credits
Year 1, Fall Semester (9 Credits)		
BECN 500	Applied Business Economics	3
BADM 505	Business Research Methods	3
BMGT 530	Overview of the Global Oil and Gas Industry	3
Year 1, Spring Semester (9 Credits)		
BFIN 500	Corporate Financial Planning	3
BACC 505	Accounting for Oil and Gas	3
BECN 525	Energy Policy and Economics	3

Year 1, Summer (0 Credits)		
BADM 585	Practicum	0
Year 2, Fall Semester (9 Credits)		
BADM 515	Quantitative Modeling for Business	3
BMGT 500	Strategic Planning and Business Policy	3
BMGT 510	Advanced Project Management	3
Year 2, Spring Semester (9 Credits)		
BMKA 510	Strategic Marketing Management	3
BADM 530	Oil and Gas Law, Contracts and Negotiations	3
BADM 595	MBA Research Project in Oil and Gas Management	3

Courses Descriptions

Descriptions of these courses are given below:

BACC 500	Strategic Managerial Accounting	3(3,0)
This course investigates the important role accounting systems and information play in business management, planning, control, and decision-making. Topics include cost concepts, behavior, and estimation; theory of constraints; cost-volume-profit analysis; activity-based costing; capital budgeting; and profit planning.		

BADM 505	Business Research Methods	3(3,0)
This course is about using business research to support business and management decisions or to pursue more advanced graduate studies in business. It mainly covers the development, implementation, analysis, and reporting of research proposals. While the course covers qualitative research, it generally emphasizes quantitative research, particularly surveys.		

BADM 515	Quantitative Modeling for Business	3(3,0)
This course introduces students to the use of management science to support business decision-making. The focus is on quantitative tools and techniques that facilitate decision-making, such as linear programming, transportation problems, project management, inventory models, waiting line models, decision analysis, and forecasting.		

BECN 500	Applied Business Economics	3(3,0)
Business Economics combines microeconomic tools with management methods for effective decision-making. It mainly covers quantitative demand analysis, optimization, consumer behavior, production, cost analysis, market structures, and pricing.		

BFIN 520	Corporate Financial Planning	3(3,0)
This course exposes students to the firm's financial management for value maximization. That includes capital budgeting, capital structure, and working capital management. The course starts with an intensive review of the main corporate finance principles, followed by advanced-level coverage of capital budgeting, capital structure		

and leverage, dividend policy, long-term debt, financial forecasting, and working capital policy.

BMGT 500	Strategic Planning and Business Policy	3(3,0)
This course offers students deep insight into the strategic management process and its influence on an organization's competitive advantage. Students will develop a comprehensive management viewpoint that integrates their knowledge of specific business functions and enables them to formulate and implement strategy. The course covers vision, mission, and objectives, environmental analysis, strategy formulation, implementation, and evaluation.		

BMKA 510	Strategic Marketing Management	3(3,0)
This course immerses you in the core principles and practices of successful marketing plans and strategies. Topics include creating a marketing strategy within the overall business strategy, exploring the marketing mix, competitive dynamics, value pricing, and integrating digital, brand, and business strategies. The course emphasizes customer relationship management and the conversion of Big Data into value and profit.		

BACC 505	Accounting for Oil and Gas	3(3,0)
This course covers the fundamentals of oil and gas accounting. Topics include non-drilling exploration costs, drilling and development costs, proved and unproved property costs, asset retirement and asset impairment, oil and gas revenue accounting, oil and gas taxation, and oil and gas disclosures.		

Elective Courses - General Business Management Program (12 credits)

Students in the general business management program elect four specialization courses in addition to the mandatory core business knowledge requirements detailed above. Below are several elective specialization courses, along with their descriptions.

BECN 505	Globalization and International Business	3(3,0)
This course offers a thorough conceptual understanding of globalization and its implications for business and economic policymaking. In addition to pointing out globalization's challenges and opportunities, the course examines the interconnections among globalization, markets, governance, global business, and economic policy.		

BECN 515	Environmental Economics	3(3,0)
This course will focus on the balance between the environment and economic prosperity. Due consideration is given to the efficient and equitable use of environmental resources, including air, water, land, parks, and wildlife. The use of such resources is examined from several perspectives, including the market, efficiency, equity, and government policy.		

BECN 520	Emerging Markets	3(3,0)
The course contributes to understanding the trend towards transformation into open-market economies while building accountability within the system. This includes		

reforming the price system, including labor market prices and exchange rate regimes, and legal reform, including business laws, to enhance competitiveness and equal opportunities.

BFIN 505	Portfolio Theory and Investment Analysis	3(3,0)
This course covers modern portfolio theories, asset allocation models, and methods for effective investment decisions. It covers investment strategies and management processes, short- and long-term investment objectives, financial instruments selection and timing, trading practices, performance evaluation, the Capital Asset Pricing Model, and the Efficient Market Hypothesis.		

BFIN 510	International Business Finance	3(3,0)
This course covers the international financial management environment and country risk analysis, foreign exchange and derivatives markets, and FX risk management. It also deals with ways to finance multinational corporations and manage their working capital. In addition, it covers foreign investment analysis with special emphasis on FDI. The course includes an in-depth review of several contemporary case studies.		

BFIN 515	Commercial Bank Management	3(3,0)
The emphasis of this course is on commercial bank management policy and decision-making. The analysis focuses on advanced asset-liability management approaches and addresses banking risk management issues, including interest rate, liquidity, credit, operational, and capital adequacy risks. Topics include performance, maturity, duration, and gap management.		

BMGT 505	Contemporary Management and Internal Organization	3(3,0)
This course examines how successful organizations use management to convert strategy into reality. It describes the management levels, managers' skills, and their functions. It elaborates, using contemporary management tracks, on the four management functions with special reference to leadership.		

BMGT 510	Advanced Project Management	3(3,0)
This course is intended to equip graduate students to manage mega projects and to provide advanced knowledge of the latest techniques across various areas of project management, including project selection and planning, cost estimation and pricing, contracts and procurement, scheduling, and resource management. PMI standards will serve as a reference point for instruction. Real project casework will be provided and used for teaching and demonstration.		

BMGT 520	Corporate Governance	3(3,0)
This course deals with optimizing economic outcomes through corporate governance processes. Corporate governance is how a corporation is directed, administered, and controlled. The balance of power between the corporation and its environment (the stakeholders) is well studied in this course.		

BMGT 525	Entrepreneurship and Investment Capital	3(3,0)
Great business ideas will remain ideas unless the proper resources are allocated to transform them into business reality. This course discusses how business opportunities are created by matching entrepreneurs with capital. Students will examine how venture capitalists evaluate, value, and structure new entrepreneurial investments. Another aspect of this course is how venture capitalists manage their funds.		

BMGT 535	Ethics and Social Responsibility	3(3,0)
The purpose of this course is to enable students to make ethical business decisions by providing a framework for identifying, analyzing, and resolving ethical issues. In addition, social responsibility is an important part of a firm's business strategy. Issues such as the balance between business and social benefits, the role of sustainability in business strategy, and the importance of stakeholder relationships will be discussed.		

BMGT 540	Organizational Leadership and Behavior	3(3,0)
This course comprehensively analyzes individual and group behavior in organizations, with an emphasis on leadership. Its purpose is to provide an understanding of how organizations can be managed more effectively while enhancing the quality of employees' work life. Topics include motivation, rewarding behavior, stress, individual and group behavior, conflict, power and politics, decision-making, communication, and organizational change and development.		

BMGT 545	Operations and Supply Chain Management	3(3,0)
This course teaches students how to manage the operations involved in creating and distributing goods and services, which increasingly take place outside traditional enterprise settings. This study includes analyzing processes, ensuring quality, creating value, and managing the flow of information, products, and services across a network of customers, enterprises, and supply chain partners.		

BMKA 515	Branding and Franchising	3(3,0)
Students will learn to develop a brand strategy and analyze, evaluate, and manage brands for maximum effectiveness. The course also examines brand planning, brand equity, brand architecture, and different brand strategies. Franchise management issues and strategies for maintaining and strengthening brand identity through franchising will also be analyzed.		

BMKA 520	Digital Marketing	3(3,0)
Digital marketing has evolved from a peripheral element of organizational marketing to the hub of customer-centric communications in an increasingly multi-channel environment. This course explains the principles of digital marketing and the key factors involved in implementing, measuring, and evaluating successful campaigns that use digital marketing channels.		

BADM 580	Graduate Independent Studies in Business	3(3,0)
This course is designed to enable students to deepen their knowledge and competence in emerging business topics and issues through independent research under the supervision of a full-time faculty member. The student and the faculty supervisor will agree on specific issues, topics, and requirements.		

Elective Courses - Oil and Gas Management Program (12 Credits)

Students in the oil and gas management program must take the four specialization courses listed below, their descriptions, and the mandatory core business knowledge courses.

BADM 530	Oil and Gas Law, Contracts and Negotiations	3(3,0)
This course covers the legal rules that govern the development of privately owned mineral rights, which often also apply to government-owned resources. It covers the nature, protection, and conveyance of oil and gas rights, as well as leasing and taxation. In addition, the course covers the structure and different types of oil and gas contracts.		

BECN 525	Energy Policy and Economics	3(3,0)
This course covers the economics of various energy resources, with an emphasis on oil and gas. Students will be exposed to how market mechanisms shape the demand for and supply of energy. Moreover, the course examines energy cost structures and analyzes the relationship between energy consumption and macroeconomic performance and economic growth.		

BMGT 510	Advanced Project Management	3(3,0)
This course is intended to equip graduate students to manage mega projects and to provide advanced knowledge of the latest techniques across various areas of project management, including project selection and planning, cost estimation and pricing, contracts and procurement, scheduling, and resource management. PMI standards will serve as a reference point for instruction. Real project casework will be provided and used for teaching and demonstration.		

BMGT 530	Overview of the Global Oil and Gas Industry	3(3,0)
This course presents a descriptive and analytical overview of the oil and gas business. It addresses a wide range of topics organized around the oil and gas industry value chain, from exploration to products sold to consumers. Topics include upstream, midstream, and downstream aspects such as exploration, development, production, transportation, trading, refining, and marketing.		

MBA Research Project

Students in the MBA program with an emphasis in General Business Administration are expected to complete their MBA studies by completing a capstone research project, as described below.

BADM 590	MBA Research Project	3(3,0)
The MBA Research Project is a self-directed study undertaken by the student under the close supervision of a faculty member. The project is a capstone experience that integrates knowledge from various business areas as part of a complete research process designed to address a business issue agreed upon between the student and the faculty supervisor.		

By contrast, students in the MBA program with an emphasis in Oil and Gas Management are expected to complete their MBA studies by completing an oil-and-gas capstone research project, as described below.

BADM 595	Oil and Gas Research Project	3(3,0)
The Oil and Gas Research Project is a self-directed study undertaken by the student under the close supervision of a faculty member. The project is an oil-and-gas capstone experience. It integrates knowledge from various areas as part of a comprehensive research process designed to address an oil and gas issue of mutual interest agreed upon by the student and the faculty supervisor.		

MBA Oil and Gas Practicum

Students enrolled in the Oil and Gas Management program must complete a practical training practicum as described below.

