



جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY



University Catalogue
2020 - 2021



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2020 - 2021**



His Majesty King Abdul Aziz Al Saud



King Salman bin Abdul Aziz Al Saud

The Custodian of the Two Holy Mosques



**His Royal Highness Prince Mohammad bin Salman bin Abdul
Aziz Al Saud**

Crown Prince, Deputy Prime Minister and Minister of Defense



**His Royal Highness Prince Fahad bin Sultan bin Abdul Aziz
Al Saud**

Prince of Tabuk Region and Chairman of the Board of Trustees

“When we speak of education in the Kingdom, we speak of building-up the country and its citizen, of promoting the country and modernizing it, and of alleviating the citizen and enabling him, for there is no cause appertaining to man, in heaven or on earth, which is more honorable than education.”

His Royal Highness Prince Fahad bin Sultan bin Abdul Aziz Al Saud
Prince of Tabuk Region and Chairman of the Board of Trustees

University Director's Welcome

Welcome to Fahad Bin Sultan University! Since its establishment in 2004, the University has committed itself to providing quality education devoted to meeting the needs of the local community and the Kingdom at large. The University offers affordable professional educational programs that can both transform the lives of individuals and be a force for societal development. Student success is vital to the University, so we strive to ensure that our programs and services are easily accessible.

This catalogue covers all aspects of your educational experience at the University. It contains information on academic policies, courses, programs of study, degree requirements, instructors, and the academic calendar.

As you explore this catalogue, I am confident that the education you will receive at Fahad Bin Sultan University will meet your goals and fulfill your objectives.

Mohammed A. Alluhidan, Ph.D.
University Director,

Chancellor's Message

This catalog is intended to detail the University's academic programs, policies and services for use by current graduate and undergraduate students, faculty, and administrators. We highly appreciate that current and prospective students, faculty and many other people will read this material, as well, for some understanding of University regulations, programs and culture.

As a center for quality education with strong commitment to excellence, FBSU has quested to provide generations of young men and women with challenging opportunities for successful life and bright future. The essential ingredients to rise for these challenges have been its keen commitment to offering stimulating and effective academic programs paving the way for growth and success, creating a research environment harmonious with the social and industrial needs, and fostering indispensable values and services to the local and international communities.

During the past year, FBSU launched five graduate programs in Civil Engineering, Electrical Engineering, Computer Engineering and Computer Science, and obtained the Ministry of Education's approval to establish the College of Medicine and the Renewable and Sustainable Energy Engineering. Moreover, the University was granted a full institutional accreditation from the Education Evaluation Commission. This recognition comes upon the university's meeting of the quality requirements in terms of teaching, scientific research, facilities, community service, and infrastructure.

The University's next challenge will be to launch the College of Medicine during the next academic year with an undergraduate program in Medicine. Simultaneously, the University is planning for launching the College of Law.

To further enhance its programs, FBSU has established, furnished and/or renovated its sciences, computing and engineering labs with state-of-the-art equipment that support both teaching and research activities. Moreover, the University is currently planning a major construction of an independent workshop for the labs of the College of Engineering and completing phase 2 of the wireless network project across its campus.

It has been exciting to witness in the past few years the steady increase in students' enrollment and the MoE's scholarships indicating a growing interest in our University. Here, I would like to acknowledge gratefully the generous support that FBSU has been receiving from the MoE and the continuous inspiration revealed to it by the directives of HRH Prince Fahad Bin Sultan, Chairman of the Board of Trustees (BoT).

Abdallah I. Husein Malkawi, Ph.D.

Professor and Chancellor

Student Responsibility for Catalog Information

FBSU students are responsible for reading the information in this catalog and on the university website (<http://www.fbsu.edu.sa>). Failure to comply with Faculty and University regulations will not exempt students from whatever consequences they may incur. Upon admission to the University, students will be assigned e-mail addresses, whence will be held responsible for checking their emails regularly for official University announcements and information.

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Tabuk 71454, Saudi Arabia

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Website: www.fbsu.edu.sa

This catalog and relevant updates can also be viewed online at www.fbsu.edu.sa

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جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY

Administration

ADMINISTRATION

University Administration

- Alluhidan, Mohammed; Director
- Malkawi, Abdallah; Acting Chancellor,
Acting VP for Graduate Studies and Scientific Research
- Al-Balawi, Abdullah; Acting VP for Development
- Btoosh, Mousa, Assistant to the Chancellor for Academic Affairs and Acting Dean of College of Sciences and Humanities
- Zainab Abu Ameh; Administrative Assistant for the Female Section
- Qudah, Abdallah, Assistant to the Chancellor for Administrative Affairs
- Maqableh, Amer H.; Assistant to the Chancellor for Information Technology and Acting Dean of College of Engineering
- Bataineh, Sameer; Acting Dean of Graduate Studies and Scientific Research and Director of Quality Assurance Center
- Algarni, Saad; Acting Dean of Student Affairs
- Salah, Mohammad; Acting Registrar
- Barake, Taha; Acting Director of Facilities
- Falah, Ahmad; Acting Director of IT Center
- Abduldaym, Majed; HR Director

Scientific Council

- Malkawi, Abdallah; Ph.D. Acting Chancellor, Acting VP for Graduate Studies and Scientific Research
- Bataineh, Sameer; Acting Dean, Graduate Studies and Scientific Research
- Shiyab, Ahmad; College of Business and Management
- Btoosh, Mousa; Ph.D., Assistant to Chancellor for Academic Affairs,
Acting Dean, College of Sciences and Humanities
- El-Fadil, Nazar; Ph.D, Acting Dean, College of Computing
- Rifa'i, Ahmad; Ph.D, Acting Dean, College of Business and Management
- Magableh, Amer; Ph.D, Acting Dean, College of Engineering
- Al-Sayed, Waad; Ph.D, Female Coordinator, College of Sciences and Humanities
- Bayoud, Hussam; Acting Director, Foundation Year Program

College of Graduate Studies and Scientific Research

- Malkawi, Abdallah; Acting VP for Graduate Studies and Scientific Research
- Bataineh, Samir; Acting Dean of Graduate Studies and Scientific Research
- Ijaz, Ali; Acting Vice Dean & Acting Director of the Graduate Studies Program
- Rawashdeh, Nusaibeh; Female Coordinator, Graduate Studies Program

College of Business & Management

- Rifa'i, Ahmad; Acting Dean
- Gohar, Ali; Chairperson, Accounting and Finance Department
- Al Balawi, Heba; College Coordinator, Female Section

College of Computing

- El-Fadil, Nazar; Acting Dean,
- Motasem Jarajrah; Chairperson, Computer Engineering Department
- Mezher, Mohamed; Chairperson, Computer Science Department
- Al-Sinawi, Heba; Female Coordinator, College of Computing

College of Engineering

- Amer Magableh; Acting Dean
- Amin Almasri; Chairperson, Civil Engineering Department
- Taimour Aldalgamouni; Chairperson, Electrical Engineering Department
- Mohammad Zoubi; Chairperson, Mechanical Engineering Department

College of Sciences and Humanities

- Btoosh, Mousa; Acting Dean
- Hammad, Abdulaziz; Chairperson, Humanities Department
- Ladadweh, Imad; Chairperson, Natural Sciences Department
- Abdulhameed, Haidar; Chairperson, Mathematics Department
- Btoosh, Mousa; Chairperson, English Language and Translation Department
- Moghrabi, Fedaa, Female Coordinator, Dept. of English Language and Translation

Foundation Year Program

- Bayoud, Hussam; Acting Director
- Abu Atieh, Amani; Coordinator, Female Section

Student Affairs

- Al Qarni, Saad; Acting Dean of Student Affairs
- Al-Atawi, Nora; Female Assistant to the Dean of Student Affairs
- Shuaa Al-Mutiri, Student Counselor
- Matar, Jihad; Sports Officer
- Aminah Al Atawi; Sports Assistant, Female Section

Admission and Registration Department

- Salah, Mohammad; Director
- Alenizi, Abdallah; Director Assistant
- Abu Al-Hassan, Lama; Assistant Registrar, Female Section

Human Resources Department

- Abduldayim, Majed; HR Director
- Al-Nojom, Amro; Payroll System Officer
- Abu Ameh, Zainab; HR Assistant, Female Section

Finance Department

- Ghazawi, Odey; Acting Director
- Al Hazmi, Amnah; Assistant, Female Section
- Al Atwai, Salah Cashier

Public Relations

- Al Balawi, Abdullah, Acting VP
- Nisrine Al Aqbi, Female Section
- Ellawand, Mirvat, Webmaster & Social Media
- Khaledi, Sami, Social Media

Purchasing Department

- Qutishat, Ahmad; Administrative Assistant, President Office
- Al Sa`afen, Yousif; Officer

Store

- Al Huwaiti, Bassam; Store Keeper

Copy & Mail Center

- Fteih, Adnan, Translation Officer
- Al Shamari, Kholoud; Female Section

Library

- Deif, Mohammad; Acting Librarian Director
- Shorba Amani; Female Section

IT Center

- Al Falah, Ahmad, Acting Director, System Administrator
- Elij, Tharwat, Database Administrator
- Barakah, Abdullah (Moodle Administrator)
- June Estrella, Technical Support

Facilities Management Unit

- Barake, Taha; Acting Director
- Alqarni, Salha; Coordinator, Female Section

Information Desk

- Al Rashidi, Kateb
- Alobaid, Nemah; Female Section

Transportation Unit

- Al-Hwaiti, Bader; Officer
- Abdel Haq, Nourah; Female Section

Security Unit

- Al Omrani, Abdullah; Acting Director
- Samti, Fatmah; Coordinator, Female Section

President's Office

- Al Dosari, Mouhammad; Secretary
- Alhweiti, Bassam; Secretary

Consultative Center

- Al Balawi, Gassem; Director

Translation Center

- Rababah, Hussein; Director



جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY

The University

THE UNIVERSITY

Background

Based on the principle of integration between private and public sectors in KSA in offering higher education services, the Ministry of Education encourages private higher education in all academic specialties. His Royal Highness Prince Fahad Bin Sultan – Prince of Tabuk Region encouraged investors to start a private university to spread culture and education in the region of Tabuk, which has a distinguished geographical location that serves the region and its surroundings.

FBSU was established in the year 1424 H in the city of Tabuk with one college, the College of Computing. At the beginning of the academic year 1427 – 28 H, a branch for girls was added and was followed by the addition of the College of Engineering and Business and Management in 1428 – 29 H and the College of Sciences and Humanities in 1435-36 H. The University is governed by a Board of Trustees chaired by His Royal Highness Prince Fahad Bin Sultan Bin Abdul Aziz. The University continues to receive technical support from the American University of Beirut which offers consulting services on the design of curricula, selection of faculty, and the development of the University bylaws.

Vision

To become a leading university in the Kingdom of Saudi Arabia and beyond in teaching, research, innovation, and community service.

Mission

Providing high quality academic programs and distinguished research through professional teaching and administrative staff, using the latest educational and research equipment in an environment conducive to research, innovation and knowledge building to contribute effectively to build the knowledge society and the knowledge economy, while adhering to the highest ethical standards.

Academic Services and Facilities

The mission of the Academic Services at FBSU is to ensure that the University's mission and goals, such as academic excellence, community service, and other core educational values, are accomplished. FBSU provides the following facilities:

Library

Library services include print and electronic collections that provide first level resources in engineering, science, mathematics, business, computing, and humanities. The resources provide a good start to complete classroom assignments and projects, explore professional literature, pursue personal learning, and conduct research.

The library includes study areas equipped with PCs connected to the internet. Through the library webpage one can use search engines to access a number of quality information sources electronically in a full-text and full-image format and popular and scholarly journals, encyclopedias and engineering handbooks, standards, catalogs and books held by KSU Library, MoE Digital library, as well as Proquest Central and Ebrary that offer hundreds of thousands of digital titles in all disciplines. The web address for the Library Webpage is: [http:// www.fbsu.edu.sa](http://www.fbsu.edu.sa)

Lab Facilities

FBSU is totally committed to providing students with a quality lab experience in order to prepare them to succeed in today's technology-based economies. As a vital hands-on component of all technology-based courses, the labs are well integrated into the curriculum giving FBSU graduates the ability to harness technology for the benefit of the institutions they work for.

FBSU also allocates computing and networking facilities to its faculty, staff, and students. These facilities are intended for teaching, learning, research and administration in support of the University's mission.

Learning Assistance Center

The Learning Assistance Center offers academic assistance in the areas of Chemistry, Computer Science, Mathematics, Physics, English, and Business. Faculty members dedicate several hours each week to tutor students and work with them on one-on-one basis on any subject the student needs. Students may also receive personal academic advisement, advice on improving study skills, and workshops/review sessions. The schedule of the Center is published at the beginning of each semester.

Deanship of Student Affairs

FBSU is dedicated to the wellbeing and development of students. The Office of Student Affairs oversees student activities, athletics and recreation, counseling and advising, and all other student services. Through this Office, activities and services are provided to enhance, support, and complement the students' personal and educational development. The Office is open daily from 8 am to 4 pm.

This holistic approach to student education enables students to learn and practice the values of tolerance, civic and moral responsibility, inclusiveness and excellence in learning and leadership, values that best represent the mission of the University.

Counseling and Advising Center

The Counseling and Advising Center exists within the Office of Student Affairs to guarantee rendering to currently enrolled students a high quality professional service. The center provides services to students whose personal difficulties and problems interfere with their academic performance. It also assists students in formulating and achieving their educational goals through its psychological services, and assists gifted and talented students to further develop their abilities.

Counseling involves one-on-one discussions with a trained professional counselor who will listen, ask questions, and help explore options about the problems or areas of concern to the student. It is a process of self-discovery and self-knowledge.

The Center's professionally trained counselors exert all possible efforts to assist and support students with emotional concerns in a sensitive, caring, and confidential manner.

Student Activities Office

The Student Activities Office is responsible for organizing and supporting a wide range of student activities. Its mission is to help students reach their full academic potential by collaborating with faculty, staff, and the community to organize extracurricular activities that enrich students' lives in the University. Most student activities are organized by officially registered clubs and societies, with elected officers. These officers, including club president and club treasurer, play a key role in overseeing the activities and ensuring the financial state of the club. Clubs, societies and student publications are important channels for students to develop their talents. The University's clubs and societies cover a very wide range of student interests which may be in the fields of drama, music, debate, writing, art and so on.

Student organizations should submit by the end of October a tentative yearly plan indicating the number, type and nature of activities planned to take place.

Student Services Office

The activities of this Office include:

- Issuing ID cards to students and maintaining their validity.
- Issuing authenticating medical and official excuses to students, when they are absent from classes or exams.
- Preparation and maintenance of students' monthly stipend payments.
- Communication with parents/guardians of the students in matters related to their academic progress.
- Maintaining and updating the official and complete non-academic records of all students.
- Processing student complaints.



جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY

Admission Policies and Procedures

ADMISSION POLICIES AND PROCEDURES

FBSU seeks students with a sound academic record, good personal character, strong interest to serve their communities, and eagerness to serve as professionals in allied fields. Students with the most promising overall profile will be selected to join either the Foundation Year Program (FYP) or any of the academic programs offered in the Colleges of Computing, Business and Management, or Engineering.

University Admission Criteria

Applicants to FBSU must satisfy the following eligibility requirements:

- Hold a Secondary Education Certificate from KSA or any equivalent certificate attained within the past five years.
- Passed the National Skills Exam.
- Be medically fit.
- Hold a good conduct certificate.
- Present a “No-Objection” letter from the employer, if applicable.
- Should not have been dismissed from any academic institution.
- Fulfill program requirements.
- Fulfill other University requirements.

A student who satisfies the above criteria has to take placement tests in English, Mathematics, and Information Technology. Students who fail to achieve the required minimum score on one or more of the placement tests will be required to complete additional remedial work by joining the University’s Foundation Year Program.

Application Process

Applicants are required to fill out an application form available at the Office of Admissions, and submit it with the following documents:

- A certified copy of the Secondary Education Certificate or an equivalent certificate.
- A certified copy of the National Skills Exam results.
- A copy of the Citizenship Card or the Residence Permit (Iqama) for non-Saudis.
- Four colored passport photos.
- “No- Objection” Certificate from employer, if applicable.
- Medical Certificate.
- Good conduct Certificate.
- Non-refundable application fee.

All documents received by the Office of Admissions become the property of FBSU, and thus cannot be returned. Applications for the fall semester are accepted until mid July and applications for the spring semester are accepted until mid December.

Admission Notification

Applicants who are admitted to an academic program or to the Foundation Year Program at FBSU are notified between August 1 and August 15 for the first semester, and between January 1 and January 15 for the second semester. Admitted students will be provided with a pamphlet containing all the necessary guidelines to proceed to the registration and payment processes. Students who have been informed of their initial acceptance but did not register during the registration period, their acceptance will be revoked unless the student requested deferred entry.

Duration of Study in an Academic Program

- The minimum study period for a Bachelor degree is four calendar years encompassing eight semesters (two calendar years encompassing four semesters for the diploma).
- The maximum study period allowed for a Bachelor degree is eight calendar years (Four calendar years for a diploma). A student who fails to complete his/her degree program within these specified times must petition the College Administrative Committee for an extension of time.
- A student transferring to a diploma program at FBSU from other recognized institutions of higher learning must register in the final two regular semesters and must complete at least 30 credits at FBSU, of which a minimum of 15 credits must be in his/her major before s/he is allowed to graduate with a diploma. For purposes of this requirement, one summer session shall be considered equivalent to one semester.
- A student transferring to a Bachelor program at FBSU from other recognized institutions of higher learning must register in the final four regular semesters and must complete at least 60 credits at FBSU, of which a minimum of 30 credits must be in his/her major before s/he is allowed to graduate with a Bachelor Degree. For purposes of this requirement, two summer sessions shall be considered equivalent to one regular semester.
- A transfer student from within FBSU must meet the residency requirement of spending a minimum of three semesters in the new College during which s/he completes a minimum of 36 credits, out of which 12 are credits in the major, before s/he graduates with a Bachelor Degree. For purposes of this requirement, two summer sessions shall be considered equivalent to one semester.



جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY

Foundation Year Program

FOUNDATION YEAR PROGRAM

Officers of the Unit

Acting Director:	Hussam Bayoud
Associate Professors:	Hussam Bayoud
Assistant Professors:	Hussein Rabab'ah
Instructors:	Mustafa Abdelrahman, Amani Abu Atieh, Hamzeh Alawneh, Ahmad Al-Damen, Feda Al-Mograbi, Waleed Dweiri, Ali Hamadsheh, Khaled Kanani, Jihan Kaiser, Anas Saraireh, Ahmad Sulaiman, AbdelRahman Tantawi, Sameer Zabadi, Sultanah AlBalwi
Assistant Instructors:	Raghad Al Nufaie, Maha AlAmad

Program Overview

The Foundation Year Program (FYP) aims to prepare students to satisfy the university admission requirements. Its purpose is mainly to improve students' English language proficiency, enhance their Information Technology (IT) skills, and enrich their math knowledge. Students who successfully complete the program will be able to join an appropriate academic major.

Vision

To prepare Secondary School graduates for a smooth transition into university education.

Mission

To provide quality instruction in English Language, Math, and IT to all students who have chosen FBSU as their academic institution for higher education.

Admission

It is important to note that admission of students to the FYP and FBSU will be usually in the first semester, and possibly in the second semester, but not in the summer. Each student is required to take placement tests in English, IT, and Mathematics to determine the entry level. The tests are designed by the FYP faculty members in consultation with the AUB team specifically for this purpose. In addition, where applicable, students must satisfy the admission criteria set by the colleges to which they apply.

Structure

Students joining the FYP will be placed in one of two levels in English, IT, and Mathematics based on their performance on the corresponding placement tests. The duration of each level is one semester followed by properly designed proficiency tests.

Duration of the Program

The program could be completed in one or two semesters depending on the entry level of the learner as well as on the skills and content targets as determined by the proficiency tests. It is important, therefore, that all stakeholders realize that it takes time to acquire, reinforce, and build on literacy and content skills. Students who fail to complete the program in two years may be asked to withdraw from the University.

Placement and Promotion in the FYP

All applicants to the FYP will be assigned a learning level in each of the three subjects (English, IT, and Mathematics) based on their performance on special tests designed to measure their abilities, skills, and knowledge in these three areas.

In the English program, other specially prepared diagnostic tests may be used to test the mastery level in the various language skills and elements (listening, speaking, reading, writing, grammar, and vocabulary).

Promotion to a higher level in each of the three subjects (English, IT, Mathematics) is not automatic; learners must demonstrate that they have successfully met the instructional objectives set for the current level before moving on to a higher level. The placement test will be administered again to serve as a measurement of progress made by the learners over the period of one semester.

Learner Evaluation

In addition to traditional achievement tests and quizzes, learners will be assessed by alternative forms of assessment that are more formative and qualitative in nature, such as portfolios, focused observations with checklists, self and peer assessment, interviews, projects, oral presentations, and conferences.

Exit from the program will be determined upon achievement of a satisfactory score on well- designed measures of proficiency in the various areas.



جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY

Bridging Year Program

BRIDGING YEAR PROGRAM

Program Overview

The Bridging Year Program (BYP) provides opportunities for students who hold a diploma from a two- or three- year technical college to pursue a Bachelor's degree at Fahad Bin Sultan University. The courses of this Program are designed to bridge the gap between a student's prior education and the requirements of the third year university courses as seamless as possible. The Program could be completed in two semesters or more depending on the entry level of the student, his/her skills, and the sought program of study. Students who pass the BYP need to spend the third and fourth years of the Bachelor's degree at FBSU.

The BYP is offered in the following majors:

- College of Business and Management: Business Administration
- College of Computing: Computer Science and Computer Engineering;
- College of Engineering: Civil, Electrical, and Mechanical Engineering.

Vision

To prepare holders of associate degrees for smooth transition into university education.

Mission

The BYP seeks to prepare holders of associate degrees to smoothly continue their education in the appropriate majors at FBSU.

Program Objectives

The BYP has two main objectives:

1. Develop students' scientific competencies and increase their opportunities to succeed in their academic courses and future careers and
2. Improve students' English language proficiency, IT skills, and knowledge in natural and basic sciences.

Program Learning Outcomes

The BYP is designed to help students develop basic skills and competencies that will prepare them to better engage their major course of study. Students who successfully complete the BYP will be able to:

- a. Effectively utilize the English language essential to their success at the University.
- b. Demonstrate the use of mathematical skills to solve various mathematical problems.
- c. Apply study skills necessary for success at the college level.

Admission

To be admitted to the BYP, a diploma graduate must:

1. Satisfy University admission criteria; see the “University admission criteria”.
2. Be a graduate of a KSA-accredited academic organization.
3. Have passed the official technical exam administered by the relevant governmental authority in case the Diploma was issued by a private academic institution.
4. Have a Secondary School degree (scientific stream) for admission to the Colleges of Computing and Engineering.

Duration of the Program

The duration of the BYP is normally one or two semesters depending on the entry level of the student, his/her performance, and the sought program of study.



جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY

General Academic Information and Policies

GENERAL ACADEMIC INFORMATION AND POLICIES

Registration

Academic Advisors

Each student is assigned an academic advisor who assists him/her in registration and selection of courses. The advisor is also involved in counseling on academic difficulties or problems encountered, and in monitoring the academic progress of advisees.

The academic advisor is a faculty member in the academic division in which the student is enrolled; the advisor of the Foundation year program students is the Director of the Foundation Year Program or anyone he/she authorizes to act on his/her behalf.

Registration Procedures

Course registration can be done through the Office of the Registrar, by the Department to which the student belongs, or through the online registration system by the student himself/herself. A student Identification Number (ID) is necessary for registration. Registration for the Fall semester normally starts two weeks prior to the first day of regular classes of that semester and continues for about one week after classes begin (the exact period is specified in the Academic Calendar posted on FBSU website <http://www.fbsu.edu.sa>), while, registration for the Spring semester takes place in the break between semesters (i.e. between the Fall and Spring semesters). A student must complete his/her own registration in person and pay the tuition fees and other charges during the registration period.

Once students have registered for classes in a semester, they may process schedule modifications during the scheduled drop/add period of that semester.

Early Registration

At approximately the middle of the first (fall) semester, early registration is held in each college for the courses to be taken by students during the second (spring) semester; and in the middle of the second semester of each year, students register for both the coming summer session and the first semester of the following academic year.

Early registration is required of all enrolled students who intend to continue their studies at the University during the following terms.

Late Registration

Students who, for a valid reason, are unable to complete formal registration during the designated periods may petition for late registration, which must take place within the drop/add period specified in the academic calendar (posted on FBSU website www.fbsu.edu.sa). A late registration fee of 1,000 SAR will be assessed to students who register after the second week of the semester.

Auditing a Course

A student is allowed to audit a course only in his/her last semester before graduation. The audited course must not be a required course for graduation. The student must fill out the "Audit Form". The form requires the signatures of the course instructor and the faculty advisor, and must be submitted to the Registrar's Office during the drop/add period. A course taken for credit may be changed to an Audit course by submitting the Audit Form by the last day for withdrawal specified in the academic calendar (www.fbsu.edu.sa).

Course Substitution

If a student is unable to complete the requirements of any program due to the termination of a course or when accrediting new programs that comprise courses the student has not studied, he/she can substitute a maximum of two courses with other equivalent courses, in terms of level, content, and credit hours. The Registrar's Office must be informed of the substitution after the student has obtained the approval of his/her advisor and the Graduation Committee.

Minimum and Maximum Course Load

Course load is defined as the number of credit-hours for which a student is registered in a regular semester or a summer session. The course load varies from one major to another and is determined as follows:

Regular Semester

The minimum course load limit is 12 credit hours during a regular semester, provided that the total number of credit hours registered by a student in any two consecutive semesters is not less than 24. This condition is relaxed in the last semester before graduation.

The maximum course load is 19 credit hours. However, a student is permitted to register for up to 21 credit hours with the approval of his/her Dean, if the student has maintained a minimum cumulative GPA of 4.00 out of 5.00 in all work undertaken during the preceding terms in which he/she earned his/her last 24 credit hours.

Summer Session

The maximum course load in a summer session is 9 credit hours.

Graduation Term

The minimum course load in this case is 1 credit hour, and the maximum is 22 credit hours during a regular semester and 13 credit hours in the summer session.

Students on Academic Probation

The maximum course load in such case is 13 credit hours in each regular semester. However, students registering on an FYP course are allowed to register for up to 14 credit hours.

Adding and Dropping Courses

A student may change his/her schedule by adding or dropping courses, or changing sections only after obtaining the approval of his/her academic advisor.

Adding Courses

Students may add courses with available seats during the drop/add period of each semester. A course add is performed using a “Course Drop/Add Form”, which may be obtained from the Registrar’s Office. The form requires the advisor’s signature, and must be submitted to the Registrar’s Office during the drop/add period of the respective semester.

Important Reminders

1. The course load should not exceed the maximum permissible limit.
2. It is the advisor’s responsibility to ensure added courses do not result in conflicts in the student’s schedule.
3. Regularly scheduled courses cannot be added after the drop/add period.

Dropping Courses

Students may drop courses from their schedule during the drop/add period of each semester. A course drop is performed using “Course Drop/Add Form”, which may be obtained from the Registrar’s Office. The form requires the advisor’s signature, and must be submitted to the Registrar’s Office during the drop/add period of the respective semester.

Important Reminders

1. The course load must remain at or above the minimum allowable limit (12 credits for a regular semester and 1 credit for a summer session).
2. If the course dropped is a co-requisite for another registered course, the two courses should be dropped simultaneously, or continue to be studied together.
3. The process for dropping courses may not be used to officially withdraw from university after the first day of the semester.
4. Non-attendance does not constitute a drop or a withdrawal from a course.
5. Any student receiving a scholarship from FBSU is required to maintain a full-time status of 12-credits load in a regular semester (6 credits in a summer session); otherwise, he/she loses the scholarship.

Changing Sections

If a student wishes to change a section of a registered course, he/she may choose a section that will not create a time conflict with his/her current schedule, and must fill out the “Section Change Form”. The form requires the signatures of the course instructor and the faculty advisor, and must be submitted to the Registrar’s Office during the drop/add period.

Duration of the Drop/Add Period

The initial drop/add period normally ends by the second week of the semester. Throughout this period, the dropped courses will not appear on the student's transcript. Courses dropped beyond this period (until the final course drop deadline) will appear as (W) on the student's permanent academic record.

Tuition Adjustments for Drop and Add

Tuition fees at FBSU are computed on a semester basis rather than credit-basis. This means that regardless of the number of credits for which a student is registered per semester, he/ she pays the same amount of tuition, as long as he/she is taking the minimum number of credits permitted by the University.

Attendance and Withdrawals

Class Attendance

- Students are expected to attend all classes, laboratories, or required field work. All missed laboratory or field work must be made up. A student is responsible for the work that is done, and for any announcements that are made, during his/her absence.
- Tardiness to classes is not at all tolerated. In cases of tardiness, the following rule applies: students who are absent for more than 10 minutes of class time are considered as absent.
- Students who absent themselves during a semester for more than 25% of the required number of lectures of any course are not allowed to continue the course, denied from sitting for the final examination, and assigned a course grade of DN, which is reported on their transcript. In some cases, the College Council may consider removing a DN grade, provided that the absence does not exceed 50%, and giving the student permission to sit for the final exam on condition that the student presents an excuse, which the College Council deems as valid.

Withdrawal from Courses

- A student who withdraws from, or is forced to drop, a course will receive a grade of "W."
- A student cannot withdraw or be withdrawn from a course after the announced deadline (not later than 10 weeks from the start of the semester or five weeks in the summer term) unless approved by the College Academic Committee.
- A student cannot withdraw or be forced to withdraw from a course if this results in the student being registered for less than 12 credits (in a regular term) without the approval of the College Academic Committee.
- A student can withdraw from only one required course per semester. Students who wish to withdraw from more than one required course must petition the College Academic Committee for permission to do so.

Dropping a Semester

A student may apply to withdraw from the semester latest by the course withdrawal deadline. Application for withdrawal after the course withdrawal deadline announced in the University Calendar needs the approval of the Dean of the College. The student must fill the Withdrawal from Semester Form from the Registrar's Office, and the withdrawal is subject to the University's refund policy as stated in the respective section in this catalog.

Dropped semesters are counted as part of the maximum duration of study.

Withdrawal from University

A student may apply to withdraw from the University at any time. The student should fill the Withdrawal from University Form that he/she could obtain from the Registrar's Office. The student should note the University's refund policy as stated in the respective section in this catalog.

Postponement and Interruption of Study

A student may apply to take a leave of absence for a maximum of two consecutive semesters or a maximum of three nonconsecutive semesters during the course of his/her studies. The student must fill the Postponement of Study Form that he/she can obtain from the Registrar's Office, otherwise the student will be considered to have taken an unauthorized postponement and thus will be classified as an inactive standing (absent). The postponed and the absent semesters are not included in the maximum period of attaining the degree.

Conditions for Readmission

Students who withdraw from FBSU with a good academic record are granted readmission within a period not exceeding four semesters for one time only, provided that he/she was not on probation prior to the interruption date. Students who wish to return after the four-semester period, or those who were on probation, have to reapply for admission. Their files will be reevaluated based on the admission requirements applicable at the time of reapplication.

Assessment and Examinations

Examinations

Courses are evaluated either by (1) at least three written examinations, or by (2) oral and/or practical examinations, research, term papers and other activities plus at least two written exams. In any case, class work score must not be less than 30% of the final course grade. All examinations, excluding the finals, are scheduled by the instructors. It is recommended that at least one exam be conducted and the results disclosed before the last day of the final course withdrawal deadline so that a student can decide whether to withdraw from the course or not.

Final examinations are scheduled by the Registrar's Office. The schedule indicates the date, time and location of all examinations. The day and time of a final examination should be strictly adhered to. In exceptional cases, with justifiable

reasons, a faculty member may request a rescheduling of a final examination with the approval of the Dean of the College.

The duration of a final written examination should not be less than one hour and not more than three hours.

Final Grade Policy

It is expected that:

- At least 60 percent of the total course grade should be allocated to written examinations, with a minimum of 30% assigned to the final exam with emphasis on practical work and projects for the remaining percentage. Any grading scenario that does not meet this policy should be cleared with the dean early in the semester.
- A certain portion of the final grade will be assigned for class participation among other possible course requirements (e.g., term paper, project, homework, etc.).

Conduct of Final Examinations

No student will be allowed to sit for a final examination after the lapse of 30 minutes from the beginning of the examination. Also, no student will be allowed to leave the examination venue less than 30 minutes after the beginning of the examination.

Submission of Final Grades

All final grades must be submitted by the instructor to the Registrar's Office by the deadline specified. The grades through grade rosters must be signed by the course instructor, the department chairperson and the college dean.

Make-Up Examinations

If a student misses an examination, other than the final, the instructor will make arrangements for a make-up examination if the student submits an approved excuse for his/her absence.

If a student misses a final exam and does not present a valid excuse for his/her absence, he/she will get a grade of zero on that exam. The final grade he/she receives for that course will be calculated on the basis of his/her performance on previous course work.

If the student misses a final examination due to circumstances beyond his/her control, the student may request from the instructor, by means of a petition, a make-up examination before the end of the next semester. The instructor, then, submits his/her report to the college council. If the petition is accepted, the dean of the college informs the student in writing of the decision of the college council and the date of the make-up examination.

Reviewing a Final Course Grade

A student, who feels that the grading was unfair, must fill a Final Grade Review form and submit it the chairperson of the department offering the course for approval within the first two weeks after the start of the next semester. If approved,

the student can discuss the matter with the instructor of the course. During the two week period, the student is allowed to review his final exam paper along with the instructor. If the student and the instructor are unable to arrive at a solution, the student may write a petition to the chairperson of the department offering the course, no later than the end of the fourth week of the next semester. The department chairperson will investigate through the Academic Committee the student's arguments and may call for a review of the instructor's evaluation of the student based on the student's class work and final examination scores.

Change of Grade

Normally, grades cannot be changed after the submission of the final grades to the Registrar's Office. Under certain circumstances, a written request from the course instructor can be addressed to the registrar explaining the reasons for the change. Such a request for a grade change must be endorsed by the department chairperson and the Dean of the College and approved by the College Council. The Registrar's Office should be informed of the change of grade no later than the beginning of the final examinations for the following semester.

Grading System and Codes

Grade	Points	Letter Grade	Grade Interpretation
95-100	5.00	A+	Outstanding
90-94	4.75	A	Excellent
85-89	4.50	B+	Superior
80-84	4.00	B	Very Good
75-79	3.50	C+	Above Average
70-74	3.00	C	Good
65-69	2.50	D+	High Pass
60-64	2.00	D	Pass
Below 60	1.00	F	Fail
AU			Audit
DN			Denied
DS			Disciplinary Action
NP			No grade-Pass (Not considered in GPA Calculation)
NF			No grade-Fail (Not considered in GPA Calculation)
IC			Incomplete
IP			In Progress
W			Withdrawn
WF			Withdrawn - Fail
WP			Withdrawn – Pass
T			Transfer

Work In Progress

For courses of a research nature which require more than one semester to complete, the grade of IP (In Progress) is assigned to the student in all terms, where the course is registered, prior to the completion of the designated work. After the completion of the course, the student will be given the grade he/she has earned. In case the work is not completed within the specified time, the Department Council concerned may recommend changing the grade from IP to IC (Incomplete).

Incomplete Work

If the work for a course is not completed by the date on which the semester ends, the following procedures will apply:

- d. To secure permission to complete the work for a course, a student must submit a valid excuse to the instructor and the Department Council at least two weeks before the date of the scheduled final exam of the course.
- e. Incomplete course work will be reported as an “IC” followed by a numerical grade reflecting the evaluation of the student available at the end of the semester. This evaluation is to be based on a grade of zero on all missed work. The student grade will not be included in the calculation of the cumulative or semester GPA.
- f. Students permitted to complete work for a course must do so by the end of the following regular semester. After the incomplete work is done and evaluated by the faculty member, a grade change will be considered by the Department Council and a new grade is reported to the Office of the Registrar.
- g. If no valid excuse is presented and the work, if permitted, is not completed within the time limits specified above, the “IC” will be changed, and the numerical grade available becomes the final grade in the course.
- h. For the purposes of averaging, the numerical grade will not be used, until changed through the procedure set above.
- i. It is the responsibility of the student to find out from his/her instructor the specific dates by which requirements must be fulfilled. The deadline for submission of incomplete grades by the instructor is within 72 hours after a student has completed the course work.

Failing and Repeating Courses

Failing Courses

If a student fails a course, no re-examination will be permitted. A student who fails a required course must repeat the course at the earliest opportunity. A student who fails an elective course is not required to repeat it as long as he/she can achieve the minimum cumulative average and the minimum number of credits required for graduation. However, the grade of the non-repeated course will be included in tallying the cumulative GPA.

Repeating Courses

A student who fails a required course must repeat it. A student who wishes to improve his/her academic standing may repeat a course for which he/she has previously obtained a "C" or a lower grade. Should a student repeat a required course and fail, he/she must repeat the course. When a course is repeated, the last grade is considered in computing the student's cumulative average. All grades are included in the student's transcript.

Academic Standing

A student is considered in good academic standing if he/she attains an overall grade point average of at least 2.0.

Academic Probation

If at the end of any semester, a cumulative grade point average of less than 2.0 is earned, the student will receive a warning and will be placed on probation. The status of academic probation can be revoked after the lapse of one regular semester from the date of the probation if the student achieves a semester and cumulative GPA of 2.0 or above at the end of this semester.

Academic Dismissal

Academic dismissal is the permanent separation of a student from the University. Academic dismissal occurs in one of two cases:

1. A student receives probation in three consecutive semesters. However, the University Council may, upon recommendation of the College Council, grant the student one more chance to raise his/her GPA by repeating some courses;
2. A student, at the end of a semester, has been in a program of study for more than 1.5 times the normal period to complete the study plan of that program, but has not yet completed the graduation. The University Council may grant the student additional time to complete the graduation requirement such that the total time the student spends in a program does not exceed twice the normal completion period.

In exceptional cases, the University Council may grant a student on whom the above conditions apply a final chance to complete program requirements in two extra semesters at most.

Appeal of Academic Dismissal

A letter officially notifying the student of academic dismissal will be mailed to him/her shortly after grades are finalized for the semester. Included in this letter is the form needed to officially appeal the academic standing. A student who wishes to appeal must complete all parts of the form and return it by the specified date. The University Council reviews appeals twice a year, in the beginning of the fall semester and at the end of the spring semester, and notifies the student of the final decision the day after the review meeting. Inquiries regarding academic standings and/or the appeal process should be directed to the University Council.

Dean's Honor List

The Dean's Honor List, published at the end of the fall and spring semesters, honors students for high scholastic achievement. A student who attains a semester GPA of at least 4.25 in no fewer than 15 credit hours and who has passed all courses for which he/she had registered will be placed on the Dean's Honor List for that semester.

Transfer

Transfer from Another Recognized University

The transfer of a student from outside the University may be accepted under the following conditions:

1. The student has been enrolled at a recognized university.
2. The student must not have been dismissed from that university for disciplinary reasons.
3. The student must satisfy the transfer provisions as determined by the University Council.
4. If, after his/her transfer, it is discovered that a student had been dismissed from his/her previous university for disciplinary reasons, his/her enrollment will be considered canceled as of the date of acceptance of his/her transfer to the University.

The student file is evaluated by the Department's Equivalency Committee, which forwards its recommendation to the Dean of the College.

A course is deemed equivalent to a course offered at FBSU if it covers 70% of the topics, involves the same components (Lecture, Lab, Tutorial), and has the same number of credits. The student must have a passing grade in the transferred courses.

The courses deemed equivalent will be transferred to the student's record but will not be included in the calculation of his/her cumulative GPA. Courses taken as Audit cannot be transferred.

A student transferring to FBSU must earn at least 60% of his/her credits at FBSU, including the last 60 credits for the Bachelor degree.

Transfer from One College to Another at the University

A student may transfer from one college to another only after spending an entire academic year in his/her current college and meeting the admission requirements of the new college. A transfer application signed by the student and approved by the dean of the college the student has departed should be sent to the Registrar's Office then to the Admissions Committee of the new College at least one month before the beginning of the new semester. The Admissions Committee of the College studies the applications of the students transferring to that College and forwards its recommendations to the Dean.

All transferred credits remain unchanged in the student's record. Grades of transferred courses are preserved as well and do enter in the calculation of the student's GPA.

Transfer from One Major to Another within the College

A student may transfer from one major to another only after spending an entire semester in his/her current major and meeting the admission requirements of the new major. A transfer application signed by the student and approved by the Dean of the College should be sent to the Registrar's Office at least one month before the beginning of the new semester. The College Admissions Committee studies the applications of the students transfer and forwards its recommendations to the Dean.

All Transferred credits remain unchanged in the student's record. Grades of transferred courses are preserved as well and do enter in the calculation of the student's GPA.

FBSU Students Visiting Other Institutions

An FBSU student in good academic standing may be allowed to takes courses at another institution subject to the following conditions:

- a. The student attains prior approval from his/her college.
- b. The student studies at an accredited university and in the same major.
- c. Courses to be taken are equivalent (a match of at least 70%) to those required for graduation.
- d. The maximum number of credits must not exceed 21 credits of which no more than 9 credits are specialized/core courses. The final year project cannot be taken outside FBSU.
- e. Students cannot normally take a course at another university if it is offered at FBSU during the same semester. Under special circumstances, students may petition the College Council for exemption.
- f. The maximum total number of credits that a student can take at FBSU and outside during a regular semester is 19 credit hours. The maximum is 9 credits for the summer session.
- g. Only courses with passing grades will be recorded in the student's transcripts but will not be used in the calculation of his/her GPA.

An FBSU student in good academic standing, who did not transfer to FBSU from another institution and wishes to study abroad, may spend up to one year and earn up to 30 credits at a foreign university. An FBSU student must spend his/her final year at FBSU.

In all cases the student must register on a full-time basis during his/her last academic year at FBSU and that a student who had spent the last two academic semesters at an external institution is not eligible to receive an FBSU-sponsored scholarship.

All MOE Rules pertaining to this issue supersede the above mentioned rules in case of conflict.

Graduation

To graduate with a Bachelor degree, students must satisfactorily complete all graduation requirements of the colleges they are enrolled in with a cumulative GPA not less than 2.0. A student must be registered for the semester at the end of which he/she graduates.

Duration of Study in an Academic Program

- The normal study period for a Bachelor degree is four calendar years encompassing eight semesters.
- The maximum study period allowed for a Bachelor degree is eight calendar years. A student who fails to complete his/her degree program within these specified times must petition the College Administrative Committee for an extension of time.
- A student transferring to a Bachelor program at FBSU from other recognized institutions of higher learning must register in the final four regular semesters and must complete at least 60% of credits at FBSU, of which a minimum of 30 credits must be in his/her major before he/she is allowed to graduate with a Bachelor degree. For purposes of this requirement, two summer sessions shall be considered equivalent to one regular semester.
- A transfer student from within FBSU must meet the residency requirement of spending a minimum of three semesters in the new College during which he/she completes a minimum of 36 credits, out of which 12 are credits in the major, before he/she graduates with a Bachelor degree. For purposes of this requirement, two summer sessions shall be considered equivalent to one semester.

General Graduation Grade

The grade stated on the student's graduation diploma depends on his/her GPA at the time of graduation as follows:

GPA	GRADE
At least 4.50	Excellent
At least 3.75 and less than 4.5	Very Good
At least 2.75 and less than 3.75	Good
At least 2.00 and less than 2.75	Pass

Graduation with Honors

To graduate with Honors, students must have earned, in residence at FBSU, no fewer than 60% of study plan required for graduation; must not have failed in any course taken at FBSU or elsewhere; must not have been subjected to any disciplinary action within the University, and must have completed all graduation requirements within the allowed time. Additional requisites are as follows:

- First Honors rank: Grade Point Average of 4.75 or above
- Second Honors rank: Grade Point Average of at least 4.25 and strictly less than 4.75

Note: Honors read at commencement are based on credit hours and the grade point average posted as of the previous semester and are not official. Official Honors will be awarded upon posting of final grades and completion of the degree, and will be noted on the final transcript and diploma.

Academic Records

Transcript Request

Transcripts will not be issued unless all obligations towards the university are cleared. To request a transcript, the student needs to fill, sign, and return a “Transcript Request” Form to the Office of Registrar.

Disclosure of Student Records

The University may disclose routine information without prior written consent from the student like student’s name, degrees received, major field(s) of study, awards received, and participation in officially recognized activities and sports.

The University will disclose other information including academic records only upon receiving written consent of the student except in the cases below:

1. Upon the request from other educational institutions, where the student seeks to enroll and/or the Ministry of Education.
2. As necessary to academic officers, academic advisors, and faculty members within the University.
3. To parents of a dependent student.
4. In compliance with a judicial order.

Academic and Intellectual Freedoms

Freedom in Classroom

Students are responsible for learning the content of the courses in which they enroll though they should be free to take reasoned exemption to the data or views offered in any course of study and reserve judgment about matters of opinion.

Students are responsible for complying with standards of academic performance required by each course in which they are enrolled. Such standards shall be communicated clearly in writing on or before the first meeting of each course. Students should have protection against prejudiced, arbitrary, and unfair academic evaluation.

Freedom of Inquiry and Expression

Students and their official organizations are free to examine, discuss questions and issues of interest to them, and to express their opinions whether in public or private.

Such freedom does not, however, permit student groups to disrupt the orderly processes of the educational environment, nor does it permit the expression of ideas in ways which violate civil or criminal laws, blatantly disregard the truth, threaten, demean, or libel others.

In expressing their views, students and their official organizations should make clear that such views are not necessarily those of the University.

Academic Integrity

Academic Integrity and honesty are central components of a student's education. Ethical conduct maintained in an academic context will eventually be taken into student's professional career. Anything less than total commitment to honesty undermines the efforts of the entire academic community. Both students and faculty are responsible for ensuring the academic integrity of the University.

Cheating

Students who use non-permissible written, verbal, or oral assistance, including that obtained from another student during examinations, in course assignments, or on projects, are guilty of cheating. Cheating is essentially fraud. It deceives others and causes them to make an assessment based on the misinterpretation of a student's actual ability, or performance. Cheating is a violation of the University's academic regulations and is subject to disciplinary action.

Plagiarism

Students who fail to credit properly ideas or materials taken from others commit plagiarism. Putting his/her name on a piece of work-any part of which is not yours-constitutes plagiarism, unless that piece is clearly marked and the work from which he/she has borrowed is fully identified. Plagiarism is a violation of the university's academic regulations and is subject to disciplinary action.

Range of Disciplinary Actions

Abusing any of the intellectual freedoms will result in disciplinary actions that correspond to the type of abuse. The possible disciplinary actions are also applicable in other situations as clarified in the student handbook.

Warning

This may be oral or written. It is a statement that the student has inadvertently violated a University regulation. The warning will be documented and recorded. Examples: attempt to cheat in an exam, littering, and smoking in prohibited areas.

Reprimand

This will be in writing. It is a statement that the student has violated a university regulation. It is intended to communicate most strongly, both the disapproval and the reprimand of the university community. Examples: inadvertent plagiarism, failure to cite sources appropriately, and inappropriate conduct in examinations.

Dean's Warning

This will be in writing. Only two Dean's warnings are allowed in a student's academic career at the University. It is recommended that any violation of the University regulations after the second Dean's warning results in consideration of suspension. Dean's warnings are normally accompanied by secondary disciplinary actions. Examples: plagiarism, academic dishonesty, in-class disruption, mental or physical harm, discrimination and harassment.

Suspension

This will be in writing and will form part of the student's permanent record (it will appear on the student's transcript). A student may be suspended for a fixed period of time during which the student may not participate in any academic or other activities at the University. At the end of the suspension period, the student may be readmitted to the university, only upon the recommendation of the University Disciplinary Committee. Examples: cheating, theft, and vandalism.

Expulsion

This will be in writing and will form part of the student's permanent record (it will appear on the student's transcript). Expulsion denies the student the right to participate in any academic or other activities at the University for an indefinite time. Only under the most unusual circumstances, and upon the recommendation of the University Disciplinary Committee, will an expelled student be readmitted to the University. On the other hand, cases whereby other committees, e.g., the student affairs committee recommend suspension or expulsion of a student, should be referred to the University Disciplinary Committee. Example cases include: academic dishonesty, possession of dangerous weapons or materials, and endangering public safety.

Note: Any person who maliciously lies to cover up an act sanctioned by the code of conduct will be considered an accessory after the fact and may be subject to disciplinary action.

Student Academic Appeals and Grievance Procedures

These procedures should be used to appeal or resolve disputes concerning an academic grade or other academic decision considered by a student to be arbitrary or contrary to University policy. For the purposes of these procedures, a student is someone holding "active" registration status as the time of the alleged violation.

Appeals Process

The following procedures outline the steps of the academic appeal and/or grievance process. It is recommended but not required that the student first arrange a conference to discuss the appeal or grievance with the faculty member(s) whose action is addressed in the student's appeal or grievance. It is expected that all of the parties involved at each step of the appeals/grievance process will make a good faith effort to resolve the issues.

Step1:

Department Chair. In the event that a student feels he/she has not received satisfaction from his discussion with the faculty involved or in the event that a student prefers not to discuss his/her concerns directly with the involved faculty, the student may arrange a conference to discuss the appeal or grievance with the Department Chair (or equivalent). If the department chair is the involved faculty member, this step may be skipped.

Step 2: Dean (or equivalent). In the event there is no department chair in the College or academic Unit involved, or in the event the involved faculty member is the Department Chair or Unit Director, or in the event a student still feels aggrieved after consultation with the Department Chair, he/she may ask for a review by the respective Dean (or equivalent). If the involved faculty member is the Dean of the College (or equivalent) this step may be skipped.

Step 3: Student Academic Review Committee. In the event the student is not satisfied with the results of the reviews by the Department Chair and the Dean (or equivalent) he/she may ask for a review committee to be formed. This request shall be in writing to the Coordinator of Academic Affairs Committee.

It is the responsibility of a student to initiate the appeals procedure at each step. If the appeal is pursued through Step 3, it is expected that, unless there are unusual circumstances, the request for a hearing by the Student Academic Review Committee will be submitted within 90 days from the last day of the term in which the alleged violation arose. If the student fails to pursue the matter in the manner provided by this policy, after a conference with the College Dean if applicable, the original academic decision will be final. The student should bring to the various conferences and to the Student Academic Review Committee hearing all evidence on which he/she intends to rely.

Fees and Expenses

Costs to students in tuition and other University fees, are kept at a minimum consistent with the provision of high quality instruction and adequate facilities and equipment. The University reserves the right to change any or all fees at any time without prior notice. Such changes are applicable to students currently registered with the University as well as to new students.

Students are not permitted to enter classes at the beginning of the term until their fees are paid or special arrangements have been made with the Office of the comptroller.

Payment of Fees

- Each FBSU student must pay all his/her tuitions and other university fees.
- Statements of Fees are available at the Office of the Comptroller or on the FBSU website.
- Under special circumstances, late payment of tuition fees is permitted during a period of no more than five working days after the announced deadline, and is subject to a late payment fee.
- Checks must be issued to the order of the bank concerned using the following format: Pay to the order of (Name of Bank) - Account FBSU.
- Students are expected to meet all financial obligations to the University by the appropriate due date. For any student who fails to promptly meet his/her financial obligations, the University reserves the right to place an

encumbrance on the student's record that prevents registration for future semesters and the release of transcripts and diplomas, and also prevents access to other university services. It is each student's responsibility to be informed of all registration and fee payment dates and deadlines.

Up-to-date schedules for registration and payment of fees are available through the Office of the Registrar.

Refund policy

If for justifiable reasons a student withdraws after registration from either the fall or the spring semester, then fees are refunded according to the following schedule:

Before the official start of classes	100% of full tuition
During the first week of classes	75% of tuition
During the second week of classes	50% of tuition
During the third week of classes	25% of tuition

No refunds are due after the end of the third week of classes.

Scholarships and Financial Support Program

Objectives

The objective of the Scholarship and the Financial Support Program at FBSU is to help students with strong potential for academic success to pursue post-secondary higher education that would not be possible otherwise. Under this policy, scholarships will be granted to students who meet the established eligibility criteria without any form of discrimination. Scholarships and Financial Support funds come from a variety of sources as outlined below.

Awards:

Prince Sultan Scholarships

Under this program, 50 scholarships are awarded to orphans and persons with disabilities. Each scholarship covers 100% of the tuition and fees for one year, renewable for up to four years. Awards are granted to the students who satisfy the following criteria:

- a. Acquired the High school certificate (Thanauia) within five years from the date of application.
- b. Attained a score among the top 50 applicants.
- c. Provide evidence of either being orphan or has a disability for which the university has adequate supporting facilities.
- d. Provide evidence of financial need.
- e. Have exemplary character and a sense of community.
- f. Be the only member of the same family to apply.

Merit Scholarships Program

The aim of the Merit Scholarship Program is to promote academic excellence and create a positive competitive environment among students. Awards recipients are selected on the basis of scholastic abilities as well as character, integrity, leadership, and potential contribution to the community.

The Merit Scholarship Program awards, each year, scholarships to undergraduate students who had spent the last two academic semesters at FBSU and are deemed to have a promising scholastic potential as evidenced by their scholastic achievement. Students are required to apply for financial aid to receive these scholarships. Recipients of any scholarship will not be included in this program. Eligible students for the MoE scholarship program must have applied to this program and been denied before being considered for the Merit Scholarship Program.

Available scholarships under this program are:

1) Prince Fahad Bin Sultan Scholarships

Under this program, 25 Scholarships are awarded. Each scholarship covers 100% of the tuition and fees for one year. Awards are granted to Saudi students who satisfy the following criteria:

- a. Maintain a cumulative GPA of 3.75 or higher for third and fourth year students and a cumulative GPA of 4.00 or higher for first and second year students.
- b. Provide evidence of financial need.
- c. Had not violated university rules and policies.
- d. All outstanding fees are paid within university set deadlines.

Students leaving Level II of the Foundation Year Program and entering a regular degree program are eligible to receive the scholarship provided that their Cumulative Average is equivalent to a GPA of 3.75 or above.

2) Sabih Al-Masri Scholarships

Under this program, 10 scholarships are awarded, 5 for males and 5 for females. Each scholarship covers 100% of the tuition and fees for one year. Awards are granted to students who satisfy the following criteria:

- a. Maintains a cumulative GPA of 3.75 or higher for third and fourth year students and a cumulative GPA of 4.00 or higher for first and second year students.
- b. Had not violated university rules and policies.
- c. Have maintained exemplary character and a sense of community.
- d. All outstanding fees are paid within university set deadlines.

Students leaving Level II of the Foundation Year Program and entering a regular degree program are eligible to receive the scholarship provided that their Cumulative Average is equivalent to 3.75 or above. Recipients of such a scholarship should contribute at least 15 hours per semester in community service.

3) Scholastic Achievement scholarship program

The purpose of the Scholastic Achievement Scholarship Program is to encourage students at FBSU to maintain and perhaps further their scholastic performance. This type of scholarship may be sponsored by individuals or agencies.

4) Individual/Institution Sponsored Scholarships

Any individual or institution may provide a set number of scholarships as an act of philanthropy. The awarding entity sets the amount and the criteria under which the scholarships are awarded pending the approval of the University..

Student Employment Program

Objectives

FBSU offers a limited number of packages under the Student Employment Program every term, excluding summer. This form of privilege is a win-win proposition: it provides some help to qualified students who need assistance with college expenses and in return, students are required to work in various campus Offices up to 15 hours per week. Students benefiting from this program can benefit from a tuition waiver to be decided by the University Council.

Eligibility Requirements

To be eligible for FBSU Student Employment Program, a student must demonstrate an evidence of need and should maintain the following average and status requirements:

- a. A minimum cumulative GPA of 3.0.
- b. A minimum cumulative GPA of 3.0 in the student's last full-load term.
- c. Carry a minimum load of 12 credits during the term of employment.

Any student who fails to satisfy the eligibility criteria will not be granted a privilege under this program. Newly admitted students are not eligible for this program during their first term at FBSU.

Application

Students are required to submit in person a Student Employment Application by August 10th, for the Fall Term and by the end of December for the Spring Term.

Students granted employment should coordinate with the Office of Student Affairs for their work assignments.

Disqualification

Student Employment privilege will be revoked if the student:

- Does not fulfill his/her duties in a previous contract as required.
- Receives a disciplinary probation as a result of misbehavior.
- Had intentionally presented false evidence or misleading statements in the employment application. Such violations may jeopardize the student's chances of benefiting from the program in the future.



جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY

College of Sciences and Humanities

COLLEGE OF SCIENCES AND HUMANITIES

Officers of the College

Acting Dean: Mousa Btoosh

Associate Professors: Mousa Btoosh, Husam Bayoud, Khaled Abu-Abbas

Assistant Professors: Haidar Abdul Hamid, Amer Abu Omar, Massad Al Balawi, Waad Al-Sayed, Imad Ladadwa, Hussein Raba'ah

Lecturers: Mustapha AbdulRahman, Amani Abu Atieh, Hamzeh Alawneh, Ahmad Al-Damen, Shuaa Al-Mutiri, Feda Al-Mograbi, Waleed Dweiri, Ali Hamadsheh, Khaled Kanani, Jihan Kaiser, Anas Saraireh, Ahmad Sulaiman, Mohammad Zaatreh, Sultanah Al-Balawi, Abdolmin'im Al-Itiwi

College Overview

The College of Sciences and Humanities (CSH) serves the entire student population at FBSU by offering different courses in basic sciences (Chemistry and Physics), Mathematics, English and social and cultural studies (Arabic and Islamic studies). In addition, the college offers an undergraduate program in English Language and Translation.

The CSH offers numerous opportunities for interdisciplinary studies. Graduates today live in a world in which the ability to integrate knowledge and skills from a variety of disciplines is increasingly important. The College fully recognizes this fact and is constantly working to create opportunities for students to integrate and apply what they learn.

Vision

To be a model college reputed for strong commitment to excellence in teaching and research, significant enhancement of creativity and innovation, and permanent engagement with the local community.

Mission

The College of Sciences and Humanities has a strong commitment to excellence in the transmission of knowledge and service, providing high quality education in the subject of basic sciences and social and cultural studies, and providing a nurturing and conducive environment to quality teaching and learning in order to meet the needs of all students in the university programs.

Goals/Objectives

The CSH is committed to achieve the following goals and objectives:

- Nurturing students to acquire knowledge, skills and attitudes to effectively complete their specific degrees.
- Ensuring that students obtain appropriate scientific foundation for life-long learning.
- Helping students to become critical thinkers and problem solvers when managing challenges in their workplace.
- Developing an intellectually stimulating and caring environment that will facilitate student academic achievement by providing them with the relevant learning resources to enhance their academic development.

Core Values

The core values of the College of Sciences and Humanities include:

- Excellence in Teaching and Learning.
- Relevant and Applied Knowledge.
- Development of Critical Thinking.
- Teamwork and Personal Development.
- Academic Integrity.

Student Learning Outcomes

Upon successful completion of the CSH courses, students are expected to have:

- a. The ability to effectively use the English language essential to their success at the University.
- b. A fundamental understanding of social and cultural studies.
- c. A fundamental understanding of basic sciences, particularly the major principles and theories.
- d. The ability to apply knowledge of mathematics, chemistry, physics and humanities.
- e. The ability to understand the relationship among disciplines.
- f. The ability to apply mathematical and/or basic statistical reasoning to analyze data.
- g. Improved critical thinking and problem-solving skills.

Academic Programs

The College of Sciences and Humanities offers service courses to students of all the majors at FBSU to assist them in completing the requirements of their respective program. In addition, the college offers an undergraduate program that grants the Bachelor Degree in English Language and Translation (BELT).

Service Course Descriptions

ARAB 101 Basic Academic Arabic **3(3, 0, 0)¹**

This course is intended to provide training in the basic elements of Arabic grammar, syntax, and morphology to enhance the competency of students who may be deficient in those respects. Emphasis will be placed on training students to proficiently use Arabic for the purpose of writing academic papers, official letters, and professional reports.

ARAB 201 Advanced Academic Arabic **3(3, 0, 0)**

Students will be provided with opportunities to conduct close textual and analytical studies of a variety of selections from classical and modern literary and professional Arabic texts. The study of selected texts is designed to enhance the students' knowledge and appreciation of the Arabic language and its literature, in addition to strengthening their analytical and writing skills.

Prerequisite: ARAB 101.

ASTR 150 Introduction to Astronomy **3(3, 0, 0)**

This is a basic Astronomy course that introduces students to the subject starting by a brief history on old astronomy and continues throughout the latest discoveries in the field. Despite the straightforward nature of the course, it strongly emphasizes the scientific methods as fundamental tools of understanding the physical laws that govern our universe.

Prerequisite: MATH 200.

CHEM 101 General Chemistry I **3(3, 0, 0)**

An introduction to chemical principles covering atomic structure, chemical bonding, Molecules & Compounds, stoichiometry, gas laws, Chemical Composition, acid-base and solubility equilibria and solution.

CHEM 101L General Chemistry I Lab **1(0, 0, 2)**

Weekly introductory applied and simulated laboratory sessions which include an introduction to chemical principles covering significant figures, accuracy and precision, chemical bonding, precipitation reactions, stoichiometry, chemical equilibrium, qualitative analysis, acid-base titration and solubility, CHEM LAB computer simulation.

Pre- or co-requisite: CHEM 101.

CHEM 102 General Chemistry II **3(3, 0, 0)**

This course covers the nature and composition of matter, atoms and molecules, solutions, chemical bonding and chemical structure, molecules and materials, energy and chemistry, thermodynamics, entropy and the second law, chemical kinetics, chemical equilibrium, gas laws, chemical reactions, equilibria, kinetics, electrochemistry, corrosion and redox reactions.

Prerequisite: CHEM 101.

¹ Credits (Lecture, Tutorial, Lab)

CHEM 150 Chemistry and Society **3(3, 0, 0)**

This course provides students with a broad survey of the applications and uses of Chemistry in several aspects of daily practical life. It would cover selections from the following topics: atmospheric chemistry and global warming, chemistry of petroleum and plastics, cosmetics, pharmaceuticals and antiseptics, food and its technology, a brief introduction to the chemistry of life (Biochemistry), electrochemistry and solar cells, and even simple introduction to nanomaterials and nanotechnology.

ENGL 101 Basic Academic English I **3(3, 0, 0)**

This course aims to equip students with the essential writing skills they need at sentence and paragraph levels. The course emphasizes fluency in the writing process through use of invention strategies, drafting, revising, and editing in order to produce well-organized, coherent, and unified paragraphs. It also reviews some of the basics of English grammar and provides training in reading comprehension and oral expression.

ENGL 102 Basic Academic English II **3(3, 0, 0)**

This course aims to improve students' composition skills and enable them to identify and produce paragraphs of diverse styles. Students will also be trained in writing short expository essays of various types, including narrative, descriptive, cause and effect, and comparative essays. Furthermore, students will have the opportunity to improve oral expression through debates and discussions.

Prerequisite: ENGL 101

ENGL 203 Advanced Academic English I **3(3, 0, 0)**

This course aims to improve students' effective communication and reasoning skills essential for proper comprehension and critical reading of academic texts. Students are expected to develop other useful skills such as note-taking, summarizing and outlining as well as writing expository and argumentative essays.

Prerequisite: ENGL 102

ENGL 204 Advanced Academic English II **3(3, 0, 0)**

The emphasis in the course will be placed on the writing of papers independently researched by the students. Skills that have already been acquired such as comprehension, critical reading of texts, and writing expository essays will be enhanced and put to use in the researching and writing of a paper on a specific topic. Emphasis will be placed on proper referencing and documentation. Oral presentation skills and proficiency in presenting an argument will be tested and refined when students present their papers in class.

Prerequisite: ENGL 203

ENGL 206 Technical Writing **3(3, 0, 0)**

This course offers students in professional schools training in the writing and presentation of papers related to their fields of study. It includes individual and/or group preparation of reports, term papers, multimedia presentations, and other specialized forms of writing.

Prerequisite: ENGL 203.

FREN 101 Basic French 1 **3(3, 0, 0)**

This course is designed for students who have no or very little knowledge of French. It introduces fundamentals of grammar, pronunciation and vocabulary. The course will also focus on developing students' basic communication skills through classroom drills and language lab work.

MATH 101 Calculus I **3(3, 0, 0)**

Calculus of one variable: limits, continuity, differentiation, chain rule, maxima and minima, curve plotting, Roll's theorem, integration by substitution, definite integrals with applications to areas, volumes and arc length, fundamental theorem of integral calculus, exponential and logarithmic functions, trigonometric functions, parametric equations, analytic geometry in space.

Prerequisite: MATH 200 (Foundation Math II).

MATH 102 Calculus II **3(3, 0, 0)**

Methods of integration; inverse trigonometric functions; limits; sequences and series; tests for convergence; Taylor approximations; Taylor series; polar coordinates; complex numbers: Cartesian and polar representation of complex numbers, mathematical operations with complex numbers.

Prerequisite: MATH 101.

MATH 201 Calculus and Analytic Geometry III **3(3, 0, 0)**

Multivariable calculus: partial derivatives, directional derivatives, chain rule, tangent planes, maxima and minima, Lagrange multipliers, cylindrical and spherical coordinates, multiple integrals, substitutions, line and surface integrals, theorems of Green, Gauss and Stokes.

Prerequisite: MATH 102.

MATH 202 Differential Equations **3(3, 0, 0)**

First-order differential equations; linear differential equations of second and higher order; homogeneous and non-homogeneous with constant coefficients; power series solutions; Bessel functions and Legendre polynomials; Laplace transforms; inverse Laplace transforms; initial value problems; Fourier Series.

Prerequisite: MATH 201.

MATH 203 Mathematics for Social Sciences I **3(3, 0, 0)**

Factorization of polynomials, second degree equations, equations for straight lines, inequalities, systems of linear equations, Gaussian elimination, curve plotting, derivatives, maxima and minima, limits, algebra of exponents, the exponential and logarithmic functions. The emphasis is on applications.

MATH 204 Mathematics for Social Sciences II **3(3, 0, 0)**

This course is a continuation of MATH 203 where the emphasis is on applications. Determinants matrix inversion, combinatorics, introduction to probability, methods of integration, approximations of definite integrals, differential equations, multivariable functions, partial derivatives, chain rule, constrained and unconstrained optimization.

Prerequisite: MATH 203.

MATH 211 Discrete Mathematics **3(3, 0, 0)**

This course covers logical reasoning, sets, relations and functions, modular arithmetic, mathematical induction, recurrence relations, counting methods, inclusion- exclusion, binomial theorem, elementary probability, introduction to graphs and trees, recursive algorithms, and some Boolean algebra.

MATH 215 Linear Algebra **3(3, 0, 0)**

Number representations and round-off errors; systems of linear equations and Gaussian elimination; vectors, matrices, determinants; vector spaces, subspaces and dimension;

orthogonal projection and least-squares approximation; eigenvalues, eigenvectors; root finding; approximation of functions; integration; solving initial value problems.

Prerequisite: MATH 102.

MATH 225 Numerical Computing **3(3, 0, 0)**

This course is intended for engineering and computing students. It introduces students to the formulation, methodology, and techniques for numerical solution of mathematical problems. This course covers: Root finding of nonlinear equations by using Bisection, Newton-Raphson, Fixed Point and Secant methods, approximation of functions, numerical integration and discrete summation by using Trapezoidal, Simpson, Romberg and Gauss methods, Solving initial value problems, Monte-Carlo (Simulation) methods. Implementations and analysis of the algorithms are stressed. Projects using MATLAB.

Prerequisite: MATH 215.

PHED 101 Physical Education 1 **3(3, 0, 0)**

This course is designed to promote the students' physical fitness through participation in a variety of individual and team activities including, but not limited to, football, volleyball, basketball and track and field. The course focuses on skills, proficiency, and playing courtesies. Students will learn the importance of being fit; improve their team-working skills and enhance collegial competitiveness, thus leading to healthier lifestyles and balanced personalities.

Prerequisite: None.

PHYS 101 General Physics I **3(3, 0, 0)**

Measurements, motion in one dimension, vectors, motion in two dimensions, Newton's laws with applications, work and energy, circular motion, linear momentum and collisions, rotation and angular momentum, oscillations, and gravity.

Co-requisite MATH 101.

PHYS 101L General Physics I Lab **1(0, 0, 2)**

Basic laboratory techniques and methods; taking measurements, data evaluation and report writing with application to selected experiments related to Newtonian mechanics, vibrations, light and optics including density of metals, free fall motion, addition and resolution of vectors, conservation of linear momentum, conservation of energy, simple pendulum, Hook's law, measuring focal length, and index of refraction.

Pre- or co-requisite: PHYS 101.

PHYS 102 General Physics II **3(3, 0, 0)**

Electrostatics, current, resistance, Ohm's law, Kirchhoff's laws, RC circuits, magnetostatic theory, Ampere's law, Biot-Savart law, Faraday's law, LR circuit, RLC circuits, and a qualitative discussion of Maxwell's equations.

Prerequisite: PHYS 101

PHYS 102L General Physics II Lab **1(0, 0, 2)**

Basic laboratory techniques and methods; taking measurements, data evaluation and report writing with application to selected experiments in electricity and magnetism including electrostatics, magneto-statics, Coulomb and current balance, DC and AC circuits, linear and nonlinear circuit elements, Kirchhoff's laws, oscilloscope in AC measurements, charge and discharge of a capacitor, filters, damped oscillations, inductors and measurement of magnetic induction fields.

Pre- or co-requisite: PHYS 102.

SOCS 101 Islamic Civilization I**3(3, 0, 0)**

This course surveys of Arab Islamic civilization tracing its intellectual and cultural development from pre-Islamic times to the present. Emphasis will be placed on the major contributions of Arab Islamic civilization.

SOCS 201 Islamic Civilizations II**3(3, 0, 0)**

Islamic civilization; Islamic law & governance, human rights laws, state and human rights in Islam, education, ethics & morality, war, peace, aggression, self-defense theory, sovereignty, life and death, human dignity, etc.

Pre-requisite: SOCS 101

SOCS 202 World Civilizations**3(3, 0, 0)**

This course surveys of ancient Near Eastern and Medieval Civilizations and world views, starting with Mesopotamia and including the classical Greek and Roman periods up to the beginning of the Renaissance in Europe. Some emphasis is placed on Islamic civilization.

STAT 130 Elementary Statistics**3(3, 0, 0)**

This course is intended to introduce students to the basic concepts and logic of statistical reasoning, give them introductory-level practical ability to properly interpret appropriate descriptive and inferential methods, and help them gain an appreciation for the diverse applications of statistics and its relevance to their lives and fields of study.

Prerequisite: MATH 200 (Foundation Math II).

STAT 230 Probability and Statistics**3(3, 0, 0)**

This course is intended for engineering and computing students. A course on random variables, laws of probability, probability distributions, expectation and variance, moment generating functions, joint distributions, independence, probability models, Chi-square, Student's t and f distributions, estimation, confidence intervals, the central limit theorem, significance tests, regression.

Prerequisite: MATH 201.

English Language and Translation Program

The curriculum is designed to grant students the Bachelor's degree of English Language and Translation upon the successful completion of the four-year program.

Program Mission

The program aims to provide students with the academic and professional knowledge and skills they need to be professional translators, interpreters, editors, and teachers. The program also strives to equip students with multifarious language and translation skills. This is to be achieved by keeping abreast with the demands of the marketplace and staying up-to-date with the latest know-how through a continuous update of the program's study plan.

Learning Outcomes

Upon graduation, students are expected to:

- a. Demonstrate high competency levels in the four language skills: listening, speaking, reading, and writing.
- b. Demonstrate a profound knowledge and understanding of the structure and usage of the English language, including its history, structure, contemporary use, and development as a global language.
- c. Develop the ability to apply critical thinking skills to read, interpret, and analyze texts.
- d. Be able to write various types of high quality essays and research papers.
- e. Demonstrate the ability to evaluate evidence and argumentation, and to form a critical judgment of one's own work as well as the work of others.
- f. Demonstrate in-depth knowledge of the translation theory, principles and techniques; and apply translation skills to a variety of texts.
- g. Develop an ability to translate texts of various registers (legal, financial, literary, etc.) from Arabic to English and vice versa and utilize various translation software programs in the translation process.
- h. Be able to work as consecutive interpreters and demonstrate the use of note-taking techniques, shorthand conventions, consecutive interpreting strategies and professional ethics.
- i. Show familiarity with teaching methods and demonstrate the ability to teach English to speakers of other languages.

Degree Requirements

In order to graduate with a bachelor's degree in English Language and Translation, students must successfully complete 126 credit hours of coursework. The distribution of the required courses and credit hours of this program is as follows:

▪ University Requirements	30 Credits
▪ College Requirements	21 Credits
▪ English Language and Translation Requirements	75 Credits
Total	126 Credits

University Requirements

University Requirements consist of 30 credit hours distributed as follows:

- 6 credits of Arabic: ARAB 101 and ARAB 201
- 9 credits of English communication skills: ENGL 101, ENGL 102, and ENGL 203
- 9 credits of Social and Cultural studies: SOCS 101, SOCS 201, and SOCS 202
- 3 credits of Computing essentials: CSC 100
- 3 credits of Mathematics: STAT 209

College Requirements

College Requirements consist of 21 credit hours distributed as follows:

Course	Title	Credits	Prerequisites
ARAB 107	Principles of Morphology & Syntax	3	
CSC 210	Computer Skills for Social Sciences	3	
ENGL 107	Study & Research Skills	3	
ENGL 204	Advanced Academic English II	3	ENGL 203
FREN 101	French Language I	3	
MNGT 110	Principles of Management	3	
SOCS 205	Introduction to Cross-Cultural Interaction	3	
	Total Credits	21	

Program Specialization Requirements

Program specialization requirements consist of 75 credit hours: 66 compulsory credit hours and 9 elective credit hours distributed as follows.

Compulsory Specialization Requirements

Course	Title	Credits	Prerequisites
ENGL 103	English Grammar & Usage	3	
ENGL 105	Listening Comprehension	3	
ENGL 108	Reading Comprehension	3	
ENGL 112	Introduction to Literature	3	
ENGL 122	Introduction to Linguistics	3	
ENGL 213	Literary Appreciation	3	ENGL 112
ENGL 221	Phonetics & Phonology	3	ENGL 122
ENGL 224	Morphology & Syntax	3	ENGL 122
ENGL 231	Introduction to Translation	3	
ENGL 232	Theoretical & Practical Issues in Translation	3	ENGL 231
ENGL 321	Semantics & Pragmatics	3	ENGL 122
ENGL 328	Advanced English Syntax	3	ENGL 224
ENGL 331	Literary Translation	3	ENGL 231
ENGL 333	Introduction to Conference Interpreting	3	ENGL 231

Course	Title	Credits	Prerequisites
ENGL 334	Technical & Scientific Translation	3	ENGL 231
ENGL 336	Consecutive & Simultaneous Interpreting	3	ENGL 333
ENGL 416	British and American Novel	3	ENGL 112
ENGL 431	Legal and Business Translation	3	ENGL 231
ENGL 433	Media and Political Translation	3	ENGL 231
ENGL 434	Advanced Consecutive & Simultaneous Interpreting	3	ENGL 336
ENGL 436	Computer Applications in Translation	3	ENGL 231
TESOL 211	Introduction to TESOL	3	
	Total Credits	66	

Elective Specialization Requirements

9 credit hours to be chosen from the following list:

Course	Title	Credits	Prerequisites
ENGL 123	Pronunciation & Speech	3	
ENGL 215	Short Story	3	ENGL 112
ENGL 234	Translation of General Texts from English into Arabic and Vice Versa	3	ENGL 231
ENGL 313	Lexicology and Lexicography	3	ENGL 224
ENGL 315	History of the English Language	3	ENGL 221
ENGL 326	The English Verb	3	ENGL 103
ENGL 420	Research Methodology	3	ENGL 204
ENGL 425	English for Specific Purposes	3	
ENGL 426	Error Analysis	3	ENGL 328
ENGL 427	English for Specific Purposes	3	ENGL 122
ENGL 435	Audiovisual Translation	3	ENGL 231
ENGL 437	Special Topics in Translation	3	ENGL 231
ENGL 439	Translation Ethics	3	ENGL 231
ENGL 438	Computer-Aided Translation CAT	3	ENGL 231
TESOL 212	Methods and Materials to Teach EFL/ESL	3	
TESOL 213	Principles and Priorities in Language Teaching	3	TESOL 211
ENGL 123	Pronunciation & Speech	3	
ENGL 215	Short Story	3	ENGL 112
ENGL 234	Translation of General Texts from English into Arabic and Vice Versa	3	ENGL 231
ENGL 313	Lexicology and Lexicography	3	ENGL 224
ENGL 315	History of the English Language	3	ENGL 221
ENGL 326	The English Verb	3	ENGL 103

BELT Study Plan

(126 Credits)

Year I

First Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 101	Basic Academic English I	3	-
ENGL 103	English Grammar	3	-
ENGL 105	Listening Comprehension	3	-
ENGL 107	Study & Research Skills	3	-
SOCS 101	Islamic Civilization I	3	-
	Total Credits	15	

Second Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ARAB 101	Arabic Communication Skills	3	-
ENGL 102	Basic Academic English II	3	ENGL 101
ENGL 108	Reading Comprehension	3	
ENGL 112	Introduction to Literature	3	-
ENGL 122	Introduction to Linguistics	3	-
FREN 101	French Language I	3	
	Total Credits	18	

Year II

Third Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
	Specialization Elective	3	-
CSC 100	Introduction to Computing	3	-
ENGL 221	Phonetics & Phonology	3	ENGL 122
ENGL 203	Advanced Academic English I	3	ENGL 102
ENGL 231	Introduction to Translation	3	-
	Total Credits	15	

Fourth Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ARAB 201	Advanced Academic Arabic	3	ARAB 101
ARAB 107	Principles of Morphology & Syntax	3	-
ENGL 213	Literary Appreciation	3	ENGL 112
ENGL 232	Theoretical & Practical Issues in Translation	3	ENGL 231
ENGL 224	English Morphology & Syntax	3	ENGL 122
SOCS 205	Introduction to Cross-Cultural Interaction	3	
	Total Credits	18	

Year III

Fifth Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 331	Literary Translation	3	ENGL 231
ENGL 321	Semantics & Pragmatics	3	ENGL 221
ENGL 333	Introduction to Conference Interpreting	3	ENGL 231
SOCS 201	Islamic Civilization II	3	SOCS 101
TESOL 211	Introduction to TESOL	3	
	Total Credits	15	

Sixth Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
	Specialization Elective	3	
ENGL 334	Technical & Scientific Translation	3	ENGL 231
ENGL 328	Advanced English Syntax	3	ENGL 224
ENGL 336	Consecutive & Simultaneous Interpreting	3	ENGL 333
STAT 209	Introduction to Statistics for Social Science	3	
	Total Credits	15	

Year IV

Seventh Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
CSC 210	Computer Skills for Social Sciences	3	
ENGL 204	Advanced Academic English II	3	ENGL 203
ENGL 431	Legal & Business Translation	3	ENGL 231
ENGL 433	Media and Political Translation	3	ENGL 231
MNGT 110	Principles of Management	3	
	Total Credits	15	

Eighth Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
SOCS 202	World Civilization	3	
ENGL 416	British & American Novel	3	ENGL 112
ENGL 434	Advanced Consecutive & Simultaneous Interpreting	3	ENGL 336
ENGL 436	Computer Applications in Translation	3	ENGL 231
	Specialization Elective	3	
	Total Credits	15	

Total Program Credits	126²	
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² Completion of the Bachelor of English Language and Translation Degree

Course Descriptions

ENGL 101 Basic Academic English I

3(3, 0, 0)³

This course aims to equip students with the essential writing skills they need at sentence and paragraph levels. The course emphasizes fluency in the writing process through use of invention strategies, drafting, revising, and editing in order to produce well-organized, coherent, and unified paragraphs. It also reviews some of the basics of English grammar and provides training in reading comprehension and oral expression.