BADM 585	Oil and Gas Practicum	0(0,3)
The Oil and Gas Practicum is 1–2 months of practical training performed at petroleum industry companies. The purpose is to enable the student to gain firsthand experience in the oil and gas business and develop a practical appreciation of the industry in general.		

Faculty List

Abou Ltaif, Samar; Lecturer, Ph.D. in Business Administration, European University Cyprus, 2024.

Al Majzoub, Mohamad; Assistant Professor, Ph.D. in Business Management, VGTU, 2023.

Diab, Bassel; Lecturer, Ph.D. in Economic Informatic, Bucharest University of Economic Studies, 2021.

Chaaban, Bahige; Assistant Professor, DBA, Grenoble École de Management, 2018.

Daher, Maya; Assistant Professor, DBA, Nottingham Trent University, 2011.

El Khatib, Anis; Assistant Professor, Ph.D. in International Business, International School of Management, 2018.

El Hajj, Mohamad; Lecturer, Ph.D. in Management & Economic Sciences, Université de Poitiers, 2015.

Hagopian, Alexan; Lecturer, DBA, University Lyon III Jean Moulin, 2024.

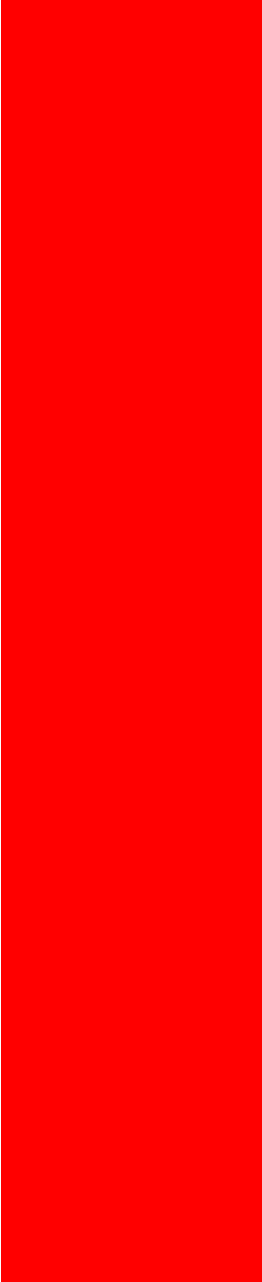
Hajj Omar, Maha; Lecturer, DBA, Paris School of Business, 2023.

Hammoud, Jamil; Ph.D. in Economics, École des Hautes Études en Sciences Sociales (EHESS), Paris, France, 2003.

Nasreddine, Ghalia; Associate Professor, Ph.D. in Information Technology and Systems, University of Technology of Compiègne, France, 2009

Srouf, Zeinab; Assistant Professor, Ph.D. in Management (Finance) & Applied Mathematics, University of Rennes 1 & LU, 2019.

Tarabay, Mohamad; Associate Professor and Chair, DBA in Finance, Grenoble École de Management, Grenoble, France, 2010.



COLLEGE OF ENGINEERING

COLLEGE OF ENGINEERING

Officers of the College

Said Ladki	President
Mahmoud Halablab	Vice President for Academic Affairs
Mohamad Taha	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 now offers six undergraduate engineering programs: Biomedical, Civil, Computer and Communications, Electrical, Mechanical, and Mechatronics Engineering. Fully accredited by the Lebanese Ministry of Higher Education, the College works with each department to achieve accreditation by the Engineering Accreditation Commission of ABET – the most prestigious accrediting agency worldwide.

The College also features active research programs in several engineering areas. In this regard, master's degree programs are available in all six programs. 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 undergraduate and graduate programs.

Overview

The College of Engineering at RHU was established to address a perceived gap in high-caliber yet affordable higher education in technology and related fields. The college strives to employ learning methodologies that transform incoming students into 21st-century leaders in their respective fields. Furthermore, the college stresses the importance of balancing knowledge, skills, and application. To that end, specialized Labs, modern classrooms, 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 incubator for innovation that serves Lebanon, the region, and the world.

Mission

The College of Engineering's mission is to provide quality professional education in a learning environment conducive to transformation, enabling 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 revising 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: 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 programs leading to a Master of Science Degree (MS).

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 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

All applicants to the MS program must first satisfy the university graduate admission requirements specified in this catalog.

Regular Admission

Applicants who meet the university graduate admission requirements for regular admission will be granted regular admission to one of the six graduate programs and will be exempt from any background and/or remedial courses.

Admission on Probation

Applicants admitted on probation may be required to take background and/or remedial courses, in addition to the graduate program requirements, to treat any deficiencies in their background. The number and nature of background and/or remedial courses are determined by the College's graduate admission committee on a case-by-case basis, depending on the strength of the applicant's file, professional work experience, and undergraduate transcript.

Admission of Students with Non-Engineering Undergraduate Degrees

Applicants with undergraduate degrees in fields other than engineering may need to take bridging courses, in addition to the graduate program requirements, to ensure they have the foundational engineering knowledge needed to complete the graduate program they intend to join. The number and nature of background and/or remedial courses are determined by the College's graduate admission committee on a case-by-case basis, depending on the strength of the applicant's file, professional work experience, and undergraduate transcript.

Degree Requirements

To earn an MS degree in any engineering discipline, students must complete 170 credits for the Thesis Option or 173 credits for the Non-Thesis Option.

Minimum MS Degree Requirements			
Undergraduate studies		MS Degree Credits Requirements	
Degree	Credits Earned	Thesis Option	Non-Thesis Option
Bachelor of Science Degree	118 Credits	52 Credits	55 Credits
Bachelor of Engineering Degree	152 Credits	18 Credits	21 Credits

In addition to the general graduation requirement for RHU graduate degrees, the following conditions shall also apply:

1. MS students with the thesis option may not register for more than three credits in Thesis II.
2. An MS student with a non-thesis option may not register for the Capstone Project before the second semester of his study.
3. Although not recommended, MS students may take ENGR600 as a co-requisite with Thesis I or the Capstone Project.

A minimum of one calendar year of residence is required for graduation.

Graduate Studies Options

Graduate students may pursue one of two options: the Thesis option or the non-thesis option. The requirements for each option beyond the completion of all BE degree requirements are as follows:

Thesis Track

- Research Methods Course (3 credits)
- 600-level Technical Elective courses (6 credits)
- Thesis work (9 credits)

Non-Thesis Track

- Research Methods Course (3 credits)
- 600-level Technical Elective courses (15 credits)
- Project-based work (3 credits)

Master Project

In partial fulfillment of the requirements for the MS degree (non-thesis option), a student must complete a three-credit project selected by the student and advisor and approved by the Dean in consultation with the College Council.

Master Thesis

In partial fulfillment of the requirements for the MS degree, a student must submit a thesis based on original, independent research. The thesis must be in English. The thesis timeline and regulations are briefly discussed below. The thesis consists of 9 credits encompassing two parts: Thesis I (3 credits) and Thesis II (6 credits). Students must work closely with their thesis advisor to complete the thesis during the semester in which they register for Thesis II. If more time is needed to complete the thesis work, the student may be allowed to register for Thesis II one additional time at no cost. The student must pay for the credits for any registration beyond the second time. Thesis I & II can only be registered during regular semesters (fall or spring).

Timeline

The following tables summarize thesis regulations and completion deadlines.

Table 1: Steps towards Thesis Completion			
	Date	From to complete	
Orientation	The first week of the first semester		
Plan of study	At the end of the first semester	(GS-1)	
Thesis committee formation	The end of the 1st semester		
Thesis proposal	See Table 2	(GS-2)	
Thesis defense	See Table 2	(GS-3)	
Thesis copy to the library	See Table 2		
Table 2: Deadlines for completing a thesis			
	To graduate in		
Deadline for	August	December	May
Approval of thesis proposal and committee	Apr 30	Sept 15	Jan 15
Thesis defense	July 15	Dec 15	Apr 30
Deposit of the thesis at the library	July 25	Dec 24	May 10

Committee

Normally, the thesis advisor is chosen from the department's full-time professorial faculty. The thesis advisor and the graduate student must form the thesis committee. The committee shall comprise the thesis advisor as chairperson and at least two other members from the RHU academic community. At least two of the thesis committee members must be members of the student's department. Committees can include up to four members. The additional member could be from RHU, an industry, or an institution other than RHU. All academic committee members should hold professorial rank. The thesis committee approves the thesis topic and research program and conducts the thesis defense examination. The Dean shall approve the thesis committee in consultation with the CGSC.

Proposal

Once the plan of study is approved, the student must submit a proposal to the CGSC that has been approved by the thesis committee and the department chairperson at least two weeks before the CGSC meets. The proposal must include thesis objectives, Scope of work with relevant literature review, Research methodology, expected findings, and expected graduation date.

The Proposal Cover Page Form (GS-2) must be submitted with the proposal. The CGSC will decide on the proposal on the following dates: April 30 for students graduating in August, September 15 for students graduating in December, and January 15 for students graduating in May.

The CGSC's decision is communicated to the student through their thesis advisor.

It is the student's responsibility to keep members of the thesis committee informed of the progress of their work and to seek their feedback.

Format

The required thesis format is explained in the Thesis Manual, which is available at the RHU Library. The thesis manual provides instructions for preparing a thesis. Theses that do not conform to the requirements of the thesis manual will not be accepted. An abstract of no more than 350 words must be submitted.

For all matters not discussed in the manual, theses must follow the form and style described in the latest edition of K. L. Turabian, *Manual for Writers of Term Papers, Theses, and Dissertations* (University of Chicago Press), or any other form specified by the department or program, provided this conforms to the manual.

Defense

A graduate student may not have their thesis defense until they have completed at least 30 credits of the master's degree requirements and obtained permission from the thesis advisor.

A final draft of the thesis must be prepared in consultation with each thesis committee member. The final draft of the thesis must be submitted to each member of the thesis committee at least two weeks before the thesis defense date.

The thesis defense should occur at least four months after the GC approves the proposal. The deadlines for the thesis defense for students who wish to graduate in August, December, or May are July 15, December 15, and April 30, respectively.

The thesis defense will be open to the public and announced at least one week in advance. The total time allocated for the thesis defense should allow time to answer all questions and normally not exceed 90 minutes.

The thesis defense results shall be reported on Form GS-3, signed by the chairperson and members of the thesis committee. The department's chairperson submits this form to the Registrar, along with a copy of the plan of study form (GS-1), indicating the

graduate courses completed by the student and the grades earned. If the student fails the thesis defense, they may resubmit and defend it after at least 3 months; a second failure results in automatic dismissal from the thesis work.

After the successful defense of the thesis, the department chairperson recommends to the GC that the student be granted the master's degree. A student must be registered for Thesis II in the semester in which they are expected to graduate.

Thesis Grade

The Thesis grade is P for Pass and F for Fail. If the thesis committee deems the thesis work exceptional, they may recommend that the department grant the student a commendation reflecting the exceptional outcome of their work.

Submission of the Thesis to the Library

After passing the thesis defense, the student must submit two hard copies and one soft copy of the thesis to the RHU Library to complete the clearance procedure and receive the degree from the Registrar's Office. The thesis should be complete, including the abstract and the signatures of the thesis committee members.