ENGL 102 Basic Academic English II

3(3, 0, 0)

This course aims to improve students' composition skills and enable them to identify and produce paragraphs of diverse styles. Students will also be trained in writing short expository essays of various types, including narrative, descriptive, cause and effect, and comparative essays. Furthermore, students will have the opportunity to improve oral expression through debates and discussions.

Prerequisite: ENGL 101

ENGL 103 English Grammar and Usage

3(3, 0, 0)

This course aims to enhance students' understanding and ability to use English grammar in a communicative context. The course reviews and expands on many aspects of grammar, including verb tenses, subject-verb agreement, prepositions, and modals. Students will develop their communicative competence by practicing these different grammatical aspects using a variety of in-class communicative and functional activities. In addition, this course introduces students to the basic syntactic categories (NP, VP, AdjP, PP, etc.) and functions (subject, direct object, indirect object, subject complement, etc.). Sentence types (simple, compound, complex, and compound complex) will be tackled, as well.

ENGL 105 Listening Comprehension

3(0, 0, 3)

This course aims to develop students' ability to understand real-life spoken English via a systematic and guided training in listening comprehension. The course offers a variety of topics and activities with audio recordings of natural and spontaneous conversations to enable students to understand and respond to different real life situations effectively.

ENGL 107 Study & Research Skills

3(2, 0, 1)

This course aims to develop students' ability to practice many academic skills necessary for success in a variety of educational settings, including dictionary use, note-taking, library use, and test preparation. Though each unit has a theoretical introduction, real emphasis is to be placed on applications, practical skills, and projects.

ENGL 108 Reading Comprehension

3(3, 0, 0)

This course aims to develop students' ability to read and comprehend English texts using the basic skills of reading comprehension such as summarizing, outlining, finding pronoun reference, making inferences, and using context clues to understand word meanings. The course also provides training in the techniques of vocabulary building as well as practicing on identifying the main ideas at paragraph and discourse levels.

³ Credits (Lecture, Tutorial, Lab)

ENGL 112 Introduction to Literature **3(3, 0, 0)**

This course aims to provide students with the requisite skills for reading, comprehending, and appreciating literature. It focuses on the study of fiction, poetry, and drama to understand and appreciate literary texts through examination of specific texts by major authors representing different cultural and historical periods. Students are expected to develop academic writing competencies using analytical and critical skills in response to literary texts. This course also offers an overview of the literary periods and genres and helps students develop an understanding of different approaches to the study of literature.

ENGL 122 Introduction to Linguistics **3(3, 0, 0)**

This course aims to acquaint students with the nature of human language and its characteristics and functions. It also introduces students to the major subfields of linguistics (phonetics, phonology, morphology, syntax, semantics, and pragmatics) with reference to contemporary English. Special emphasis will be placed on the examination of sounds and sound patterns (phonetics and phonology), how words are constructed from smaller parts (morphology), and how words are combined to form sentences (syntax).

ENGL 123 Pronunciation & Speech **3(1, 0, 2)**

This course aims to help students improve their listening comprehension skill, correct their pronunciation, and reduce foreignness in their speech. This is to be achieved by intensive practice in the pronunciation of individual sounds, sound clusters, and suprasegmentals. The course also acquaints students with conversation and public speech skills.

ENGL 203 Advanced Academic English I **3(3, 0, 0)**

This course aims to improve students' effective communication and reasoning skills essential for proper comprehension and critical reading of academic texts. Students are expected to develop other useful skills such as note-taking, summarizing and outlining as well as writing expository and argumentative essays.

Prerequisite: ENGL 102

ENGL 204 Advanced Academic English II **3(3, 0, 0)**

This course aims to enhance students' language skills that have already been acquired in previous courses and put them to use to improve their ability to write a research paper on a relevant topic. These skills include essentially comprehension, critical reading of texts, and writing expository and argumentative essays. Emphasis will be placed on proper researching, note taking, and documentation. Oral presentation skills and proficiency in presenting arguments will be tested and refined when students present their papers in class.

Prerequisite: ENGL 203

ENGL 213 Literary Appreciation **3(3, 0, 0)**

This course aims to improve students' literary appreciation skills and enhance their knowledge of English literature and culture through reading a selection of short stories, poems and one-act plays. The course also presents an overview of the most influential approaches to literary analysis and interpretation.

Prerequisite: ENGL 112

ENGL 215 Short Story**3(3, 0, 0)**

This course aims to introduce students to the genre of short story through tracing its origins and development from 1840s to the present time. This is to be achieved by reading a representative sample of short stories, beginning with the pioneers of the genre, like Poe, Turgenev, Maupassant, and the modernists such as Joyce, Lawrence, Hemingway, Faulkner, and Beckett, among others.

Prerequisite: ENGL 112

ENGL 221 Phonetics & Phonology**3(2, 0, 1)**

This course aims to acquaint students with the field of English phonetics and phonology. Topics include airstream mechanism, speech organs, places and manners of articulation, phonation and stricture types, consonants, vowels, and phonemic and phonetic transcription. Special emphasis will be placed on phonemes and allophones, syllabification rules, phonological processes, natural classes, and suprasegmentals.

Prerequisite: ENGL 122

ENGL 224 Morphology and Syntax**3(3, 0, 0)**

This course aims to introduce students to morphological processes including word formation, grammatical categories, and syntactic relations. This course focuses on the principles by which parts of words are organized into larger units (inflectional morphology and word-formation), and by which words are organized into phrases and sentences (syntax). Synchronic and diachronic data from English and several other languages will be analyzed to illustrate how language is structured.

Prerequisite: ENGL 122

ENGL 231 Introduction to Translation**3(3, 0, 0)**

This course aims to introduce students to the basic principles and methods of translation from English into Arabic and vice versa. Students will be introduced to various theories of translation and learn how to implement them in practice. The course will also assist students develop their translation skills by training them in translating texts of different genres. Aspects of text analysis, sentence structure, and importance of context in translation will be given the due attention.

ENGL 232 Theoretical and Practical Issues in Translation**3(3, 0, 0)**

This course aims to introduce students to a comprehensive historical account of the translation theory and the most challenging practical issues in translation with innovative points of view to analyze the nature of such problems and develop possible solutions for them. Students will be trained on how to analyze texts and use the best strategies and tools in accordance with text type and form in actual communicative situations. Students as well will be acquainted with some translation difficulties of idiomatic expressions and cultural untranslatability.

Prerequisite: ENGL 231

ENGL 234 Translation of General Texts from English into Arabic and Vice Versa**3(3, 0, 0)**

This course aims to train the student to translate general texts representing various fields from English into Arabic and vice versa. It also trains the student to choose the proper word (or expression) in order to convey the sense intended in a given context. Special emphasis is to be placed on the translation of idioms collocations and formulaic expressions.

Prerequisite: ENGL 231

ENGL 313 Lexicology and Lexicography **3(3, 0, 0)**

This course aims to familiarize the students with the developing fields of lexicology and lexicography. It covers topics such as lexical sets, lexical selection, lexical relations, and componential features of lexical items. The course offers systematic training in the use of monolingual and bilingual dictionaries. Problems of translating lexical relations and collocations will also be investigated in this course. Training will be in both Arabic and English.

Prerequisite: ENGL 224

ENGL 315 History of the English Language **3(3, 0, 0)**

This course aims to survey the genesis and development of the English language from its earliest Indo-European origins to the present day. This survey includes an extensive examination of the major events in the historical development of the English language over the three major phases (Old, Middle and Modern English). The course also presents the linguistic changes which took place over centuries, including the phonetic, phonological, morphological, and syntactic changes. Changes in the orthographic system and lexicology will be tackled, as well.

Prerequisite: ENGL 221

ENGL 321 Semantics & Pragmatics **3(3, 0, 0)**

This course aims to introduce students to some basic approaches to the study of meaning. The course provides a detailed exploration of the major current issues in semantics and pragmatics. Students are introduced to some core concepts used in the analysis of meaning and context-based interpretation: denotation, reference, quantification, propositional meaning (compositionality), presupposition, speech acts (il-locution, perlocution), implicature, and context vs. contextual domain. The main goal is to familiarize students with the basic topics in semantics and pragmatics and to help them develop fundamental knowledge in semantic and pragmatic analysis.

Prerequisite: ENGL 122

ENGL 326 The English Verb **3(3, 0, 0)**

This course aims to provide students with a solid understanding of the semantic structure of the English verb. Special emphasis will be placed on categorizing English verbs and interpreting their internal semantic structures. The course will also examine the morphological and syntactic behavior of verbs in relation to their semantic properties.

Prerequisite: ENGL 103

ENGL 328 Advanced English Syntax **3(3, 0, 0)**

This course aims to introduce students to the theory of constituent structure, units of syntactic analysis, syntax of arguments and predicates, and argument structure in natural languages. In addition, students will be introduced to the main schools of contemporary syntactic theorizing, including the "Government and Binding Theory", and "Minimalism Program".

Prerequisite: ENGL 224

ENGL 331 Literary Translation **3(3, 0, 0)**

This course aims to acquaint students with the history and practice of literary translation. The course addresses the difficulties of literary language, theories of translation and translatability, theories of semantic equivalence, and alternative modes of translation, including sound- and graph- translation.

Prerequisite: ENGL 231

ENGL 333 Introduction to Conference Interpreting 3(2, 0, 1)

This course aims to acquaint students with basic skills used in conference interpreting. The course is carefully tailored to the needs of conference interpreters. It introduces students to strategies and techniques to perform ‘Sight Translation’ (“Source Language to Target Language” and “Target Language to Source Language”) and bilateral consecutive and simultaneous interpretation. There will be a mixture of interactive lectures on Interpreting Theory, live sessions, and language laboratory practical sessions using the latest technology to enhance interpreting skills. This course covers a selection of topics in the areas of education, culture, politics, environmental health & protection, business and economy.

Prerequisite: ENGL 231

ENGL 334 Technical and Scientific Translation 3(3, 0, 0)

This course aims to familiarize students with the terminology and style of technical and scientific texts (engineering, medicine, pharmacy, etc.), and translate various technical and scientific texts from English into Arabic and vice versa. The course will focus on building conceptual knowledge of technical and scientific fields and the special features peculiar to them. The course also provides numerous case studies, highlights various translation challenges, and introduces a range of strategies for dealing with these fields.

Prerequisite: ENGL 231

ENGL 336 Consecutive & Simultaneous Interpretation 3(2, 0, 1)

This course aims to introduce students to in-house interpreting, escort interpreting and conference interpreting. It acquaints students with the main principles and techniques of two of the various forms and types of interpreting: consecutive and simultaneous interpreting. It will develop students’ interpreting skills needed to process a continuous message from the source language to the target language. Additional strategies for providing peer feedback are developed and refined. Lab hours will provide intense experiential opportunities to practice and hone skills introduced in class.

Prerequisite: ENGL 233

ENGL 416 British and American Novel 3(3, 0, 0)

This course introduces students to the English novel as a literary genre exploring various elements such as narrative techniques, plot, setting, characterization, theme, etc. Through an in-depth study of selected novels, students will be acquainted with the various styles and trends within this genre with reference to its historical, cultural, and thematic contexts.

Prerequisite: ENGL 112

ENGL 420 Research Methodology 3(3, 0, 0)

This course aims to provide students with an opportunity to advance their understanding of research through practical exploration of research techniques, approaches, and ethics. The course is designed as a guide to write a formal term paper on a linguistic or literary topic. In addition to the format and stylistic issues, students will be trained on selecting and shaping topics, searching for relevant literature, data collection and analysis, and documentation.

Prerequisite: ENGL 204

ENGL 425 English for Specific Purposes 3(3, 0, 0)

Topics vary according to student and faculty interests.

ENGL 426 Error Analysis**3(3, 0, 0)**

This course aims to introduce students to the theories and approaches that dominated the scene of second language acquisition research during the second half of the past century. The major component of the course is devoted to explore the tenets and views representing the “Error Analysis Approach”. The goals of this course are achieved through reading a selection of original articles that tackle this subject. Emphasis will be placed on the performance errors of Arab students of English. Students are trained on how to identify, label and account for errors according to the major taxonomies representing all possible sources and types of errors.

Prerequisite: ENGL 328

ENGL 431 Legal & Business Translation**3(3, 0, 0)**

This course aims to acquaint students with the translation of legal and business documents and texts, including contracts, agreements, law and constitutional articles, banking and finance, stock markets, and privatization. The course also introduces students to professional standards of legal and business translation practice using authentic materials and contextually meaningful situations.

Prerequisite: ENGL 231.

ENGL 433 Media and Political Translation**3(2, 0, 1)**

This course aims to acquaint students with media and political discourse styles, formats, and features. This is to be achieved by translating a wide range of political and mass-media texts, including press reports, interviews, political speeches, news bulletins, and public speeches. This course also aims to familiarize students with the socio-cultural, linguistic, and technical dimensions that characterize the translation of media and political discourses, including understatement, hedging, and indirectness.

Prerequisite: ENGL 231.

ENGL 434 Advanced Consecutive & Simultaneous Interpretation II**3(1, 0, 2)**

This course aims to introduce students to in-house interpreting, escort interpreting and conference interpreting. Students are familiarized with advanced strategies and techniques in both consecutive and simultaneous modes of interpreting. Intensive training in sight translation, note-taking and memory retention seek to promote students' listening comprehension and facilitate consecutive interpreting. In simultaneous interpreting sessions, students learn the multitasking nature of the profession and the concept of processing capacity. Practical coping tactics including segmentation, conversion, amplification/omission, correction and induction are also put into practice in interpreting authentic speeches.

Prerequisite: ENGL 336

ENGL 435 Audiovisual Translation**3(3, 0, 0)**

This course aims to introduce students to audiovisual media translation and to familiarize them with the socio-cultural, linguistic and technical dimensions that characterize this type of translation. Additionally, this course offers new insights, practice and research relevant to this promising industry. It also provides students with a broad introduction to the subject, ranging from dubbing and voice-over to subtitling and subtitling, while offering a practical focus on professionally oriented training in interlingual subtitling. It places significant emphasis on accessibility to the media and offers grounding in translation theory and research methods.

Prerequisite: ENGL 231.

ENGL 436 Computer Applications in Translation **3(0, 0, 3)**

This course aims to enrich students' awareness of the importance of the computer and its various applications in the translation process. The course introduces students to various uses of computers in the process of translation such as electronic dictionaries and thesauri, terminology databases, machine translation, and computer-aided translation. Other uses such as word processing and automatic dictation software will be discussed, as well.

Prerequisite: ENGL 231

ENGL 437 Special Topics in Translation **3(3, 0, 0)**

This course focuses on translation of texts in a special field of expertise such as economics, international trade, political science, law, business, medicine, science and technology, etc. Emphasis will be placed on terminology, format, style, and expression in the relevant field using Arabic and English parallel texts. In-class exercises and written assignments will be essential to achieve such ends.

Prerequisite: ENGL 231

ENGL 438 Computer-Aided Translation **3(0, 0, 3)**

This course aims to introduce students to a variety of computer software programs used in the translation process, including translation memories (SDL Trados Workbench), and machine translation tools. During this course, students will be introduced to the major steps of the translation process and the tools available on the market to help in each step. The course consists of two main components: Translation Memories and Machine Translation. Students should be aware of the limitations of machine translation (polysemy, pragmatic meaning, etc.) and trained to rule out the erroneous outcomes.

Prerequisite: ENGL 231

ENGL 439 Translation Ethics **3(3, 0, 0)**

This course aims to introduce students to the basic notions and terminology regarding social and professional ethics with a special emphasis on translation, including ethics for sworn or certified translators. In addition to trust, integrity, honesty, accuracy, meticulousness, impartiality, and justified refusal to accept a commission, this course focuses on professional confidentiality and discretion. This course also highlights the obligatory use of all available aids such as dictionaries, encyclopedias, textbooks and other sources of knowledge; and consulting an expert in order to ensure the highest possible quality of translation.

Prerequisite: ENGL 231.

TESOL 211 Introduction to TESOL **3(3, 0, 0)**

This course aims to introduce students to the educational contexts in which English is taught and learned and the primary methods and materials that are used to teach English as a foreign language. In addition, students will be introduced to the links between what teachers and learners do in class and what applied linguistic research tells us about how foreign languages are learned. These are to be achieved via a program of lectures, readings, discussions, and practical teaching exercises.

TESOL 212 Methods & Materials to Teach EFL/ESL **3(3, 0, 0)**

This course aims to survey the methods and materials used for teaching English as a second or foreign language. The course covers several topics, including TESOL settings and contexts; teaching the four skill areas of listening, speaking, reading and writing; classroom management and activities; technology and language teaching; and TESOL resources and support.

TESOL 213 Principles and Priorities in Language Teaching 3(3, 0, 0)

This course aims to introduce students to general principles that will orient language teaching towards proficiency goals. The course focuses on how to provide instruction that is meaningful, interactive, and responsive to learners' needs. It also provides an overview of the principles and priorities that have changed in response to paradigm shifts in "Linguistics and Learning Theory".

Prerequisite: TESOL 211



جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY

College of Business and Management

COLLEGE OF BUSINESS AND MANAGEMENT

Officers of the College

Acting Dean: Ahmed alrefai

Professors: Ahmad Shiyab

Associate Professor: Hasan El-Essa

Assistant Professors: Ali Gohar, Ahmad alrefai, Ijaz Ali, Saad Algarni

Lecturers: Heba Albalawi, Nosaiba Rawashdeh, Maen Salhab

College Overview

The College of Business and Management was established in 2009 with a goal to offer high standard education in Business Administration. The college is structured around two departments:

1. The Management, Marketing, and Entrepreneurship Department, which offers programs in Business Administration and Marketing.
2. The Accounting and Finance Department, which offers programs in Accounting and Finance.

Vision

To become a leading business college capable of equipping graduates with professional competences and commitment to business ethics to serve the business development needs in Tbaok and the rest of KSA.

Mission

The College of Business and Management is committed to achieve and maintain a recognized position as a credible provider of high quality undergraduate and graduate business education. We are committed to adopt focused teaching and research philosophy that combines theory and practice and imparting graduates with a commitment to life-long learning and professional competence. The College also prepares its graduates to be professionals who play an entrepreneurial role in the Kingdom and the region and are capable of conducting research, innovation and decision-making to contribute effectively in building their society according to the highest ethical standards.

Core Values

- Uncompromising pursuit of quality educational services to students in ways that enhance cognitive skills, cultivate personality and help the development of character
- Critical thinking and broad exposure to major global currents
- Life-long learning and investment in self-renewal
- Integrity and adherence to ethical behavior in all ways at all levels
- Community spirit and commitment to social service
- Reinforcement of national identity and cultural authenticity

College Objectives

- Providing sound business education to students from the Tabuk area and other parts of the Kingdom.
- Graduating highly qualified employable business specialists who can meet the changing requirements of the labor market at the para-professional, professional and senior professional levels in such areas as Management, Marketing, Accounting, Finance, Management of Information Systems and related competencies.
- Providing faculty members with the needed facilities and with an international exposure to partner institutions in order for them to develop their academic expertise.
- Building close ties of cooperation with industry within and beyond Tabuk with a view to fostering strategic partnerships, cultivating various programs of cooperation and complementing each other in the interest of better management practices.
- Providing relevant open-ended, customized, function-specific and sector-specific management training programs to private and public organizations in Tabuk and the rest of the Kingdom.
- Building capacity for conducting applied research relevant to the needs of various companies and sectors.
- Cooperating with other Business Colleges in KSA and outside to build networks, leverage resources and better fulfill the mission.

Career Opportunities

The College Programs are committed to providing the local region's residents with meaningful, up- to-date skills and knowledge that will allow them to pursue successful careers and make deep impacts both within the Tabuk province, and across the Gulf region at large. With these objectives in mind, the programs have been designed around fostering contemporary best practices and skills in line with the job opportunities within Tabuk and the Middle East.

As such, the College programs aim to provide the graduates with relevant business knowledge and practices to cater to these three key areas, and to help promote development, growth and prosperity in the region. Courses target the cultivation of

practical business tools to pursue strategic development and integration of the agricultural sector with other prominent sectors in the region and to allow students to pursue managerial and administrative positions within the growing firms in this sector. Accounting, Finance, Management, and Marketing programs cater to the development of these key skills.

Graduates of the College's Bachelor Degree in Accounting and Finance are poised to take advantage of numerous job opportunities in financial institutions and major economic institutions within the Tabuk province itself, and in the growing Saudi and Gulf markets. In addition the Accounting and Finance programs enable graduates to join the growing financial services industry within Tabuk and become the future leaders within the Gulf's top financial services firms.

Similarly, the Management program is designed to attract the best and brightest students from all regions within Saudi Arabia, to develop their management and administration skills and enable them to serve on the highest levels in different sectors including the military, government, and in the booming construction sector.

Admissions and Graduation Requirements

- Student admission to the Bachelor of Business Administration is based on the requirements of the national center for evaluation and measurement, the general University admission criteria, as well as specific criteria set by the College of Business and Management. All direct admissions are decided by the University Admissions Committee.
- To graduate with a Bachelor of Business Administration, students must satisfactorily complete 134 credit hours with a cumulative average as decided by the University Council.
- All third year business students are required to fulfill a summer (July and August) internship period of at least eight weeks of specialized work on individual basis. This includes training and practice in an actual service in a technical, business, or governmental establishment under both faculty supervision by a mentor and corporate guidance by a preceptor who will acquaint students with the world of work. The preceptor will also help interns acquire the core values and basic skills necessary for an understanding of the business world. Interns will be assigned tasks and responsibilities commensurate with their skills and qualifications.

Academic Programs

The College of Business & Management offers a broad range of venues for study and exploration in the field of Business Administration. The programs offered in the college are meant to allow eligible students develop enhanced knowledge in the corresponding areas through a balanced curriculum of required/elective intermediate and advanced courses in specific business interests. Currently, the College hosts two departments offering a total of four undergraduate programs organized as follows:

- The Department of Management, Marketing and Entrepreneurship offers the two programs:

- Bachelor of Business Administration (BBA)
- Bachelor of Marketing (BMK)
- The Department of Accounting and Finance offers the two programs:
 - Bachelor of Accounting (BAT)
 - Bachelor of Finance (BFN)

Course Coding System

ACCT	Accounting
BUSS	Business
DCSN	Business Decision Support Systems
ECON	Economics
ENTM	Entrepreneurship
FINA	Finance
INFO	Business Information Systems
MNGT	Management
MKTG	Marketing

DEPARTMENT OF MANAGEMENT, MARKETING AND ENTREPRENEURSHIP

Mission

The mission of the Department of Management, Marketing and Entrepreneurship is to:

- a. provide undergraduate students quality higher education in Management, Marketing, and Entrepreneurship,
- b. develop in student's management and marketing skills through coursework and practical experience,
- c. provide synergistic knowledge and solutions between academia and industry, and
- d. enrich the students' academic experience with global perspective and awareness of their leadership role in regional development.

Programs of Study

The Department of Management, Marketing and Entrepreneurship offers two undergraduate programs:

- Bachelor of Business Administration (BBA): The BBA program allows eligible students to develop enhanced knowledge in these areas through a balanced curriculum of required/elective intermediate and advanced courses. The courses offered in the BBA provide students with more in-depth skills and knowledge in their chosen track area. Alternatively, students may elect to pursue a generic bachelor's degree.
- Bachelor of Marketing (BMK): The Bachelor of Marketing program allows students to build complete knowledge related to marketing to include supply chain, logistics, advertisement, promotion, marketing plans, and integrated marketing communication. The eligible students are expected to successfully manage any task or assignment related to marketing in the actual work field.

BACHELOR OF BUSINESS ADMINISTRATION (BBA)

The BBA program allows the students to graduate with a bachelor's degree in generic Business Administration.

Program Objectives

- Provide students with a broader knowledge of business environment.
- Provide students with the knowledge and tools required for meaningful and successful careers.
- Prepare students for management responsibilities.
- Prepare students for further studies in graduate schools.
- Provide the educational background for various professional certification examinations.

Learning Outcomes

Upon completion of the BBA program, students will be able to:

- a. Understand technical and quantitative aspects of management.
- b. Focus on appropriate issues and develop proper solutions to problems faced by companies.
- c. Communicate efficiently both orally and in writing.
- d. Understand professional and ethical issues relevant to core business areas such as marketing, financial accounting, economics, information systems, strategic management, and organizational behavior.

Program Requirements

In order to graduate with a bachelor's degree in business administration, students are expected to complete a total of 134 credit hours by the end of their fourth year of studies. These are divided as follows:

1) University Requirements	39 Credits
2) College Requirements	56 Credits
3) Business Program Requirements	39 Credits
Total	134 Credits

University Requirements

Students working towards the bachelor's degree of Business Administration must complete a total of 39 credit hours in University requirements. The 39 credit hours in University general educational requirements for Bachelor program are as follows:

A. University Core Requirements (33 credits)

- 6 credits of Arabic: ARAB 101 and ARAB 201
- 12 credits of English communication skills: ENGL 101, ENGL 102, ENGL 203, and ENGL 206

- 9 credits of Social and Cultural studies: SOCS 101, SOCS 201, and SOCS 202
- 3 credits of Computing: CSC 100
- 3 credits of Mathematics: MATH 203 (instead of MATH 101)

B. University Elective Requirements (6 credits)

- Two 3-credit non-business elective course

College Requirements

Students working towards the bachelor's degree of Business Administration must complete a total of 56 credit hours in College requirements. The 56 credit hours in requirements for Bachelor program are as follows:

A. College Core Requirements (50 credits)

- 6 credits of Accounting: ACCT 110 and ACCT 215
- 20 credits of Business: BUSS 100, BUSS 110, BUSS 200, BUSS 210, BUSS300, BUSS 400, DCSN 200, DCSN 305 and MATH 204.
- 6 credits of Economic: ECON 211, ECON 212.
- 3 credits of finance: FINA 110
- 3 credits of Management Information System: INFO 200
- 3 credits of Marketing: MKTG 210
- 9 credits of General Management: MNGT 110, MNGT 215, MNGT 420

B. College Elective Requirements (6 credits)

- 6 credits of Business Elective courses.

Program Requirements

To graduate with a bachelor's degree of Business Administration program, students must complete 39 credit hours in Business and Management courses which are:

A. Core Requirements (27 credits)

- 26 credit hours: BUSS245, BUSS 330, , BUSS 440, BUSS460, DCSN 415, ENTM 420, MNGT 428, MNGT 430, MNGT 460.
- One credit hour: A summer internship in Business (BUSS 346) is a 1 credit course which is required for a two-month period in the third year of studies. By the end of their internships, students have to write and submit a report to their advisors who are full-time faculty members.

B. Elective Requirements (12 Credits)

- 12 hours: MNGT 440, INFO 400, FINA 215, FINA 310, FINA 316, FINA 420, FINA 430, BUSS 340, MKTG 330, MKTG 440, MKTG 320, MKTG 315, MKTG 325, MKTG 420, MKTG 435, MKTG 450, BUSS 320, and MNGT 450.

BBA Program Study Plan

Year I

First Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
BUSS 100	Orientation Workshop	0	-
SOCS 101	Islamic Civilizations I	3	-
MNGT 110	Principles of Management	3	-
ENGL 101	Basic Academic English I	3	-
MATH 203	Introduction for Business Mathematics I	3	-
ACCT 110	Financial Accounting	3	-
	Total Credits	15	

Second Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 102	Basic Academic English II	3	ENGL 101
ARAB 101	Basic Academic Arabic	3	-
CSC 100	Introduction to Computing	3	-
BUSS 110	Business Statistics and Data Analysis	3	MATH 203
FINA 110	Business Finance	3	
	Total Credits	15	

Year II

Third Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
BUSS 200	Business Communication Skills	2	MNGT 110
DCSN 200	Managerial Decision Making	3	MNGT 110
ACCT 215	Managerial Accounting	3	ACCT 110
ECON 211	Principles of Microeconomics	3	
SOCS 201	Islamic Civilizations II	3	SOCS 101
MKTG 210	Principles of Marketing	3	
	Total Credits	17	

Fourth Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ECON 212	Principles of Macroeconomics	3	
ELECTIVE	Business Elective Course	3	
BUSS 210	Business Law	3	MNGT 110
INFO 200	Management Information Systems	3	CSC 100
MNGT 215	Organizational Behavior	3	MNGT 110
	College Business Elective	3	
	Total Credits	18	

Year III

Fifth Semester (19 Credit Hours)

Course	Title	Credits	Prerequisites
BUSS 300	Strategic Career Planning	1	MNGT 110
MATH 204	Business Math	3	MATH 203
ENGL 203	Advanced Academic English I	3	ENGL 102
BUSS 330	Managerial Economics	3	ECON 211
MNGT 430	International business and management	3	MNGT 110, MNGT 215
ELECTIVE	Business Elective Course	3	
	College Business Elective	3	
	Total Credits	19	

Sixth Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
MNGT 460	Change management	3	MNGT 110
DCSN 305	Operations Management	3	MATH 204, MNGT 110
ARAB 201	Advanced Academic Arabic	3	ARAB 101
ELECTIVE	Business Elective Course	3	
ELECTIVE	Business Elective Course	3	
	Non Business Elective Course	3	
	Total Credits	18	

Summer Semester (1 Credit Hours)

Course	Title	Credits	Prerequisites
BUSS 346	Internship in Business (two months)	1	

Year IV

Seventh Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
	Non Business Elective Course	3	
BUSS 400	Developing Business Plans	2	
DCSN 415	Decision Support Systems: Applications in Management	3	DCSN 200
BUSS 245	Business Research Methods	3	BUSS 110, MNGT 110
MNGT 428	Business Ethics	2	MNGT 110
ENGL 206	Technical Writing	3	ENGL 203
	Total Credits	16	

Eight Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
SOCS 202	World Civilizations	3	-
BUSS 440	Strategic Management	3	MNGT 110
ENTM 420	Entrepreneurship and Small Business Management	3	ACCT110, MNGT 110, MKTG 210
MNGT 420	Human Resource Management	3	MNGT 110
BUSS 460	Graduation Project	3	
	Total Credits	15	

Total Program Credits	134⁴	
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⁴ Completion of the Bachelor of Business Administration Degree

BACHELOR OF MARKETING (BMK)

Program Objectives

- Provide students with a broader knowledge of Marketing and Logistics.
- Provide students with the knowledge and tools required for meaningful and successful careers.
- Prepare students for management and technical responsibilities.
- Prepare students for further studies in graduate schools.
- Provide the educational background for various professional certification examinations such as Certified Marketing Analyst, Certified logistics Manager, etc.

Learning Outcomes

Upon completion of the BMK program, students will be able to

- a. Understand of technical and quantitative aspects of marketing.
- b. Conduct marketing research and base all decisions on statistical information.
- c. Use improved marketing communication skills.
- d. Understand professional and ethical issues relevant to marketing.

Program Requirements

In order to graduate with a Bachelor Degree in Marketing, students are expected to complete a total of 134 credit hours by the end of their fourth year of studies. These are divided as follows:

1) University Requirements	33 Credits
2) Non-business elective course	6 Credits
3) College Requirements	56 Credits
4) Marketing Program Requirements	39 Credits
Total	134 Credits

University Requirements

Students working towards the bachelor's degree of Marketing must complete a total of 39 credit hours in University requirements. The 39 credit hours in University general educational requirements for Bachelor program are as follows:

A) University Core Requirements (33 credits)

- 6 credits of Arabic: ARAB 101 and ARAB 201
- 12 credits of English communication skills: ENGL 101, ENGL 102, ENGL 203, and ENGL 206
- 9 credits of Social and Cultural studies: SOCS 101, SOCS 201, and SOCS 202
- 3 credits of Computing: CSC 100
- 3 credits of Mathematics: MATH 203 (instead of MATH 101)

B) University Elective Requirements (6 credits)

- Two 3-credit non-business elective course

College Requirements (56 credits)

Students working towards the Bachelor Degree of Marketing must complete a total of 56 credit hours in College requirements. The 56 credit hours in requirements for Bachelor program are as follows:

A) College Core Requirements (50 credits)

- 6 credits of Accounting: ACCT 110 and ACCT 215
- 20 credits of Business: BUSS 100, BUSS 110, BUSS 200, BUSS 210, BUSS300, BUSS 400, DCSN 200, DCSN 305 and MATH 204.
- 6 credits of Economic: ECON 211, ECON 212.
- 3 credits of finance: FINA 110
- 3 credits of Management Information System: INFO 200
- 3 credits of Marketing: MKTG 210
- 9 credits of General Management: MNGT 110, MNGT 215, MNGT 420

B) College Elective Requirements (6 credits)

- 6 credits of Business Electives from the following courses: ACCT321, BUSS 320, BUSS 330, BUSS 340, BUSS 440, BUSS 445, ENTM 420, FINA 215, FINA 310, FINA 420, MNGT 430, and MNGT 450.

Marketing Program Requirements (39 credits)

To graduate with a Bachelor Degree of Marketing program, students must complete 39 credit hours in Business and Management courses which are:

A) Marketing Program Core Requirements (27 credits)

1. 26 credit hours: BUSS451, MKTG 315, MKTG 320, MKTG 325, MKTG 330, MKTG 420, MKTG 440, MKTG 450, and MKTG 490
2. One credit hour: A summer internship in Marketing (BUSS 346) is a 1 credit course which is required for a two-month period in the third year of studies. By the end of their internships, students have to write and submit a report to their advisors who are full-time faculty members.

B) Marketing Program Elective Requirements (12 Credits)

12 hours: MKTG 390, MKTG 430, MKTG 435, MKTG 460, MKTG 470, MKTG 475 and MKTG 480.

BMK Program Study Plan

(134 Credits)

Year I

First Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
BUSS 100	Orientation Workshop	0	-
SOCS 101	Islamic Civilizations I	3	-
MNGT110	Principles of Management	3	-
ENGL 101	Basic Academic English I	3	-
MATH 203	Introduction for Business Mathematics I	3	-
ACCT 110	Introduction to Accounting	3	-
	Total Credits	15	

Eight Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 102	Basic Academic English II	3	ENGL 101
ARAB 101	Basic Academic Arabic	3	
CSC 100	Introduction to Computing	3	
BUSS 110	Statistics and Data Analysis	3	MATH 203
FINA 110	Introduction to Finance	3	
	Total Credits	15	

Year II

Third Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
DCSN 200	Managerial Decision Making: Models and Technique	3	MNGT 110
ACCT 215	Managerial Accounting	3	ACCT 110
ECON 211	Principles of Microeconomics	3	
SOCS 201	Islamic Civilizations II	3	SOCS 101
MKTG 210	Principles of Marketing	3	
	Total Credits	15	

Fourth Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
ECON 212	Principles of Macroeconomics	3	
ENGL206	Technical Writing	3	ENGL103
BUSS 210	Business Law	3	MNGT 110
INFO 200	Management Information Systems	3	CSC 100
BUSS 200	Business Communication Skills	2	MNGT 110
MNGT 215	Organizational Behavior	3	MNGT 110
	Total Credits	17	

Year III

Fifth Semester (19 Credit Hours)

Course	Title	Credits	Prerequisites
MKTG 325	Product & Brand Management	3	MKTG 210
MATH 204	Introduction for Business Mathematics II	3	MATH 203
ENGL 203	Advanced Academic English I	3	ENGL 102
BUSS 300	Strategic Career Planning	1	
MKTG 315	Marketing Channels	3	MKGT 210
MKTG 330	International Marketing	3	MKGT 210
ELECTIVE	Marketing Elective Course	3	
	Total Credits	19	

Sixth Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
MKTG 320	Competitive Marketing Str.	3	MKTG 210
ELECTIVE	Free Elective-1	3	
DCSN 305	Operations Management	3	
ARAB 201	Advanced Academic Arabic	3	ARAB 101
ELECTIVE	Business elective-1	3	
ELECTIVE	Business elective-2	3	
	Total Credits	18	

Summer Semester (1 Credit Hour)

Course	Title	Credits	Prerequisites
BUSS 346	Internship in Business (two months)	1	
	Total Credits	1	

Year IV

Seventh Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
BUSS 400	Developing Business Plan	2	
MKTG 450	Logistics MKT Management	3	MKGT 210
ELECTIVE	Marketing Elective-2	3	
ELECTIVE	Marketing Elective-3	3	
MKTG 420	Marketing Research	3	MKGT 210
MKTG 440	Consumer Behavior	3	MKGT 210
	Total Credits	17	

Eight Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
SOCS 202	World Civilizations	3	
ELECTIVE	Free Elective-2	3	
BUSS 420	Human Resources Management	3	MNGT 110
BUSS 451	Graduation Project	3	
ELECTIVE	Marketing Elective-4	3	
MKTG 490	Special Topics in Marketing	2	Senior Standing
	Total Credits	17	

Total Program Credits	134⁵	
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⁵ Completion of the Bachelor Degree in Marketing

DEPARTMENT OF ACCOUNTING AND FINANCE

Mission

The mission of the Department of Accounting and Finance is to:

- a. provide undergraduate students quality higher education in Accounting and Finance,
- b. develop in students skills to solve Finance and Accounting problems through coursework and practical experience,
- c. provide synergistic knowledge and solutions between academia and industry, and
- d. enrich the students' academic experience with global perspective and awareness of their leadership role in regional development.