Study Plans

In the following sections, the study plan for each MS program offered in the College of Engineering is presented, followed by the descriptions of the associated 600-level courses.

Civil Engineering Program

The following study plan summarizes the courses and credit distribution for the Master of Science (MS) in Civil Engineering. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
ENGR 600	Engineering Research Methods	3	
CIVE 690	Capstone Research Project (non-thesis)	3	ENGL 217
CIVE 695A	Thesis I (thesis)	3	Co-req: ENGL 217
CIVE 695B	Thesis II (thesis)	6	CIVE 695A
CIVE 6xx	Technical Elective I	3	
CIVE 6xx	Technical Elective II	3	
CIVE 6xx	Technical Elective III (non-thesis option)	3	
CIVE 6xx	Technical Elective IV (non-thesis option)	3	
CIVE/MECH 6xx	Technical Elective V (non-thesis option)	3	

A. Engineering Research Methods

The MEHE mandates the research methodology course. All MS-bound students must take this course. However, the specific experiences organized around the general topics may be tailored to meet the program's needs. The Engineering required course is described below.

ENGR 600	Engineering Research Methods	3(3,0)
This course introduces students to quantitative and qualitative methods for engaging in meaningful research. At the end of the course, students will attain skills in research intent and design, methodology and technique, format and presentation, and data management. Throughout the course, the student's ability to use this knowledge to become a more effective researcher will be developed. In particular, the student will be able to develop a hypothesis about a research problem and develop related questions; frame the problem with the correct research methodology; collect data that accurately addresses the research problem; measure the effectiveness of a solution methodology; analyze data to make informed decisions; provide technical documentation of all the phases of a research project; evaluate the feasibility of research proposals; and present data to support decisions in front of stakeholders.		

B. Research Project/Thesis

CIVE 690	Capstone Research Project	3(3, 0)
A capstone course that requires group work in one of the Department's emphasis areas. The project is to be carried out under the supervision of a full-time faculty member. It culminates in a formal written and oral report (refer to the college guidelines on the graduation project's structure and content). Prerequisite: ENGL 217.		

CIVE 695A	Master's Thesis I	3(3, 0)
Includes guided review of research literature and/or pilot work relevant to the thesis topic. By the end of this course, the candidate for the MS degree should have established a hypothesis, a research methodology, and a work schedule to complete their thesis. A brief oral and written report is expected at the end of the course and should be approved by the research advisor(s). (This course may be repeated only once to accomplish its objective). Co-requisite: ENGL 217.		

CIVE 695B	Master's Thesis II	6(6, 0)
Continuation of CIVE 695A. Includes the completion and submission of a research thesis, the quality of which is judged acceptable by the jury committee established in accordance with the College of Engineering and Graduate Committee guidelines. (This course may be repeated only once to accomplish its objective). Prerequisite: CIVE 695A.		

C. Elective Courses

As part of the Master of Science in Civil Engineering program, the student is required to take a total of 6 credit hours (12 credit hours for the non-thesis option, plus 3 credit hours for the Capstone Project) of 600-level technical elective courses. These courses allow the student to attain in-depth knowledge and understanding in a focused area of interest. The student who chooses the non-thesis option can mix and match elective courses from different areas to gain a broader understanding of Civil Engineering disciplines. The thesis option student should, in coordination with the thesis advisor, select the set of electives that best meet the requirements for the successful completion of their thesis. The available technical elective courses in CIVE are distributed in three areas:

1. Structures, Materials, and Geotechnical Engineering
2. Water & Environmental Engineering
3. Public Works, Construction Management

It is highly recommended that students take elective courses from the list below after completing the mandatory requirements in their respective areas. Students may select technical electives from other programs, subject to the thesis committee's approval.

The list of recommended technical electives is given below.

Course #	Title	Credits	Prerequisites
Structures, Materials, and Geotechnical			
CIVE 611	Plastic Analysis of Structures	3	CIVE 507
CIVE 613	Advanced Reinforced Concrete	3	CIVE 415
CIVE 614	Retaining Structures	3	CIVE 424
CIVE 615	Soil and Site Improvement	3	CIVE 424
CIVE 616	Advanced Construction Systems	3	CIVE 415, CIVE 417
CIVE 617	Soil Strength and Slope Stability	3	CIVE 423
CIVE 642	Bridge Engineering	3	CIVE 415, CIVE 424
Water & Environmental Engineering			
CIVE 672	Environmental Impact Assessment	3	

CIVE 673	Irrigation and Drainage Engineering	3	CIVE 536
CIVE 674	Environmental Policy and Management	3	
CIVE 675	Hydraulic and Hydrologic Modeling	3	CIVE 536
Public Works & Construction Management			
CIVE 604	Infrastructure Asset Management	3	Senior Standing
CIVE 605	Decision Making and Risk Management	3	MATH 351
CIVE 642	Bridge Engineering	3	CIVE 415,424
CIVE 643	Advanced Highway Engineering	3	CIVE 342, CIVE 415
CIVE 644	Airport Engineering	3	CIVE 342

Courses Description

Structures, Materials, and Geotechnical

CIVE 611	Plastic Analysis of Structures	3(3,0)
Concepts of plastic analysis, plastic hinges, incremental load method (step-by-step), mechanism method, upper- and lower-bound and uniqueness theorems, combined mechanisms, beams, multistory, multi-bay, and gable frames, computer implementation. Prerequisite: CIVE 507. On demand.		

CIVE 613	Advanced Reinforced Concrete	3(3,0)
Design of reinforced concrete walls: walls designed as compression members; empirical design method; alternative design of slender walls; shear walls; and precast concrete. Distribution of forces among members, member design, structural integrity, connection and bearing design, strength evaluation of existing structures, and reinforced concrete arches. Prerequisite: CIVE 415. On demand.		

CIVE 614	Retaining Structures	3(3,0)
Lateral earth pressures: at-rest, active, and passive states; limit equilibrium methods and the theory of elasticity; seismic conditions; hydrostatic and seepage pressures. Retaining walls: design of gravity, cantilever, and basement walls. Sheet piles: cantilever and anchored bulkheads, free- and fixed-earth support methods, moment reduction, and anchorage design. Braced cuts: pressure envelopes; design of sheeting, wale beams, and struts; stability against bottom heave or piping. Shoring systems: types, groundwater control, construction stages, anchor prestressing and testing, ground settlement around excavations. Code requirements, computer applications. Prerequisite: CIVE 424. On demand.		

CIVE 615	Soil and Site Improvement	3(3,0)
Mechanical methods: compaction theory, properties of compacted soils, laboratory tests, field equipment, compaction specifications and control, dynamic compaction, vibroflotation, and blasting techniques. Hydraulic methods: theory of wells, dewatering systems, drainage of slopes, preloading, and use of vertical sand/wick drains. Physical and chemical methods: granular admixtures, Portland cement, lime, calcium chloride, fly ash, bitumen, grouting materials, and techniques. Inclusion methods: reinforced earth with steel strips or geosynthetics, soil nails, and rock bolts. Laboratory and computer applications. Prerequisite: CIVE 424. On demand.		

CIVE 616	Advanced Construction Systems	3(3,0)
Composite systems; composite beams and columns; Lateral resisting systems; Braced Frames, moment-resisting frames (OMRF-SMRF), Shear Wall, Dual System, Core System. Design and detailing of special joints. Prerequisite: CIVE 415, CIVE 417. On demand.		

CIVE 617	Soil Strength and Slope Stability	3(3,0)
Slope stability is a critical element of geotechnical engineering and is involved in virtually every civil engineering project. The Soil Strength and Slope Stability course aims to provide a detailed background on the Mechanics of soil and limit equilibrium procedures; discuss the classification of mass movement and landslide types; analyze slope stability, safety, and reliability; and investigate the main methods of slope design and stabilization. Prerequisite: CIVE423. On demand.		

CIVE 618	Special Topics in Design	3(3,0)
Design of bearing and retaining walls; strut-and-tie model; deep beams, corbels, inverted beams, water tanks, domes, ring beams, and torsionally loaded beams; finite element modeling and design of plates and shells. Prerequisite: CIVE 510. On demand.		

CIVE 642	Bridge Engineering	3(3,0)
Types of bridges and influence lines. Loads and their distribution on bridges; serviceability of bridges; design of the bridge deck, superstructure, and substructure. Prerequisite: CIVE 415; CIVE 424. On demand.		

Water & Wastewater Treatment

CIVE 672	Environmental Impact Assessment	3(3,0)
Study and evaluation of the impacts of large-scale projects on the physical, biological, and socio-economic aspects of the environment, considering environmental laws and regulations and EIA guidelines; identification of impacts, quantification methods, mitigation measures, and monitoring plans. A case study involving the preparation of an EIA report, including a sustainability impact assessment and an environmental management plan.		

CIVE 673	Irrigation and Drainage Engineering	3(3,0)
Irrigation: planning and design of canal networks, field irrigation, sprinkler irrigation systems, drip irrigation systems; drainage: the importance of drainage, open drainage design and planning, tile drainage design and planning, canal lining design. Prerequisite: CIVE 536. On demand.		

CIVE 674	Environmental Policy and Management	3(3,0)
This course explores human-made environmental problems alongside concepts in environmental ethics, management, and policy to provide solutions for environmental preservation. Topics covered are air, water, and soil pollution, international and national environmental ethics, management, and policies. On demand.		

CIVE 675	Hydraulic and Hydrologic Modeling	3(3,0)
Hydraulic modeling: Physical modeling, numerical modeling, hydrologic modeling; application of deterministic and probabilistic concepts to simulate and analyze hydrologic systems; discussion of the theory and application of linear and non-linear, lumped and distributed system techniques in modeling the various phases of the hydrologic cycle. Prerequisite: CIVE 536. On-demand		

Public Works

CIVE 605	Decision Making and Risk Management	3(3,0)
Decision-making, risk analysis, quantitative analysis, and application of quantitative methods to the construction project environment. Prerequisite: Senior Standing.		

CIVE 642	Bridge Engineering	3(3,0)
Types of bridges and influence lines. Loads and their distribution on bridges; serviceability of bridges; design of the bridge deck, superstructure, and substructure. Prerequisite: CIVE 415; CIVE 424. On demand.		

CIVE 643	Advanced Highway Engineering	3(3,0)
Highway and Airport pavement design (flexible and rigid pavements), Stress Analysis in flexible and rigid pavements, pavement response under traffic load, failure of flexible and rigid pavements, highway pavement maintenance and rehabilitation (methods, programs, management), types and design, Hot Mix Asphalt Concrete: Materials, Design Methods, and Testing. Prerequisite: CVLE 342, CIVE 415. On demand.		

CIVE 644	Airports Engineering	3(3,0)
Principles of Airport Planning, Components of Airports (airside, landside), Aircraft characteristics, Airport operations, Airport System planning, Site selection, Land use, Airport terminal area and airport access, Airport Capacity and delays, Airport geometric design (Runways, Taxiways, Aprons), Safety Surfaces (Obstacle limitation surfaces: approach, take-off, transition, conical, horizontal), Airport pavement (types, design, construction). Prerequisite: CIVE 342. On demand.		