Academic Programs

The Department of Accounting and Finance offers two undergraduate programs:

- Bachelor of Accounting (BAT): The BAT program provides students with a multi-skilled accounting degree with strong emphasis on both accounting and financial management, both being essential business tools.
- Bachelor of Finance (BFN): The BFN program enhances students' abilities and skills in the areas of financial management. The program will expand its scope to teach students technical skills that will allow them to manage financial positions competitively.

BACHELOR OF ACCOUNTING (BAT)

Programs Objectives

- Provide students with a broader knowledge of accounting techniques and theories.
- Provide students with the knowledge and tools required successful career in the accounting field.
- Prepare students for sensitive accounting responsibilities.
- Educate students on the latest accounting theories for further studies in graduate schools.
- Provide the educational background for various professional certification examinations such as CPA etc.

Learning Objectives

Upon completion of the BAT program, students will be able to:

- Understand accounting technical and quantitative aspects.
- Conduct accounting practices
- Use statistical and quantitative skills.
- Understand professional and ethical issues relevant to accounting.

Program Requirements

In order to graduate with a Bachelor Degree in Accounting, students are expected to complete a total of 134 credit hours by the end of their fourth year of studies. These are divided as follows:

1) University Requirements	39 Credits
2) College Requirements	56 Credits
3) Program Requirements	39 Credits
Total	134 Credits

University Requirements

Students working towards the Bachelor Degree of Accounting must complete a total of 39 credit hours in University requirements. The 39 credit hours in University general educational requirements for Bachelor program are as follows:

A) University Core Requirements (33 credits)

- 6 credits of Arabic: ARAB 101 and ARAB 201
- 12 credits of English communication skills: ENGL 101, ENGL 102, ENGL 203, and ENGL 206
- 9 credits of Social and Cultural studies: SOCS 101, SOCS 201, & SOCS202
- 3 credits of Computing: CSC 100
- 3 credits of Mathematics: MATH 203 (instead of MATH 101)

B) University Elective Requirements (6 credits)

- Two 3-credit non-business elective course

College Requirements

Students working towards the Bachelor Degree of Accounting must complete a total of 56 credit hours in College requirements. The 56 credit hours in requirements for Bachelor program are as follows:

A) College Core Requirements (50 credits)

- 6 credits of Accounting: ACCT 110 and ACCT 215
- 20 credits of Business: BUSS 100, BUSS 110, BUSS 200, BUSS 210, BUSS300, BUSS 400, DCSN 200, DCSN 305 and MATH 204.
- 6 credits of Economic: ECON 211, ECON 212.
- 3 credits of finance: FINA 110
- 3 credits of Management Information System: INFO 200
- 3 credits of Marketing: MKTG 210
- 9 credits of General Management: MNGT 110, MNGT 215, MNGT 420

B) College Elective Requirements (6 credits)

- 6 credits of Business Electives from the following courses: BUSS 320, BUSS 330, BUSS 340, BUSS 440, BUSS 445, BUSS 490, ENTM 420, FINA 215, FINA 310, FINA 420, MKTG 320, MNGT 430, and MNGT 450.

Program Requirements

To graduate with a Bachelor Degree of Accounting program, students must complete 39 credit hours in Business and Management courses which are:

A) Program Core Requirements (27 credits)

- 26 credit hours: ACCT 300, ACCT 321, ACCT 322, ACCT 332, ACCT 422, ACCT 430, ACCT 435, ACCT 490, and BUSS 451.
- One credit hour: A summer internship in Accounting (BUSS 346) is a 1 credit course which is required for a two-month period in the third year of studies. By the end of their internships, students have to write and submit a report to their advisors who are full-time faculty members.

B) Program Elective Requirements (12 Credits)

- 12 hours: ACCT 426, ACCT 424, ACCT 425, ACCT 427, ACCT 429, ACCT 445, ACCT 452.

BAT Program Study Plan

(134 Credits)

Year I

First Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
BUSS 100	Orientation Workshop	0	-
SOCS 101	Islamic Civilizations I	3	-
MNGT110	Principles of Management	3	-
ENGL 101	Basic Academic English I	3	-
MATH 203	Introduction for Business Mathematics I	3	-
ACCT 110	Introduction to Accounting	3	-
	Total Credits	15	

Second Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 102	Basic Academic English II	3	ENGL 101
ARAB 101	Basic Academic Arabic	3	
CSC 100	Introduction to Computing	3	
BUSS 110	Statistics and Data Analysis	3	MATH 203
FINA 110	Introduction to Finance	3	
	Total Credits	15	

Year II

Third Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
DCSN 200	Managerial Decision Making: Models and Technique	3	MNGT 110
ACCT 215	Managerial Accounting	3	ACCT 110
ECON 211	Principles of Microeconomics	3	
SOCS 201	Islamic Civilizations II	3	SOCS 101
MKTG 210	Principles of Marketing	3	
	Total Credits	15	

Fourth Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
ECON 212	Principles of Macroeconomics	3	
ENGL206	Technical Writing	3	ENGL203
BUSS 210	Business Law	3	MNGT 110
INFO 200	Management Information Systems	3	CSC 100
BUSS 200	Business Communication Skills	2	MNGT 110
MNGT 215	Organizational Behavior	3	MNGT 110
	Total Credits	17	

Year III

Fifth Semester (19 Credit Hours)

Course	Title	Credits	Prerequisites
ACCT 321	Intermediate Accounting	3	ACCT 110
MATH 204	Introduction for Business Mathematics II	3	MATH203
ENGL 203	Advanced Academic English I	3	ENGL102
BUSS 300	Strategic Career Planning	1	
ACCT 322	Accounting in Islamic Banking	3	ACCT110
ACCT 300	Accounting for non-Profit Org.	3	FINA110, ACCT110
ELECTIVE	Accounting Elective Course	3	
	Total Credits	19	

Sixth Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ACCT 332	Computer Accounting	3	ACCT110
ELECTIVE	Free Elective-1	3	
DCSN 305	Operations Management	3	MNGT 110, MATH 204 MATH 204
ARAB 201	Advanced Academic Arabic	3	ARAB 101
ELECTIVE	Business elective 1	3	
ELECTIVE	Business elective 2	3	
	Total Credits	18	

Summer Semester (1 Credit Hour)

Course	Title	Credits	Prerequisites
BUSS 346	Internship in Business (two months)	1	
	Total Credits	1	

Year IV

Seventh Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
BUSS 400	Developing Business Plan	2	
ACCT 435	Accounting Info System	3	INFO200
ELECTIVE	Accounting Elective-2	3	
ELECTIVE	Accounting Elective-3	3	
ACCT 422	Intermediate Fin Accounting	3	ACCT110, ACCT215
ACCT 427	Zakat & Tax Accounting	3	ACCT321
	Total Credits	17	

Eight Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
SOCS 202	World Civilizations	3	
ELECTIVE	Free Elective-2	3	
BUSS420	Human Resources Management	3	MNGT 110
BUSS 451	Graduation Project	3	
ELECTIVE	Accounting Elective-4	3	
ACCT 490	Special Topics in Accounting	2	Senior Standing
	Total Credits	17	

Total Program Credits	134⁶	
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⁶ Completion of the Bachelor Degree in Accounting

BACHELOR OF FINANCE (BFN)

Programs Objectives

- Provide students with the ability to prepare and interpret financial statements.
- Prepare students to efficiently write and apply financial advances in companies' valuation techniques and risk management.
- Graduates will be able to state different business functions
- identify and address financial problems and evaluate different investment opportunities
- Educate students on the latest finance theories for further studies in graduate schools.
- Provide the educational background for various professional finance certification examinations.

Learning Outcomes

Upon completion of the BAT program, students will be able to

- a. Develop various business concepts for solving financial problems and responding to challenges facing the / within organizations
- b. Conduct financial practices
- c. Demonstrate readiness for finance responsibilities like designing appropriate tools of analysis
- d. Use statistical and quantitative skills.
- e. Understand professional and ethical issues relevant to finance.

Program Requirements

In order to graduate with a bachelor's degree in finance, students are expected to complete a total of 134 credit hours by the end of their fourth year of studies. These are divided as follows:

1) University Requirements	39 Credits
2) College Requirements	56 Credits
3) Finance Program Requirements	39 Credits
Total	134 Credits

University Requirements

Students working towards the bachelor's degree of Finance must complete a total of 39 credit hours in University requirements. The 39 credit hours in University general educational requirements for Bachelor program are as follows:

A) University Core Requirements (33 credits)

- 6 credits of Arabic: ARAB 101 and ARAB 201
- 12 credits of English communication skills: ENGL 101, ENGL 102, ENGL 203, and ENGL 206

- 9 credits of Social and Cultural studies: SOCS 101, SOCS 201, and SOCS 202
- 3 credits of Computing: CSC 100
- 3 credits of Mathematics: MATH 203 (instead of MATH 101)

B) University Elective Requirements (6 credits)

- Two 3-credit non-business elective course

College Requirements

Students working towards the bachelor's degree of Finance must complete a total of 56 credit hours in College requirements. The 56 credit hours in requirements for Bachelor program are as follows:

A) College Core Requirements (50 credits)

- 6 credits of Accounting: ACCT 110 and ACCT 215
- 20 credits of Business: BUSS 100, BUSS 110, BUSS 200, BUSS 210, BUSS300, BUSS 400, DCSN 200, DCSN 305 and MATH 204.
- 6 credits of Economic: ECON 211, ECON 212.
- 3 credits of finance: FINA 110
- 3 credits of Management Information System: INFO 200
- 3 credits of Marketing: MKTG 210
- 9 credits of General Management: MNGT 110, MNGT 215, MNGT 420

B) College Elective Requirements (6 credits)

- 6 credits of college electives from the following courses: ACCT321, BUSS 320, BUSS 330, BUSS 340, BUSS 440, BUSS 445, ENTM 420, MKTG 320, MNGT 430, MNGT 450.

Finance Program Requirements

To graduate with a bachelor's degree of Finance program, students must complete 39 credit hours in Business and Management courses which are:

A) Program Core Requirements (27 credits)

- 26 credit hours: BUSS 451, FINA 215, FINA 316, FINA 370, FINA 390, FINA 410, FINA 427, FINA 450, and FINA 490.
- One credit hour: A summer internship in Finance (BUSS 346) is a 1 credit course which is required for a two-month period in the third year of studies. By the end of their internships, students have to write and submit a report to their advisors who are full-time faculty members.

B) Program Elective Requirements (12 Credits)

- 12 hours: FINA 310, FINA 314, FINA 351, FINA 353, FINA 411, FINA 412, FINA 420, FINA 425, FINA 430, FINA 452, and FINA 459.

BFN Program Study Plan

(134 Credits)

Year I

First Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
BUSS 100	Orientation Workshop	0	-
SOCS 101	Islamic Civilizations I	3	-
MNGT110	Principles of Management	3	-
ENGL 101	Basic Academic English I	3	-
MATH 203	Introduction for Business Mathematics I	3	-
ACCT 110	Introduction to Accounting	3	-
	Total Credits	15	

Second Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 102	Basic Academic English II	3	ENGL 101
ARAB 101	Basic Academic Arabic	3	
CSC 100	Introduction to Computing	3	
BUSS 110	Statistics and Data Analysis	3	MATH 203
FINA 110	Introduction to Finance	3	
	Total Credits	15	

Year II

Third Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
DCSN 200	Managerial Decision Making: Models and Technique	3	MNGT 110
ACCT 215	Managerial Accounting	3	ACCT 110
ECON 211	Principles of Microeconomics	3	
SOCS 201	Islamic Civilizations II	3	SOCS 101
MKTG 210	Principles of Marketing	3	
	Total Credits	15	

Fourth Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
ECON 212	Principles of Macroeconomics	3	
ENGL206	Technical Writing	3	ENGL203
BUSS 210	Business Law	3	MNGT 110
INFO 200	Management Information Systems	3	CSC 100
BUSS 200	Business Communication Skills	2	MNGT 110
MNGT 215	Organizational Behavior	3	MNGT 110
	Total Credits	17	

Year III

Fifth Semester (19 Credit Hours)

Course	Title	Credits	Prerequisites
FINA 215	Financial Markets & Institutes	3	FINA110
MATH 204	Introduction for Business Mathematics II	3	MATH203
ENGL 203	Advanced Academic English I	3	ENGL102
BUSS 300	Strategic Career Planning	1	
FINA 316	Principles of Insurance	3	FINA 110
FINA 370	Portfolio Theory & Investment	3	FINA110, MNGT110
ELECTIVE	Accounting Elective Course	3	
	Total Credits	19	

Sixth Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
FINA 390	Valuation Methods	3	FINA 110
ELECTIVE	Free Elective-1	3	
DCSN 305	Operations Management	3	MNGT 110, MATH 204
ARAB 201	Advanced Academic Arabic	3	ARAB 101
ELECTIVE	Business elective-1	3	
ELECTIVE	Business elective-2	3	
	Total Credits	18	

Summer Semester (1 Credit Hour)

Course	Title	Credits	Prerequisites
BUSS 346	Internship in Business (two months)	1	
	Total Credits	1	

Year IV

Seventh Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
BUSS 400	Developing Business Plan	2	
FINA 410	Financial Planning & control	3	FINA215
ELECTIVE	Finance Elective-2	3	
ELECTIVE	Finance Elective-3	3	
FINA 427	Real Estate Finance & Invest.	3	FINA110
FINA 450	Risk Management	3	FINA314
	Total Credits	17	

Eight Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
SOCS 202	World Civilizations	3	
ELECTIVE	Free Elective-2	3	
BUSS420	Human Resources Management	3	MNGT 110
BUSS 451	Graduation Project	3	
ELECTIVE	Finance Elective-4	3	FINA110
FINA 490	Special Topics in Finance	2	Senior Standing
	Total Credits	17	

Total Program Credits	134⁷	
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⁷ Completion of the Bachelor degree in Finance

Elective Courses

Business Electives			
Course	Title	Credits	Prerequisites
BUSS 340	Quality Assurance	3	
BUSS 320	Organizational Management	3	
INFO 400	E-commerce: strategies and applications	3	CSC 100
FINA 215	Financial markets and institutions	3	FINA 110
FINA 310	Islamic finance and management	3	FINA 110
FINA 316	Principle of insurance	3	FINA 110
FINA 420	Investment management	3	FINA 110
FINA 430	International Financial Management	3	FINA 110
MKTG 330	Consumer behavior	3	MKTG 210
MKTG 440	International marketing	3	MKTG 330
MKTG 320	Competitive Marketing Strategies	3	MKTG 210
MKTG 315	Marketing Channels	3	MKTG 210
MKTG 325	Product & Brand Management	3	MKTG 210
MKTG 420	Marketing Research	3	MKTG 210, BUSS 110
MKTG 435	Public Relations	3	MKTG 210
MKTG 450	Logistics Marketing Management	3	MKTG 210
MNGT 440	Total quality management	3	MNGT 110
MNGT 450	Case Studies/Special Topics	3	MNGT 110

Marketing Electives			
Course	Title	Credits	Prerequisites
MKTG 390	Online Marketing	3	None
MKTG 430	Professional Selling & Sales Management	3	MKTG420
MKTG 435	Public Relations	3	None
MKTG 460	Integrated Marketing Communication	3	MKTG210
MKTG 470	Distribution Management	3	MKTG 450
MKTG 475	Supply Chain Management	3	MKTG 450
MKTG 480	Logistics and Transportation	3	MKTG 450

Accounting Electives			
Course	Title	Credits	Prerequisites
ACCT423	Advanced Accounting	3	None
ACCT424	Accounting Theory	3	ACCT 110; ACCT 321
ACCT425	Cost Accounting	3	ACCT 110; BUSS 110; ACCT 215
ACCT429	Advanced Management Accounting	3	ACCT 110; BUSS 110; ACCT 215; ACCT 321
ACCT 430	Auditing	3	None
ACCT445	International Accounting	3	ACCT 110; ACCT 321; ACCT 422
ACCT452	Financial Report Analysis	3	ACCT 110; FINA 110

Finance Electives			
Course	Title	Credits	Prerequisites
FINA 310	Islamic Finance	3	FINA 110; MATH 203
FINA 314	Intermediate Finance	3	None
FINA 351	Advanced Insurance	3	BUSS 110; FINA 316; MATH 203
FINA 353	Advanced Banking	3	BUSS 110; MATH 203
FINA 411	Financial Engineering	3	BUSS 110; FINA 110; FINA 215; FINA 314; MATH 203
FINA 412	Financial Derivatives	3	BUSS 110; FINA 110; FINA 215; FINA 314; MATH 203
FINA 420	Investment Management	3	None
FINA 425	Commercial Bank Management	3	FINA 110; FINA 215
FINA 430	International Finance	3	FINA 110; FINA314; MATH 203
FINA 459	International Banking	3	FINA 110; FINA 215; MATH 203

Recommended Non Business Elective Courses (Free Electives)				
Course	Title	Credits	College	Prerequisites
CEN 403	Special Topics in Computer Engineering	3	CSC	
CEN 434	Cryptography and Computer Security	3	CSC	
CEN 452	Web Server Design & Programming	3	CSC	
CEN 454	Pervasive Computer System & Application	3	CSC	
CEN 493	Neural Networks	3	CSC	
COEN 400	Engineering Ethics	3	COE	
CSC 397	Selected Topics in Computer Science	3	CSC	
CSC 487	Computer Security	3	CSC	
CSC 488	System Programming	3	CSC	
ENGL 123	Pronunciation & Speech	3	CSH	
ENGL 204	Advanced Academic English	3	CSH	ENGL 203
ENGL 425	English for Specific Purpose	3	CSH	
FREN 101	Basic French	3	CSH	
MECH 499	Special Topics in Mechanical Engineering	3	COE	
PHED 101	Physical Education	3	CSH	
SPTP 945	Special Topics	3	CSH	
STAT 230	Probability and Statistics	3	CSH	MATH 204
TESOL 212	Methods & Material to Teach EFL/ESL	3	CSH	

Course Descriptions

Accounting Courses:

ACCT 110 Financial Accounting **3(3, 0, 0)**

An introduction to financial accounting that covers the use, interpretation, and analysis of the principal financial statements and other sources of financial information from a national and international perspective.

ACCT 215 Managerial Accounting **3(3, 0, 0)**

This course covers the use, interpretation, and analysis of management accounting information for management decision-making, planning, and control of operations. The focus is on cost behavior, cost measurement, budgeting, performance measurement and valuation, responsibility accounting, and product costing.

Prerequisites ACCT 110.

ACCT 300 Accounting for Non- Profit Organizations **3(3, 0, 0)**

This course discusses the basic framework, principles and concepts underlying accounting for governmental and not-for-profit organizations. This includes budgeting, fund accounting, and accounting and financial reporting for local governmental units, hospitals, voluntary health and welfare organizations, and other non-profit entities.

Prerequisites ACCT 110.

ACCT 321 Intermediate Financial Accounting 1 **3(3, 0, 0)**

This course covers concepts and standards of external financial reporting, systems to record and prepare financial accounting information, contents and presentation of basic financial statements, and financial reporting issues of assets.

Prerequisites: Business third year standing and ACCT 110.

Co-requisite: ACCT 110.

ACCT 322 Accounting in Islamic banking **3(3, 0, 0)**

The basic mechanism of the Islamic bank is to accept deposits from surplus persons on the liability side and offer financing on the assets side to the deficit persons. The basic idea is to activate this mechanism on acceptable Islamic modes which preclude payment or receipt of interest and conform to the rules of Shariah.

Prerequisites ACCT 110.

ACCT 422 Intermediate Financial Accounting 2 **3(3, 0, 0)**

This course covers concepts of financial reporting related to liabilities, equity, and other selected financial reporting issues and disclosure.

Prerequisites: Business third year standing and ACCT 321

Co-requisite: ACCT 110.

ACCT 423 Advance Accounting **3(3, 0, 0)**

This rigorous technical-based course introduces the conceptual basis for consolidated accounting, and develops the technical application of advanced financial reporting issues including consolidation accounting and reporting, variable interest entities, joint venture accounting, foreign currency transactions and hedge accounting, translation and consolidation of financial statements stated in foreign currencies, segmented reporting and not-for-profit entities.

Prerequisites ACCT 110, ACCT321

ACCT 424 Accounting Theory **3(3, 0, 0)**

Selected contemporary and international issues in financial accounting will be covered with an emphasis on reading and interpreting professional accounting literature to prepare financial statements according to generally accepted accounting principles.

Prerequisites ACCT 110, ACCT321.

ACCT 425 Cost Accounting **3(3, 0, 0)**

A course on accounting in manufacturing operations; cost concepts and classifications; cost accounting cycle; accounting for materials, labor, and burden; process cost accounting; budgeting; standard costs; cost reports; direct costing and differential cost analysis; cost-volume-profit analysis and gross profit analysis.

Prerequisites: Business third year standing and ACCT 215.

ACCT 427 Zakat and Tax Accounting **3(3, 0, 0)**

This course familiarize the students with the basic principles of Zakat and Taxes and its calculation. Also it shall introduces the students with the new Income tax law in the Kingdom of Saudi Arabia, and its main features.

Prerequisites ACCT 110, ACCT321

ACCT 430 Introduction to Auditing **3(3, 0, 0)**

An introduction to auditing and the professional responsibilities of a career in accounting, the course covers a comprehensive study of procedures used in the verification of financial statements. Topics include the legal and ethical responsibilities of accountants; professional auditing standards; international auditing standards; the acquisition, evaluation, and documentation of audit evidence; reports on the results of the engagement, evaluation in internal control, compliance testing, substantive testing, and statistical sampling and auditing EDP. Prerequisites: Senior standing and ACCT 321.

ACCT 435 Accounting Information System **3(3, 0, 0)**

This course explores in detail several typical Accounting Information System (AIS) application subsystems, such as order entry/sales, billing/receivables/cash receipts, inventory, purchasing/ accounts payable/cash disbursements, payroll, and materials planning/production. This course includes understanding, documenting, designing, using, and auditing these application subsystems.

Prerequisites: Senior standing and INFO 200.

ACCT 445 International Accounting **3(3, 0, 0)**

This course focuses on the main challenges faced by professional accountants in international business that includes the financial reporting standards, foreign currency, budgeting, management control, and the analysis of the profit plan.

Prerequisites: Senior standing and ACCT 215.

ACCT 452 Financial Report Analysis **3(3, 0, 0)**

Financial statement information is the basis for a wide range of business decisions. Managers use financial statements to monitor their firm's performance relative to competitors, to communicate with external investors, to help judge what financial policies they should pursue, and to evaluate potential new businesses to acquire.

Business Courses:

BUSS 100 Orientation Workshop 0(1, 0, 0)

The main objectives of this orientation are to give students general insight into the fields of business and management, to introduce recent regional developments and career possibilities, and to familiarize students with the requirements of the business study program. The primary aims of this course are to help students plan out their study programs for the business diploma or for a specific track within the business bachelor's degree program, and to advise students on course and degree objectives.

BUSS 110 Statistics and Data Analysis 3(3, 0, 0)

This course covers basic statistical concepts and introduces some advanced concepts and tools that are useful for decision-makers. Topics include descriptive statistics, probability distribution, statistical inference (hypothesis testing and analysis of variance) from small and large samples of data, correlation and regression, forecasting and time series and statistical quality controls. An emphasis will be given to the understanding, applicability of statistical analysis and interpretation of the output of analyses using Excel spreadsheet tools and small mini real-life cases.

Prerequisites: MATH 203.

BUSS 200 Business Communication Skills 2(2, 0, 0)

This course is designed to introduce students to the various communication skills needed in a typical work environment. Mastering these skills plays a profound role in shaping and advancing professional careers in all types of industries and work scopes.

Prerequisite: None

BUSS 210 Business Law 3(3, 0, 0)

The main objective of the course is to help business students understand Saudi and Gulf legal environment and the legal aspect of common business activities and the formation and functioning of commercial companies along with the related ethical principles. Topics covered include laws pertaining to business people and employment, labor laws, business associations, the business firm, breach of contract, commercial papers and letters of credit.

Prerequisite: MNGT 110.

BUSS 300 Strategic Career Planning 1(1, 0, 0)

This course is designed to build awareness of changing career patterns and major personal and professional influences that impact future careers. The course covers issues such as preparation for joining the labor market, basic career guidance, understanding career stages, and practicing self- assessment.

Prerequisite: Business third year standing.

BUSS 330 Managerial Economics 3(3, 0, 0)

The main objective of this course is to equip students with the necessary economic theory and techniques and the ability to apply them in order to inform and enhance managerial decision making. Topics covered include: optimization techniques, demand theory and estimation, forecasting and measurement, theory of production and estimation, cost theory and estimation, pricing and output determination under different market structures, game theory, and pricing in practice.

Prerequisites: Business third year standing and ECON 211.

BUSS 346 Internship/Practicum **1(1, 0, 0)**

A summer period of guided work experience under faculty supervision by a mentor, and corporate guidance by a preceptor is designed to acquaint students with the ground realities and help them acquire core values and basic skills necessary for an understanding of the field operations of a firm.

Prerequisites: Business third year standing and FINA 110, MNGT 110, MKTG 210, INFO 200.

BUSS 400 Developing Entrepreneurial Plan **2(2, 0, 0)**

This course focuses on starting your own business from inception to IPO, passing through the stages of feasibility study, VC financing, launching, and operating.

Prerequisites: Senior standing.

BUSS 440 Strategic Management **3(3, 0, 0)**

This capstone course exposes seniors to the strategic management process of local, regional, and multinational corporations. Emphasis is placed on identifying the tools needed for strategic analysis of the firm and the industry, and on comprehending the key strategic issues that managers face in managing corporations. Prerequisites: Senior standing and MNGT 110.

BUSS 445 Business Research Methods **3(3, 0, 0)**

The course provides students with an introduction to the main theories and practices in the field of business research. Topics include: business research process; research design and strategies; methods of qualitative and quantitative research; design of experiments including sampling, survey design, data collection, basic data analysis, and research reporting and evaluation.

Pre-requisites: BUSS 110

BUSS 460 Graduation Project **3(3, 0, 0)**

The project requires, among other things, that the student works on a problem faced by one of the local or regional businesses, and recommend a set of possible solutions under the supervision of a faculty mentor in the particular area. The results of the project are normally presented in a meeting in the presence of representatives from the business subject to the consulting assignment.

Prerequisites: Senior standing.

BUSS 490 Special Topics in Business **3(3, 0, 0)**

This is a general course intended to reinforce the student's knowledge in a specific functional area of Business Administration usually not offered in one of the regular core or other elective courses. Through a combination of lectures, case studies and independent reading, the course aims to expand the students' knowledge of the related concepts and applications.

Pre-requisite: at least a third year standing.

DCSN 200 Managerial Decision Making: Models and Techniques **3(3, 0, 0)**

This course addresses the tools and techniques of modern managerial decision making. It addresses formulation of theories and models that can be used to analyse complex problem taken from various functional areas of management. The main goal is to understand how business decisions are reached, what tradeoffs is made and how outcomes depend on the underlying data.

DCSN 305 Operations Management 3(3, 0, 0)

This course offers an overview of the issues involved in how operations managers make strategic decisions to operate a production or service system in order to give the firm a sustainable competitive advantage in a global marketplace. Specific topics covered include operations strategy framework; project management; product design and process management; total quality management; capacity planning; supply chain design; and control of operations.

Prerequisites: Business third year standing.

DCSN 415 Advanced Managerial Decision Making Models 3(3, 0, 0)

This course introduces students to concepts, processes and practices of decision making at both individual and group level. Students will understand the essential definition of DSS, Business intelligence and their components and structure.

Prerequisites: Senior standing and DCSN 200.

Economics Courses:

Econ 211 Principles of Microeconomics 3(3, 0, 0)

This is an introductory course which presents the general Principles of microeconomics. Topics include supply and demand, market equilibrium, consumer theory, market equilibrium, production, market structures (monopoly and oligopoly), and welfare economics and income distribution.

Econ 212 Principles of Macroeconomics 3(3, 0, 0)

This course deals with principles of economics that apply to an economy as a whole. It includes elements on the determinants of the general price level and national output, consumption, investment, inflation and unemployment. The course introduces the monetary and fiscal policies to promote long-term economic growth. It also provides a basic understanding of the foreign exchange markets, balance of payments and the effects of currency changes on a country's imports and exports.

Prerequisites: ECON 211

Entrepreneurship Courses:

ENTM 420 Entrepreneurship and Small Business Management 3(3, 0, 0)

This course covers the management, organization, and operational issues of small business enterprises. This course emphasizes the identification and resolution of managerial problems from the perspective of small business focusing mainly on marketing, finance and HR areas.

Prerequisites: Senior standing & ACCT 110, FINA 110, MNGT 215, BUSS 400.

Finance Courses:

FINA 110 Business Finance 3(3, 0, 0)

This course teaches the tools that determine and analyze the major decisions a financial manager has to make, including identification of the firm's goals, time value of money, use of discount cash flow models, capital budgeting under certainty, capital structure as it relates to cost of capital, dividend policy, and ethics in finance.

Prerequisites: ACCT 110.

FINA 215 Financial Markets and Institutions 3(3, 0, 0)

This course covers analysis of existing financial systems, money and capital markets, banks and non-bank financial intermediaries, term structure of interest rates, and securities markets including the stock and bond exchanges. It introduces the role of risk management in the financial institutions industry. Both quantitative and qualitative measures of risks are emphasized.

Prerequisites: FINA 110.

FINA 310 Islamic Finance and Management 3(3, 0, 0)

This course introduces financial institutions, transactions and instruments that comply with Islamic principles. The course focuses on Shariah compliant transactions and instruments such as financial partnerships and profit sharing, asset-backed equity and debt, and Shariah compliant insurance. Further topics include the development of new instruments and practices to offer a broader range of Islamic financial solutions, practical management uses and implications of Islamic finance.

Prerequisites: Business third year standing and FINA 110, MNGT 110.

FINA 314 Intermediate Financial Management 3(3, 0, 0)

The course will address important financial management topics, including the methods of analyzing capital budgeting decisions and the unique problems they pose, long-term capital structure and dividend policy decisions, corporate financial analysis and forecasting, working capital management, and additional special topics in financial management.

Prerequisites: Business third year standing and FINA 110

FINA316 Principles of Insurance 3(3, 0, 0)

This course is designed to provide an in depth study of the different types of non-speculative risks faced by individuals and businesses. The first section of the course will provide a clear understanding of the definitions of risk and insurance, as well as examine the various principles of insurance from an economic and regulatory perspective. The second section of the course will provide an in depth study of the property and casualty insurance field and provide a review of the various insurance contracts used therein.

Prerequisites: FINA 110.

FINA 370 Portfolio Theory and Investment Analysis 3(3, 0, 0)

Investments can be thought to be composed of two branches: security analysis and portfolio management. We will begin by looking at the financial markets and the concept of risk/return; then we will examine modern portfolio theory, including market efficiency and behavioral finance.

Prerequisites: FINA 422.

FINA 410 Financial Planning and Control 3(3, 0, 0)

This course focuses on topics such as the financial planner's role and environment, cash flow budgeting, consumer credit, controlling and planning labor and overhead costs, expense and capital expenditure planning, debt management, insurance, taxation and financial planning. The course also covers aspects of personal financial planning, including retirement planning, estate planning and wills, personal bankruptcy and insolvency, and preparation of financial plans.

Prerequisites: Senior standing and FINA 110.

FINA 411 Financial Engineering **3(3, 0, 0)**

The objective of this module is to study the wide array of tools and techniques that have evolved to manage and transfer risks. We start by reviewing the building blocks of risk management strategies, i.e. forward contracts, futures, swaps and options. We will study the rationale behind their usage, and how they can be combined to replicate more complex financial contracts and achieve the desired risk management goals.

Prerequisites: FINA 412

FINA 412 Financial Derivatives **3(3, 0, 0)**

The purpose of the course is to provide the student with the necessary skills to value and to employ options, option-like-instruments and futures. In order to provide a useful treatment of these topics in an environment that is changing rapidly, it is necessary to stress fundamentals and to explore topics at a technical level.

FINA 420 Investment Management **3(3, 0, 0)**

A study of the operations of securities markets, investment policies, valuation of individual securities, and techniques of investing in securities. This course also introduces students to analysis of investment information, evaluation of risks and returns, and principles of portfolio selection in investment decisions.

Prerequisites: Senior standing and FINA 215.

FINA 425 Commercial Bank Management **3(3, 0, 0)**

This course focuses on the management aspects of commercial banks, financial analysis of bank statements, liquidity management, assets and liability management, profitability, capital adequacy, credit analysis, trade finance, and banking regulations.

Prerequisites: Senior standing and FINA 215.

FINA 430 International Financial Management **3(3, 0, 0)**

This course examines international regulatory and environment differences, access to money and capital markets, use of derivatives to hedge exchange rate risk, exposure to different types of risks, and international diversification handled by multinational corporations.

Prerequisites: Senior standing and FINA 110.

FINA 450 Risk Management in Financial Institutions **3(3, 0, 0)**

This course defines the role of risk management in the financial industry. It focuses on the qualitative and quantitative measures of risk, and considers the management of various risks faced by investors: interest rate risk, foreign exchange rate risk, credit risk, operational risk. It also discusses portfolio analysis and the role of asset and liability management and risk control processes.

Prerequisites: Senior standing and FINA 110.

Management Courses:

MNGT 110 Principles of Management **3(3, 0, 0)**

A course that focuses on the modern corporate entity: rationale, structure, processes and functions; internal dynamics of supervision and leadership, functions of management, performance and change management, systems dynamics, and interface with the environment.

MNGT 215 Organizational Behavior **3(3, 0, 0)**

This course deals with corporate behavioral dynamics at the individual and group levels, managerial communication, team building, leadership, motivation, and conflict resolution.

Prerequisites: MNGT 110.

MNGT 428 Business Ethics **2(2, 0, 0)**

This course covers the topics of instrumental expediency and moral imperatives, ethical dimensions of corporate decision making, intra- and interpersonal ethical conflicts, and limits of individual and corporate responsibility.

Prerequisite: Business third year standing & MNGT 110.

MNGT 420 Human Resource Management **3(3, 0, 0)**

A course that deals with understanding and managing human capital as a major strategic asset, macro and micro manpower planning, skill surveying, management learning, de-learning and relearning, results-driven performance in the age of virtual organizations and telecommuting, and knowledge workers in a rapidly changing corporate context within a global knowledge economy.

Prerequisites: Senior standing and MNGT 110.

MNGT 430 International Business and Management **3(3, 0, 0)**

This course examines substantive and stylistic challenges for senior and middle management in international cross continent corporations and conglomerates, standardization and diffusion of authority and operations, mobility and self-reinvention, and integration and differentiation.

Prerequisites: Senior standing.

MNGT 440 Total Quality Management **3(3, 0, 0)**

This course covers an advanced analytical account of TQM as a modern management philosophy and a program for reaching customer satisfaction. It includes a large set of practical applications at different firm levels in sustaining the relationship with customers.

Prerequisite: Senior standing.

MNGT 450 Case Studies/Special Topics **3(3, 0, 0)**

This course deals with special issues and management concerns that are not covered in regular courses. Students will solve in-depth business case studies covering different strategic management problems and situations.

Prerequisite: Senior standing.

MNGT 460 Change Management **3(3, 0, 0)**

This course discusses a central paradigm in modern management theory and practice. It reviews various organizational forces that enable and resist change. It includes the change processes at the individual, group, and organizational levels and introduces theories and approaches related to managing changes.

Prerequisite: Senior standing.

Management Information Systems Courses:

INFO 200 Management Information System 3(3, 0, 0)

This course introduces the IT applications in businesses that raise productivity, create customer value and sustain competitive advantage. The survey of the underlying information technology and information systems (IT/IS) show how business processes and transactions are supported.

Prerequisites: MNGT 110, CSC 100.

INFO 400 E-Commerce (EC) Strategies and Applications 3(3, 0, 0)

This course explores strategies and applications in the context of planning an EC initiative or startup. Business models and competitive strategies are used as the framework: (a) for understanding how EC is different from and similar to other businesses; and (b) how to create business value from the combined use of internet technology and the underlying IS/IT. Students/teams outline key items of an EC business plan; write high-level requirements for an E-Commerce initiative/startup; and study cases.

Prerequisites: Senior standing.

Marketing Courses:

MKTG 210 Principles of Marketing 3(3, 0, 0)

This course presents an overview of marketing activities including marketing inputs in strategic planning, global marketing, marketing research, analysis of buyer behavior, market segmentation and positioning, and development of the marketing mix elements.

Prerequisite: MNGT 110.

MKTG 315 Marketing Channels 3(3, 0, 0)

This course provide overview of a marketing channel where is viewed as an inter-organizational system of companies involved with the task of making goods, services, and experiences available to end-users by enhancing their time, place, possession and solution utilities. The focus is on how upstream organizations can create and drive innovation across the entire business system they rely on to get to market.

Prerequisites: MKTG 210.

MKTG 320 Competitive Marketing Strategies 3(3, 0, 0)

This course provides the insight and skills necessary to formulate and implement sound marketing strategies. The process of strategy formulation is divided into three stages; strategic analysis, strategic decision-making, and implementation of strategies. Specific topics include strategic planning, consumer decision-making, life cycle segmentation, product positioning, market response, competitive behavior, new product development, product line management, and the marketing plan.

Prerequisites: Senior standing and MKTG 210.

MKTG 325 Product and Brand Management 3(3, 0, 0)

The purpose of the Product and Brand Management course is to give the students a fundamental understanding of how to build, measure, and manage a brand. Course activities include readings from Keller's 'Strategic Brand Management' textbook, discussions of these readings, and cases from Keller's 'Best Practice Cases in Branding' that will allow the students to apply the theories and strategies learned.