CIVE 645	Urban Transportation Planning	3(3,0)
A detailed review of the transportation planning process; inventory methodologies; trip generation, distribution, and assignment with associated mathematical models and theories; prediction of future travel; land-use models; modal split; development and testing of proposed systems; and simulation. Prerequisite: CIVE 342. On demand.		

CIVE 685	Advanced Topics in Civil and Environmental Engineering	3(3,0)
A detailed investigation of advanced topics of current significance in civil and environmental engineering, such as the design of small earth dams, man and the environment, drilling and blasting, scheduling construction operations, operations research and optimization, construction equipment and methods, traffic safety, optimum structural design, environmental impact analysis, infrastructure networks, water and wastewater treatment, solid waste management, air pollution, systems		

analysis in civil engineering, and current issues and advances in civil and environmental engineering. May be repeated up to 6 credits, but only 3 credits may be earned under the same title. **Prerequisite:** Graduate studies.

Electrical Engineering Program

The following study plan summarizes the courses and credit distribution for the Master of Science (MS) in Electrical Engineering. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
ENGR 600	Engineering Research Methods	3	
ELEC 690	Capstone Research Project (non-thesis option)	3	ENGL 217
ELEC 695A	Thesis I (thesis option)	3	Co-req: ENGL 217
ELEC 695B	Thesis II (thesis option)	6	ELEC 695A
ELEC 6xx	Technical Elective I	3	
ELEC 6xx	Technical Elective II	3	
ELEC 6xx	Technical Elective III (non-thesis option)	3	
ELEC 6xx	Technical Elective IV (non-thesis option)	3	
ELEC 6xx	Technical Elective V (non-thesis option)	3	

A. Engineering Research Methods

The MEHE mandates the research methodology course. All MS-bound students must take this course. However, the specific experiences organized around the general topics may be tailored to meet the program's needs. The Engineering required course is described below.

ENGR 600	Engineering Research Methods	3(3,0)
This course introduces students to quantitative and qualitative methods for engaging in meaningful research. By the end of the course, the student will attain skills in research intent and design, methodology and technique, format and presentation, and data management. Throughout the course, the student's ability to use this knowledge to become a more effective researcher will be developed. In particular, the student will be able to develop a hypothesis about a research problem and develop related questions; frame the problem with the correct research methodology; collect data that accurately addresses the research problem; measure the effectiveness of a solution methodology; analyze data to make informed decisions; provide technical documentation of all the phases of a research project; evaluate the feasibility of research proposals; and present data to support decisions in front of stakeholders.		

B. Research Project and Thesis

ELEC 690	Capstone Research Project	3(3, 0)
A capstone course that requires group work in one of the Department's emphasis areas. The project is to be carried out under the supervision of a full-time faculty member. It will culminate in a formal written and oral report (refer to college guidelines on the graduation project's structure and content). Prerequisite: ENGL 217.		

ELEC 695A	Master's Thesis I	3(3, 0)
Includes guided review of research literature and/or pilot work relevant to the thesis topic. By the end of this course, the candidate for the MS degree should have established a hypothesis, a research methodology, and a work schedule to complete their thesis. A brief, written report is expected at the end of the course and should be approved by the research advisor(s). (This course may be repeated only once to accomplish its objective. Co-requisite: ENGL 217.		

ELEC 695B	Master's Thesis II	6(6, 0)
Continuation of ELEC 695A - Includes the completion and submission of a research thesis, the quality of which is judged acceptable by the jury committee established in accordance with the College of Engineering and Graduate Committee guidelines. (This course may be repeated only once to accomplish its objective. Prerequisite: ELEC 695A.		

C. Elective Courses

As part of the Master of Science in Electrical Engineering program, the student is required to take a total of 6 credit hours (12 credit hours for the non-thesis option) of 600-level technical electives. These courses allow the student to attain in-depth knowledge and understanding in a focused area of interest. The student who chooses the non-thesis option can mix and match elective courses from different areas to gain a broader understanding of Electrical Engineering disciplines. The thesis option student should, in coordination with the thesis advisor, select the set of electives that best meet the requirements for the successful completion of their thesis. The available technical elective courses are distributed in three areas:

1. Power
2. Renewable Energy
3. Intelligent Systems

It is highly recommended that students take elective courses from the list below after completing the mandatory requirements in their respective areas. Students may select technical electives from other programs, subject to the thesis committee's approval. The list of recommended technical electives is given below.

Course #	Title	Credits
ELEC 685	Advanced Topics in Electrical Engineering	3
Power		
ELEC 611	Computer Modeling of Electrical Power Systems	3

ELEC 612	Electric Power System Control	3
Renewable Energy		
ELEC 621	Renewable Energy Resources and Technologies	3
ELEC 622	Advanced Smart Grid	3
Intelligent Systems		
ELEC 631	Digital Control	3
ELEC 632	Nonlinear Adaptive Control	3

Courses Description

ELEC 685	Advanced Topics in Electrical Engineering	3(3,0)
This course is designed to enable students to study current, advanced topics of interest, carefully selected from ELEC-related areas. The contents of such a course are to be determined by the instructor and the department.		

Power

ELEC 611	Computer Modeling of Electrical Power Systems	3(3,0)
This course is intended to teach electrical engineering students how to simulate the changing states of electrical power systems by studying performance and predicting disturbances in power systems enhanced by FACTS. It describes the mathematical background, algorithms, and basic tools needed to simulate interconnected, complex power systems and their likely responses to various network pathologies or disturbances.		

ELEC 612	Electric Power System Control	3(3,0)
This is a course on the structure of modern power systems, the different levels of control, and the nature of stability problems. The course will introduce students to generators, excitation systems, prime movers, AC and DC transmission, and system loads, as well as the principles of active and reactive power control and models for control equipment.		

Renewable Energy

ELEC 621	Renewable Energy Resources and Technologies	3(3,0)
This course covers renewable energy technologies from an engineering perspective, including applications, engineering calculations and design, feasibility, and related topics. The main aim of the course is to provide the student with a systematic understanding of current knowledge, problems, and insight into the field of renewable energy technologies.		

ELEC 622	Advanced Smart Grid	3(3,0)
The use of communication and information technologies is likely to cause major shifts in how energy is delivered. The smart grid will use these technologies to deliver electricity reliably and efficiently, and it has the potential to radically transform the electricity sector in the same way new technologies have transformed the telecommunications sector. This course will examine not just smart grid technologies		

but also the transformational impacts of the smart grid on industry. Students in this course will learn the fundamentals of the smart grid: its purpose and objectives, technologies, architectures, and management. Students will also learn about many of the challenges facing the smart grid as it evolves.

Intelligent Systems

ELEC 631	Digital Control	3(3,0)
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This course is a comprehensive introduction to digital control system analysis and synthesis. The course covers the analysis and synthesis of sampled-data control systems. It leverages the student's knowledge of Classical Control to extend classical methods to the analysis and synthesis of digital control systems. The course also introduces digital control methods that are not based on classical control theory.

ELEC 632	Nonlinear Adaptive Control	3(3,0)
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This course presents a comprehensive exposition of the theory of nonlinear dynamical systems and their control. It will focus on (1) methods of characterizing and understanding the behavior of systems that nonlinear ordinary differential equations can describe and (2) methods for designing controllers for such systems. In the design parts, we will focus on robust nonlinear adaptive control. Both classical and modern concepts from nonlinear system theory will be introduced.

Computer and Communications Engineering Program

The following study plan summarizes the courses and credit distribution for the Master of Science (MS) in Computer and Communications Engineering (CCE). The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
ENGR 600	Engineering Research Methods	3	
CCEE 690	Capstone Research Project (non-thesis option)	3	ENGL 217
CCEE 695A	Thesis I (thesis option)	3	Co-req: ENGL 217
CCEE 695B	Thesis II (thesis option)	6	CCEE 695A
CCEE 6xx	Technical Elective I	3	
CCEE 6xx	Technical Elective II	3	
CCEE 6xx	Technical Elective III (non-thesis option)	3	
CCEE 6xx	Technical Elective IV (non-thesis option)	3	
CCEE 6xx	Technical Elective V (non-thesis option)	3	

A. Engineering Research Methods

The MEHE mandates the research methodology course. All MS-bound students must take this course. However, the specific experiences organized around the general topics may be tailored to meet the program's needs. The description of the Engineering Research Methods course is given below.

ENGR 600	Engineering Research Methods	3(3,0)
This course introduces students to quantitative and qualitative methods for engaging in meaningful research. By the end of the course, the student will attain skills in research intent and design, methodology and technique, format and presentation, and data management. Throughout the course, the student's ability to use this knowledge to become a more effective researcher will be developed. In particular, the student will be able to develop a hypothesis about a research problem and develop related questions; frame the problem with the correct research methodology; collect data that accurately addresses the research problem; measure the effectiveness of a solution methodology; analyze data to make informed decisions; provide technical documentation of all the phases of a research project; evaluate the feasibility of research proposals; and present data to support decisions in front of stakeholders.		

B. Research Project/Thesis

CCEE 690	Capstone Research Project	3(3, 0)
A capstone course that requires group work in one of the Department's emphasis areas. The project is to be carried out under the supervision of a full-time faculty member. It culminates in a formal written and oral report (refer to the college guidelines on graduation project structure and content). Prerequisite: ENGL 217.		

CCEE 695A	Master's Thesis I	3(3, 0)
Includes guided research literature review and/or pilot work relevant to the thesis topic. By the end of this course, the candidate for the MS degree should have established a hypothesis, a research methodology, and a work schedule to complete their thesis. A brief, written report is expected at the end of the course and should be approved by the research advisor(s). (This course may be repeated only once to accomplish its objective. Co-requisite: ENGL 217.		

CCEE 695B	Master's Thesis II	6(6, 0)
Continuation of CCEE 695A includes the completion and submission of a research thesis, the quality of which is judged acceptable by the jury committee established in accordance with the College of Engineering and Graduate Committee guidelines. (This course may be repeated only once to accomplish its objective. Prerequisite: CCEE 695A.		

C. Elective Courses

As part of the Master of Science in Computer and Communications Engineering program, the student is required to take 6 credit hours (12 credit hours for the non-thesis option) of 600-level technical elective courses. These courses allow the student to attain in-depth knowledge and understanding in a focused area of interest. The student who chooses the non-thesis option can mix and match elective courses from different areas to gain a broader understanding of Computer and Communications Engineering disciplines. The thesis option student should, in coordination with the thesis advisor, select the electives that best meet the requirements for completing their thesis. The available technical elective courses in CCE are distributed in four areas:

1. Computer Software and Artificial Intelligence
2. Computer Hardware
3. Computer Networks
4. Signal Processing and Wireless Communications

It is highly recommended that students take elective courses from the list below after completing the mandatory requirements in their respective areas. Students may select technical electives from other programs, subject to the thesis committee's approval. The list of recommended technical electives is given below.

Course #	Title	Credits	Prerequisites
CCEE 685	Advanced Topics in Computer and Communication Engineering	3	
Computer Software and Artificial Intelligence			
CCEE 611	Game Design and Programming	3	CCEE 216
CCEE 612	Advanced Data Mining	3	CCEE 564
Computer Hardware			
CCEE 621	Reconfigurable Computing	3	CCEE 325
CCEE 623	Advanced Embedded Systems	3	CCEE 426

Computer Networks			
CCEE 631	Multimedia Systems	3	CCEE 447
CCEE 632	Ad-hoc Networks	3	CCEE 454
Signal Processing and Wireless Communications			
CCEE 641	Security in Wireless Networks	3	CCEE 552
CCEE 642	Satellite Communication Systems	3	CCEE 447

Courses Description

CCEE 685	Advanced Topics in Computer and Communication Engineering	3(3,0)
This course is designed to enable students to study carefully selected, current, advanced topics related to CCE. The contents of such a course are to be determined by the instructor and the department.		

Computer Software and Artificial Intelligence

CCEE 611	Game Design and Programming	3(3,0)
This course teaches students the basics of object-oriented architecture and software design patterns used in game design. The student will learn how to design and implement several kinds of games, animation techniques, physics simulation, user controls, graphical methods, and intelligent behaviors. Prerequisite: CCEE 216.		

CCEE 612	Advanced Data Mining	3(3,0)
In this course, advanced data mining topics will be covered, namely, classification (decision trees, logistic regression, support vector machines), combining multiple learners (bagging, boosting, cascading, stacking), clustering (k-means, EM, hierarchical clustering, topic modeling), dimensionality reduction (principal component analysis, linear discriminant analysis, subset selection), and graphical models (Bayesian networks, Markov networks). More advanced topics will be covered through student presentations, such as active learning, multi-label learning, graph mining, link prediction, data mining in bioinformatics, social media analytics, privacy-aware data mining, viral marketing, recommender systems, large-scale data mining, temporal pattern mining, stream data mining, and outlier detection. Prerequisite: CCEE 564.		

Computer Hardware

CCEE 621	Reconfigurable Computing	3(3,0)
This course introduces students to state-of-the-art reconfigurable computing (RC) from both hardware and software perspectives. Numeric and signal processing applications will be used to illustrate the RC platform's advantages. Field-programmable gate arrays (FPGAs) will be reviewed first, focusing on their hardware limitations and their effect on the placement and routing problems. Then, the architecture for existing multi-FPGA systems and the compilation techniques for mapping applications described in a hardware description language for RC are introduced. Finally, specific contemporary RC systems are examined. Students will be expected to work with existing RC hardware to design and implement working projects. Prerequisite: CCEE 325.		

CCEE 623	Advanced Embedded Systems	3(3,0)
This course introduces the student to Real-time operating systems (RTOS). The RTOS topics of managing multiple tasks and processes, context switching, task scheduling, and inter-process communication mechanisms are introduced. The student will also learn how to ensure system reliability and fault tolerance. Students must use state-of-the-art development tools to design and implement useful projects. Prerequisite: CCEE 426.		

Computer Networks

CCEE 631	Multimedia Systems	3(3,0)
This course covers 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, algorithms, and multimedia hardware and software. Prerequisite: CCEE 447.		

CCEE 632	Ad-hoc Networks	3(3,0)
This course will provide students with an understanding of wireless ad hoc networks, enabling them to recognize their wide range of applicability and the major design issues, including protocol mechanisms and resource constraints. Prerequisite: CCEE 454.		

Signal Processing and Wireless Communications

CCEE 641	Security in Wireless Networks	3(3,0)
This course will present the most important mechanisms dedicated to protecting data integrity and confidentiality, access control, authentication, user privacy, quality, and continuity of service in wireless networks. Topics include Wireless Technology Overview, Risks and Threats of Wireless, Security under Resource Constraints (bandwidth, memory, computation, energy constraints), Intrusion and Anomaly Detection in Wireless Environments, Key Management in Wireless Environments, Privacy and Anonymity in Wireless Environments, Public Key Infrastructure in Wireless Environments, Authentication, Authorization, and Access Control in Wireless Environments, Standards in Wireless Security (Equivalent Privacy Standard (WEP), Extensible Authentication Protocol (EAP), Wi-Fi Protected Access (WPA, WPA2, IEEE 802.11i), Bluetooth Security, RFID Security, Secure Mobile Commerce, Secure Wireless Multimedia Broadcast. Prerequisite: CCEE 552.		

CCEE 642	Satellite Communication Systems	3(3,0)
Description of a Satellite Communication System, Orbit Types, Radio Regulations, Applications of Communication Satellites. Multiple Access Techniques. Multi-beam Satellite Systems, Regenerative Satellite Systems, Satellite Broadcasting, Satellite		

Communication Techniques, Satellite Communication Payload, Earth Station Technology. Prerequisite: CCEE 447.

Biomedical Engineering Program

The following study plan summarizes the courses and credit distribution for the Master of Science (MS) in Biomedical Engineering. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
ENGR 600	Engineering Research Methods	3	
BIOM 690	Capstone Research Project (non-thesis option)	3	ENGL 217
BIOM 695A	Thesis I (thesis option)	3	Co-req: ENGL 217
BIOM 695B	Thesis II (thesis option)	6	BIOM 695A
BIOM 6xx	Technical Elective I	3	
BIOM 6xx	Technical Elective II	3	
BIOM 6xx	Technical Elective III (non-thesis option)	3	
BIOM 6xx	Technical Elective IV (non-thesis option)	3	
BIOM 6xx	Technical Elective V (non-thesis option)	3	

A. Engineering Research Methods

The MEHE mandates the research methodology course. All MS-bound students must take this course. However, the specific experiences organized around the general topics may be tailored to meet the program's needs. The Engineering required courses are described below.

ENGR 600	Engineering Research Methods	3(3,0)
This course introduces students to quantitative and qualitative methods for engaging in meaningful research. At the end of the course, the student will attain skills in research intent and design, methodology and technique, format and presentation, and data management. The student's ability to use this knowledge to become a more effective researcher will be developed throughout the course. In particular, the student will be able to develop a hypothesis about a research problem and develop related questions; frame the problem with the correct research methodology; collect data that accurately addresses the research problem; measure the effectiveness of a solution methodology; analyze data to make informed decisions; provide technical documentation of all the phases of a research project; evaluate the feasibility of research proposals; and present data to support decisions in front of stakeholders.		

B. Research Project/Thesis

BIOM 690	Capstone Research Project	3(3, 0)
A capstone course that requires group work in one of the Department's emphasis areas. The project is to be carried out under the supervision of a full-time faculty		

member. It culminates in a formal written and oral report (refer to the college guidelines on the graduation project's structure and content). **Prerequisite:** ENGL 217.

BIOM 695A	Master's Thesis I	3(3, 0)
Includes guided review of research literature and/or pilot work relevant to the thesis topic. By the end of this course, the candidate for the MS degree should have established a hypothesis, a research methodology, and a work schedule to complete their thesis. A brief, written report is expected at the end of the course and should be approved by the research advisor(s). (This course may be repeated only once to accomplish its objective. Co-requisite: ENGL 217.		

BIOM 695B	Master's Thesis II	6(6, 0)
Continuation of BIOM 695A includes completing and submitting a research thesis whose quality is deemed acceptable by the jury committee established in accordance with the College of Engineering and Graduate Committee guidelines. (This course may be repeated only once to accomplish its objective. Prerequisite: BIOM 695A.		

C. Elective Courses

As part of the Master of Science in Biomedical Engineering program, the student is required to take a total of 6 credit hours (12 credit hours for the non-thesis option) of 600-level technical elective courses. These courses allow the student to attain in-depth knowledge and understanding in a focused area of interest. The student who chooses the non-thesis option can mix and match elective courses from different areas to gain a broader understanding of Biomedical Engineering disciplines. The thesis option student should, in coordination with the thesis advisor, select the set of electives that best meet the requirements for the successful completion of their thesis. The BIOM available technical elective courses are distributed in three areas:

1. Medical Instrumentation and Imaging
2. Clinical Engineering and Bioinformatics
3. Artificial organs

It is highly recommended that students take elective courses from the list below after completing the mandatory requirements in their respective areas. Students may select technical electives from other programs, subject to the thesis committee's approval. The list of recommended technical electives is given below.

Course #	Title	Credits	Prerequisites
BIOM 685	Advanced Topics in Biomedical Engineering	3	
Medical Instrumentation and Medical Imaging			
BIOM 611	Interventional Treatment Systems	3	BIOM 414
BIOM 612	Emerging Techniques in Healthcare	3	BIOM 417
BIOM 613	Human Performance Engineering	3	BIOM 530
BIOM 621	Cardiovascular Explorations and Angiographic Procedures	3	BIOM 522

BIOM 622	MRI Research and Innovations	3	BIOM 522
BIOM 623	Functional and Molecular Imaging	3	BIOM 522; BIOM 530
Clinical Engineering and Bioinformatics			
BIOM 631	Risk Management	3	
BIOM 632	Health Care Facility Management	3	
BIOM 633	Medical Technology & Ethics	3	BIOM 531
BIOM 651	Medical Informatics and Artificial Intelligence	3	
BIOM 652	Bio-computation	3	
BIOM 653	Biometrics	3	
Artificial Organs			
BIOM 641	Prostheses	3	BIOM 519
BIOM 642	Transport Phenomena	3	BIOM 522
BIOM 643	Genetic and Tissue Engineering	3	BIOM 416

Courses Description

BIOM 685	Advanced Topics in Biomedical Engineering	3(3,0)
This course is designed to enable students to study carefully selected, current, advanced BIOM-related topics. The contents of such a course are to be determined by the instructor and the department.		

Medical Instrumentation and Medical Imaging

BIOM 611	Interventional Treatment Systems	3(3,0)
This course introduces students to the contributions of technology to the direct treatment of disease. It highlights the need for reliable technology development for surgical suite healthcare interfaces. The emphasis will be on assessing the wide variety of technologies that have made surgical procedures more reliable, less traumatic, and shorter in duration, as well as understanding advances in materials and know-how that have led to the development of technologies enabling minimally invasive treatment of various diseases. Covered topics include anesthesia/monitoring devices, intraoperative neurophysiological monitoring, spontaneous activity, angioplasty, stents, embolic filters, cardiac ablation catheters, stereotactic procedures, and clinical applications. Prerequisite: BIOM 414.		

BIOM 612	Emerging Techniques in Healthcare	3(3,0)
This course introduces students to new treatment and diagnostic strategies, as well as new applications of existing technologies that have emerged from a wide range of ideas, presented as case studies in innovation. It highlights the factors that determine the extent to which these techniques are accepted. The emphasis will be on proving the efficacy of the emerging medical technologies. Covered topics include hyperbaric oxygen therapy, indications and outcomes for hyperbaric oxygen treatment, delivery strategies for image-guided thermal therapy, electrotherapy, hearing and audiology assessment, pure-tone audiometry, speech recognition testing, spontaneous		

otoacoustic emissions (SOAE), immittance audiometry, slit lamp, ophthalmology sets, ear, nose, and throat (ENT) devices. **Prerequisite:** BIOM 417.