Prerequisites: MKTG 210.

MKTG 330 International Marketing **3(3, 0, 0)**

This course will equip students with the tools and terminology to explore and understand marketing practices in a global environment. The students will learn the scope and challenge of international marketing, the dynamic environment of international trade, the culture, political, legal, and business systems of global markets, the global market opportunities and finally, the ways to develop global marketing strategies.

Prerequisites: MKTG 210.

MKTG 390 Online Marketing **3(3, 0, 0)**

The course examines digital marketing strategy, implementation and executioner considerations for BtoB and BtoC brands and provides a detailed understanding of all digital channels and platforms. Students will complete the course with a comprehensive knowledge of and experience with how to develop an integrated digital marketing strategy, from formulation to implementation.

Prerequisites: MKTG 210

MKTG 420 Marketing Research **3(3, 0, 0)**

A course that provides thorough coverage of various marketing research tools along with an applied orientation, including a systematic analysis of the steps comprising the marketing research process, starting with research problem definition and terminating with data collection, analysis, and presentation.

Prerequisites: Senior standing and MKTG 210, BUSS 110.

MKTG 430 Professional Selling and Sales Management **3(3, 0, 0)**

This course examines sales management functions and strategies, developing the selling function, sales goals and structure, building a sales program, and leading and motivating the sales force. This course also examines the opportunities and problems faced by marketers in contemporary retail formats. The principle issues involved in retailing are explored, including store location and layout, merchandise planning, buying and selling, category management, and coordination of store activities. Overall the course allows students to develop appropriate skills and knowledge for effective and efficient decision making in the contemporary retail environment.

Prerequisites: MKTG 420

MKTG 435 Public Relations **3(3, 0, 0)**

This course focuses on the communication between an individual or organization and the public to promote stakeholder acceptance and approval. Students explore traditional and emerging components of the public relations process through mass media, as well as the needs of different types of businesses, such as corporations, non-profit organizations, and government agencies.

Prerequisites: Senior standing and MKTG 210.

MKTG 440 Consumer Behavior **3(3, 0, 0)**

This course introduces behavioral science perspective to analyze and predict consumer behavior by focusing on the decision-making processes followed by consumers in different situations.

Prerequisites: Senior standing and MKTG 210.

MKTG 450 Logistics Marketing Management **3(3, 0, 0)**

This course examines on the organizational, management and technology issues related to the sales and marketing function. It covers the business approaches that support sales and marketing plans as well as information and knowledge management considerations. It also explores the knowledge linkages between the sales and marketing function and the supply chain functions.

Prerequisites: Senior standing and MKTG 210.

MKTG 460 Integrated Marketing Communication **3(3, 0, 0)**

Students examine the elements of integrated marketing communications including advertising, direct marketing, social media, personal branding, personal selling, sales promotion, and public relations/publicity, focusing on the blending of the elements into a total enterprise marketing communications program.

Prerequisites: MKTG 210

MKTG 470 Distribution Management **3(3, 0, 0)**

This is an introductory course in (distribution) logistics, which deals with the management of the flow of goods (inventory), services, and related information among members in the supply chain (i.e., suppliers, manufacturers, distributors, retailers, logistics service providers and the end customer).

Prerequisites: MKTG 210

MKTG 475 Supply Chain Management **3(3, 0, 0)**

The course will explore the major elements of the supply chain. The student will be exposed to leading edge thinking on supply chain strategy as well as practical tools and methods for its implementation.

Prerequisites: MKTG 210

MKTG 480 Logistics and Transportation **3(3, 0, 0)**

Distribution Management is the introductory undergraduate logistics and supply chain management course in the business curriculum. It is designed to give students a managerial knowledge of how logistics supports marketing-distribution, procurement and manufacturing.

Prerequisites: MKTG 210

Bridging and Evening Programs in Business Administration

The bridging program allows students with a two-year technical diploma to continue their studies to earn a Bachelor of Science in Business Administration. The program gives credit to up to 40% of equivalent courses previously taken. Placement exams are administered at the beginning of studies to offer compensatory coursework and build a solid foundation to participating students.

Moreover, the department offers courses at night to allow employees and those who are busy during working hours to pursue their study.

Admission Requirements

Admission of Diploma graduates to the Bachelor Program at the College of Business & Management is based on the General University admission requirements. The applicant must, however, be a graduate of a KSA-accredited academic organization and must have passed the official technical exam administered by the relevant governmental authority.

A student applying to the program may first be admitted to the foundation program that may take up to one year to complete based on his/her performance in the English Entrance Exam and in the placement exams.

Program Requirements

In order to graduate with a bachelor's degree in business administration, new students are expected to complete a total of 134 credit hours by the end of their fourth year of academic courses. Diploma graduates are entitled to get exemption from up to 40% of the required credits, depending on their entry qualifications. Hence the program of study can normally be completed in about two years beyond the foundation year program (for a student entering in Bridging English level 2).



جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY

College of Computing

COLLEGE OF COMPUTING

Officers of the College

Acting Dean: Nazar El-Fadil

Professor: Samir Bataineh

Associate Professors: Nazar El-Fadil

Assistant Professors: Marwan ALSayyed, Mo'tassem Jarajrah (CEN Chairperson), Mohamed Mezher (CS & CIT Chairperson)

Lecturers: Hiba AbdelHakim, Abdulla Albalawi, Fedaa Farhat

Overview

The College of Computing (CC), the first to be established at FBSU in 2005, offers programs in the two major venues of informatics: Computer Science and Computer Engineering. The CC is structured around the two departments:

1. Computer Science Department, which offers two programs: a Bachelor of Computer Science and a Bachelor of Science in Information Technology.
2. Computer Engineering Department, which offers one program: Bachelor of Engineering Sciences in Computer Engineering.

Through its intensive four-year undergraduate programs that emphasize on actual implementation of theories and real world environment and problems, the CC graduates experts in all walks of Computing.

Vision

To become a prominent computing college in the Tabuk region and the Kingdom offering undergraduate and graduate programs capable of equipping students with professional computing aptitudes, advanced research skills, and high ethics.

Mission

The College of Computing at Fahad Bin Sultan University is a professional school committed to providing quality programs in various computing fields, following a liberal arts educational philosophy, and combining theory and practice in the educational process. The College prepares its graduates to be professionals who take up leading positions in the Kingdom and the region. It also prepares them to be life-long learners and critical thinkers who respect diversity and ethical standards.

Core Values

- Reinforcement of national identity and cultural authenticity
- Uncompromising pursuit of quality educational services to students in ways that cognitive skills, cultivate personality and help the development of character
- Integrity and adherence to ethical behavior in all ways at all levels
- Life-long learning and investment in self-renewal
- Critical thinking and board exposure to major global currents
- Community spirit and commitment to social service

Objectives

- Provide students with basic foundations in computing to enable them to identify, formulate, and solve computing problems,
- Equip students with basic principles in software and hardware and the necessary tools to be able to implement computing solutions,
- Enable students to communicate effectively, think critically, and be life-long learners,
- Instill in students an appreciation of the ethical, social and professional issues in an increasingly diverse and technological society, and
- Prepare students to undertake higher studies in computing or related fields.

Bachelor Degrees Offered

The Computing College grants the following degrees

- Bachelor of Computer Science (CSC).
- Bachelor of Science in Information Technology (CIT)
- Bachelor of Engineering Sciences in Computer Engineering (CEN)

The bachelor degree programs allow eligible students to develop enhanced knowledge in these areas through a balanced curriculum of required/elective intermediate and advanced courses in specific computing concentrations. The courses offered in the bachelor program provide students with more in-depth skills and knowledge in their chosen track area.

Admission Requirements

Admission of students to the CSC, CIT and CEN programs at the College of Computing is based on the General University admission requirements in addition to specific criteria set by the College of Computing. All direct admissions are decided by the University Admissions Committee.

University Requirements

To complete a bachelor degree program in the Computing College, 30 credits of general education are required. The following are the general education requirements:

- 6 credits of Arabic: ARAB 101 and 201
- 9 credits of English communication skills: ENGL 101, 102, and 203
- 9 credits of Social and Cultural studies: SOCS 101, 201, and 202
- 3 credits of Computing basics: CSC 100
- 3 credits of Mathematics: MATH 101

College Requirements

The College of Computing requires the following 27 credits for the bachelor degree:

- 4 credits of physics: PHYS 101 and PHYS 101L
- 3 credits of Mathematics: MATH 102
- 3 credits of statistics: STAT 230
- 3 credits of technical English writing: ENGL 206
- 11 credits of computing: CSC 102, CSC 102L, CSC 212, CEN 221, CEN 221L
- 3 credits in computing ethics: CSC 492

Final Year Project

As part of their fourth year, all College of Computing students following a bachelor program are required to carry out a project and submit a technical report. This project is a substantial piece of work that will require creative activity and original thinking. Students in groups, normally three per group, are supervised while working on a project accounting for 4 credits, extending over a full academic year. The project aims to provide students with a transitional experience from the academic world to the professional world. It is designed to serve as a platform on which students in teams engage in a meaningful design experience requiring the solution of engineering design projects. The project is important for a number of reasons:

- It is the largest single piece of design work that a student does during his/her bachelor degree program.
- It allows students to specialize in a topic that they enjoy.
- It is the work that prospective employers will most likely ask students about during an interview.
- It allows students to show a wide range of the skills learned since the first year.
- Students must demonstrate these skills by delivering a product that has passed through the design, analysis, testing and evaluation stages.

Practical Training/Summer Internship Requirement

All students of College of Computing are required to fulfill a 1-credit hour internship period of 8 to 12 weeks. This graduation requirement entails that each senior student gains practical training experience during the summer term prior to graduation, or during the graduation year, with either a company or another academic institution.

College of Computing Laboratories

The College of Computing hosts several state-of-the-art instructional and research laboratories, which provide students with practical and advanced hands-on experience. These laboratories include:

1. **Computer Laboratories:** Used mainly to apply programming courses through languages such as C++, Java and database management systems. In addition, these laboratories provide students with access to advanced application for Multimedia, modeling and simulation of software and hardware systems.
2. **Digital Systems Laboratory:** To offer students the proper environment, with electronic equipment, computers, and software, to design, implement, and test microprocessor and microcontroller systems.
3. **Networks Laboratory:** To introduce Computer Network concepts and protocols. Network hardware (routers, switches, modems) is used and software protocols are applied (IP, ARP, ICMP, UDP, TCP, DNS, routing protocols (RIP, OSPF, BGP), NAT, DHCP, SNMP)
4. **Cisco Academy Laboratory:** Students gain access to standards-based courses that support core academics and align to in-demand job skills and globally recognized certifications, including the CCENT certification for entry-level network technicians and the CCNA Security certification for security specialists.

DEPARTMENT OF COMPUTER SCIENCE

Mission

The mission of the Department of Computer Science is to provide students quality education fostering a solid foundation in Computer Science, mathematics, physical sciences, and technology; to expose students to major research and practical experiences in Computer Science; and to enrich the students' academic experience with good perception and awareness of their leadership role in regional development.

Academic Programs

The Department of Computer Science offers two undergraduate programs:

- Bachelor of Computer Science (BCS)
- Bachelor of Science in Information Technology (BIT)

BACHELOR OF COMPUTER SCIENCE (BCS)

The curriculum of the BCS program is designed to grant students a Bachelor of Computer Science degree upon the successful completion of the four-year program.

Program Objectives

- Provide students with knowledge of the fundamentals in computer science theory, design skills, and basic sciences for a career in computer science.
- Develop students' skills in theoretical and practical knowledge as well as in field training in Computer Science.
- Sharpen students' analytic, interpretive, and communicative skills including oral, written and team work as well as ethical conduct.
- Provide students with means to address contemporary research problems in Computer Science apply the acquired knowledge in industrial settings.
- Accommodate recent advances in Computer Science via periodic revision of the curriculum.

Learning Outcomes

The Computer Science program at FBSU strives to achieve success by insuring that graduates:

- a. Recognize and apply knowledge of fundamental Mathematics, Science, and CS in Real life.
- b. Outline and reproduce acquired education to understand the impact of computer solutions in a global, economic, environmental, and societal context.
- c. Define and implement the design of a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability, and sustainability.
- d. Recognize, formulate, and solve major CS problems.
- e. Describe and recognize the major tracks of CS involved in industry.
- f. Differentiate between various development tools and CS tools used in designing projects
- g. Evaluate the design and implementation of a computer-based system, process, or program to meet desired needs within realistic constraints.
- h. Compare and evaluate design and development principles in the construction of software systems of varying complexity
- i. Recognize and judge efficiency and usefulness of CS principles in a broad range of non- computing applications
- j. Demonstrate a good level of understanding of professional and ethical responsibilities as part of a team.
- k. Show work skills independently and as part of a team, and exhibit leadership characteristics

- l. Communicate effectively with other members of the team.
- m. Demonstrate communication skills such as: writing, reading, presenting, negotiating and debating
- n. Assess and Demonstrate skills in the usage of computer, network, and software packages relevant to CS.

Career Opportunities

The Department of Computer science is committed to providing its students with meaningful, up- to-date skills and knowledge that will allow them to pursue successful careers and make deep impacts at leading commercial hardware and software companies. With these objectives in mind, the CS program is designed around fostering contemporary best practices and skills in line with the job opportunities for computing professionals.

Computer science is a broad and diverse field and rivals all other disciplines in its impact on society. The expanding role of computer science in today’s society reflects the variety and scope of this exciting profession. Local, regional as well as global career opportunities available for computer scientists including but not limited to programming and software development, information systems operation and management, telecommunications and networking, computer science research, web and Internet, graphics and multimedia, training and support, and computer industry specialists.

Degree Requirements

To graduate with a Bachelor of Computer Science, students must satisfactorily complete a four year program consisting of 128 credit hours. The distribution of courses is as follows:

▪ University Requirements	30 Credits
▪ College Requirements	27 Credits
▪ Computer Science Requirements	71 Credits
Total	128 Credits

University Requirements

Students working towards the BCS degree must complete a total of 30 hours in University requirements. The 30 credit hours in University general educational requirements for BS programs are as follows:

- 6 credits of Arabic: ARAB 101 and ARAB 201
- 9 credits of English communication skills: ENGL 101, ENGL 102, and ENGL 203
- 9 credits of Social and Cultural studies: SOCS 101, SOCS 201, and SOCS 202
- 3 credits of Computing essentials: CSC 100
- 3 credits of Mathematics: MATH 101

College Requirements

The College of Computing requires students to take the following 27 credits for the bachelor degree³:

- 4 credits of physics: PHYS 101 and PHYS 101L
- 3 credits of Mathematics: MATH 102
- 3 credits of statistics: STAT 230
- 3 credits of technical English writing: ENGL 206
- 11 credits of computing: CSC 102, CSC 102L, CSC 212, CEN 221, CEN 221L
- 3 credits in computing ethics: CSC 492

Program Requirements

The computer science requirements consist of 71 credits of which 47 credits are from required courses and 24 from elective courses.

The required courses are:

- 37 credits of Computer Science courses: CSC 201, CSC 201L, CSC 212L, CSC 356, CSC 357, CSC 358, CSC 360, CSC 360L, CSC 372, CSC 372L, CSC 377, CSC 377L, CSC 382, CSC 384, CSC 384L, CSC 498, CSC 499.
- 9 credits of Mathematics: MATH 201, MATH 211, MATH 215
- 1 credit of internship: CSC 398 The elective courses include:
- 15 credits of Computer Science electives
- 6 credits of Free Electives
- 3 credits of Science Elective

³ For Computing, Computing ethics, final year projects and internship courses needed for the bachelor degree, see details in each program: CSC, CIT, and CEN

BCS Program Study Plan

(128 Credits)

Year I

First Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 101	Basic Academic English I	3	
MATH 101	Calculus I	3	
CSC 102	Computer Programming I	3	
CSC 102L	Computer Programming I Lab	1	CSC 102
CSC 100	Introduction to Computing	3	
SOCS 101	Islamic Civilization I	3	
	Total Credits	16	

Second Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 102	Basic Academic English	3	
MATH 102	Calculus II	3	MATH 101
CSC 201	Computer Programming II	3	CSC 102
CSC 201L	Computer Programming II Lab	1	CSC 201
PHYS 101	College Physics I	3	
PHYS 101L	College Physics I Lab	1	PHYS 101
	Total Credits	17	

Year II

Third Semester (14 Credit Hours)

Course	Title	Credits	Prerequisites
CSC 212	Algorithms and Data Structure	3	CSC 102
CSC 212L	Algorithms and Data Structure Lab	1	CSC 212
CEN 221	Computer Organization and Assembly Language	3	CSC 212
CEN 221L	Computer Organization and Assembly Language Lab	1	CEN 221
STAT 230	Probability and Statistics	3	MATH 201
MATH 201	Calculus and Analytic Geometry III	3	MATH 102
	Total Credits	14	

Fourth Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
CSC 356	Design and Analysis of Algorithms	3	CSC 212
CSC 377	Database Systems	3	
CSC 377L	Database Systems Lab	1	CSC 377
MATH 211	Discrete Mathematics	3	
SOCS 201	Islamic Civilizations II	3	SOCS 101
ENGL 203	Advanced Academic English	3	ENGL 102
	Total Credits	16	

Year III**Fifth Semester (16 Credit Hours)**

Course	Title	Credits	Prerequisites
CSC 384	Computer Networks	3	CEN 221, CSC 356
CSC 384L	Computer Networks Lab	1	CSC 384
CSC 358	Programming Languages	3	CSC 212
MATH215	Linear Algebra and Numerical Techniques	3	MATH 102
CSC 357	Theory of Computation	3	MATH 211, CSC 212
	Computer Science Elective	3	
	Total Credits	16	

Sixth Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
CSC 372	Operating Systems	3	CEN 221, CSC 358
CSC 372L	Operating Systems Lab	1	CSC 372
CSC 382	Software Engineering	3	CSC 372 , CSC 377
ENGL 206	Technical Writing	3	ENGL 203
	Computer Science Elective	3	
	Free elective	3	
	Total Credits	16	

Summer Semester (1 Credit Hour)

Course	Title	Credits	Prerequisites
CSC 398	Internship	1	ENGL 206
	Total Credits	1	

Year IV

Seventh Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
CSC 360	Internet Programming and Web Design	3	CSC 382
CSC 360L	Internet Programming and Web Design	1	CSC 360
CSC 492	Computing Ethics	3	Senior Standing
CSC 498	Final Year Project I	1	Senior Standing
	Computer Science Elective	3	
	Computer Science Elective	3	
	Free Elective	3	
	Total Credits	17	

Eight Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
CSC 499	Final Year Project II	3	CSC 498
ARAB 201	Advanced Academic Arabic	3	ARAB 101
SOCS 202	World Civilizations	3	SOCS 101
	Computer Science Elective	3	
	Natural Science Elective	3	
	Total Credits	15	

Total Program Credits	128⁸	
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⁸ Completion of the Bachelor in Computer Science

Course Descriptions

CSC 100 Introduction to Computing **3(3, 0, 0)**

This course is an introduction to computers and their applications. Common applications are considered in word processing, spreadsheets, presentation, and database systems. This course also includes introduction to number systems, concepts of Algorithms, and an introduction to the Internet and the World Wide Web. This course provides an introduction to programming.

Prerequisite: None.

CSC 101 Introduction to Computing for Engineers **3(3, 0, 0)**

This course includes the following topics: an overview of electrical engineering as a profession; introduction to the use of different CAD tools (e.g., SPICE, MATLAB, LabVIEW and basic laboratory instruments) in areas of Electrical Engineering such as circuits, electromagnetic fields, energy, machines, signal processing, communications, and control.

CSC 102/ELEE 230 Computer Programming I **3(3, 0, 0)**

Introduction to computer science with emphasis on problem solving, programming and algorithm design; use of a high-level programming language for solving problems and emphasizing program design and development; topics include basic programming constructs, expressions, conditional statements, loop statements, functions, classes and objects, data types, arrays, and strings.

Prerequisite: None.

CSC 102L Computer Programming I Lab **1(0, 0, 2)**

Laboratory experiments to cover CSC 102 material.

Pre- or co-requisite: CSC 102.

CSC 201 Computer Programming II **3(3, 0, 0)**

Introduction to the following object-oriented programming concepts: Object-oriented design; abstraction, encapsulation and information hiding; classes; separation of behavior and implementation; class hierarchies; inheritance; and polymorphism; constructor and accessory concepts; overloading principles.

Prerequisite: CSC 102.

CSC 201L Computer Programming II Lab **1(0, 0, 2)**

This Lab complements the contents of CSC 201.

Pre- or co-requisite: CSC 201.

CSC 212 Algorithms and Data Structures **3(3, 0, 0)**

This course covers basic data structures and related algorithms. It includes detailed studies of data structures and data abstraction such as queues, linked lists, hashing techniques, trees, data structure for representing graphs with emphasis on algorithm design and programming techniques in large programs; introduction to program complexity and verification as well as fundamental algorithms and their implementation for sorting, searching, merging, hashing, graph theoretic models, and recursive procedures.

Prerequisite: CSC 102.

CSC 212L Algorithms and Data Structures Lab **1(0, 0, 2)**

This course is meant to help students explore the use of a variety of data structures and useful such as queues, linked lists, hashing techniques, trees, and graphs. In addition, the course covers techniques for implementing fundamental algorithms for sorting, searching, merging, hashings, and recursive procedures.

Prerequisite: CSC 212.

CSC 356/CEN 432 Design and Analysis of Algorithms **3(3, 0, 0)**

Techniques of the design and analysis of efficient algorithms and advanced data structures: asymptotic analysis, divide and conquer, greedy algorithms, dynamic programming, and optimization algorithms. This course includes an introduction to NP-Completeness; application to searching, sorting, graphs, matrices, and set manipulation.

Prerequisite: CSC 212.

CSC 357 Theory of Computation **3(3, 0, 0)**

Introduction to formal languages and computational models: finite automata, pushdown automata, Turing machines, undesirability, recursive, recursively enumerable functions, and an introduction to Computability and Complexity; applications to compiler design and text processing.

Prerequisites: MATH 211 and CSC 212.

CSC 358 Programming Languages **3(3, 0, 0)**

Comparative study of the design and implementation of advanced programming language features in imperative, scripting, object-oriented, functional, logic, and visual languages. Formal methods for syntactic and semantic description of imperative programming languages are examined. Statement types, data types, variable binding, method binding, and backtracking mechanisms; functional programming language (Haskell or LISP) or logic programming language (Prolog or LISP) with associated Lab.

Prerequisite: CSC 212.

CSC 360 Internet Programming and Web Design **3(3, 0, 0)**

Hands-on approach in understanding how medium-sized interactive client/server Web applications are built using different types of integrated Web technologies; implementation of a database-driven website, relevant technologies involved in each tier of the web architectural model; accessibility of Web agents and end-users, Web caching and proxy techniques, and security issues and strategies of Web-based applications; operational concepts of the internet and the web, static and client content, dynamically served content, and n-tiered architecture.

Prerequisites: CSC 382.

CSC 360L Internet Programming and Web Design Lab **1(0, 0, 2)**

Laboratory experience to complement CSC 360 material.

Co requisites: CSC 360

CSC 372/CEN360 Operating Systems **3(2, 0, 0)**

An overview of operating systems: operating system principles, scheduling and resource management, virtual memory, file systems, concurrent processing and synchronization, Deadlocks, Disk Scheduling; Programming under UNIX with the emphasis on concurrency and Inter-Process Communication (IPC).

Prerequisites: CEN 221 and CSC 356.

CSC 372L Operating Systems Lab 1(0, 0, 2)
Lab experience to complement CSC 372.

Co-requisite: CSC 372.

CSC 377/CEN 430 Database Systems 3(3, 0, 0)
An introduction to data modeling and various relational models (with relational algebra, and calculus) in a database system; the entity relationship model, SQL and integrity constraints, file organization and index files; and normalization.

CSC 377L Database Systems Lab 3(3, 0, 0)
Lab course to complement CSC 377.

CSC 379 Human-Computer Interaction 3(3, 0, 0)
Formal methods for facilitating human-computer communication: information processing characteristics important to facilitate human-computer interaction, and formal models of human-computer interaction; dialogue techniques, response times and display rates, information presentation, interaction devices, computer training, help systems, information search and visualization, and hypermedia, Usability evaluation – Other forms of input/output.

Prerequisites: CSC 358 and CSC 382

CSC 382/CEN 330 Software Engineering 3(3, 0, 0)
Overall process of software development: principles of software requirements, analysis, implementation, testing, and maintenance; professional practices, risks and liabilities; a brief survey of available tools and techniques of analysis, planning, design and structure charts, system and information flow diagrams, testing and quality control; basic modeling and design, particularly using UML; project in software engineering techniques.

Prerequisites: CSC 372 and CSC 377.

CSC 384/CEN 340 Computer Networks 3(3, 0, 0)
Foundation in computer networks - a top-down view of the layered architectural elements of communication systems, focusing on the Internet and TCP/IP; client/server systems, packet switching, protocol stacks, queuing theory, application protocols, socket programming, remote service calls, reliable transport (Error detection and recovery, multimedia networking with quality of service and multicasting), UDP, TCP, and security.

Prerequisite: CEN 221 and CSC 356.

CSC 384L/CEN 344L Computer Networks Lab 1(0, 2, 0)
Lab experience to complement CSC 384.

Co-requisite: CEN 221, CSC 356.

CSC 398 Internship/Practicum 1(0, 1, 0)
This is an eight to twelve-week professional training course in computer science.

Pre-requisite: ENGL 206.

CSC 492/COEN 400 Computing Ethics 3(3, 0, 0)
Critical examination of ethical problems and research methods associated with computer technology; discussion of these problems conducted within the framework of classical philosophical ethical theories; legal and quasi-legal (i.e., policy and regulative) issues;

topics addressed include the process of ethical decision-making, privacy and confidentiality, computer crime, professional codes and responsibilities, software piracy, the impact of computers on society, and proliferation of Computers in our World (Education, Medicine, e-government, e-learning. etc.)

Prerequisite: Senior standing.

CSC 498 Final Year Project in Computer Science I 1 (0, 1, 0)

A significant teamwork project experience to integrate much of the material learned in lead-up courses including applications of computer science in various domains. This course involves project selection, literature survey, preparation of the necessary materials for the specific project to be accomplished in CSC 499.

Prerequisite: Senior standing.

CSC 499 Final Year Project in Computer Science II 3 (0, 3, 0)

Continuation of CSC 498: significant project team experience that integrates material learned in lead-up courses, including applications of computer science in various domains.

Prerequisite: CSC 498.

Elective Courses

CSC 262 Introduction to Multimedia Concepts 3(3, 0, 0)

Concepts of multimedia: principles of graphics, sound, video, and animation; scripting techniques; use of contemporary multimedia programs to develop and create an interactive multimedia project.

Prerequisite: CSC 212

CSC 351 Discrete Mathematics for Computer Science 3(3, 0, 0)

Survey of logic and set theory, mathematical induction, number theory, relations, functions, algebraic structures, advanced counting and introductory graph theory.

Prerequisite: MATH 211, STAT 230, and CSC 212.

CSC 359 Parallel Computing 3(3, 0, 0)

Essentials of parallel computers and associated programming methodology; basic architecture of parallel computers including shared memory, message passing, meshes, and hyper-cubes; basic techniques of parallel computations, portioning and divide-conquer; basic algorithms such as searching algorithms, numerical algorithms, etc.

Prerequisites: CEN 221 and CSC 356.

CSC 363/CEN 320/ELEE 422 Computer Architecture 3(3, 1, 0)

A comprehensive understanding of the structure and function of a computer system from architectural and integration viewpoint focusing on two broad architectural perspectives: the internal perspective, which entails the architecture and design integration of the data path logic, control path logic, memory and I/O; and the external perspective, which provides consumer views and system selection aspects of real machines examples.

Prerequisite: CEN 221/ELEE 320 and CSC 372.

CSC 374 Compiler Construction 3(3, 0, 0)

An understanding of how compilers work: a simple compiler, context-free grammars, lexical analysis, top-down parsing, bottom-up parsing, semantic analysis, and code generation; programming projects.

Prerequisites: CEN 221 and CSC 357.

CSC 378 Database Management Systems 3(3, 0, 0)

Essentials of database management system with the emphasis on relational ones: query and transaction processing, concurrency control, recovery, distributed transactions and database security; web deployed database systems – data mining – data warehousing, OLAP – Object Oriented.

Prerequisite: CSC 377.

CSC 379 Human-Computer Interaction 3(3, 0, 0)

Formal methods for facilitating human-computer communication: information processing characteristics important to facilitate human-computer interaction, and formal models of human-computer interaction; dialogue techniques, response times and display rates, information presentation, interaction devices, computer training, help systems, information search and visualization, and hypermedia, Usability evaluation – Other forms of input/output.

Prerequisites: CSC 358 and CSC.

CSC 380 Graphical User Interface 3(3, 0, 0)

Concepts and techniques used in the design and implementation of interactive systems: interface design guidelines, human factors, technical methods of user interface design, and the design and execution of usability studies; application of various techniques through the design, creation, and testing of an interactive software application.

Prerequisite: CSC 358.

CSC 383 Digital Media 3(3, 0, 0)

Technical aspects of digital media: capturing, storage, digital representation, compression, and generation of digital media; forms of media including text, images, 2D animation, video, sound, and 3D graphics and animation.

Prerequisites: CSC 356.

CSC 386 Advanced Computer Graphics 3(3, 0, 0)

Basic concepts of 3D computer graphics using an application-based approach: 3D object representations and manipulations; 3D transformation and viewing; hidden-surface and hidden-line removal; shading models; rendering; texture mapping; ray-tracing; animation techniques; programming using OpenGL.

Prerequisite: CSC 385.

CSC 387 Artificial Intelligence 3(3, 0, 0)

Introduction to the automation of intelligent capabilities, including intelligent agents, constraint satisfaction problems, knowledge representation and reasoning (search and logical inference), interpreting, behavior modeling and learning; expert systems, knowledge acquisition, and machine learning will also be stressed; programming projects using an Artificial Intelligence programming Language.

Prerequisites: CSC 356 and 358.

CSC 388 Computer-Aided Geometric Design 3(3, 0, 0)

An overview of the use of a computer in modeling 2- and 3-D objects: representation of free-form curves and surfaces with emphasis on Bezier and B-spline; approximation and interpolation, visual smoothness, geometric continuity, parameterization and subdivision surfaces; programming projects using OpenGL with various applications including animation.

Prerequisite: CSC 385.

CSC 389 Computer Vision **3(3, 0, 0)**

Introduction to the basic techniques of automated (computer) processing, analysis, and understanding of image/video data: geometry and physics of image formation, image enhancement, feature extraction, video imagery, multi-view imagery analysis.

Prerequisites: CSC 212, MATH 201.

CSC 390 Computer Animation **3(3, 0, 0)**

Basic techniques of computer animation in 2D and 3D with hands-on experience: transformations, morphing, free form deformation, Rigid-body motion, camera control, subdivision surfaces, NURBS curves and Surfaces, implicit surfaces.

Prerequisites: CSC 385.

CSC 391 Scientific Visualization **3(3, 0, 0)**

Techniques in scientific data visualization with an object oriented approach: basic data representation, visualization schemes for scalar, vector and other types of data, basic algorithms for generation of ISO-surface and volume visualization; applications include 3D medical imaging, financial applications, modeling, algorithms visualization and others.

Prerequisites: CSC 385 and CSC 356.

CSC 385/ELEE 421 Computer Graphics
3(3, 0, 0)

Fundamentals of computer graphics with emphasis on 2-D graphics using an application-based approach: graphics output primitives, their attributes, colors, transformations, anti-aliasing, texture mapping, and curves and surfaces; 2D graphics algorithms, essentials of user interface and window management systems, and graphics hardware; programming using OpenGL.

Prerequisites: CSC 212.

CSC 397 Selected Topics in Computer Science **3(3, 0, 0)**

This course includes presentation on a selected topic of interest to the instructor and/or students. Topics will be chosen from state-of-the-art innovations in computer Science.

Prerequisite: Senior Standing or consent of instructor.

CSC 475 Computer Arabization **3(3, 0, 0)**

Issues and techniques in Computer Arabization: System Arabization level such as font and code page manipulation – keyboard, screen and printer Arabization, Arabic text-editing, morphology, information retrieval, language comprehension, spell and grammar checking, world-wide-web browsers, and computer-aided education; foundations of applications in Speech Recognition – Neural network - Pattern Recognition for Arabic Language - Machine Translation.

Prerequisites: Consent of the instructor.

CSC 481 Introduction to Computer Security **3(3, 0, 0)**

Introduction to cryptography and the security of networks and databases: classical encryption; modern encryption techniques; public key encryption; elliptic curve cryptography; message authentication, message digest functions; and methods for relational database security, including access control, system and network attacks and defenses – intrusion detection and preventions– risk assessment and management.

Prerequisite: CSC 356.

CSC 487 Computer Security**3(3, 0, 0)**

Principles, mechanisms and implementation of computer security and data protection; Policy, encryption and authentication, access control and integrity models and mechanisms; network security; secure systems; programming and vulnerabilities analysis. Study of an existing operating system.

Pre-requisite: Consent of instructor.

CSC 488 System Programming**3(3, 0, 0)**

Components of computer hardware such as processor, data paths and control, and memory design taking into consideration the performance evaluation; Basic principles involved in instruction set architecture and design using assembly coding; advanced techniques in computer organization - pipelining, multiprocessors, multiprocessors on-chip, and network on-chip.

Pre-requisite: Consent of instructor.

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY (BIT)

This program is designed to grant students the Bachelor of Science in Information Technology degree upon the successful completion of the four-year program.

Program Mission

Computer Information Technology at FBSU is a core high-technology discipline which integrates theoretical and practical education. Through a combination of courses and a final degree project, the college of computing provides quality teaching that prepares students to assume positions in public and private sectors, computer industry, or educational institutes in the kingdom. The program also offers prospective students opportunities to pursue a higher education in Information Technology.

Program Objectives

- Perform periodical amendments in CIT program to keep the curriculum intact and updated according to the industrial needs.
- Develop students' ability to apply modern CIT theories and practical knowledge to the contemporary and real time environment.
- Identify, evaluate current and emerging technologies and assess their applicability to address the users' needs and recognize the need for continued learning throughout their career.
- Develop an understanding of professional responsibility to evaluate their professional, social, and ethical obligations to the society, employers, and their peers.
- Develop an understanding of the commitment needed to pursue lifelong goals through educational and professional endeavors.

Learning Outcomes

The Computer Information Technology (CIT) program at FBSU strives to achieve success by insuring that graduates:

- a. Have the necessary theoretical and practical knowledge in IT.
- b. Demonstrate ability to apply IT skills to analyze problems, design and implement solutions, and verify their correctness.
- c. Are able to integrate ethical, social and legal concerns in solutions to problems,
- d. Are able to participate smoothly and effectively in teamwork as a member and as a leader to develop and deliver quality solutions.
- e. Are able to prepare technical reports and conduct professional presentations in the discipline.
- f. Are able to communicate effectively orally and in writing
- g. Show evidence of being self-motivated life-long learners.
- h. Are able to think in a multi-disciplinary manner.

Career Opportunities

The highest demands of Computer Information Technology (CIT) indicate that the CIT sector has the highest expectations of growth across all sectors. Most recent statistics indicate that graduates with university level qualifications in technology have one of the best career perspectives nationwide.

Despite the growing demand for IT graduates, the number of graduated students indicate that there is a shortage of IT graduates and employers find them the hardest to source. CIT graduates may go on to work for organizations like Google, Amazon, Facebook or Apple.

The graduate student of CIT program will be successful and eager in all of the following fields:

- Systems designer
- Database developer
- Web programmer
- E-Commerce application developer
- Systems manager
- Database administrator
- Web developer
- Educator

Degree Requirement

To graduate with a Bachelor of Science in Information Technology, students must successfully complete a four-year program consisting of 126 credit hours. The distribution of courses is as follows:

▪ University Requirements	30 Credits
▪ College Requirements	24 Credits
▪ Information Technology Requirements	72 Credits
Total	126 Credits

University Requirements

A number of 30 credit hours are required by the University and are distributed as follows:

- 6 credits of Arabic: ARAB 101 and ARAB 201
- 9 credits of English communication skills: ENGL 101, ENGL 102, and ENGL 203
- 9 credits of Social and Cultural studies: SOCS 101, SOCS 201 and SOCS 202
- 3 credits of computing essentials: CSC 100
- 3 credits of Mathematics: MATH 101

College Requirements

The College of Computing requires the following 24 credits for the bachelor degree:

- 3 credits of technical English writing: ENGL 206
- 15 credits of computing: CSC 102, CSC 102L, CSC 212, CSC 201, CSC 201L, CIT 498, and CIT 499
- 3 credits in computing ethics: CSC 492
- 3 credits of Mathematics: MATH 102.