BIOM 613	Human Performance Engineering	3(3,0)
This course describes concepts, methods, and tools that apply engineering rigor to each area, as is routinely done for artificial systems. It emphasizes the evaluation of an individual's performance capacities, the design of assistive devices, and the design of operator interfaces for medical instruments. Importance is thus placed on a combination of cause-and-effect and statistical models, measurements of varying sophistication selected to fit the needs of a particular circumstance, and various types of analyses. Covered topics include gait analysis, neuromuscular functional unit, range of motion and extremes of motion, endurance, reliability, limitations, analysis of sensory-motor control performance, measurement instruments and procedures, models of human mental processing and performance, and physical task analysis. Prerequisite: BIOM 530.		

BIOM 621	Cardiovascular Explorations and Angiographic Procedures	3(3,0)
This course describes the interaction between biomechanics and medical imaging disciplines by discussing various imaging modalities and techniques used in the diagnosis of cardiac and vascular complications. It emphasizes the study of blood flow, the investigation of vessel properties, the assessment of arterial dimensions and obstructions, and the monitoring of injected catheters and/or stents. The interests and principles of non-invasive methods such as ultrasound and NMR will be discussed in detail. The purposes of X-ray-based interventional imaging systems will also be presented. Covered topics include Colored Doppler, Cardiac MRI, Cardiac Function, Atherosclerosis, Carotid Bifurcation, Brain Perfusion, Fluoroscopy, and contrast agents. Prerequisite: BIOM 522.		

BIOM 622	MRI Research and Innovations	3(3,0)
This course introduces students to the latest improvements in diagnosis and healthcare follow-up using magnetic resonance imaging systems. The emphasis will be on presenting MR sequence engineering applications in diverse medical fields and discussing MR-based spectroscopy principles and objectives. The MR safety, complications, artifact definitions, limitations, and associated proposed solutions will be detailed. Covered topics include Fast Spin Echo, FLAIR, Time-of-Flight, Diffusion-Weighted Imaging, Parallel Imaging, Magnetohydrodynamics, Magnetic Susceptibility, Aliasing, and Saturation. Prerequisite: BIOM 522.		

BIOM 623	Functional and Molecular Imaging	3(3,0)
This course introduces students to the in vivo characterization of biological processes at the cellular and molecular levels and to the visualization of in vivo physiologic or biochemical processes using different imaging modalities, primarily MRI, PET, and SPECT. The course will highlight the increasing attention this type of imaging has received in recent years, as imaging the distribution of targeted molecules enables tracking of biochemical processes before their physiological consequences appear. Several applications in neurological studies and cardiovascular explorations are to be		

described. Covered topics include Kinetic modeling, parametric imaging, glucose metabolism, radioactive tracers, regional cerebral blood flow, regional cerebral oxygen extraction fraction (rCOEF), and arterial oxygen concentration (CaO₂). **Prerequisite:** BIOM 522 and BIOM 530.

Clinical Engineering and Bioinformatics

BIOM 631	Risk Management	3(3,0)
This course describes the deep roots inside health care of the organized effort to identify, assess, and reduce physical and financial risk to patients, staff, and businesses. The emphasis will be on new initiatives by international regulatory agencies to inject risk management techniques into the development and use of medical devices. The course will also discuss the risk management model, processes, steps, regulations, and risk identification and assessment. Covered topics include Enterprise risk, Total quality management (TQM), Performance improvement (PI), Failure mode and effects analysis (FMEA), Corrective and preventive action (CAPA), Risk analysis–ISO/IEC 14971, Root cause analysis (RCA).		

BIOM 632	Health-care Facility Management	3(3,0)
This course presents procedures followed for medical and health services management. It covers the duties of the administrator and his assistants, as well as the workflow between staff of different services and departments. It emphasizes credentials, quality control, human resources, finances, recovery, insurance, sterilization, infection control, and health safety procedures—prerequisite: BIOM 421.		

BIOM 633	Medical Technology & Ethics	3(3,0)
This course introduces students to the ethical dilemmas and challenges that have emerged alongside the positive outcomes of biomedical engineering, particularly its role in developing new treatment modalities that have significantly improved medical care and patients' quality of life. The course will stress the involvement of humans in clinical research, the definition of death and the issue of euthanasia, animal experimentation and human trials for new medical devices, patient access to sophisticated and high-cost medical technology, and the regulation of new biomaterials and devices. Covered topics include professions, sources of professional ethics, professional integrity, responsibility, code, euthanasia, animal experimentation, regulation of medical device innovation, ethical issues in emergency use, ethical issues in treatment use, and the Safe Medical Devices Act. Prerequisite: BIOM 531.		

BIOM 651	Medical Informatics and Artificial Intelligence	3(3,0)
This course describes the growth, complexity, and content of the bioinformatics field. It will consist of two parts. The first is defined as non-artificial-intelligence decision-making and is devoted to areas that form a key “core” of computer technologies, such as hospital information systems (HIS), computer-based patient records (CPR), communications and standards. The second part covers artificial intelligence topics, including expert systems, knowledge-based systems, and neural networks. Covered topics include Patient Database Strategies, Patient Management, Clinical Decision Support Systems, Computer Networks in Health Care, HL7, PACS, Decision-Theoretic		

Models, Statistical Models, Decision Making, Artificial Neural Networks, Training Algorithms, Clinical Decision Systems, and Expert System Process Models.

BIOM 652	Bio-computation	3(3,0)
This course refers to several areas of research at the boundary between computation and biology. The emphasis will be on computational biology, natural computing using naturally inspired models to solve mathematical problems, and exploiting biomolecules and cells to perform computations. It will focus on DNA computing, in which one uses DNA molecules and their interactions to perform computations, as well as recent promising models such as membrane computing. Covered topics include DNA sequencing, Polymerase chain reaction (PCR), Adleman's experiment, Stranded DNA, DNA computing on surfaces, Genomic databases, and Bio-computational Models.		

BIOM 653	Biometrics	3(3,0)
This course deals with the automatic recognition of individuals based on statistical analysis of physiological and/or behavioral characteristics. The emphasis will be on biometric characteristics, defined as human physiological or behavioral characteristics that are unique, universal, stable, and collectible. Covered topics include biometric system structure, verification and identification systems, feature extraction, matching, decision-making, performance evaluation, fingerprints, palm prints, faces, irises, hand-vein thermograms, DNA, ears, odors, etc.		

Artificial Organs

BIOM 641	Prostheses	3(3,0)
This course describes the fundamentals of substitutive medicine. It stresses interest in engineered devices and the transplantation of organs, tissues, or cells, and their ability to replace most organs and body functions. Highlights of the categories, types, nature, and principles of different artificial organs will be provided. Covered topics include Heart Valve Prostheses, Vascular Grafts, Hyperplasia, Graft Infections, Liver Support Systems, Nerve Guidance Channels, ENT Replacement Devices, Artificial Blood, and Artificial Skin. Prerequisite: BIOM 519.		

BIOM 642	Transport Phenomena	3(3,0)
This course intends to couple the concepts of transport phenomena with chemical reaction kinetics and thermodynamics to introduce the field of reaction engineering. It encompasses the subjects of momentum transport (viscous flow), energy transport (heat conduction, convection, and radiation), and mass transport (diffusion). The medium through which transport occurs is regarded as continuous; however, some molecular explanations are discussed. The continuum approach is of more immediate interest to engineers, but both approaches are required to master the subject thoroughly. Covered topics include Microvascular Heat Transfer, Interstitial Transport in the Brain, Arterial Wall Mass Transport, and Concepts of Biomimicry. Prerequisite: BIOM 542.		

BIOM 643	Genetic and Tissue Engineering	3(3,0)
This course provides students with unprecedented insight into the inner workings of the most basic structures of living tissues, made possible by information revealed by revolutionary undertakings such as the Human Genome Project. The focus will be on manipulating molecular architectures for therapeutic purposes. It will describe the techniques developed to transplant genetic material into a variety of living tissues. It will also discuss the ability to influence the future of many areas of disease treatment, as well as developments in tissue engineering. Covered topics include transgenic animals, DNA microinjection, embryonic stem (ES) cell technology, cloning, tissue regeneration, fluid-induced shear, micropipette aspiration, chondrocytes, scaffold materials, and protein coating. Prerequisite: BIOM 416.		

Mechanical Engineering Program

The following study plan summarizes the courses and credit distribution for the Master of Science (MS) in Mechanical Engineering. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites
ENGR 600	Engineering Research Methods	3	
MECH 690	Capstone Research Project (non-thesis option)	3	ENGL 217
MECH 695A	Thesis I (thesis option)	3	Co-req: ENGL 217
MECH 695B	Thesis II (thesis option)	6	MECH 695A
MECH 6xx	Technical Elective I	3	
MECH 6xx	Technical Elective II	3	
MECH 6xx	Technical Elective III (non-thesis option)	3	
MECH 6xx	Technical Elective IV (non-thesis option)	3	
MECH 6xx	Technical Elective V (non-thesis option)	3	

A. Engineering Research Methods

The MEHE mandates the research methodology course. All MS-bound students must take this course. However, the specific experiences organized around the general topics may be tailored to meet the program's needs. The Engineering required course is described below.

ENGR 600	Engineering Research Methods	3(3,0)
This course introduces students to quantitative and qualitative methods for engaging in meaningful research. By the end of the course, the student will attain skills in research intent and design, methodology and technique, format and presentation, and data management. Throughout the course, the student's ability to use this knowledge to become a more effective researcher will be developed. In particular, the student will be able to develop a hypothesis about a research problem and develop related questions; frame the problem with the correct research methodology;		

collect data that accurately addresses the research problem; measure the effectiveness of a solution methodology; analyze data to make informed decisions; provide technical documentation of all the phases of a research project; evaluate the feasibility of research proposals; and present data to support decisions in front of stakeholders.

B. Research Project/Thesis

MECH 690	Capstone Research Project	3(3, 0)
A capstone course requires group work in one of the Department's emphasis areas. The project is to be carried out under the supervision of a full-time faculty member. It culminates in a formal written and oral report (refer to the college guidelines on the graduation project's structure and content). Prerequisite: ENGL 217.		

MECH 695A	Master's Thesis I	3(3, 0)
Includes guided review of research literature and/or pilot work relevant to the thesis topic. By the end of this course, the candidate for the MS degree should have established a hypothesis, a research methodology, and a work schedule to complete their thesis. A brief, written report is expected at the end of the course and should be approved by the research advisor(s). (This course may be repeated only once to accomplish its objective. Co-requisite: ENGL 217.		

MECH 695B	Master's Thesis II	6(6, 0)
Continuation of MECH 695A includes completing and submitting a research thesis whose quality is deemed acceptable by the jury committee established in accordance with the College of Engineering and Graduate Committee guidelines. (This course may be repeated only once to accomplish its objective. Prerequisite: MECH 695A.		

C. Elective Courses

As part of the Master of Science in Mechanical Engineering program, the student is required to take a total of 6 credit hours (12 credit hours for the non-thesis option) of 600-level technical electives. These courses allow the student to attain in-depth knowledge and understanding in a focused area of interest. The student who chooses the non-thesis option can mix and match elective courses from different areas to gain a broader understanding of Mechanical Engineering disciplines. The thesis option student should, in coordination with the thesis advisor, select the set of electives that best meet the requirements for the successful completion of their thesis. The available technical elective courses in MECH are distributed in two areas:

1. Mechanical Design and Manufacturing
2. Energy and Thermo-fluid Systems

It is highly recommended that students take elective courses from the list below after completing the mandatory requirements in their respective areas. Students may select technical electives from other programs, subject to the thesis committee's approval. The list of recommended technical electives is given below.

Course #	Title	Credits	Prerequisites
Mechanical Design and Manufacturing			
MECH 601	Advanced Mechanics of Materials	3	MECH 320
MECH 602	Pressure Vessel and Piping Design and Analysis	3	
MECH 606	Fatigue and Fracture Mechanics Design and Evaluation	3	MECH 320; MECH 421
MECH 608	Advanced Manufacturing	3	MECH 422
MECA 604	Design of Mechanisms	3	MECH 321
MECA 607	Manufacturing System & Supply Chain Design	3	MECH 422
MECA 608	Lean/ Six Sigma Processes	3	
MECH 685	Advanced Topics in Mechanical Engineering	3	
Energy and Thermo-fluid Systems			
MECH 603	Combustion Engineering	3	MECH 334
MECH 604	Solar Energy	3	MECH 330 or MECH 333
MECH 605	Turbomachinery	3	MECH 335
MECH 607	Advanced Heat Transfer	3	MECH 431
MECH 609	Advanced Computational Fluid Dynamics	3	MECH 530
MECH 610	Advanced Fluid Mechanics	3	MECH 335
MECH 697	Advanced Topics in Mechanical Engineering	3	

Courses Description

Mechanical Design and Manufacturing

MECH 601	Advanced Mechanics of Materials	3(3,0)
3-D Stress tensor and invariants; constitutive models; theories of failure for ductile and brittle materials; plane stress/plane strain elasticity; unsymmetrical bending of straight beams; shear center for thin-walled cross-sectional beams; bending of curved beams and rings; axisymmetric geometry and loading; elastoplastic analysis of thick-walled cylinders and autofrettage & shrink-fitting residual stresses; rectangular & circular thin plates; circular thick plates; Beam on elastic foundation theory and practice use of Roark's formula. Prerequisite: MECH 320. On demand.		

MECH 602	Pressure Vessel and Piping Design & Analysis	3(3,0)
Stress analysis and evaluation of thin-walled pressure vessels and piping components; material properties and temperature limit; design philosophy of ASME Section VIII, Division 1; design philosophy of Section VIII, Division 2; design calculations using Section VIII, Division 1; design calculations using B 31.3 Piping code; flange selection based on P/T ratings – ASME/B 16.5 / 16.47 standards; fabrication, inspection and testing of pressure vessels; safety valves; in-service inspection & monitoring; practical applications; design project. On demand.		

MECH 606	Fatigue and Fracture Mechanics Design and Evaluation	3(3,0)
Material properties; stress intensity calculation; Brief S-N method used in non-pressurized mechanical components design; S-N method used in pressurized mechanical components design; effects of cracks and notches; fundamentals of linear elastic fracture mechanics (LEFM) principles; crack-tip stress intensity factor calculations; fracture toughness evaluation; codes & standards; crack growth models, the use of the finite element method in evaluating fatigue crack propagation life. Prerequisite: MECH 320 and MECH 421. On demand.		

MECH 608	Advanced Manufacturing	3(3,0)
Overview of advanced manufacturing: engineering materials, metal forming, particulate processing, solidification processes; non-traditional machining, understanding metrology and instrumentation; joining & assembly processes; micro-fabrication and nanofabrication technologies; automation technologies; production planning, control, and inspection; industrial visits. Prerequisite: MECH 422. On demand.		

MECH 685	Advanced Topics in Mechanical Engineering	3(3,0)
This course is designed to enable students to study a carefully selected advanced topic of interest in mechanical engineering. The content outline for such a topic is to be determined by the instructor and approved by the department Chair. Prerequisite: Instructor's consent. On demand.		

Energy and Thermo-Fluid Systems

MECH 603	Combustion Engineering	3(3,0)
Fuels and their properties; review of basic thermodynamics and gaseous mixtures; combustion thermodynamics: stoichiometry; the first and second Laws of thermodynamics applied to combustion; composition products in equilibrium; fundamentals of combustion; applications. Prerequisite: MECH 334. On demand.		

MECH 604	Solar Energy	3(3,0)
Solar geometry for stationary and tracking systems; solar energy availability and measurement; radiative, conductive, and convective heat transfer pertinent to simple solar collectors; flat-plate collectors and concentrators; energy storage; project. Prerequisite: MECH 330 or MECH 333. On demand.		

MECH 605	Turbomachinery	3(3,0)
This course involves the design of turbo-compressors. It includes a review of thermo-fluids, compressible flow, diffusion processes, centrifugal compressors, swept vanes, velocity triangles, slip factor, axial compressors, stage pressure rise, stage reaction and loading, compressor map and performance, blockage factor, aerofoil aerodynamics, tip clearance, CFD and axial compressor design projects. Prerequisite: MECH 335. On demand.		

MECH 607	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 609	Advanced Computational Fluid Dynamics	3(3,0)
Structured and unstructured mesh, orthogonal and non-orthogonal grids; discretization of the general transport equation using the finite volume method (diffusion, convection, source and transient term discretization); boundary conditions; various solvers; discretization of incompressible flow equations using finite volume method; derivation of the pressure correction equation; the SIMPLE algorithm; comparison of different convection schemes using Fluent solver; application of the finite volume method on steady state and transient 1D and 2D problems. Prerequisite: MECH 530		

MECH 610	Advanced Fluid Mechanics	3(3,0)
Surface tension; vapor pressure and cavitation; integral and differential forms of continuity and momentum equations on a fixed and deforming control volume; boundary layer; dimensionless analysis of the equations of motion; introduction to microflow applications. Prerequisite: MECH 335.		

MECH 685	Advanced Topics in Mechanical Engineering	3(3,0)
This course is designed to enable students to study a carefully selected advanced topic of interest in mechanical engineering. The content outline for such a topic is to be determined by the instructor and approved by the department Chair. Prerequisite: Instructor's consent. On demand.		

Mechatronics Engineering Program

The following study plan summarizes the courses and credit distribution for the Master of Science (MS) in Mechatronics Engineering. The following study plan serves as a roadmap for a smooth progression toward graduation.

Course #	Title	Credits	Prerequisites:
ENGR 600	Engineering Research Methods	3	
MECA 690	Capstone Research Project (non-thesis option)	3	ENGL 217
MECA 695A	Thesis I (thesis option)	3	Co-req: ENGL 217
MECA 695B	Thesis II (thesis option)	6	MECA 695A
MECA 6xx	Technical Elective I	3	
MECA 6xx	Technical Elective II	3	
MECA 6xx	Technical Elective III (non-thesis option)	3	
MECA 6xx	Technical Elective IV (non-thesis option)	3	
MECA 6xx	Technical Elective V (non-thesis option)	3	

A. Engineering Research Methods

The MEHE mandates the research methodology course. All MS-bound students must take this course. However, the specific experiences organized around the general topics may be tailored to meet the program's needs. The Engineering required course is described below.

ENGR 600	Engineering Research Methods	3(3,0)
This course introduces students to quantitative and qualitative methods for engaging in meaningful research. By the end of the course, the student will attain skills in research intent and design, methodology and technique, format and presentation, and data management. Throughout the course, the student's ability to use this knowledge to become a more effective researcher will be developed. In particular, the student will be able to develop a hypothesis about a research problem and develop related questions; frame the problem with the correct research methodology; collect data that accurately addresses the research problem; measure the effectiveness of a solution methodology; analyze data to make informed decisions; provide technical documentation of all the phases of a research project; evaluate the feasibility of research proposals; and present data to support decisions in front of stakeholders.		

B. Research Project/Thesis

MECA 690	Capstone Research Project	3(3, 0)
A capstone course requires group work in one of the Department's emphasis areas. The project is to be carried out under the supervision of a full-time faculty member. It will culminate in a formal written and oral report (refer to college guidelines on the graduation project's structure and content). Prerequisite: ENGL 217.		

MECA 695A	Master's Thesis I	3(3, 0)
Includes guided review of research literature and/or pilot work relevant to the thesis topic. By the end of this course, the candidate for the MS degree should have established a hypothesis, a research methodology, and a work schedule to complete their thesis. A brief, written report is expected at the end of the course and should be approved by the research advisor(s). (This course may be repeated only once to accomplish its objective. Co-requisite: ENGL 217.		

MECA 695B	Master's Thesis II	6(6, 0)
Continuation of MECA 695A includes the completion and submission of a research thesis, the quality of which is judged acceptable by the jury committee established in accordance with the College of Engineering and Graduate Committee guidelines. (This course may be repeated only once to accomplish its objective. Prerequisite: MECA 695A.		

C. Elective Courses

As part of the Master of Science in Mechatronics Engineering program, the student is required to take a total of 6 credit hours (12 credit hours for the non-thesis option) of 600-level technical elective courses. These courses allow the student to attain in-depth knowledge and understanding in a focused area of interest. The student who chooses the non-thesis option can mix and match elective courses from different areas to gain a broader understanding of Mechatronics Engineering disciplines. The thesis option student should, in coordination with the thesis advisor, select the set of electives that best meet the requirements for the successful completion of their thesis. The MECA available technical elective courses are distributed in two areas:

1. Automation
2. Mechanisms and Robotics

It is highly recommended that students take elective courses from the list below after completing the mandatory requirements in their respective areas. Students may select technical electives from other programs, subject to the thesis committee's approval. The list of recommended technical electives is given below.

Course #	Title	Credits	Prerequisites
Automation			
MECA 601	Advanced Mechatronics System Design	3	MECA 443
MECA 602	Multi-Agent System MAS	3	
MECA 607	Manufacturing System & Supply Chain Design	3	MECH 422
MECA 608	Lean/ Six Sigma Processes	3	
MECA 685	Advanced Topics in Mechatronics Engineering	3	
Mechanisms and Robotics			
MECA 603	Advanced Robotics	3	MECA 544
MECA 604	Design of Mechanisms	3	MECH 321

MECA 605	Spatial Mechanisms	3	MECA 541
MECA 606	Compliant Mechanisms	3	MECH 520; MECH 571
MECA 609	Advanced Control Theory	3	MECA 440
MECA 685	Advanced Topics in Mechatronics Engineering	3	

Courses Description

Automation

MECA 601	Advanced Mechatronics System Design	3(3,0)
This course uses computer-aided design methodologies to synthesize multivariable Mechatronics system design. Topics covered include sequential tasks integrating several engineering systems; finite-state machine-based design; direct and indirect problems; multi-objective optimization problems; performance and robustness trade-offs; model-based compensators; and nonlinear effects. Prerequisite: MECA 443.		

MECA 602	Multi-Agent System MAS	3(3,0)
The course aims to present tools and methodologies for performing system realization in a multidisciplinary design context. The focus will be equally strong on all three aspects of the problem: (i) the multidisciplinary character of engineering systems, (ii) the design of these complex systems, and (iii) tools for realization. Prerequisite: Instructor's consent.		