Program Requirements

The program requirements consist of 72 credits hours distributed as follows:

- 60 credit hours in the following courses: CIT 110, CIT 120, CIT 241, CIT 240, CIT 355, CIT 350, CIT 350L, CSC 382, CSC 372, CSC 372L, MATH 211, CIT 364, CIT 306, CCIT 230, CIT 360, CIT 470, CIT 398, CIT 362, CIT 475, CIT 472, STAT 201 and CIT 245.
- 12 credit hours of elective courses:
 - 6 credit hours of Computer of Information Technology Electives
 - 6 credit hours of Free Electives

BIT Study Plan

(126 Credits)

Year I

First Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 101	Basic Academic English I	3	
MATH 101	Calculus I	3	
CIT 110	Introduction to IT	3	
CSC 100	Introduction to Computing	3	
ARAB 101	Arabic Communication Skills	3	
	Total Credits	15	

Second Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 102	Basic Academic English II	3	ENGL 101
MATH 102	Calculus II	3	MATH 101
CSC 102	Computer Programming I	3	
CSC 102L	Computer Programming I Lab	1	CSC 102
ARAB 201	Advanced Academic Arabic	3	ARAB 101
CIT 120	Introduction to Web Design	3	
	Total Credits	16	

Year II

Third Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 203	Advanced Academic English I	3	ENGL 102
CIT 230	Web Information Systems	3	CIT 120
SOCS 101	Islamic Civilization I	3	
MATH 211	Discrete Mathematics	3	
CSC 201	Computer Programming II	3	CSC 102
CSC 201 L	Computer Programming II L	1	CSC 201
	Total Credits	16	

Fourth Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
CIT 240	Fundamentals of Hardware	3	
CIT 245	Web Intelligence	3	CIT 230
CIT 241	Fundamentals of E-Commerce	3	
STAT201	Elementary Statistics	3	
CSC 212	Algorithms and Data Structures	3	CSC 201
	Total Credits	15	

Year III**Fifth Semester (17 Credit Hours)**

Course	Title	Credits	Prerequisites
CSC 372	Operating Systems	3	CSC 212, CIT 240
CSC 372L	Operating Systems Lab	1	CSC 372
CSC 382	Software Engineering	3	CSC 372
CIT 350	Database Systems for IT	3	
CIT 350L	Database Systems Lab	1	CIT 350
CIT355	IT Networking	3	CIT 240
SOCS 201	Islamic Civilization II	3	SOCS 101
	Total Credits	17	

Sixth Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
CIT 360	Advanced Software Engineering	3	CSC 382
CIT362	Advanced Database for IT	3	CIT350
CIT 364	Wireless and Mobile Computing	3	CIT355
SOCS 202	World Civilization	3	SOCS201
ENGL 206	Technical Writing	3	ENGL 203
	Total Credits	15	

Summer Semester (1 Credit Hour)

Course	Title	Credits	Prerequisites
CIT 398	Internship	1	ENGL 206
	Total Credits	1	

Year IV

Seventh Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
CIT 498	Final Year Project I	1	Senior standing
CIT 470	Project Management	3	CIT 360
	CIT Elective	3	
	Free Elective	3	
CIT475	Information Security	3	
CIT472	Human Computer Interaction	3	
	Total Credits	16	

Eight Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
CIT 499	Final Year Project II	3	CIT 498
CIT 380	Information and Innovation Management	3	CIT 470
	CIT Elective	3	
	Free Elective	3	
CSC 492	Computing Ethics	3	
	Total Credits	15	

Total Program Credits	126⁹	
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⁹ Completion of the Bachelor of Science in Information Technology

Course Descriptions

A) Core Courses:

CIT 110 Introduction to Information Systems 3(3, 0, 0)

Information systems analysis, design and implementation, relational database technology, data modeling, data querying using SQL, building a small-scale information system using a relational database management system.

CIT 120 Introduction to Web Design 3(3, 0, 0)

This course introduces the student to design and development practices for multimedia content, focusing particularly on web sites. Modern design practices for the web are taught, framed by an introduction to human-centered design techniques, particularly heuristic based interface design guidelines for web interfaces and web accessibility from a global perspective. The course also introduces some basic scripting techniques for going beyond static content. The focus of learning is activity based and incorporates both individual and team based exercises.

CIT 230 Web Information Systems 3(3, 0, 0)

Concepts & fundamentals of web-based Information Systems (WIS): HTML, XHTML, CSS, JavaScript, Java Servlet, Java Server Page, client-server database applications on the internet, and XML, Latest and advanced technologies for developing WIS: AJAX, Web Security, Web Search, Web Service and current trends in WIS.

Prerequisite: CIT 120.

CIT 240 Introduction to Hardware 3(3, 0, 0)

Introduction to digital logic & digital systems; machine level representation of data; computer organization; memory system organization & architecture; interfacing & communication; microcontroller architecture and usage; programming of microcontroller based systems.

CIT 241 Fundamentals of Electronic Commerce 3(3, 0, 0)

Introduces students to the nature of electronic commerce/online business, business decision-making involving electronic commerce/online business. Management issues of technological infrastructure security, privacy and website development for electronic commerce/online business.

CIT 245 Web Intelligence 3(3, 0, 0)

This module provides a critical and applied understanding of the technologies and standards enabling reasoning over and intelligent access to information on the World Wide Web, and a critical and applied understanding of the structure and properties of the web as a complex system, and how this impacts on the growth and use of the web. This module explores the fundamental roles as well as practical impacts of artificial intelligence and advanced information technology for the next generation of Web-empowered systems, services, and environments. Web Intelligence is regarded as the key research field for the development of the Wisdom Web (including the Semantic Web). It presents both the current state of research and development as well as application aspects. Topics covered include Web Agents, Web Mining and Farming, Web Information Retrieval, Web Knowledge Management, Infrastructure for Web Intelligence Systems, Social Networks Intelligence.

Prerequisite: CIT 230.

CIT 350 Database Systems 3(3, 0, 0)

An introduction to data modeling and various relational models (with relational algebra, and calculus) in a database system; the entity relationship model, SQL and integrity constraints, file organization and index files; and normalization.

Pre-requisite: Senior Standing.

CIT 350L Database Systems Lab 1(0, 0, 2)

Laboratory experience to complement CIT 350 material.

Co-requisite: CIT 350.

CIT 355 Information Technology Networking 3(3, 0, 0)

Provides instruction in networking media, physical and logical topologies, common networking standards and popular networking protocols. Emphasizes the Application layer protocols, TCP/IP protocol suite and related IP addressing schemes. Includes support and LAN/WAN connectivity. Provides a basic comprehension of Internet and network technologies including IT job roles, connection methods, TCP/IP functionality and DNS. Explores web server technologies with security and project management concepts. Introduces network creation, physical and logical topologies including media properties, server types, IP addressing and network security.

Co-Requisite: CIT 240.

CIT 360 Advanced Software Engineering 3(3, 0, 0)

This course covers techniques that scale to programming large software systems with teams of programmers. The techniques are explained in the context of the specification, implementation, testing and maintenance of software systems. This course focuses on the technical and management processes and practices used for the effective and efficient development of high quality, complex systems. This course will cover software engineering topics associated with large systems development such as requirements and specifications, testing and maintenance, and design with the emphasis on verification and validation techniques. Specific attention will be given to development tools and automated support environments.

Prerequisite: CSC 382

CIT 362 Advanced Database Systems 3(3, 0, 0)

Distributed database design, query and transaction processing. Data integration, data warehousing, data cleansing, management of spatial data, and data from large scale distributed devices.

Prerequisite CIT 350

CIT 364 Wireless & Mobile Computing 3(3, 0, 0)

This course will examine the area of mobile and wireless networking, looking at the unique network protocol challenges and opportunities presented by wireless communication and host or router mobility. Although, this course will touch on some of the important physical layer properties of radio and infrared communications, it will focus on network protocols above the physical layer, with an emphasis on the media access control, network, and transport protocol layers.

Prerequisite: CIT 355

CIT 470 Project Management 3(3, 0, 0)

This course introduces students to the concepts currently being used in the emerging professional field of Project Management. Project Management is designed to build and expand the foundation of knowledge needed by successful managers.

Pre-requisite: CIT 360

CIT 472 Human-Computer Interaction 3(3, 0, 0)

Formal methods for facilitating human-computer communication: information processing characteristics important to facilitate human-computer interaction, and formal models of human-computer interaction; dialogue techniques, response times and display rates, information presentation, interaction devices, computer training, help systems, information search and visualization, and hypermedia, Usability evaluation – Other forms of Input/output.

Prerequisite: Senior Standing

CIT 475 Information Security 3(3, 0, 0)

Introduction to cryptography and the security of networks and databases: classical encryption; modern encryption techniques; public key encryption; elliptic curve cryptography; message authentication, message digest functions; and methods for relational database security, including access control, system and network attacks and defenses – intrusion detection and preventions – risk assessment and management.

Prerequisite: Senior Standing.

CIT 480 Information and Innovation Management 3(3, 0, 0)

Introduction to the management of technology & innovation, including strategic & operational technology & innovation management, business competitiveness, business partnerships & alliances, managing R&D, new product development, & valuation of technology.

Pre-requisite: CIT 470

CIT 498 Final Year Project in Information Technology I 1 (0, 1, 0)

A significant teamwork project experience to integrate much of the material learned in lead-up courses including applications of IT in various domains. This course involves project selection, literature survey, preparation of the necessary materials for the specific project to be accomplished in CSC 499.

Prerequisite: Senior standing

CIT 499 Final Year Project in Information Technology II 3 (0, 3, 0)

Continuation of CIT 498: significant project team experience that integrates material learned in lead-up courses, including applications of IT in various domains.

Prerequisite: CSC 498.

CSC 382 Software Engineering 3(3, 0, 0)

Overall process of software development: principles of software requirements, analysis, implementation, testing, and maintenance; professional practices, risks and liabilities; a brief survey of available tools and techniques of analysis, planning, design and structure charts, system and information flow diagrams, testing and quality control; basic modeling and design, using UML; project in software engineering techniques.

Co-requisite: CSC 372.

CSC 398 Internship/Practicum **1(0, 1, 0)**

This is an eight to twelve-week professional training course in computer science. Prerequisite: Senior standing.

Prerequisite: ENGL 206.

B) Elective Courses

CSC 262 Introduction to Multimedia Concepts **3(3, 0, 0)**

Concepts of multimedia: principles of graphics, sound, video, and animation; scripting techniques; use of contemporary multimedia programs to develop and create an interactive multimedia project.

Prerequisite: CSC 212

CSC 380 Graphical User Interface **3(3, 0, 0)**

Concepts and techniques used in the design and implementation of interactive systems: interface design guidelines, human factors, technical methods of user interface design, and the design and execution of usability studies; application of various techniques through the design, creation, and testing of an interactive software application.

Prerequisite: Senior Standing.

CSC 383 Digital Media **3(3, 0, 0)**

Technical aspects of digital media: capturing, storage, digital representation, compression, and generation of digital media; forms of media including text, images, 2D animation, video, sound, and 3D graphics and animation.

Prerequisite: Senior Standing.

CSC 385 Computer Graphics **3(3, 0, 0)**

Fundamentals of computer graphics with emphasis on 2-D graphics using an application-based approach: graphics output primitives, their attributes, colors, transformations, anti-aliasing, texture mapping, and curves and surfaces; 2D graphics algorithms, essentials of user interface and window management systems, and graphics hardware; programming using OpenGL.

Prerequisites: CSC 212.

CSC 387 Artificial Intelligence **3(3, 0, 0)**

Introduction to the automation of intelligent capabilities, including intelligent agents, constraints satisfaction problems, knowledge representation and reasoning (search and logical inference), interpreting, behavior modeling and learning; expert systems, knowledge acquisition, and machine learning will also be stressed; programming projects using an Artificial Intelligence programming Language.

Prerequisites: Senior Standing.

CIT 302 Working with Our Environment **3(3, 0, 0)**

This course is an introduction to environmental issues and the role of technology in today's fast paced computer world. It will suit the needs of students whether they intend to study technology or if they have a general interest in learning how to shape a sustainable future. It takes students progressively from environmental impacts of their lifestyle to the global issues of technological and economic development. They will also learn general skills such as basic numeracy, critical reading, report and essay writing. The course introduces more specific skills and knowledge required for higher-level environment or technology courses. The themes are: You and the Environment,

DEPARTMENT OF COMPUTER ENGINEERING

Mission

The mission of the Department of Computer Engineering is to provide students quality education fostering a solid foundation in Computer Engineering, mathematics, physical sciences, and technology; to expose students to major research and practical experiences in Computer Engineering; and to enrich the students' academic experience with good perception and awareness of their leadership role in regional development.

Academic Program

Currently, the Department of Computer Engineering offers one undergraduate program:

- Bachelor of Engineering Sciences in Computer Engineering (BES-CEN)

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING (CEN)

The CEN curriculum is a four-year program designed to grant students the Bachelor of Engineering Sciences (BES) degree upon the successful completion of the requirements. The first common year with College of Engineering majors allows students to switch between the engineering majors at the start of the second year of their study.

Program Mission

The mission of the undergraduate program in Computer Engineering is to impart a basic understanding of computer engineering built on a foundation of mathematics, physical sciences, and technology; to expose students to practical and major design experiences; and to provide students with a global perspective and an awareness of their leadership role in regional development.

Career Opportunities

The Department of Computer Engineering is committed to providing its students with meaningful, up-to-date skills and knowledge that will allow them to explore the education and skills of computer engineering. Furthermore, allow them to pursue successful careers and make deep impacts at leading commercial hardware and software companies. With these objectives in mind, the CE program is designed around fostering contemporary best practices and skills in line with the job opportunities for computing professionals.

Examples of career opportunities include

- Computer Network Engineering
- Computer System and Application Development
- Software Design
- Digital Signal and Image Processing
- Integrated Circuit Design
- Internet Applications Development
- Robotics and Automated Manufacturing
- Engineering consulting
- Manufacturing
- Global communication systems
- Instrumentation

Program Objectives

Graduates of the Bachelor of Engineering Sciences (BES) in CEN program:

1. Possess skills and knowledge that qualify them for professional practice in computer engineering and for admission to reputable graduate programs.
2. Are capable of applying fundamental knowledge, appropriate mathematical principles and computing tools, critical thinking, and best practices in computer engineering analysis and design.

3. Are provided with an educational foundation that fosters creativity, team work, leadership, and communication skills, and prepares them for life-long learning along diverse career paths.
4. Have an appreciation of technical, social, economic, environmental, ethical, and global aspects of engineering practice.

Learning Outcomes

By the time of graduation, students with a BES in CEN will be expected to demonstrate:

- a. Ability to apply knowledge of mathematics, science, and engineering;
- b. Ability to design and conduct experiments, as well as to analyze and interpret data;
- c. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability, and sustainability;
- d. Ability to function on multi-disciplinary teams;
- e. Ability to identify, formulate, and solve engineering problems;
- f. An understanding of professional and ethical responsibility;
- g. Ability to communicate effectively;
- h. Attaining a broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- i. A recognition of the need for, and an ability to engage in life-long learning;
- j. Knowledge of contemporary issues;
- k. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;
- l. Knowledge of Probability and Statistics;
- m. Knowledge of Discrete Mathematics;
- n. Knowledge of mathematics, basic sciences, computer sciences, and engineering sciences necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components.

Degree Requirement

To graduate with a Bachelor of Engineering Science (BES) in Computer Engineering, students must satisfactorily complete a four year program consisting of 134 credit hours distributed as follows:

▪ University Requirements	30 Credits
▪ College Requirements	27 Credits
▪ Computer Engineering Requirements	77 Credits
Total	134 Credits

University Requirements

Students working towards the BES degrees must complete a total of 30 credit hours in University requirements. The 30 credit hours in University general educational requirements for BS programs are as follows:

- 6 credits of Arabic: ARAB 101 and ARAB 201
- 9 credits of English communication skills: ENGL 101, 102, and 203
- 9 credits of social and cultural studies: SOCS 101, 201, and 202
- 3 credits of computing essentials: CSC 100
- 3 credits of mathematics: MATH 101

College Requirements

The College requirements consist of 27 credits distributed as follows:

- 4 credits of physics: PHYS 101 and PHYS 101L
- 3 credits of Mathematics: MATH 102
- 3 credits of statistics: STAT 230
- 3 credits of technical English writing: ENGL 206
- 11 credits of computing: CSC 102, CSC 102L, CSC 212, CEN 221, CEN 221L
- 3 credits in computing ethics: CSC 492

Program Requirements

The computer engineering program requirements consist of 77 credits. The courses in this group include 63 required credits, 13 elective credits, and 1 credit for internship.

The required courses are:

- 34 credits of Computer Engineering courses: CEN 220, CEN 240, CEN301, CEN 320, CEN 321, CEN 322L, CEN 330, CEN 340, CEN 350, CEN 360, CEN 498, CEN 499, CEN 220L, and CEN 440L.
- 12 credits of Mathematics: MATH 201, 202, 211, 215
- 4 credits of Chemistry: CHEM 101, CHEM 101L
- 7 credits of Electrical Engineering courses: ELEE 210, 210L, 250
- 4 credits of Physics: PHYS 102 and 102L
- 3 credits of Engineering Economy: COEN 300

The elective courses include:

- 9 credits of Computer Engineering electives
- 3 credit hours of Free electives

The internship course:

- 1 credit of internship

BES-CEN Program Study Plan

(134 Credits)

Year I

First Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 101	Basic Academic English I	3	
MATH 101	Calculus I	3	
PHYS 101	College Physics I	3	
PHYS 101L	College Physics I Lab	1	PHYS 101 (co)
CSC 100	Introduction to Computing	3	
SOCS 101	Islamic Civilization I	3	
	Total Credits	16	

Second Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 102	Basic Academic English II	3	ENGL 101
MATH 102	Calculus II	3	MATH 101
PHYS 102	College Physics II	3	PHYS 101
PHYS 102L	College Physics II Lab	1	PHYS 102 (co)
CSC 102	Computer programming	3	CSC 100
CSC 102L	Computer programming Lab	1	CSC 102 (co)
ARAB 101	Basic Academic Arabic	3	
	Total Credits	17	

Year II

Third Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
MATH 201	Calculus and Analytic Geometry III	3	MATH 102
MATH 211	Discrete Mathematics	3	
ELEE 210	Electric Circuits I	3	PHYS 102
ELEE 210L	Electric Circuits I Lab	1	ELEE 210
CEN 220	Logic Design	3	MATH 211
CEN 220L	Logic Design Lab	1	CEN 220
CHEM 101	College Chemistry	3	
CHEM 101L	College Chemistry Lab	1	
	Total Credits	18	

Fourth Semester (19 Credit Hours)

Course	Title	Credits	Prerequisites
MATH 202	Differential Equations	3	MATH 201
CEN 221	Computer Organization	3	CSC212
CEN 221L	Computer Organization Lab	1	CEN 221
ELEE 250	Electric Circuits II	3	ELEE 210
CSC 212	Algorithms and Data Structures	3	CSC 102
CEN 240	Signal and Systems	3	ELEE 250
ENGL 203	Advanced Academic English I	3	ENGL 102
	Total Credits	19	

Year III**Fifth Semester (18 Credit Hours)**

Course	Title	Credits	Prerequisites
ARAB 201	Advanced Academic Arabic	3	ARAB 101
STAT 230	Probability and Statistics	3	MATH 201
ENGL 206	Technical Writing	3	ENGL 203
CEN 250	Communication Systems	3	CEN 240
CEN 320	Computer Architecture	3	CEN 221
CEN 301	Electronics	3	ELEE 210
	Total Credits	18	

Sixth Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
COEN 300	Engineering Economy	3	STAT 230
MATH 215	Linear Algebra and Numerical Techniques	3	MATH 201
CEN 321	Embedded Systems	3	CEN 220
CEN 322L	Digital Systems Lab	1	CEN 321 (co)
CEN 340	Computer Networks	3	CEN 240
CEN 440L	Networking Lab	1	CEN 340 (co)
CEN 360	Operating Systems	3	CEN 221
	Total Credits	17	

Summer Semester (1 Credit Hour)

Course	Title	Credits	Prerequisites
CEN 398	Internship	1	ENGL 206
	Total Credits	1	

Year IV

Seventh Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
CEN 498	Final Year Project I	1	Senior Standing
SOCS 201	Islamic Civilization II	3	SOCS 101
CEN 330	Software Design	3	CSC 212
CEN 350	Digital Integrated Circuits	3	CEN 301
	Free Elective	3	
	Computer Engineering Elective	3	
	Total Credits	16	

Eight Semester (12 Credit Hours)

Course	Title	Credits	Prerequisites
CEN 499	Final Year Project II	3	CEN 498
SOCS 202	World Civilizations	3	SOCS 101
CSC 492	Computing ethics	3	
	Computer Engineering Elective	3	
CEN 499	Final Year Project II	3	CEN 498
	Total Credits	12	

Total Program Credits	134¹⁰	
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¹⁰ Completion of the Bachelor of Science in Computer Engineering

Course Description

A) Required Courses:

CEN 220/ELEE 220 Logic Design **3(3, 1, 0)**

A course that covers number systems and codes, switching algebra; combinational circuit analysis, synthesis, and practice; minimization methods; sequential logic design principles; latches and flip-flops, clocked synchronous state machines, designing state machines using state tables and state diagrams; introduction to the VHDL hardware description language.

Co-requisite: MATH 211.

CEN 220L Logic Design Lab **1(0, 0, 2)**

This laboratory course covers digital logic design. Experiments cover hardware design tools and technologies: hardware description language, high level synthesis

Co-requisite: CEN 220.

CEN 221/ELEE 320 Computer Organization and Assembly Language
3(3, 1, 0)

This is an introductory course in computer organization and architecture. Topics include basic hardware and software structure, addressing methods, programs control, processing units, I-O organization, arithmetic and logic units, main-memory organization, peripherals, microprocessor families, CSIC and RISC architectures, and multiprocessors. Assembly language is used as an aid to studying computer organization.

Co-requisite: CSC 212.

CEN221L/ELEE320L Computer Organization and Assembly Language Lab
1 (0, 0, 2)

This Lab complements the contents of CEN 221L.

Co-requisite: CEN 221

CEN 240 Signals and Systems **3(3, 1, 0)**

This course introduces students to the fundamental ideas of signals and system analysis. The topics covered in the course include basic properties of signals and systems, classifications of signals and systems, typical signals, the processing of signals by linear systems, the impulse response, Fourier series and transforms, sampling, discrete-time processing of continuous-time signals. This course should serve as a central building block for students interested in further studying information processing: image processing, communications, control, machine learning, and finance.

Co-requisite: ELEE 250

CEN 250 Communication Systems **3(3, 1, 0)**

This course introduces principles of data and computer communications at the physical layer; analog to digital conversion and pulse coded modulation; transmission and reception of digital signals; digital modulation; performance of digital communication systems in the presence of noise and inter-symbol interference; equalization.

Prerequisite: CEN 240

CEN 301 Electronics 3(3, 1, 0)

This course covers semiconductors: PN junctions; diodes and diode circuits; field effect transistor; MOS transistor and applications such as amplifier and switch; bipolar junction transistor and applications such as amplifier and switch; and circuit simulation using SPICE.

Prerequisite: ELEE 210.

CEN 320/CSC 363/ELEE 422 Computer Architecture 3(3, 1, 0)

Study of computer architecture from classical to advanced perspectives; explores architectural characteristics of modern computer systems such as performance, instruction sets, assemblers, data- paths, pipelining, caching, memory management, I/O considerations, multiprocessing, and other advanced systems.

Prerequisite: CEN 221.

CEN 321/ ELEE 423 Embedded Systems 3(3, 1, 0)

Implementation of microprocessors and microcontrollers in embedded digital computer systems; topics include architecture, operations, software; hardware/software design methodology; interfacing of microcomputers to peripherals or other computers for purposes of data acquisition, device monitoring and control, and other communications.

Prerequisite: CEN 220.

CEN 322L Digital Systems Laboratory 1(0, 0, 2)

This laboratory course covers digital systems design. Experiments cover hardware design tools and technologies: hardware description language, high-level synthesis, ASIC and FPGA design flow; hardware/software co-design.

Co-requisite: CEN 321.

CEN 330 Software Design 3(3, 0, 1)

Study of the nature of the program development task when many people, modules and versions are involved in designing, developing and maintaining a large program or system; issues addressed include software design, specification, version control, testing, cost estimation and management; study of software systems in different domains such as database systems and HCI systems are also addressed.

Prerequisite: CSC 212.

CEN 340/ CSC 384/ELEE 431 Computer Networks 3(3, 1, 0)

This course presents the foundations of computer networks. It includes a top-down view of the layered architectural elements of communication systems: Application Layer, Transport Layer, Network Layer, and the Link Layer. In particular, the emphasis is on the Internet protocols, TCP/IP, client/server systems, packet switching, protocol stacks, queuing theory, application protocols, socket programming, remote service calls, reliable transport (Error detection and recovery, multimedia networking with quality of service and multicasting), UDP, and security.

Prerequisites: CEN 240/ CEN 221, CSC 356.

CEN 350/ ELEE 442 Digital Integrated Circuits **3(3, 0, 1)**

Study of basic methods of digital integrated circuit design; emphasis will be on structured design methodologies for MOS systems with focus on performance considerations and design methodologies for VLSI IC chips; VLSI CAD tools are used to design and simulate a small CMOS chip.

Prerequisite: CEN 301.

CEN 360 Operating Systems **3(3, 0, 1)**

A study of the internal design of operating systems; topics include memory management, multiprogramming, virtual memory, paging and segmentation; job and process scheduling; Multiprocessor systems; device and file management; thrashing, cache memory.

Prerequisites: CEN 221 and CSC 212.

CEN 398 Summer Internship **1(0, 1, 0)**

This is an eight to twelve-week professional training course in computer engineering.

Prerequisite: ENGL 206.

CEN 440L Networking Laboratory **1(0, 0, 2)**

This laboratory course covers the technologies and protocols of the Internet. The experiments cover the Internet Protocol (IP), Address Resolution Protocol (ARP), Internet Control Message Protocol (ICMP), User Datagram Protocol (UDP) and Transmission Control Protocol (TCP), the Domain Name System (DNS), routing protocols (RIP, OSPF, BGP), network address translation (NAT), dynamic host configuration (DHCP), network management protocols (SNMP), and IP multicast.

Prerequisite: CEN 340.

CEN 498 Final Year Project I **1 (0, 1, 0)**

A supervised project in groups of normally three students aimed at providing practical experience in some aspect of computer engineering. Students are expected to complete a literature survey, project specification, critical analysis, and to acquire the necessary material needed for their intended end product.

Prerequisite: Senior standing.

CEN 499 Final Year Project II **3 (0, 3, 0)**

A course that seeks to impart in students the skill to integrate the knowledge gained in different courses by asking them to deliver a product that has passed through the design, analysis, testing, and evaluation stages. This course includes production of a professional report, design process and outcome, implementation and testing, verification and validation, and critical appraisal of the project.

Prerequisite: CEN 498.

B) Elective Laboratories:

CEN 430L Mobile Computing Laboratory **1(0, 0, 2)**

This laboratory course covers the technologies involved in integrating front-end mobile devices into local and global networks. Lab experiments involve programming in Java2ME, and .NET Compact Framework. The lab course provides a general coverage of underlying technologies and standards, including IEEE 802.11, WAP, GPRS, Bluetooth, and Jini.

Prerequisite: CEN 340.

CEN 460L Multimedia Laboratory **1(0, 0, 2)**

This laboratory course covers the technologies used in multimedia storage and communications. Multimedia formats for voice, music, and video are covered. Experiments also cover coding, streaming, and quality of service for multimedia applications.

Prerequisite: Senior standing.

C) Required Electrical Engineering Courses:

ELEE 210 Electric Circuits I **3(3, 1, 0)**

A course on fundamentals of electric circuits; basic elements and laws; independent and dependent sources; techniques of circuit analysis: node voltage, mesh current, and source transformation; circuit theorems: superposition, Thevenin and Norton equivalents; inductors, capacitors, mutual inductance, and transformers; steady-state AC circuits; power calculations; circuit simulation using SPICE.

Prerequisite: PHYS 102.

ELEE 250L Electric Circuits Laboratory **1(0, 0, 2)**

This laboratory course covers passive electronic components; laboratory instruments; voltage- divider circuits; sources and Thevenin's theorem; RC lead-lag networks; the transformer; AC circuits.

Co-requisite: ELEE 210.

ELEE 250 Electric Circuits II **3(3, 1, 0)**

A course on Laplace transform and its use in circuit analysis; s-domain representation; network functions; transient response of RC, RL, and RLC circuits; frequency-selective circuits; Bode plots; two-port networks; ideal op-amp; active filters; circuit simulation using SPICE.

Prerequisite: ELEE 210.

D) Elective Courses:

CEN 403 Special Topics in Computer Engineering 3(3, 0, 0)

This course covers contemporary topics of interest to students.

Prerequisite: Consent of the instructor.

CEN 410 Computer-Aided Analysis and Design of VLSI Circuits 3(3, 1, 0)

This course covers circuit and logic simulation; timing analysis and verification; testing and fault simulation; logic and high-level synthesis; physical design automation.

Prerequisite: CEN 350.

CEN 420/ CSC 385/ ELEE 421 Computer Graphics 3(3, 1, 0)

A course on interactive graphics; graphics hardware; graphical input devices; windowing; clipping; viewports; zooming, geometrical transformations (2D and 3D); data structures; advanced raster display architectures; raster algorithms; special graphics techniques; applications.

Prerequisite: CSC 102/ ELEE 230.

CEN 421 Advanced Computer Architecture 3(3, 1, 0)

A course that focuses on the allocation of hardware and software resources in solving large-scale computing problems, with emphasis on the relationships between hardware organization, system programming, and language support in the evolution of advanced computer architectures.

Prerequisite: CEN 320.

CEN 422 VLSI for Communications and Signal Processing 3(3, 1, 0)

This course introduces concepts in the design and implementation of digital signal processing systems using integrated circuits. The main emphasis is on the architectural exploration, design and optimization of signal processing systems for communications. Algorithm, architecture, and circuit design techniques will be introduced that enable joint optimization across the algorithmic, architectural and circuit domains.

Prerequisite: CEN 350.

CEN 423 Reconfigurable Computing 3(3, 1, 0)

A course dealing with the design issues pertaining to the implementation of application specific architectures using the reconfigurable computing paradigm allowing the same circuit to be reused in order to run different applications. Emphasis will be on the systematic design of reconfigurable computing platforms that exploit a high degree of parallelism.

Prerequisite: CEN 320.

CEN 424 Digital Systems Testing 3(3, 1, 0)

A course on digital systems testing and testable design; test economics, fault modeling, logic and fault simulation, testability measures, test generation for combinational and sequential circuits, memory test, delay test, scan design, built-in self-test and boundary scan.

Prerequisite: CEN 220.

CEN 434 Cryptography and Computer Security 3(3, 1, 0)

Overview of encryption and computer security; classical encryption techniques, block ciphers and the data encryption standard, finite fields, advanced encryption standard, confidentiality using symmetric encryption, public-key cryptography, key management, hash and MAC algorithms, digital signatures; authentication applications, intruders, and malicious software.

Prerequisite: Senior standing.

CEN 435 Optimizing Compilers 3(3, 1, 0)

This course covers theoretical and practical aspects of building modern optimizing compilers. Topics: intermediate representations, basic blocks and flow graphs, data flow analysis, partial evaluation and redundancy elimination, loop optimizations, register allocation, instruction scheduling, and inter-procedural analysis. Students will implement significant optimizations within the framework of a modern research compiler.

Prerequisites: CSC 212 and CEN 320.

CEN 441/ELEE 472 Information Theory 3(3, 1, 0)

This course introduces the field of information theory and its applications to communications theory, computer science, statistics, and probability theory. Covering all the essential topics in information theory, we introduce the basic quantities of entropy, relative entropy, and mutual information, and show how they arise as natural answers to questions of data compression, channel capacity, rate distortion, and hypothesis testing; Shannon's fundamental coding theorem.

Prerequisites: CEN 240

CEN 442/ ELEE 473 Coding Theory 3(3, 1, 0)

This course introduces the theory of error-correcting codes. The course will focus on results of asymptotic or algorithmic significance. Topics include: construction and existence results for error-correcting codes; limitations on the combinatorial performance of error-correcting codes; BCH codes, Reed-Solomon codes; low density parity check codes; algebraic geometric codes; Turbo codes; and decoding algorithms; unique and soft decoding; applications in computer engineering such as: computer storage, compact disk player, satellite communications, bandwidth-limited systems.

Prerequisites: STAT 230 and MATH 215.

CEN 447 Queuing Theory 3(3, 1, 0)

Poisson counting and renewal processes; Markov chains and decision theory, branching processes, birth death processes, and semi-Markov processes; simple Markovian queues, networks of queues, general single and multiple-server queues, bounds and approximations.

Prerequisite: STAT230, CEN340

CEN 450 Client-Server Computing 3(3, 1, 0)

Internet and intranet technologies; the client-server model of interaction; design and implementation of clients and servers; interactive and concurrent servers; distributed computing; application gateways; design project.

Prerequisite: CEN 340.

CEN 451 Internet Engineering 3(3, 1, 0)

Examining major protocols used in Internet: IP, ICMP, TCP, UDP; new technologies introduced on the Internet: IP Multicast, Mobile IP, IPv6, VPNs, and quality of service; routing on the Internet; network security and firewall design; overview of the application protocols: SMTP, HTTP, RTP, and SNMP.

Prerequisite: CEN 340.

CEN 452 Web Server Design and Programming 3(3, 1, 0)

Major technologies used in building Web servers. Alternate versions are to be given each year: The Windows-based IIS Server and the Linux-based Apache server. For IIS, ASP.NET along with C# will be used for programming Web servers. For Apache, PHP will be the language of choice. The course starts with a fast track on client programming, the HTTP protocol, SQL database servers, and XML programming.

Prerequisite: Senior standing.

CEN 453 Multimedia and Networking 3(3, 1, 0)

Multimedia topics: system requirements, performance requirements, representation and compression; Multimedia networking is emphasized by discussing multicasting, streaming, multimedia networking protocols and quality of service based traffic management protocols; synchronization, VoIP, and Internet2; Multimedia networking applications are designed and implemented as student projects.

Prerequisite: CEN 340.

CEN 454 Pervasive Computing Systems and Applications 3(3, 1, 0)

Technologies involved in integrating front-end mobile devices into local and global networks.; emphasis is placed on the programmability and networking of mobile phones, PDAs, and Pocket PCs; hands on experience involve programming in Java2 ME, C/C++ for Palm OS, and .NET Compact Framework for Windows CE; general coverage of underlying technologies and standards: XML, WAP, UMTS, GPRS, Bluetooth, and Jini.

Prerequisite: Senior standing.

CEN 491/ ELEE 451 Digital Signal Processing 3(3, 1, 0)

Revision of signals, systems, and transforms; design of Digital Filters: FIR and IIR; sampling and reconstruction of signals; multi-rate signal processing with applications; effects of finite word length; discrete random signals and Spectral Estimation; introduction to 2D signal and image processing.

Prerequisite: CEN 240.

CEN 493 Neural Networks 3(3, 1, 0)

Perceptron, Madeline, back propagation, and adaptive neural networks; transformation by layered networks, statistical neuro-dynamics, associative memory, and neural learning; applications to functional approximations, signal filtering, and pattern classification.

Prerequisite: Senior standing.

CEN 494/ ELEE 454 Digital Image Processing 3(3, 1, 0)

Two-dimensional signals and systems; image formation and perception; representation, coding, filtering restoration, and enhancements; feature extraction and scene analysis; introduction to computer vision.

Prerequisite: CEN 240CEN 4919



جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY

College of Engineering

COLLEGE OF ENGINEERING

Officers of the College

Acting Dean:	Amer Magableh
Professors:	Abdallah Malkawi, Sameer Bataineh, Khaldoun Bani Hani
Associate Professors:	Amer Magableh, Amin AlMasri, Abdullah Qudah, Taimour Aldalgamouni, Mohammad Zoubi. Ali Eyadeh
Assistant Professors:	Yasser Ahmad, AbdulGhani Athamneh, AbdulSamee Halahlah, Yazan Issa, Jamal Nejem, Ali Ramadan, Hossam El-Sayed, Ayedh Al Qahtani
Lecturers:	Mohammad Akhtar, Raed Aqil, Mastour Alnomasi, Maher Alsharari

Vision

The College of Engineering seeks to contribute to the development of the Kingdom of Saudi Arabia and the Gulf region by providing undergraduate education of the highest quality through developing strong programs, enhancing research activities, and disseminating expert engineering culture.

Mission

The mission of the College of Engineering at FBSU is to graduate high quality engineering students and to produce cutting-edge research leading to innovative technology for the benefit of society, locally and globally.

At the College of Engineering, we believe in equipping students with the necessary skills to advance the engineering “state-of-the-art” and to become life-long learners, innovators, and professionals capable of being leaders in their chosen careers while being committed to personal integrity and civic responsibility.

Core Values

The main core values that guide the decisions and actions at the college of engineering are:

1. Academic excellence by fostering lifelong excellence in learning, teaching, and research.
2. Collaboration through encouraging teamwork and building partnership across disciplines and with the community.
3. Professionalism and integrity by instilling high engineering ethics and the values of perseverance in industry.
4. Respect, collegiality and civility by appreciating the contribution of everyone at the college and acknowledging his/her indigenous rights and responsibilities.
5. Responsiveness by encouraging feedback from students and faculty members alike.
6. Leadership and continuous improvement.

Academic Programs

Currently, the College of Engineering offers the following undergraduate and graduate programs:

1. Bachelor in Civil Engineering (BCE)
2. Bachelor in Electrical Engineering (BEE)
3. Bachelor in Renewable Energy Engineering (BREE)
4. Bachelor in Mechanical Engineering (BME)
5. Master's in Electrical Engineering (MEE)
6. Master's in Civil Engineering (MCE)

Admission Requirements

Applicants to the college of engineering are first admitted to the foundation year program, where they receive a thorough enforcement of their knowledge in mathematics, English, and IT skills. Upon completion of the foundation year program, eligible applicants are selected for admission into the first year of engineering program they choose. Special attention is given to the following aspects:

1. Level of proficiency in English
2. Level of proficiency in mathematics and IT skills
3. Academic performance in the subject matters related to engineering

In particular, the college of Engineering considers the following Admission Requirements:

1. "Qudurat" test score of at least 65%; also applicable to applicants from Technical Colleges who had the "Qudurat" test.
2. Weighted average of both the Secondary School Average and the "Qudurat" test score must be at least 70% (40% for Secondary School Average and 60% for "Qudurat").
3. For applicants from Technical Colleges, the weighted average of both the Technical College Average and the "Qudurat" exam score must be at least 65% (60% for Technical College Average and 40% for "Qudurat"). If the applicant does not have a "Qudurat" score, the admission is decided on both the Technical College GPA and the Secondary School score (60% for the Technical College and 40% for the Secondary School Average), where the weighted average must be at least 70%.
4. Students admitted to the College of Engineering prior to joining the Foundation Year Program must earn at least 70% in Math 100 and at least 65% in Math 200 in order to maintain their admission to the College upon promotion to Year 1.
5. Students may transfer to the College of Engineering from another college at FBSU or from another university if they have passed Calculus I (or its equivalent) with a grade of at least 65%. If the course was not taken, then admission is decided by applying the relevant requirement in 1 or 2.

Graduation Requirements

The specific program requirements for each of the offered programs are shown under the respective department sections. The total number of credit hours required for a bachelor's degree in each of the three programs is:

1. Civil Engineering: 134 credit hours;
2. Electrical Engineering: 134 credit hours;
3. Mechanical Engineering: 134 credit hours.

University Requirements

Students working towards the bachelor's degrees must complete a total of 30 credit hours in University requirements, which are detailed as follows:

- 6 credit hours of Arabic: ARAB 101 and ARAB 201;
- 9 credit hours of English communication skills: ENGL 101, ENGL 102, and ENGL 203;
- 9 credit hours of social and cultural studies: SOCS 101, SOCS 201, and a free elective course;
- 3 credit hours of computing for engineers: CSC 101;
- 3 credit hours of mathematics: MATH 101.