MECA 607	Manufacturing System & Supply Chain Design	3(3,0)
This course focuses on decision-making for system design as it arises in manufacturing systems and supply chains. Students are exposed to frameworks and models for structuring the key issues and trade-offs. It also introduces various models, methods, and software tools for logistics network design, capacity planning and flexibility, make-or-buy, and integration with product development. Industry applications and cases illustrate concepts and challenges. Prerequisite: MECH 422.		

MECA 608	Lean/Six Sigma Processes	3(3,0)
Students in this course will develop a broad understanding of Lean/Six Sigma principles and practices, build the capability to implement Lean/Six Sigma initiatives in manufacturing operations, and learn to operate with an enterprise-level awareness of Lean/Six Sigma. All course materials are organized around a common "single-point lesson" (SPL) format, with some SPLs provided by the instructor and guests, and others developed and delivered by student teams. Prerequisite: Instructor's consent. On demand.		

MECA 685	Advanced Topics in Mechatronics Engineering	3(3,0)
This course is designed to enable students to study a specific advanced topic of interest, carefully selected from the field of mechatronics engineering. The content outline for such a topic is to be determined by the instructor and approved by the department Chair. Prerequisite: Instructor's consent. On demand.		

Mechanisms and Robotics

MECA 603	Advanced Robotics	3(3,0)
Current technology in robotics, sensing, and vision; basic knowledge of building intelligent, autonomous mobile robots using AI concepts; trajectory planning and obstacle avoidance; use of software packages, sensors, and image acquisition and processing; autonomous mobile robots; applications of mobile robots; tele-robotics; future trends. Prerequisite: MECA 544.		
MECA 604	Design of Mechanisms	3(3,0)
Mobility analysis of mechanisms; kinematic chains and inversions; precision synthesis techniques (graphical and analytical methods); introduction to different optimization techniques; optimum synthesis of mechanisms using gradient-based and global intelligent optimization methods; creative mechanism design project. Prerequisite: MECH 321. Annually.		
MECA 605	Spatial Mechanisms	3(3,0)
General mobility criteria; description of spatial displacements; formulation of kinematic equations; kinematic analysis and synthesis of spherical and spatial mechanisms; optimal synthesis of spherical and spatial kinematic chains; kinematics of robotic manipulators. Prerequisite: MECA 544.		
MECA 606	Compliant Mechanisms	3(3,0)
Nonlinear beam theory; pseudo-rigid-body model (PRBM); flexible-link model (FLM); synthesis of partially compliant mechanisms using PRBM and FLM; synthesis of fully compliant mechanisms (rigid-body displacement and kinetostatic synthesis); finite-element application; size, shape, and topology optimization; research project. Prerequisite: MECH 520, MECH 571.		
MECA 609	Advanced Control Theory	3(3,0)
The course covers various forms of process control, including statistical process control; run-by-run and adaptive control; 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 computer-aided design problems (MATLAB®). Prerequisite: MECA 440. On demand.		
MECA 685	Advanced Topics in Mechatronics Engineering	3(3,0)
This course is designed to enable students to study a specific advanced topic of interest, carefully selected from the field of mechatronics engineering. The content outline for such a topic is to be determined by the instructor and approved by the department Chair. Prerequisite: Instructor's consent. On demand.		

FACULTY LIST

Al Wardany, Riad; Associate Professor, Ph.D. in Civil Engineering, University of Sherbrooke, 2005

Chaaban, Ahmad; Professor, Ph.D. in Mechanical Engineering, University of Waterloo, 1985.

El Chammaa, Rouaa; Assistant Professor, Ph.D. in Computer and Communication Engineering, USJ/ Lyon University, 2020

Diab, Mohammad; Professor, Ph.D. in Biomedical Engineering, University of Compiègne, 2007.

Diab, Nadim; Professor, Ph.D. in Mechanical Engineering, American University of Beirut, 2013.

Hijazi, Toufic; Professor, Ph.D. in Electrical Engineering, Clarkson University, 1988.

Koubeyssi, Ahmad; Associate Professor, Ph.D. in Robotics and Automation Engineering, university of Lille, 2015.

Machaka, Muheiddein; Associate Professor, Ph.D. in Civil Engineering, Beirut Arab University, 2015.

Moslem, Bassam; Associate Professor, Ph.D. in Signal Processing and Bioengineering, UTC, 2011.

Moustafa, Ousama; Associate Professor, Ph.D. in Engineering, University Le Havre, 2008.

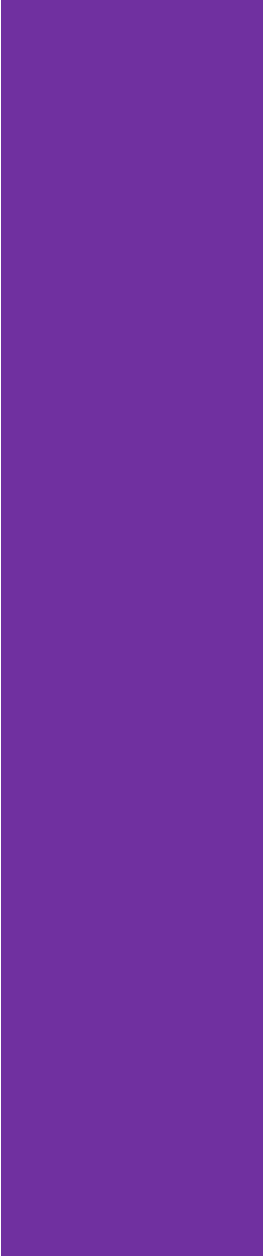
Ramadan, Rawan; Lecturer, Ph.D. Structural and Geotechnical Engineering, BAU, 2024.

Sabbah, Maher; Associate Professor, Ph.D. in Biomedical Engineering, University of Technology of Compiègne (UTC), France, and Université Claude Bernard, Lyon, 2016.

Taha, Mohamad; Professor, Ph.D. in Electrical Engineering, Aston University, 1992.

Zantout, Rached; Professor, Ph.D. in Communications Engineering, Ohio State University, 1994.

Younis, Manar; Assistant Professor, Ph.D. in Mechanical Engineering, American University of Beirut, 2021



GRADUATE STUDIES FORMS

PROPOSED PLAN OF STUDY – GS1

The student and advisor should complete this form before the second semester of graduate studies. The student should commit to the MS track (thesis or non-thesis), the plan of study, and the courses. The form helps track the student's progress until graduation.

Student Name			ID #			
Major			Proposed Degree			
MS Track	☐ Thesis track ☐ Non-thesis (CRP) track					
Thesis / Capstone Research Project (CRP)						
Proposed Title						
Research Advisors						
Role	Name		Signature		Date	
Advisor						
Co-Advisor						
Co-Advisor						
Note: Please Attach the Updated Student Contract Sheet						
Category	Course #	Course Name	Where?	When?	# Credits	Grade
Background Courses (credits do not count toward degree)						
Transfer Credits						
Mandatory Courses						
Elective Courses						
Total Credit Hours that count toward the degree						

500 level _____ 400 level _____

THESIS PLAN – GS2

Students on the thesis track should complete this form to plan their thesis defense.

Student Name		ID #	
Major		Proposed Degree	
MS Track	☐ Thesis track ☐ Project track		

Thesis/Project Title and Summary

--

Tentative Dates to Complete Milestones

Thesis/Project Defense	
Graduation Date	

Thesis/Project Committee (optional for Project Track)

Role	Name	Signature	Date
Chair			
Member			
Member			
Member			

Approvals

	Name	Signature	Date
Department Chairperson			
College Dean (for the CGSC)			

READINESS REPORT FOR THESIS / CRP DEFENSE – GS [3]

The Main Research Advisor should fill out this form.

Student Name			ID #	
Major			Degree	
Undergraduate Degree				
Major			Institution	
GPA			Class of	
Prior Practical Experience				
Years of Experience				
Type of Experience				
Graduate Studies				
Major				
Enrollment Date		Graduation Date		
GPA		Thesis / Project Advisor		
Thesis / Project Title				
Performance Evaluation				
Evaluate the thesis/Project on a scale from 1 to 4 (1 being minimally acceptable) based on the following criteria:				
a. Independent research and generating new concepts and valuable conclusions []				
b. Creativity and critical thinking []				
c. Writing skills []				
Overall Assessment of The Thesis / Project (Advisor)				
Date of Submission of the Final Draft of Thesis / Project *				
Date:		Signature:		

* The final draft of the report must be submitted to each member of the Jury Committee at least two weeks (Thesis option) before the date of the thesis defense, or a week (non-thesis option) before the CRP presentation.

ASSESSMENT OF GRADUATE STUDENT'S PERFORMANCE GS 4

Student Name		ID #	
Major		Degree	

Undergraduate Degree			
Major		Institution	
GPA		Class of	

Prior Practical Experience			
Years of Experience			
Type of Experience			
Graduate Studies			
Major			
Enrollment Date		Graduation Date	
GPA		Thesis Advisor	
Thesis Title			

Performance Evaluation	
Rate the student on a scale from 1 to 4 (1 being minimally acceptable) based on the following criteria:	
a. Ability to conduct independent research and generate ideas ()	
b. Creativity and critical thinking ()	
c. Writing skills ()	

Overall Assessment of Graduate Performance (Thesis Advisor)	
Date:	Signature:

MS REQUIREMENTS COMPLETION CHECKLIST – GS [5]

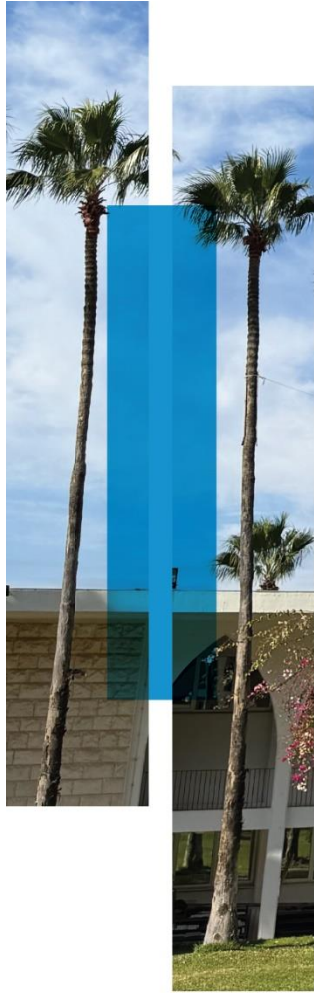
This form shall be completed by the GSRC coordinator and kept in the student's permanent record for future reference, assessment of the graduate program, and quality assurance measures.

Student Name		ID #	
Enrollment Date			
Graduation Date			
Academic Advisor			
Thesis/CRP Advisor			
Thesis/CRP Title			
Thesis/CRP Sponsor			

Graduate Studies Forms	Date Completed
GS-1	
GS-2	
GS-3	
GS-4	

Date thesis submitted to the Library.	
Signature of the Librarian	

Role	Name and Signature	Date
Thesis/CRP Committee Chair		
Department Chair		
College Dean		
GSRC Coordinator		
Registrar		



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Office of the Registrar

Mechref, Lebanon
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P.O. Box: 10 Damour - Chouf 2010
Fax: 00961 25 60 18 30
Extension: 615-618

Email: registrar@rhu.edu.lb