College requirements

The College of Engineering requirements for the bachelor's degrees include 42 credit hours detailed as follows:

- 11 credit hours in sciences: PHYS 101, PHYS 102, PHYS 103L, and CHEM 101/ 101L;
- 15 credit hours in mathematics and statistics: MATH 102, MATH 201, MATH 202, MATH 215, and STAT 230;
- 3 credit hours in Technical Writing: ENGL 206;
- 3 credit hours in Engineering Economy: COEN 300;
- 3 credit hours in Engineering Programming: ELEE 230;
- 1 credit hour in Engineering Ethics: COEN 401;
- 1 credit hour in Engineering Drawings: CIVE 215;

In addition, bachelor's degree students should complete a 4-credit hour final-year project during the senior year and 1-credit hour, eight-week-minimum internship after they complete their third year.

Program requirements

The program requirements of each of the offered degrees are detailed in the following sections.

DEPARTMENT OF CIVIL ENGINEERING

Mission

The mission of the Civil Engineering Department (CE) is to:

- Offer high-quality education that encompasses basic engineering sciences in both the traditional and emerging areas of the discipline;
- Prepare graduates to adapt to global and domestic engineering challenges and changing industry practices;
- Foster student-faculty relationship that enrich teaching and learning;
- Develop scholarship and encourage public service;
- Maintain an academic environment characterized by integrity and respect;
- Prepare graduates for lifelong intellectual and professional development;
- Contribute to economic prosperity of the Kingdom and the region.

Academic Program

Currently, the Department of Civil Engineering offers one undergraduate program:

- Bachelor**Error! Bookmark not defined.**'s in civil engineering (BCE)
- Master of Science in Civil Engineering (MSCE)

BACHELOR IN CIVIL ENGINEERING (BCE)

The Civil Engineering program is designed to grant students a bachelor's degree upon the successful completion of the four-year curriculum.

Program Objectives

The Civil Engineering program is designed to achieve the following objectives:

- To impart a sound understanding of the fundamental principles and concepts of civil engineering.
- To develop the mathematical, scientific, and computational skills in formulating and solving civil and environmental engineering problems.
- To cultivate the skills pertinent to the engineering design process, conduct of experiment, analysis and interpretation of data.
- To expose students to real-world problems of multi-disciplinary nature while addressing relevant social, environmental, economical and aesthetic concerns.
- To develop effective teamwork and communication skills and prepare students for leading roles in the profession and the community.

Learning Outcomes

Upon graduation, Bachelor holders in CE will be expected to demonstrate:

- a. Ability to apply knowledge of mathematics, science and engineering;
- b. Ability to identify, formulate and solve engineering problems;
- c. Ability to conduct experiments, analyze and interpret data;
- d. Ability to design a system, component or process to meet desired needs;
- e. Ability to use the techniques, skills and modern tools necessary for engineering practice;
- f. Ability to appreciate the impact of engineering solutions in local and global contexts;
- g. Ability to function in a team environment;
- h. Ability to communicate effectively;
- i. Ability to understand professional and ethical responsibility;
- j. Knowledge of contemporary issues;
- k. Ability to engage in life-long learning;
- l. Experience in engineering practice or undergraduate research.

Career Opportunities

As one of the oldest engineering disciplines, Civil Engineering involves planning, designing and executing structural works. The profession deals with a wide variety of engineering tasks including design, supervision and construction activities of public works like roads, bridges, tunnels, buildings, airports, dams, water works, sewage systems, ports etc.; and offers a multitude of challenging career opportunities.

A civil engineer is responsible for planning, designing, constructing and maintaining civil engineering projects. He/she is required to have a high standard of engineering knowledge as well as supervisory and administrative skills. The planning part of his work involves site investigation, feasibility studies, creating solutions to complications that may occur and the actual designing of structures. He/she has to follow the guidelines of the local government authority and approve his plans accordingly. He/she may prepare cost estimates and set construction schedules; deal with clients, architects, contractors etc.; and supervise the work according to standards.

Demand for civil engineers has been consistently high during the last decades particularly in the Gulf region where engineers have been involved primarily in large development projects. The emerging construction activity offers ever increasing and expanding opportunities for civil engineers.

The Civil Engineering Department is committed to providing its students with meaningful, up-to- date skills and knowledge that will allow them to pursue successful engineering careers within Tabuk and across the Gulf region.

Civil Engineering Laboratory Facilities

The Civil Engineering Department is furnished with high quality state-of-art laboratories that support research and teaching activities for Structural, Environmental, Hydrology, Surveying and Highway Engineering Programs.

These laboratories extend over an area exceeding 610 sq. m and are manned with highly qualified and well-trained personnel. Furthermore, most of the lab equipment are support advanced computerized data acquisition systems.

The Department hosts the following eight major laboratories:

1. Soil Mechanics Laboratory;
2. Concrete Laboratory;
3. Aggregate Laboratory;
4. Surveying Laboratory;
5. Fluid Mechanics and Hydraulics Laboratory;
6. Asphalt Laboratory;
7. Environmental Engineering Laboratory;
8. Structures Laboratory.

Curriculum and Program Structure

The curriculum is designed in conformance with the study plan approved by the MOE. It includes courses in basic sciences and mathematics, engineering sciences, engineering design, communication skills, and humanities and social sciences. Lab hands-on experience and emphasis on design are important elements that are integrated throughout the curriculum.

The requirements of the BCE include:

- At least 29 credit hours of mathematics and basic sciences,
- At least 68 credit hours of engineering sciences and engineering design, and

- At least 18 credit hours of social sciences and humanities
- At least 12 credit hours of English language and technical writing courses
- At least 7 credit hours in Computer and Programming

The curriculum is designed to grant students the bachelor's degree upon the successful completion of the four-year program. The first year is shared with all engineering majors in order to allow students to transfer from one major to another without losing any credits earned in the first year.

Final Year Project

As part of their fourth year, students are required to carry out a project and submit a technical report. This project is a substantial piece of work that will require creative activity and original thinking. Students in groups, normally three per group, are supervised while working on a project accounting for four credit hours, extending over a full academic year. The project aims to provide students with a transitional experience from the academic world to the professional world. It is designed to serve as a platform in which CE students in teams engage in a practical design experience requiring the solution of civil engineering design problems. Yet, a student who has already passed a minimum of 90 credits is eligible to register for the Final Year Project.

The objectives of the final year project are:

- To allow students to demonstrate a wide range of the skills learned at the College of Engineering during their course of study by asking them to deliver a complete and original design for a Civil Engineering scheme;
- To encourage work on multidisciplinary projects, where students get to apply material learned in a number of courses;
- To allow students to develop problem solving, analysis, synthesis, evaluation and design skills.
- To encourage teamwork;
- To improve students' communication skills by asking them to produce both a professional report and a professional poster and to give an oral presentation of their work;

The project is important for a number of reasons:

- It is the largest single piece of design work that a student does during his/her bachelor's degree program;
- It is the work that prospective employers will most likely ask students about during an interview;
- It allows students to show a range of the skills they have learned during their course of study.

Practical Training Internship

All engineering students are required to fulfill a 1-credit hour internship after they complete the third year in the program. This graduation requirement entails that each student gains practical training experience with either a company or another academic institution. The internship can be conducted either during the last summer

term or in the last regular term, prior to graduation provided that s/he has passed a minimum of 94 credits.

Degree Requirements

To graduate with a bachelor's degree in civil engineering (BCE), students must satisfactorily complete 134 credit hours. The distribution of courses in the proposed study plan is as follows:

University Requirements

The University requirements for the bachelor's degree in CE total 30 credit hours and are distributed as follows:

- 6 credit hours of Arabic: ARAB 101 and ARAB 201;
- 9 credit hours of English communication skills: ENGL 101, ENGL 102, and ENGL 203;
- 9 credit hours of social and cultural studies: SOCS 101, SOCS 201, and a free elective course;
- 3 credit hours of computing for engineers: CSC 101;
- 3 credit hours of mathematics: MATH 101.

College Requirements

The College requirements for the bachelor's degree in CE consist of 42 credit hours and are distributed as follows:

- 11 credit hours in sciences: PHYS 101, PHYS 102, PHYS 103L, and CHEM 101/ 101L;
- 15 credit hours in mathematics and statistics: MATH 102, MATH 201, MATH 202, MATH 215, and STAT 230;
- 3 credit hours in Technical Writing: ENGL 206;
- 3 credit hours in Engineering Economy: COEN 300;
- 3 credit hours in Engineering Programming: ELEE 230;
- 1 credit hour in Engineering Ethics: COEN 401;
- 1 credit hour in Engineering Drawings: CIVE 215.

Program requirements

The program requirements for the BCE total 62 credit hours and are distributed as follows:

- 50 credit hours for the courses : CIVE 205, CIVE 210, CIVE 211, CIVE 220, CIVE 220L, CIVE 240, CIVE 240L, CIVE 250, CIVE 260, CIVE 260L, CIVE 310, CIVE 320, CIVE 330, CIVE 330L, CIVE 351, CIVE 360, CIVE 430, CIVE 460, CIVE 471, CIVE 472, CIVE 480
- Four 3-credit hour electives from Civil Engineering;

Study Plan for the BCE Degree

(134 Credit Hours)

Year I

First Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ARAB 101	Arabic Communication Skills	3	
SOCS 101	Islamic Civilization I	3	
CSC 101	Introduction to Computing	3	
ENGL 101	Basic Academic English I	3	
PHYS 101	Physics 101	3	
MATH 101	Calculus I	3	
	Total Credits	18	

Second Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ARAB 201	Advanced Academic Arabic	3	ARAB 101
ENGL 102	Basic Academic English II	3	ENGL 101
MATH 102	Calculus II	3	MATH 101
PHYS 102	Physics II	3	PHYS 101
CHEM 101	Chemistry I	3	
ELEE 230	Programming for Engineers	3	CSC 101
	Total Credits	18	

Year II

Third Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 203	Advanced Academic English I	3	ENGL 102
MATH 201	Calculus and Analytic Geometry III	3	MATH 102
MATH 202	Differential equations	3	MATH 102
CIVE 260	Spatial Measurements	2	MATH 101
SOCS 201	Islamic Civilization II	3	SOCS 101
CHEM 101L	Chemistry Lab	1	Co-CHEM 101
CIVE 210	Statics	3	PHYS 101
	Total Credits	18	

Fourth Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
STAT 230	Probability and Statistics	3	MATH 101
MATH 215	Linear algebra and Numerical Techniques	3	MATH 202
ENGL 206	English Technical Writing	3	ENGL 203
CIVE 220	Engineering Materials	3	CHEM 101 CHEM 101L
CIVE 260L	Surveying Lab	1	Co-CIVE 260
CIVE 211	Structural Mechanics	3	CIVE 210
	Total Credits	16	

Year III**Fifth Semester (18 Credit Hours)**

Course	Title	Credits	Prerequisites
CIVE 310	Structural Analysis I	3	CIVE 211, MATH 215
CIVE 220L	Engineering Materials Lab	1	Co-CIVE 220
CIVE 240	Fluid Mechanics	3	CIVE 210, MATH 202
CIVE 240L	Fluid Lab	1	Co-CIVE 240
CIVE 250	Environmental Engineering	3	CHEM 101
CIVE 330	Geotechnical Engineering	3	CIVE 211
CIVE 330L	Geotechnical Engineering Lab	1	Co-CIVE 330
CIVE 360	Transportation Engineering	3	CIVE 260, STAT 230
	Total Credits	18	

Sixth Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
CIVE 320	Concrete I	3	CIVE 220L, CIVE 310
CIVE 351	Water and Wastewater Treatment and Laboratory	3	CIVE 250, CIVE 240L
CIVE 460	Highway Engineering	3	CIVE 360
COEN 300	Engineering Economy	3	MATH 102
COEN 401	Communication skills and ethics	1	ENGL203
PHYS 103L	Physics Lab.	1	Co-PHYS 102
CIVE 215	Computer Aided Engineering Drawing	1	CSC101
CIVE 205	Engineering Drawings	1	MATH 102
	Total Credits	16	

Summer Semester (1 Credit Hour)

Course	Title	Credits	Prerequisites
CIVE 400	Internship for CIVE Students	1	Senior, ENGL 206, CIVE 320, CIVE 360
	Total Credits	1	

Year IV

Seventh Semester (14 Credit Hours)

Course	Title	Credits	Prerequisites
CIVE 471	Quantity Surveying and Cost Estimation	2	COEN 300, CIVE 260, CIVE 320, CIVE 330
CIVE 472	Contracts and Specifications	2	Co: COEN 401 Co: CIVE 471
	Specialization Elective	3	
	Specialization Elective	3	
	Free Elective	3	
CIVE 401	Final Year Project I	1	Senior Standing ENGL 206, CIVE 320, CIVE 360
	Total Credits	14	

Eight Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
CIVE 480	Construction Management	3	Co: CIVE 471 Co: CIVE 472
CIVE 430	Foundation Engineering	3	CIVE 330
	Specialization Elective	3	
	Specialization Elective	3	
CIVE 402	Final Year Project II	3	CIVE 401
	Total Credits	15	

Total Program Credits	134¹¹	
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¹¹ Completion of the Bachelor of Science in Civil Engineering

Course Descriptions

CIVE 205 Engineering Drawing

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Drawing equipment, lettering, Geometric construction, sketching, dimensioning, orthographic projections, points, lines, areas and solids, principal and auxiliary views, skew lines, distances between points, lines and plane surfaces, piercing points, shadow, perspective, surface development, applications.

Prerequisite: MATH 102.

CIVE 210 Statics

3(3, 0, 0)

A course outlining vector mechanics of forces and moments; free-body diagrams; equilibrium of particles and rigid bodies in two and three dimensions; plane and space trusses; frames and machines; axial, shear, and moment diagrams of beams and simple frames; friction; center of gravity and centroid; area moment of inertia; computer applications.

Prerequisite: PHYS 101.

CIVE 211 Structural Mechanics

3(3, 0, 0)

A course on stresses, strains, and stress-strain relationship; tension and compression; torsion of circular bars; bending and shear stresses in beams; combined stresses; stress transformation and Mohr's circle.

Prerequisite: CIVE 210.

CIVE 215 Computer Aided Engineering Drawing

1(0, 0, 2)

Introduction to Computer Aided Drawing (AutoCAD) Software, Drawing limits, grid setting and drawing aids, coordinate system, Drawing tools (point, line , ray, multi-line, poly-line, polygons, rectangle, arc, circle, ellipse), Modify tools (copy, erase, offset, move, rotate, lengthen, terminate, fillet, chamfer, array), Layers, Zoom, dimensions, text, hatch, isometric drawing.

Perquisite: CSC 101.

CIVE 220 Engineering Materials

3(3, 0, 0)

This course introduces Civil Engineering materials that include cement, aggregates, admixtures, plain concrete, steel, masonry, plastics and polymers. Concrete mix design, concrete curing and durability; construction equipment and technologies; hot and cold weathering concreting.

Prerequisite: CHEM 101, CHEM 101L.

CIVE 220L Engineering Materials Lab

1(0, 0, 2)

Hands-on laboratory experiments to introduce students to testing different materials including cement, aggregates, admixtures, plain concrete, steel, masonry, and plastics.

Co-requisite: CIVE 220.

CIVE 240 Fluid Mechanics

3(3, 0, 0)

An introductory course on fluid behavior emphasizing conservation of mass, momentum, and energy and dimensional analysis; study of fluid motion in terms of the velocity field, fluid acceleration, the pressure field, and the viscous effects; applications of Bernoulli's equation, Navier- Stokes, and modeling; flow in ducts, potential flows, and boundary layer flows.

Prerequisite: MATH 202, CIVE 210.

CIVE 240L Fluid Lab**1(0, 0, 2)**

Hydrostatic, Fluids in motion, Open channel flow, Uniform flow, Non-uniform flow, Flow through pipelines, Flow over weirs and under sluice gates, Hydraulic machinery, Water pumps, Flow water Measurement.

Co-requisite: CIVE 240.

CIVE 250 Environmental Engineering**3(3, 0, 0)**

A course that introduces the fundamentals of environmental engineering. A screening course of major topics in environmental engineering including water and wastewater, environmental hydrology, environmental hydraulics and pneumatics, air, solid waste, noise, environmental modeling, and hazardous waste.

Prerequisite: CHEM 101.

CIVE 260 Spatial Measurements**2(1, 0, 2)**

A course on the theory of measurements and errors; linear measurements; surveying instruments; leveling; angles, bearings, and azimuths; stadia measurements; traversing—field aspects; traverse computations and adjustment; topographic surveying; triangulation.

Prerequisite: MATH 101.

CIVE 260L Surveying Lab**2(1, 0, 2)**

Surveying lab covers the three basic surveying tools – the tape, level and transit/theodolite – along with proper field procedures for basic surveying which include taking field notes, taping and EDM, leveling, bearings and azimuths, topography, and mapping. In addition, more advanced tools such as Total Station is also introduced.

Co-requisite: CIVE 260.

CIVE 310 Structural Analysis I**3(3, 0, 0)**

An introductory course covering stability and determinacy of structures; influence lines; deflection of beams and frames by double integration method, moment-area theorems, and conjugate beam; principle of virtual work and applications on beams, frames and trusses; introduction to indeterminate structures; approximate analysis of building frames.

Prerequisite: MATH 215, CIVE 211.

CIVE 320 Concrete I**3(3, 0, 0)**

A course that covers the mechanical properties of concrete materials; ultimate strength theory of flexure and shear; flexural and shear design of beams; service load behavior; bond properties of reinforcing bars; design of solid and ribbed one-way slabs; design of short, slender and bi-axially columns.

Prerequisite: CIVE 220L, CIVE 310.

CIVE 330 Geotechnical Engineering**3(3, 0, 0)**

A course on engineering geology, soil classification and index properties; soil structure and moisture; compaction; seepage; effective stress concept; compressibility and consolidation; stress and settlement analysis; shear strength.

Prerequisite: CIVE 211.

CIVE 330L Geotechnical Engineering Lab **1(0, 0, 2)**

Water content determination, liquid and plastic limits, shrinkage limit, grain size distribution (sieve analysis), hydrometer analysis, compaction, in-situ field density, constant and falling head permeability tests, unconfined compression test, tri-axial test, direct shear test .

Co-requisite: CIVE 330.

CIVE 351 Water and Wastewater Treatment and Laboratory **3(2, 0, 2)**

A course that examines the quality and treatment methods of water and wastewater; testing for physical, chemical, and biological parameters.

Prerequisite: CIVE 240L, CIVE 250.

CIVE 360 Transportation Engineering **3(2, 0, 2)**

A course that introduces the field of transportation engineering through a presentation of the basics of traffic engineering, traffic flow theory, and pavement design. A laboratory component consists of carefully structured experiments that reinforce students' understanding of the academic concepts and principles.

Prerequisite: STAT 230, CIVE 260.

CIVE 400 Internship for CE Students **(1 Credit)**

An eight- to twelve-week professional training course in Civil Engineering.

Prerequisite: Senior Standing, ENGL 206, CIVE 320, CIVE 360.

CIVE 401 Final Year Project I **(1 Credit)**

A chosen design topic of wide range of civil engineering application including structural, geotechnical, transportation, highway, material, hydrologic, water resources and environment and preparation of a detailed execution program for CIVE 402, through Define the project, State the objectives, Complete a literature survey, Set project specifications and master plan, Select a design method or experimental matrix.

Prerequisite: Senior Standing, ENGL 206, CIVE 320, CIVE 360.

CIVE 402 Final Year Project II **(3 Credits)**

A supervised project in groups of normally three students aimed at providing practical design experience in a civil engineering application.

Prerequisite: CIVE 401.

CIVE 460 Highway Engineering **3(3, 0, 0)**

A course that examines road vehicle performance; principles of geometric design and highways; horizontal and vertical alignment; earthwork; intersections and interchanges; parking facilities; basic traffic models; queuing theory and traffic analysis; travel demand forecasting.

Prerequisite: CIVE 360.

CIVE 471 Quantity Surveying and Cost Estimation **2(2, 0, 0)**

Calculation of quantities of concrete elements, steel reinforcement bars, steel structures, brick work, earth work, finishing's (paining, plastering, tiling, etc.), and roads work. Construction cost estimations process, unit rates determination, labor costing, and final pricing.

Prerequisite: COEN 300, CIVE 260, CIVE 320, CIVE 330

CIVE 472 Contracts and Specifications **2(2, 0, 0)**

A course on the structure of contract documents, bidding requirements, general and detailed contract specifications, types of contracts, arbitration and legal requirements. Building structural specifications. Building finishing's specification.

Co-requisite: COEN 401, CIVE 471

CIVE 480 Construction Management **3(3, 0, 0)**

A course on organizing for construction projects; pre-construction activities; bidding and contracts; fundamentals of construction planning, monitoring, and control; application of construction control tools: CPM, materials management, operations analysis, and quality control.

Co-requisite: CIVE 471, CIVE 472.

COEN 300 Engineering Economy **3(3, 0, 0)**

A course that covers principles, basic concepts and methodology for making rational decisions in the design and implementation of real engineering projects; time value of money, depreciation, comparing alternatives, effect of taxes, inflation, capital financing and allocation, and decision under uncertainty.

Prerequisite: MATH 102.

COEN 401 Engineering Ethics **3(1, 0, 0)**

A course on engineering ethics covering responsibility in engineering; framing the moral problem; organizing principles of ethical theories; computers, individual morality, and social policy; honesty, integrity, and reliability; safety, risk, and liability in engineering; engineers as employees; engineers and the environment; international engineering professionalism; and future challenges.

Elective Courses

Elective Courses - General

CIVE 403 Special Topics in Civil Engineering **3(3, 0, 0)**

Any selected topic in the state-of-the-art in Civil Engineering.

Prerequisite: discretion of advisor.

CIVE 470 Introduction to Geographic Information Systems **3(3, 0, 0)**

An introductory course on Geographic Information Systems (GIS) and their applications in the planning and engineering fields, alternatives in computer-based graphics, data concepts and tools, network data management and planning applications, and implementation issues.

Prerequisite: CIVE 260

Elective Courses - Structural

CIVE 410 Structural Analysis II **3(3, 0, 0)**

A course on the solution of statically indeterminate structures by flexibility (force) and stiffness methods for plane and space trusses and frames introduction to the direct stiffness method; influence lines for indeterminate structures; computer applications.

Prerequisite: CIVE 310.

CIVE 411 Bridges **3(3, 0, 0)**

A course that discusses types of bridges; influence lines; loads and their distribution on bridges; serviceability of bridges; methods of design of bridge deck, superstructure, and substructure.

Prerequisites: CIVE 310 and CIVE 320.

CIVE 412 Steel Design **3(3, 0, 0)**

A course that examines loads on structures; philosophies of design: LRFD versus ASD; behavior, analysis, and design (according to AISC) of tension members, bolted connections, welded connections, compression members, and beams.

Prerequisite: CIVE 310.

CIVE 420 Concrete II **3(3, 0, 0)**

A course that builds upon Concrete I and covers continuous beams; wall footings, concentrically and eccentrically loaded single column footings, and combined footings; staircases; bearing walls; cantilever retaining walls; two-way slabs.

Prerequisite: CIVE 320.

CIVE 421 Special Topics in Concrete **3(3, 0, 0)**

A course that reviews reinforced concrete design; wind load on structures; seismic design of structures; design of shear walls; brackets, corbels, and deep girders; torsion in concrete members; circular, rectangular, and elevated water tanks; spherical, conoidal, and ellipsoidal domes.

Prerequisite: CIVE 420.

CIVE 422 Pre-Stressed Concrete **3(3, 0, 0)**

A course on materials characteristics; prestress losses; working strength design procedures; composite construction; ultimate flexural strength and behavior; shear design; continuous pre-stressed concrete members.

Prerequisite: CIVE 420.

Elective Courses - Geotechnics

CIVE 423 Strength and Rehabilitation of Concrete Structural Systems **3(3, 0, 0)**

A course on assessment of structural deficiency using analytical and field test methods; strengthening materials; strengthening of structural members in flexure, shear, and axial load; upgrading of gravity load-designed members for earthquake load resistance.

Prerequisite: CIVE 320.

CIVE 430 Foundation Engineering **3(3, 0, 0)**

A course that covers site investigations; evaluation of data from field and laboratory tests; estimation of stresses in soil masses; applications of principles of soil mechanics to determination of bearing capacity and settlement of spread footings, mats, single piles, and pile groups.

Prerequisite: CIVE 330.

CIVE 431 Applied Foundation Engineering **3(3, 0, 0)**

A course on braced excavations, retaining structures, deep foundations, slope stability, and computer applications.

Prerequisite: CIVE 330.

CIVE 432 Environmental Geotechnics **3(3, 0, 0)**

A course on geotechnical practice in environmental protection and restoration; methods of soil and site characterization for siting of waste repositories and site restoration; influence of physical and chemical processes in soils on the evaluation of contaminant distribution; design of waste containment systems including landfills, slurry walls, and soil stabilization; the applicability and use of geosynthetics; technologies for site restoration and cleanup.

Prerequisite: CIVE 330.

CIVE 433 Soil and Site Improvement **3(3, 0, 0)**

A course that covers compaction, admixture stabilization, foundation soil treatment, reinforced soil and composite materials, and material sites reclamation.

Prerequisite: CIVE 330.

CIVE 434 Geotechnical Earthquake Engineering **3(3, 0, 0)**

A course on causative mechanisms of earthquake, earthquake magnitudes, ground motion; influence of soil conditions on site response; seismic site response analysis; evaluation and modeling of dynamic soil properties; analysis of seismic soil-structure interaction; evaluation and mitigation of soil liquefaction and its consequences; seismic code provisions and practice; seismic earth pressures seismic slope stability and deformation analysis, seismic safety of dams and embankments, seismic performance of pile foundations, and additional current topics.

Prerequisite: CIVE 330.

Elective Courses - *Transportation*

CIVE 461 Pavement Design **3(3, 0, 0)**

A course examining highway and airport pavement design; flexible and rigid pavement types and wheel loads; stresses in flexible and rigid pavements; pavement behavior under moving loads; soil stabilization.

Prerequisite: CIVE 360.

CIVE 462 Urban Transportation Planning I **3(3, 0, 0)**

An introductory course on methods and models used in transportation planning with emphasis on the urban context.

Prerequisite: CIVE 360.

CIVE 463 Traffic Engineering **3(3, 0, 0)**

A course outlining traffic engineering studies; traffic control of signalized and unsignalized intersections; signal control hardware and maintenance; arterial performance and operations; network optimization.

Prerequisite: CIVE 360.

CIVE 464 Transportation Systems Analysis **3(3, 0, 0)**

A course on transportation and traffic problems in modern society. Among the topics covered are travel forecasting problems and methods; theoretical techniques for traffic flow description and management; highway, railway, and runway capacity and performance characteristics; economic considerations; cost functions.

Prerequisite: CIVE 360.

CIVE 465 Design and Management of Transport Operations 3(3,0,0)

A course that covers the application of quantitative techniques from operations research and probabilistic analysis to transportation problems. Applications covered include: pickup and delivery systems, emergency urban services, facility location, and network problems.

Prerequisite: CIVE 360.

CIVE 466 Transportation Economics 3(3,0,0)

A course that investigates the application of economic principles to the evaluation of projects and policies in the transport sector such as transport project benefits, costs, and financing, and pricing in the transport sector.

Prerequisite: CIVE 360 and COEN 300.

Elective Courses - Water Resources

CIVE 440 Hydraulics and Laboratory 3(2,0,2)

Flow in conduits, flow in open channels, flow measurements, and laboratory experiments.

Prerequisite: CIVE 240.

CIVE 441 Hydraulic Structures 3(3,0,0)

A course that covers closed conduit flow, water distribution systems, transient analysis, open channel flow, flood control, culvert hydraulics, design of various hydraulic structures.

Prerequisite: CIVE 240.

CIVE 442 Surface Water Hydrology 3(3,0,0)

A course on design storm, rainfall-runoff modeling, overland flow, flood routing, reservoir routing, simulation models, hydrologic design, urban hydrology, and stochastic hydrology.

Prerequisite: CIVE 240.

CIVE 443 Groundwater Hydrology 3(3,0,0)

A course that deals with properties of groundwater, groundwater movement, general flow equations, steady-state well hydraulics, seepage forces, unsteady well hydraulics, infiltration, and groundwater modeling.

Prerequisite: CIVE 340.

CIVE 444 Hydraulics of Open Channels 3(3,0,0)

A course that examines gradually varied flow theory and analysis, spatially varied flow, and numerical modeling of unsteady flow in open-channels.

Prerequisite: CIVE 240.

CIVE 445 Coastal Engineering 3(3,0,0)

A course on small-amplitude wave theory, finite-amplitude wave theory, conoidal waves, solitary wave theory, wave refraction, diffraction, and reflection, wave forces, and design of maritime structures (e.g., breakwaters).

Prerequisite: CIVE 240.

CIVE 446 Transport Phenomena in Surface and Subsurface Waters

3(3, 0, 0)

A course on advection, diffusion, and dispersion of pollutants; transport in rivers and estuaries; transport in groundwater; numerical modeling; design of wastewater discharge system.

Prerequisite: CIVE 240 and CIVE 250.

CIVE 447 Water Resources Systems: Planning and Management

3(3, 0, 0)

A course that introduces the main concepts and principles of water resources planning and management; logical steps in engineering planning and decision making; water resources systems analysis, modeling, simulation, and optimization; economic and financial analysis; flood protection and reservoir operation; and water resources management case studies.

Prerequisite: Senior Standing.

CIVE 448 GIS for Water Resources and Environmental Engineering

3(3, 0, 0)

A course that introduces the concepts and principles of Geographic Information Systems (GIS) from the perspective of water resources and environmental engineering. It provides coverage of state-of-the-art GIS methods and tools, specifically targeting water resources and environmental applications including: spatial and terrain analysis, geo-statistical analysis, watershed delineation and identification of river networks, representation of groundwater and aquifer systems, time series analysis, and development of GIS integrated water and environmental models.

Prerequisite: CIVE 260.

Elective Courses – *Environmental*

CIVE 450 Methods of Environmental Sampling and Analysis 3(3, 0, 0)

A course on sampling techniques and instrumental methods in environmental sciences; determination of pollutants in water, air, and soil; analytical techniques; adaptation of procedures to specific matrices; case studies.

Prerequisite: CIVE 250.

CIVE 451 Environmental Chemistry and Microbiology 3(3, 0, 0)

A course that deals with organic, inorganic, and physical chemistry; chemical equilibrium; reaction kinetics; acidity, alkalinity; composition, morphology, and classification of microorganisms; energy, metabolism, and synthesis; growth, decay, and kinetics; biological water quality indicators.

Prerequisite: CIVE 250.

CIVE 452 Environmental Management and Decision Making 3(3, 0, 0)

A course that deals with mathematical programming techniques, multi-objective optimization, and the generation of alternatives, as these are used in environmental systems analysis and management; as well as introducing how considerations such as economics, uncertainty, equity, and other sociopolitical parameters may influence environmental management and decision-making.

Prerequisite: Senior Standing and CIVE 250.

CIVE 453 Water and Sewage Works Design 3(3, 0, 0)

A course that examines the design of water and wastewater schemes, including design reports and a literature search on the development of conventional treatment processes.

Prerequisites: CIVE 351.

CIVE 454 Solid Waste Management I 3(3, 0, 0)

A course on nature and effects of solid wastes including hazardous wastes; engineering management principles, practices, and techniques for management of solid wastes administration; solid waste generation, storage, collection and transport, processing, resource recovery, and disposal; trip to a local facility.

Prerequisite: CIVE 351.

CIVE 455 Solid Waste Management II 3(3, 0, 0)

A course on the design of solid waste disposal schemes, including design reports and a literature search on the development of conventional treatment and disposal processes.

Prerequisite: CIVE 454.

CIVE 456 Air Pollution and Control 3(3, 0, 0)

An introductory course on air pollutants, sources, and effects; emissions estimates, regulations, and monitoring techniques; particulate matter characterization; meteorology and atmospheric dispersion; air pollution control processes.

Prerequisite: CIVE 250.

CIVE 457 Industrial/Hazardous Waste Management 3(3, 0, 0)

A course that deals with sources, quantity, and quality of industrial wastes; basic industrial waste treatment processes; major industries, types of wastes, and existing treatment practices; disposal and fate of industrial wastes.

Prerequisites: CIVE 451.

CIVE 458 Environmental Impact Assessment 3(3, 0, 0)

A course that outlines theories and procedures of assessing environmental impact; analysis of the impact of development on various measures of environmental quality; benefit-cost considerations in environmental impact assessment.

Prerequisite: CIVE 250.

DEPARTMENT OF ELECTRICAL ENGINEERING

Mission

The mission of the Department of Electrical Engineering is to provide students with quality education based on a thorough foundation in electrical engineering, mathematics, physical sciences, and technology; to guarantee students an exposure to major research and practical design experiences in electrical engineering; and to enrich the students' academic experience with global perspective and awareness of their leadership role in regional development.

Academic Programs

Currently, the Department of Electrical Engineering offers an undergraduate program:

- Bachelor's in electrical engineering (BEE)
- Master of Science in Electrical Engineering (MSEE)

BACHELOR IN ELECTRICAL ENGINEERING (BEE)

The Electrical Engineering program is designed to grant students a Bachelor degree upon the successful completion of the four-year curriculum.

Program Objectives

The Department of Electrical Engineering offers an undergraduate program in Electrical Engineering that has the following main objectives:

1. Provide students with knowledge of the fundamental prerequisites in theory, design, and basic sciences for a career in electrical engineering.
2. Develop in students a range of skills based on theoretical and practical knowledge as well as specialized training in electrical engineering.
3. Develop in students a professional approach to engineering based on strong communication skills, teamwork, responsibility, and high ethics.
4. Equip students with proper tools to address open research problems in electrical engineering and to explore opportunities to apply the acquired knowledge in industrial settings.

Learning Outcomes

Students who graduate from the Department are expected to possess:

- a. A good command of engineering fundamentals in mathematics and physical sciences necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components.
- b. Knowledge of advanced engineering mathematics, probability and statistics, and physics concepts.
- c. Ability to design and conduct experiments in electrical engineering as well as to analyze data, interpret results, and write engineering reports.
- d. Ability to work in teams.
- e. Ability to identify, formulate, and solve engineering problems.
- f. Ability to communicate effectively through reports, presentations, discussions, and letters.
- g. Ability to engage in life-long learning and to approach research related problems in electrical engineering and related fields.
- h. Knowledge of contemporary issues in electrical engineering along with the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- i. A clear understanding of the impact of engineering solutions in a global, economic, environmental, and social context.
- j. Ability to initiate and complete a design project in electrical engineering taking into account realistic constraints including technical, economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

Career Opportunities

Modern electrical engineering is a broad and diverse field that rivals all engineering disciplines in its impact on society. The expanding role of electrical engineering in today's society reflects the variety and scope of this exciting profession. Local as well as regional career opportunities now available for electrical engineers span communications companies; hardware companies; consulting offices; design and implementation of electronic systems; electric power industry; biomedical equipment companies; radio and television broadcasting; control and manufacturing; electrical power generation, transmission and distribution; and industrial automation companies.

The Department of Electrical Engineering is committed to provide its students with meaningful, up-to-date skills and knowledge that allow them to pursue successful engineering careers and make deep impacts in their workplace. With these objectives in mind, the Electrical Engineering program is designed around fostering contemporary best practices and skills in line with the job opportunities for electrical engineers primarily within Tabuk and the Gulf region.

Consequently, graduates of the Department of Electrical Engineering are poised to take advantage of numerous job opportunities within the Tabuk province, and in the growing Saudi and Gulf markets.

Electrical Engineering Laboratories

In conformance with its mission and educational objectives, the Department of Electrical Engineering provides practical and advanced hands-on experience for students through state-of-the-art instructional and research laboratories including:

1. **Circuits Laboratory:** to introduce students to fundamental circuit analysis and measurement equipment including simulation-based analysis of circuits using packages like PSPICE.
2. **Digital Systems Laboratory:** to offer students the proper environment, with electronic equipment, computers, and software, to design, implement, and test microprocessor and microcontroller systems.
3. **Electronics Laboratory:** to allow students to apply classroom instruction and to investigate electronic systems at a component level and perform fundamental tests to understand the principles operating electronic components and devices.
4. **Electric Machines Laboratory:** to give students exposure to the main elements and equipment usually encountered in a power system including transformers DC machines; induction machines, single-phase induction motors; and synchronous machines.
5. **Control Systems Laboratory:** to offer students the experience of applying concepts and principles of linear control theory with state-of-the-art equipment and experiments including: rotary motion control, remote sensors for Ball and Beam, magnetic levitation, coupled tanks.
6. **Computer-based Laboratories:** to allow students an exposure to simulation-based analysis of control, electronics, power, and communication systems using the MATLAB software.

Curriculum and Program Structure

The curriculum of the Electrical Engineering is designed in conformance with the plan approved by the MOE. It includes courses in basic sciences and mathematics, engineering sciences, engineering design, communications skills, and humanities and social sciences. In addition, Lab hands-on experience with emphasis on design is an important element that is integrated throughout the curriculum.

The Electrical Engineering program requirements include:

- At least 29 credit hours of mathematics and basic sciences,
- At least 68 credit hours of engineering sciences and engineering design, and
- At least 18 credit hours of social sciences and humanities
- At least 12 credit hours of English language and technical writing courses
- At least 7 credit hours in Computer and Programming

The curriculum is designed to grant students a bachelor's degree in electrical engineering (BEE) upon the successful completion of the four-year program. The first year is shared with all engineering majors, which allows students to transfer from one major to another without losing any credits earned in the first year.

Final Year Project

As part of the fourth year, students are required to carry out a design project in electrical engineering and submit a technical report. The project is a substantial piece of work that will require creative activity, original thinking, and extensive teamwork to complete the usual four phases of projects: initiation, analysis, design and implementation. Approved projects account for four credit hours and extend over a full academic year. Throughout the phases of the project, students work in groups under the supervision of a faculty member. The project aims to provide students with a transitional experience from the academic world to the professional world. It is designed to serve as a platform in which teams of Electrical Engineering students engage in a meaningful design experience requiring the solution of significant and practical engineering design problems. The objectives of the final year project are:

- Allow students to demonstrate a wide range of the skills learned at the College of Engineering during their course of study by asking them to deliver a product that has passed through the design, analysis, testing and evaluation stages.
- Encourage multidisciplinary research through the integration of material learned in the program
- Allow students to develop problem solving, analysis, synthesis and evaluation skills.
- Encourage teamwork and interaction between students.
- Improve students' communication skills by asking them to produce both a professional report and a professional poster and to give an oral presentation on their work.

The project is important for a number of reasons:

- It is the largest single piece of design work that a student does during his/her BEE degree.

- It allows students to specialize in a topic that they enjoy.
- It is the work that prospective employers will most likely ask students about during interviews.
- It allows students to learn a wide range of the skills since the first year.
- Students must demonstrate these skills by delivering a product that has passed through the design, analysis, testing and evaluation stages.

Practical Training/ Internship

All engineering students are required to fulfill a 1-credit hour internship period of 8 to 12 weeks. This graduation requirement entails that each senior student (one who has completed around 80% of the total credit requirement) gains practical training experience during the summer term prior to graduation, or in the graduation semester, with either a company or an academic institution while involved in a practical experience.

Degree Requirements

To graduate with a bachelor's in electrical engineering, students must satisfactorily complete 134 credit hours. The distribution of courses is as follows:

University requirements

A total of 30 credit hours of general educational requirements:

- 6 credits of Arabic language: ARAB 101 and 201.
- 9 credits of English communication skills: ENGL 101, 102, and 203.
- 9 credits of social and cultural studies: SOCS 101, 201, and free elective course.
- 3 credits of computing basics for engineers: CSC 101.
- 3 credits of mathematics: MATH 101.

College requirements

Students in the Electrical Engineering Department are required to complete a total of 42 credit hours in college requirements distributed as follows:

- 11 credit hours in sciences: PHYS 101, PHYS 102, PHYS 103L, and CHEM 101/ 101L;
- 15 credit hours in mathematics and statistics: MATH 102, MATH 201, MATH 202, MATH 215, and STAT 230;
- 3 credit hours in Technical Writing: ENGL 206;
- 3 credit hours in Engineering Economy: COEN 300;
- 3 credit hours in Engineering Programming: ELEE 230;
- 1 credit hour in Engineering Ethics: COEN 401;
- 1 credit hour in Engineering Drawings: CIVE 215;

In addition, Electrical Engineering students should also complete a 4-credit hour final-year project during the senior year (ELEE 498 and 499) and a 1-credit hour internship (ELEE 400).

Program requirements

Electrical Engineering students must complete 62 credit hours in program requirements including the following 56 core courses:

- ELEE 210, ELEE 220, ELEE 240, ELEE 250, ELEE 250L, ELEE 290, ELEE 290L, ELEE 340
- ELEE 340L, ELEE 440L, ELEE 350, ELEE 360, ELEE 380, ELEE 390, ELEE 399L, ELEE 470
- ELEE 480L, MATH 225, ELEE 461, ELEE 451, ELEE 485, ELEE 460L, ELEE 470L,

In addition, Electrical Engineering students must take 6 credit hours electives. The accepted electives include:

- ELEE 462, ELEE 463, ELEE 465, ELEE 468, ELEE 469, ELEE 403, ELEE 443, ELEE 471, ELEE 490, ELEE 491, ELEE 422, ELEE 423, ELEE 431, ELEE 442

Study Plan for the BEE Degree

(134 Credit Hours)

Year I

First Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ARAB 101	Arabic Communication Skills	3	
SOCS 101	Islamic Civilization I	3	
CSC 101	Introduction to Computing	3	
ENGL 101	Basic Academic English I	3	
PHYS 101	Physics 101	3	
MATH 101	Calculus I	3	
	Total Credits	18	

Second Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ARAB 201	Advanced Academic Arabic	3	ARAB 101
ENGL 102	Basic Academic English II	3	ENGL 101
MATH 102	Calculus II	3	MATH 101
PHYS 102	Physics II	3	PHYS 101
CHEM 101	Chemistry I	3	
ELEE 230	Programming for Engineers	3	CSC 101
	Total Credits	18	

Year II

Third Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 203	Advanced Academic English I	3	ENGL 102
MATH 201	Calculus and Analytic Geometry III	3	MATH 102
MATH 202	Differential equations	3	MATH 102
PHYS 103L	Physics Lab.	1	PHYS 102
CIVE 215	Computer Aided Drawing	1	CSC 101
ELEE 210	Electric Circuits I	3	PHYS 102
	Free elective	3	
	Total Credits	17	

Fourth Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
STAT 230	Probability and Statistics	3	MATH 101
MATH 215	Linear algebra and Numerical Techniques	3	MATH 202
ELEE 250	Electric Circuits II	3	ELEE 210
ENGL 206	English Technical Writing	3	ENGL 203
ELEE 220	Logic Design	3	CSC101
MECH 225	Engineering Mechanics	3	PHYS 101
	Total Credits	18	

Year III**Fifth Semester (17 Credit Hours)**

Course	Title	Credits	Prerequisites
ELEE 240	Electronics	3	ELEE 210
ELEE 360	Machines	3	ELEE 250
ELEE 350	Signals and Systems	3	ELEE 250 & MATH 202
ELEE 290	Digital Systems	3	ELEE 220
ELEE 290L	Digital Systems Lab	1	CO ELEE 290
COEN 300	Engineering Economy	3	MATH 102
ELEE 250L	Electric Circuits Lab	1	Co- ELEE 250
	Total Credits	17	

Sixth Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
ELEE 340	Electronic Circuits	3	ELEE 240
ELEE 380	Control Systems	3	ELEE 350
ELEE 461	Fundamentals of Power Systems	3	ELEE 250
COEN 400	Communication Skills and Ethics	1	ENGL 203
ELEE 340L	Electronic Lab	1	ELEE 240
MATH 225	Numerical Computing	3	MATH 215
CHEM 101L	Chemistry Lab.	1	CHEM 101
	Total Credits	15	

Summer Semester (1 Credit Hour)

Course	Title	Credits	Prerequisites
ELEE 400	Internship for BEE Students	1	
	Total Credits	1	

Year IV

Seventh Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
ELEE 390	Electromagnetics	3	MATH 201, MATH 202, PHYS 102
ELEE 470	Communication Systems	3	ELEE 350 & STAT 230
ELEE 399L	MATLAB for Engineers	1	ELEE 230
ELEE 485	Instrumentation	3	ELEE 380
ELEE 480L	Control Lab	1	ELEE 380
	Specialization Elective	3	-
ELEE 460L	Machines Lab	1	ELEE 360
ELEE 498	Final Year Project (1)	1	ELEE 350 & ENGL 206
	Total Credits	16	

Eight Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
SOCS 201	World Civilization I	3	
ELEE 499	Final Year Project (2)	3	ELEE 498
ELEE 470L	Communications Lab	1	ELEE 370
ELEE 451	Digital Signal Processing	3	ELEE 350
ELEE 440L	Electronic Circuits Lab	1	ELEE 340
	Specialization Elective	3	-
	Total Credits	15	

Total Program Credits	134¹²	
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¹² Completion of the Bachelor of Science in Electrical Engineering

Course Descriptions

ELEE 210 Electric Circuits I

3(3, 0, 0)

System of units, Circuit variables (charge, current, voltage, power, energy). Circuit elements, and simple resistive circuits. Techniques of DC circuit analysis KVL, KCL, Nodal and Mesh analyses. The ideal Operational amplifier, Inductance and Capacitance. Natural and step responses of first order RL and RC circuits. Natural and step responses of RLC circuits

ELEE 220 Logic Design

3(3, 0, 0)

Number systems and codes, Boolean algebra; combinational circuit design; minimization methods; sequential logic design principles; latches and flip-flops, design of sequential circuits using flip flops, counters and registers, state machines.

Pre-requisite: CSC 101.

ELEE 230 Programming for Engineers

3(3, 0, 0)

This is an introductory programming course with an emphasis on problem-solving algorithmic ideas. Its topics include data types, selection, repetition, strings, functions, and pointers. Laboratory based lectures are an integral part of this course.

Pre-requisite: CSC 101.

ELEE 240 Electronics

3(3, 0, 0)

A course on semiconductors; semiconductor devices including PN junctions, diodes, Bipolar junction transistors (BJT), MOS field effect transistors (MOSFET), operational amplifiers (OP- AMPS); device characteristics; diode and transistor circuits. The course covers fundamental skills in analysis of electronic circuits: DC biasing, AC small signal analysis, and circuit simulation.

Pre- requisite: ELEE 210.

ELEE 250 Electric Circuits II

3(3, 0, 0)

Sinusoidal steady state analysis. Techniques of AC circuit analysis, AC power analysis (instantaneous, average power maximum average power transfer **Error! Bookmark not defined.**, complex and apparent power, power factor and power factor correction). Analysis of three-phase circuits. Mutual inductance and magnetically coupled circuits. Resonance circuits. Frequency response using Bode plots.

Prerequisite: ELEE 210

ELEE 250L Electric Circuits Laboratory

1(0, 0, 2)

Description: Measurement Device (Ammeters, Voltmeters, Oscilloscope), DC Circuit analysis (Ohm's Law, KCL, KVL, Current division, voltage division, Series/Parallel Combinations of Resistors, Thevenin's and Norton's Equivalent Circuits, Maximum Power Transfer), Frequency Response of RL and RC Circuits, Phase Measurements Using the Oscilloscope, Series Sinusoidal Circuits, Parallel sinusoidal Circuits, Series-Parallel Sinusoidal circuits, Series-Parallel sinusoidal Circuits, Resonant Circuits, Frequency response of filters (low-pass, high-pass, Band-pass).

Prerequisite: ELEE 250

ELEE 290 Digital Systems**3(3, 0, 0)**

Microprocessor and Microcontroller design and applications: internal architecture, programming, interfacing techniques, and performance evaluation. The course includes a design project.

Prerequisite: ELEE 220 and ELEE 230.

ELEE 290L Digital Systems Lab**1(0, 0, 2)**

Logic circuit design: combinational and sequential circuits; computer organization and interfacing techniques; program-controlled and interrupt-driven I/O; memory organization; simple peripheral devices and controllers; bus interfaces; microcontroller-based designs.

Co-requisite: ELEE 290.

ELEE 340 Electronic Circuits**3(3, 0, 0)**

A course on BJT amplifiers; common emitter, common collector, common base; MOSFET amplifiers; common source, common gate; multistage amplifier; Darlington-pair transistor differential amplifiers; frequency response of amplifiers; practical considerations of operational amplifiers; oscillators.

Prerequisite: ELEE 240.

ELEE 340L Electronics Lab**1(0, 0, 2)**

A practical course on silicon and germanium diode characteristic; light emitting diode (LED); Zener diode; half wave rectifier; full wave rectifier; BJT transistor characteristics; basic op-amps amplifier like differential; summer; multiplier; division.

Co-requisite: ELEE 340

ELEE 350 Signals and Systems**3(3, 0, 0)**

Signals and Systems, introduces electrical engineering students to core tools in continuous-time signals and linear systems characterization and analysis, time domain analysis using convolution, frequency domain analysis using Fourier series and transform, and Laplace transform.

Prerequisite: ELEE 250 and MATH 202

ELEE 360 Electric Machines**3(3, 0, 0)**

Magnetic circuits, ideal and real transformers, equivalent circuit of a power transformer, single phase, three phase, auto transformers construction, regulation, transformer taps and Voltage Regulation, The voltage and induced torque equations in DC machines, The construction of DC machines, power flow and losses in DC machines, Motor equivalent circuit, Motor starters, Efficiency, DC generators, voltage control and regulation, construction of AC machines, principle of operation as motor and generator synchronous generators, construction, equivalent circuits, power and torque equations, parallel operation. Synchronous motors starting, equivalent circuit-synchronous condenser. Induction motors, construction, equivalent circuit, power and torque, speed control.

Prerequisite: ELEE 250:

ELEE 380 Linear Control Systems**3(3, 0, 0)**

A course that covers mathematical modeling (transfer functions, block diagrams, signal flow graph) of linear continuous single input/single output dynamical systems; Open-loop and Closed-loop systems analysis; First and second order systems, Systems Stability (Routh-Hurwitz criterion); Steady-state error analysis of unity-feedback

control systems; Frequency response analysis (Bode plots, Nyquist, Root-locus method); Introduction to PID controllers (performances, Ziegler-Nichols tuning method).

Prerequisite: ELEE 350.

ELEE 390 Electromagnetic Field Theory 3(3, 0, 0)

This course covers the fundamentals of engineering electromagnetics. It deals with transmission line theory; the study of electrostatic fields in vacuum and dielectrics, conductors, capacitance, electrostatic potential energy; magnetostatic fields, Biot-Savart law, Ampere's law, vector magnetic potential, inductance.

Prerequisites: ELEE 350 and MATH 215.

ELEE 399L MATLAB for Engineers 1(0, 0, 2)

This course covers MATLAB fundamentals and graphics; m-files programming; Simulink; electrical engineering (e.g. control, communication and power systems) related MATLAB toolboxes. Laboratory based lectures are an integral part of this course: ELEE 230, ELEE 350.

Prerequisites: MATH 225.

ELEE 400 Internship for ELEE Students (1 Cr)

This is an eight to twelve-week professional training course in electrical engineering. This course is open for students with senior standing (who have completed around 80% of the total credit requirement) to gain practical training experience during the summer prior to graduation, or during graduation semester, with either a company or an academic institution while involved in a practical experience.

Prerequisite: Pass 90 credit hours.

ELEE 451 Digital Signal Processing 3(3, 0, 0)

Review of signals, systems, and transforms; design of Digital Filters: FIR and IIR; sampling and reconstruction of signals; multi-rate signal processing with applications; effects of finite word length; discrete random signals and Spectral Estimation; introduction to 2D signal and image processing.

Prerequisite: ELEE 350.

ELEE 470 Communication Systems 3(3, 0, 0)

This is an introductory course on modern communication systems. The course covers the following main topics: Equivalent low-pass models. Amplitude modulation and demodulation. Angle modulation and demodulation. AWGN channels and noise and signal power calculations using the PSD. Sampling, quantization and pulse code modulation.

Prerequisite: ELEE 350 and STAT 230

ELEE 470L Communication Systems Lab 1(1, 0, 0)

AM modulators and demodulators. Super-heterodyne radio receiver. FM modulators and demodulators. Simulation using Matlab/Simulink. Lab project.

Prerequisite: ELEE 470

ELEE 480L Control Lab**1(0, 0, 2)**

A laboratory course that covers analysis of linear systems; second order systems; effects of poles and zeros on the transient response; effect of gain on response and stability; compensation implementation.

Prerequisite: ELEE 380.

ELEE 498 Final Year Project I**1(1, 0, 0)**

This course is intended to provide students with practical experience in a wide range of electrical engineering applications including electronics, power, control, computer, and communications. Students learn how to initiate a project in an engineering discipline by completing the main tasks: define the project, state the objectives, complete a literature survey, set project specifications, and select a design method.

Prerequisite: Pass 90 credit hours.

ELEE 499 Final Year Project II**3(0, 3, 0)**

In this course, students work in groups to complete the project initiated in ELEE 401 under the supervision of an instructor. The course is offered either in lecture style with covered subjects including: design and implementation issues related to projects, progress evaluation, change management, and closure; or as individual groups supervised by different instructors.

Prerequisite: ELEE 498.

ELEE 440L Electronic Circuits Lab**1(0, 0, 2)**

PSPICE simulation of electronic circuits; linear applications of op-amp; Wein-bridge oscillator; active filters: LPF and HPF; Schmitt trigger and astable multi-vibrator; differential amplifier using BJT; CMOS inverter characteristics; TTL inverter characteristics.

Prerequisite: ELEE 340.

ELEE 460L Machines Lab**1(0, 0, 2)**

Operation of Single-Phase Transformers. Three-Phase Transformers. DC Generator, Series, Shunt, Compound Generators. DC Motors, Series, Shunt, Compound Motors. Synchronous Generator, No-load test, parallel operation. Synchronous motors, Induction motors. Single-Phase Induction motors. Plot curves of an AC machine characteristics.

Prerequisites: ELEE 360.

ELEE 470L Communications Lab**1(0, 0, 2)**

A laboratory course with experiments covering the following topics: AM and FM modulation/demodulation, sampling and quantization, digital modulation (PSK, FSK, MSK, GMSK), digital demodulation, and inter-symbol interference.

Prerequisite: ELEE 370.

ELEE 490L Radio Frequency Lab**1(0, 0, 2)**

Transmission line parameters; attenuation, magnitude and phase of voltage and current on lines; reflected waves; waveguide characteristics and techniques; antenna patterns and impedances; optical devices.

Prerequisite: ELEE 390.

Electives Courses:

ELEE 403 Special Topics in Electrical Engineering 3 (3, 0, 0)

Any selected topic in the state-of-the-art in Electrical Engineering.

Prerequisite: discretion of advisor.

ELEE 404 Introduction to Engineering Project Management 3 (3, 0, 0)

This course is meant to expose students to problems, techniques, and issues of project management similar to those encountered in practice. The course serves to convey knowledge, skills, tools, and techniques that project managers use to initiate, plan, execute, and evaluate projects. Special emphasis will be placed on learning and applying the concepts of managing scope, risk, budget, time, expectations, quality, people, communications, and procurement. The course includes a practical side where students get to apply project management tools and techniques to real problems.

Prerequisites: COEN 300, ENGL 206.

ELEE 421 Computer Graphics 3(3, 0, 0)

A course on interactive graphics; graphics hardware; graphical input devices; windowing; clipping; viewports; zooming, geometrical transformations (2D and 3D); data structures; advanced raster display architectures; raster algorithms; special graphics techniques; applications.

Prerequisite: Senior standing.

ELEE 422 Computer Architecture 3(3, 0, 0)

A course on the principles, techniques, and trade-offs used in designing modern processor architectures. Topics include: benchmarking and performance evaluation, long-latency instruction pipelining, hardware and software techniques for exploiting instruction-level parallelism (out-of-order, speculative, and predicated instruction execution; multithreading; loop unrolling, software pipelining, and trace scheduling), high performance memory systems, and multiprocessor systems and programming.

Prerequisite: ELEE 290.

ELEE 423 Embedded Systems Design 3(3, 0, 0)

This is a course on embedded hardware and software design. The system design process: requirements analysis, specification, hardware/software co-design, testing; Embedded computing platforms: general- and special-purpose processors, hardware accelerators, systems-on-a-chip, intellectual property (IP) core-based design, embedded networks; Software design tools and technologies: CAD tools, compilers, and assemblers. Hardware design tools and technologies: hardware-description languages, high-level synthesis tools, ASIC and FPGA design flows; Real-time operating systems: multiple tasks and processes, context switching, task scheduling, inter-process communication mechanisms; Low-power computing: circuit, architecture, and application techniques; System reliability and fault tolerance.

Prerequisites: ELEE 290.

ELEE 431 Computer Networks 3(3, 0, 0)

A course that outlines data communications; wide area networks; circuit and packet switching; routing; congestion control; local area networks; communications architecture and protocols; internetworking.

Prerequisites: ELEE 350 and STAT 230.

ELEE 441 Analog Integrated Circuits **3(3, 0, 0)**

A course on the design of analog integrated circuits with an emphasis on MOS circuits; op-amp design; feedback and stability; applications of analog integrated circuits such as filtering and A/D conversion; comparison with bipolar circuits; extensive use of SPICE for circuit simulation.

Prerequisite: ELEE 340.

ELEE 442 Digital Integrated Circuits **3(3, 0, 0)**

A course on digital electronic circuits; models, current equations, and parasitic of CMOS transistors for digital design; study of CMOS inverter and logic gates, including analysis, design, simulation, layout, and verification; advanced circuit styles; sequential circuits; advanced topics: semiconductor memories, power grid, clocking strategies, data-path building blocks, deep-submicron design issues, interconnect.

Prerequisite: ELEE 290 and ELEE 340.

ELEE 454 Digital Image Processing **3(3, 0, 0)**

A course on two-dimensional signals and systems; image formation and perception; representation, coding, filtering restoration, and enhancements; feature extraction and scene analysis; introduction to computer vision.

Prerequisite: ELEE 350.

ELEE 455 Adaptive Filtering **3(3, 0, 0)**

A course that examines the fundamentals of adaptive filter analysis and design, with emphasis on applications in linear and decision-feedback equalization, beam forming, channel estimation and tracking, noise and echo cancellation, source separation, and blind equalization; stochastic gradient algorithms (LMS-type) and recursive least-squares algorithms (RLS-type).

Prerequisite: ELEE 350.

ELEE 471 Wireless Communications **3(3, 0, 0)**

A course on wireless channel models; performance of digital modulation schemes in wireless channels; diversity techniques; channel coding and interleaving in fading channels; adaptive equalization in wireless channels; multiple access techniques; fundamentals of cellular communications; current wireless communication systems.

Prerequisite: ELEE 370.

ELEE 472 Information Theory **3(3, 0, 0)**

This course introduces the field of information theory and its applications to communications theory, computer science, statistics, and probability theory. Covering all the essential topics in information theory, we introduce the basic quantities of entropy, relative entropy, and mutual information, and show how they arise as natural answers to questions of data compression, channel capacity, rate distortion, and hypothesis testing.

Prerequisite: Senior standing.

ELEE 473 Coding Theory **3(3, 0, 0)**

This course introduces the theory of error-correcting codes. The course will focus on results of asymptotic or algorithmic significance. Topics include: construction and existence results for error-correcting codes; limitations on the combinatorial performance of error-correcting codes; low density parity check codes; algebraic geometric codes; Turbo codes; and decoding algorithms.

Prerequisite: Senior standing.

ELEE 475 Stochastic Processes, Detection, and Estimation 3(3, 0, 0)

This is a course on types of random processes, series representation, and filtering; hypothesis testing and parameter estimation from a probabilistic point of view; extension to detection and estimation of known signals in white and non-white noise; prediction and filtering problems.

Prerequisites: STAT 230 and ELEE 350.

ELEE 481 Control System Analysis and Design 3(3, 0, 0)

This course outlines state-space models of discrete and continuous, linear and nonlinear systems; controllability; observability; minimality; Eigenvector and transforms analysis of linear time invariant multi-input multi-output systems; pole shifting; computer control; design of state feedback controllers and observers.

Prerequisite: ELEE 380.

ELEE 482 Robotics 3(3, 0, 0)

A course that examines robot manipulators: kinematics, control, programming, task planning, and effect of load; design of robot controllers: path tracking, force feedback control, real-time computation issues; a set of laboratory experiments and a design project.

Prerequisite: ELEE 380.

ELEE 483 Optimal Control 3(3, 0, 0)

A course on optimization theory and performance measures; calculus of variations; the maximum principle; dynamic programming; numerical techniques; LQR control systems.

Prerequisite: ELEE 380.

ELEE 484 System Identification 3(3, 0, 0)

This course provides an introduction to time series; auto regressive moving average models and their characteristics; modeling; forecasting; stochastic trends and seasonality; multiple series and optimal control; and applications.

Prerequisite: Senior standing.

ELEE 485 Instrumentation 3(3, 0, 0)

This is a design course for complete instrumentation systems including measurements, sensors, data acquisition, and component integration. Application areas and course projects include industrial control, laboratory measurements, automation systems, and the like. This course is completed with a set of laboratory experiments.

Prerequisite: ELEE 380.

ELEE 486 Intelligent Control Systems 3(3, 0, 0)

Introduction to artificial intelligence concept and techniques; fuzzy control systems: fuzzy logic; fuzzy sets; fuzzification and defuzzification; fuzzy inference and control; neural network control: single-layer and multi-layer perceptrons, self-organizing networks, feedforward networks, training techniques; considerations of practical implementation of intelligent control.

Prerequisite: Senior standing.

ELEE 461 Fundamentals of Power Systems Analysis 3(3, 0, 0)

Description: Introduction to Power systems, Review of Basic Principles (active, Reactive, and complex power, power factor, power factor correction, balanced three-phase circuits and analysis Y/ Δ loads, per-phase analysis). Generator Model, Transformer Model (equivalent circuits, types), Per-Unit Systems and Calculations, Transmission Line Parameters and Calculation (resistance, capacitance, inductance, corona), Line Model and Performance (modeling of short, medium, and long lines, voltage and current waves, surge impedance loading, complex power flow, power transmission capability, line compensation).

Prerequisite: ELEE 250

ELEE 462 Power Electronics 3(3, 0, 0)

Introduction Power semiconductor Devices. Signals and Integration. AC-DC Converters (Rectifiers), Un-controlled Rectifiers, controlled. Rectifiers. Single-Phase and Three-Phase converters. DC-DC converters, Step-Down and Step-up converters. Switching Mode Regulations. Applications, DC Drivers, DC power Supplies.

Prerequisite: ELEE 340

ELEE 463 Electric Drives 3(3, 0, 0)

Fundamental and basic principles of electric motor drive systems are studied. Selecting the proper electric motor for different applications based on the characteristics of the electrical machine and the mechanical load are introduced. Moreover, designing a suitable power electronics converter and its associated control system (speed control, position control, and current control) for industrial drives are presented. Electric drives for dc motors, brushless dc motors, three-phase induction motors, and electronic low-power motors are thoroughly explained.

Prerequisite: ELEE 360

ELEE 464 Industrial Electrification 3(3, 0, 0)

A course on medium and low voltage installations; lighting; practical applications of electric machines; motor control centers; emergency power supplies; auxiliary systems.

Prerequisite: ELEE 360.

ELEE 465 Power System Planning 3(3, 1, 0)

Basic power system load forecast methodologies, Electric power system loads types and characteristics, Electric power system energy consumer categories, Power system generation and transmission reliability evaluation, Power system cost assessment, Electric power system load management and energy conservation strategies. Power system generation planning, Transmission system planning, substation expansion planning.

Prerequisite: ELEE 461

ELEE 466 Environmental Aspects of Energy Systems 3(3, 0, 0)

A course that examines world energy resources and classifications; sources and effects of air pollution; air quality modeling, Gaussian dispersion models for pollution estimation; motor vehicle emissions and noise pollution; environmental impacts of electricity generation, pollution control systems, electromagnetic radiation, production and impacts in high-voltage applications; environmental impact assessment; basic concepts.

Prerequisite: Senior standing.

ELEE 467 Energy Planning and Policy **3(3, 0, 0)**

This course focuses on features of modern energy planning and policy. Topics covered include the interaction among the technological, economic, environmental, and sociopolitical aspects of energy supply and use; electricity, oil, and gas industries, and their market structures; elements of energy planning on the sectoral and national levels; energy decision making under uncertainties, risk management in energy planning; liberalization of energy markets; case studies.

Prerequisite: Senior standing.

ELEE 468 Renewable Energy Systems **3(3, 0, 0)**

Renewable energy resources, Wind energy , types of wind turbines, solar thermal energy and solar PV, waste energy and biomass, tidal and water wave power, Hydropower plants, Micro-hydro generation technology, fuel cells and hydrogen.

Prerequisite: ELEE 250.

ELEE 469 Power System Protection **3(3, 0, 0)**

It is an introductory course for the fundamentals of power System protection, that reviews the different types of faults in the power system, principles and components of power system protection, types and operating principles of protective relays, protection of transmission lines (overcurrent, distance and pilot protection), apparatus protection (Bus bar-reactor, transformer, generator, motor), power fuses, circuit breakers, overvoltage protection and mitigation techniques.

Prerequisite: ELEE 461.

ELEE 443 RF and Microwave Circuits for Communications **3(3, 0, 0)**

The course focuses on the analysis and design of high-frequency electronic circuits, with emphasis on RF and Microwave circuits and components for communication systems. The course covers the basic principles of radio-frequency (RF) and microwave circuits design, as applied to the design of micro-strip and coplanar lines, impedance transformers, low-pass and band-pass filters, directional couplers, power dividers, amplifiers, mixers, and diode detectors. It provides understanding of S- parameters and signal-flow graph analysis techniques. The course enables the student to get hands- on experience in RF and Microwave circuit design through the use of computer-aided design tools to simulate and analyze high frequency circuits, build them as part of a course project, and perform measurements in the lab using network and spectrum analyzers.

Prerequisites: ELEE 340 and ELEE 390.

ELEE 474 RF and Microwave Communication Systems **3(3, 0, 0)**

This course introduces students to system blocks, system parameters and architectures of RF and microwave systems for wireless communications. It mainly targets the physical layer of a communication system, addresses the operation of the components that reside within the RF chain, details the functional level modeling of RF systems by accounting for the gain, noise, non-linearity, sensitivity and dynamic range parameters, and overviews link budget analysis of RF radio links.

Prerequisites: ELEE 340 and ELEE 390.

ELEE 490 Electromagnetic Waves and Transmission 3(3, 0, 0)

This course covers basic concepts and methods related to time-varying electromagnetic fields. It deals with impedance matching using the Smith Chart, Maxwell's equations for time varying fields, plane-wave propagation, and wave reflection and transmission.

Prerequisite: ELEE 390.

ELEE 491 Antenna Theory and Design 3(3, 0, 0)

This course presents the basic principles of antenna theory analysis and design for wireless communications. It covers the fundamental parameters of antennas and the analytical methods used to design linear antennas, loop antennas, antenna arrays and microstrip antennas.

Prerequisite: ELEE 390.

ELEE 411 Biomedical Instrumentation 3(3, 0, 0)

This course introduces general instrumentation configuration, living cells, and performance of instrumentation systems; types and characteristics of transducers; sources and characteristics of bioelectric signals and electrodes; cardiovascular system, measurements, and diagnostic equipment; patient care and monitoring.

Prerequisite:

ELEE 412 Biomedical Signal and Image Processing 3(3, 0, 0)

A course that introduces the fundamentals of digital signal processing as implemented in biomedical applications. It provides a concise treatment of the tools utilized to describe deterministic and random signals as the basis of analyzing biological signals: data acquisition; imaging; de-noising and filtering; feature extraction; modeling. The course is tightly coupled with a practical component as it looks at and assigns several laboratory projects. Examples include the auditory system, speech generation, electrocardiogram, neuronal circuits, and medical imaging. Students should have reasonable software skills in Matlab.

Prerequisite: ELEE 350.

DEPARTMENT OF RENEWABLE ENERGY ENGINEERING

Mission

The mission of the Department of Renewable Energy Engineering is to provide students with quality education based on a thorough foundation in electrical, mechanical, and renewable sources of energy using the mathematics and physical sciences, and technology; to guarantee students an exposure to major research and practical design experiences in renewable energy engineering; and to enrich the students' academic experience with global perspective and awareness of their leadership role in regional development.

Academic Program

Currently, the Department of Renewable Energy Engineering offers an undergraduate program:

- Bachelor in Renewable Energy Engineering (BREE)

BACHELOR IN RENEWABLE ENERGY ENGINEERING (REE)

The Renewable Energy Engineering program is designed to grant students a Bachelor degree upon the successful completion of the four-year curriculum.

Program Objectives

The Department of Renewable Energy Engineering offers an undergraduate program in Renewable Energy Engineering that has the following main objectives:

1. Provide students with knowledge of the fundamental prerequisites in theory, design, and basic sciences for a career in renewable energy engineering.
2. Develop in students a range of skills based on theoretical and practical knowledge as well as specialized training in renewable energy engineering.
3. Develop in students a professional approach to engineering based on strong communication skills, teamwork, responsibility, and high ethics.
4. Equip students with proper tools to address open research problems in renewable energy and to explore opportunities to apply the acquired knowledge in industrial settings.

Learning Outcomes

Students who graduate from the Department of Renewable Energy Engineering are expected to possess:

- a. A good command of engineering fundamentals in mathematics and physical sciences necessary to analyze and design complex electrical power and electronic devices, software, and systems containing hardware and software components.
- b. Knowledge of advanced engineering mathematics and physics concepts.
- c. Ability to design and conduct experiments in renewable energy engineering as well as to analyze data, interpret results, and write engineering reports.
- d. Ability to work in teams.
- e. Ability to identify, formulate, and solve engineering problems,
- f. Ability to communicate effectively through reports, presentations, discussions, and letters.
- g. Ability to engage in life-long learning and to approach research related problems in renewable energy engineering and related fields.
- h. Knowledge of contemporary issues in renewable energy engineering along with the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- i. A clear understanding of the impact of renewable energy solutions in a global, economic, environmental, and social context.
- j. Ability to initiate and complete a design project in renewable energy engineering taking into account realistic constraints including technical, economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

Career Opportunities

Modern renewable energy engineering is a broad and diverse field that rivals all engineering disciplines in its impact on society. The expanding role of renewable energy engineering in today's society reflects the variety and scope of this exciting profession. Local as well as regional career opportunities are now available for renewable energy engineers that span solar cells industry, production of clean energy sources; such as wind and solar power plants, design and implementation of renewable energy systems, such as photovoltaic farm, wind turbine, and other renewable energy sources. In general, the graduate of this programs would maximize the energy potential of clean energy sources including wind, solar, geothermal and hydropower.

The Department is committed to provide its students with meaningful, up- to-date skills and knowledge that allow them to pursue successful engineering careers and make deep impacts in their workplace. With these objectives in mind, the Renewable Energy Engineering program is designed around fostering contemporary best practices and skills in line with the job opportunities for renewable energy engineers primarily within Tabuk and the region.

Consequently, graduates of the Department of Renewable Energy Engineering are poised to take advantage of numerous job opportunities within the Tabuk province, especially with the growing demands of Saudi and Gulf markets for new energy sources.

Renewable Energy Engineering Laboratories

In conformance with its mission and educational objectives, the Department of Renewable Energy Engineering provides practical and advanced hands-on experience for students through state-of-the- art instructional and research laboratories including:

1. **Circuits and Electronics Laboratory:** to introduce students to fundamental circuit analysis and measurement equipment including simulation based analysis of circuits using packages like PSPICE.
2. **Photovoltaic Laboratory:** to offer students the proper environment, with photovoltaic cells and industry. Techniques used for processing and fabrication PV cells, and lab safety equipment, Organic and inorganic solar cells design and simulation tools, and photovoltaic testing and measurement techniques to characterize solar cells. Calibration of solar cells.
3. **Electric Machines Laboratory:** to give students exposure to the main elements and equipment usually encountered in a power system including transformers DC machines; induction machines, single-phase induction motors; and synchronous machines.
4. **Control Systems Laboratory:** to offer students the experience of applying concepts and principles of linear control theory with state of the art equipment and experiments including: rotary motion control, remote sensors for Ball and Beam, magnetic levitation, coupled tanks.
5. **Computer-based Laboratories:** to allow students an exposure to simulation based analysis of control, electronics, power, and communication systems using the MATLAB software.

Curriculum and Program Structure

The curriculum of the Renewable Energy Engineering program is designed in conformance with the plan approved by the MOE. It includes courses in basic sciences and mathematics, engineering sciences, engineering design, communications skills, and humanities and social sciences. In addition, Lab hands-on experience with emphasis on design is an important element that is integrated throughout the curriculum.

The Renewable Energy Engineering program requirements include:

- At least 29 credit hours of mathematics and basic sciences,
- At least 68 credit hours of engineering sciences and engineering design, and
- At least 18 credit hours of social sciences and humanities
- At least 12 credit hours of English language and technical writing courses
- At least 7 credit hours in Computer and Programming

The curriculum is designed to grant students a Bachelor degree in Renewable Energy Engineering (REE) upon the successful completion of the four-year program. The first year is shared with all engineering majors, which allows students to transfer from one major to another without losing any credits earned in the first year.

Final Year Project

As part of the fourth year, students are required to carry out a design project in renewable energy engineering and submit a technical report. The project is a substantial piece of work that will require creative activity, original thinking, and extensive teamwork to complete the usual four phases of projects: initiation, analysis, design and implementation. Approved projects account for four credit hours and extend over a full academic year. Throughout the phases of the project, students work in groups under the supervision of a faculty member. The project aims to provide students with a transitional experience from the academic world to the professional world. It is designed to serve as a platform in which teams of Renewable Energy Engineering students engage in a meaningful design experience requiring the solution of significant and practical engineering design problems. The objectives of the final year project are:

- Allow students to demonstrate a wide range of the skills learned at the College of Engineering during their course of study by asking them to deliver a product that has passed through the design, analysis, testing and evaluation stages.
- Encourage multidisciplinary research through the integration of material learned in the program
- Allow students to develop problem solving, analysis, synthesis and evaluation skills.
- Encourage teamwork and interaction between students.
- Improve students' communication skills by asking them to produce both a professional report and a professional poster and to give an oral presentation on their work.

The project is important for a number of reasons:

- It is the largest single piece of design work that a student does during his/her BEE degree.
- It allows students to specialize in a topic that they enjoy.
- It is the work that prospective employers will most likely ask students about during interviews.
- It allows students to show a wide range of the skills learned since the first year.
- Students must demonstrate these skills by delivering a product that has passed through the design, analysis, testing and evaluation stages.

Practical Training/ Internship

All engineering students are required to fulfill a 1-credit hour internship period of 8 to 12 weeks. This graduation requirement entails that each senior student (has completed around 80% of the total credit requirement) gains practical training experience during the summer term prior to graduation, or in the graduation semester, with either a company or an academic institution while involved in a practical experience.

Degree Requirements

To graduate with a Bachelor in Renewable Energy Engineering, students must satisfactorily complete 140 credit hours. The distribution of courses is as follows:

University requirements

A total of 30 credit hours of general educational requirements:

- 6 credits of Arabic language: ARAB 101 and 201.
- 9 credits of English communication skills: ENGL 101, 102, and 203.
- 9 credits of social and cultural studies: SOCS 101, 201, and free elective course.
- 3 credits of computing basics for engineers: CSC 101.
- 3 credits of mathematics: MATH 101.

College requirements

Students in the Renewable Energy Engineering Department are required to complete a total of 42 credit hours in college requirements distributed as follows:

- 11 credit hours in sciences: PHYS 101, PHYS 102, PHYS 103L, and CHEM 101/ 101L;
- 15 credit hours in mathematics and statistics: MATH 102, MATH 201, MATH 202, MATH 215, and STAT 230;
- 3 credit hours in Technical Writing: ENGL 206;
- 3 credit hours in Engineering Economy: COEN 300;
- 3 credit hours in Engineering Programming: ELEE 230;
- 1 credit hour in Engineering Ethics: COEN 401;
- 1 credit hour in Engineering Drawings: CIVE 215;

In addition, Renewable Energy Engineering students should also complete a 4-credit hour final-year project during the senior year (REE 498 and 499) and a 1-credit hour internship (REE 400).

Program requirements

Renewable Energy Engineering students must complete 68 credit hours in program requirements including the following 59 core courses:

- ELEE 350, ELEE 360, ELEE 380, ELEE 480L, MECH 230, MECH 342, REE 210, REE 240, REE 250, REE 245L, REE 260, REE 310, REE 320, REE 340, REE 350, REE 420, REE 460, REE 465, REE 470, REE 473, REE 475, REE 460L

In addition, Renewable Energy Engineering students must take 9 credit hours electives. The accepted electives include:

- REE 471, REE 472, REE 474, REE 475, REE 476, REE 477, REE 478, REE 479, REE 481, REE 482, REE 483, REE 485, REE 486

Study Plan for the REE Degree

(140 Credit Hours)

Year I

First Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ARAB 101	Arabic Communication Skills	3	
SOCS 101	Islamic Civilization I	3	
CSC 101	Introduction to Computing	3	
ENGL 101	Basic Academic English I	3	
PHYS 101	Physics 101	3	
MATH 101	Calculus I	3	
	Total Credits	18	

Second Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ARAB 201	Advanced Academic Arabic	3	ARAB 101
ENGL 102	Basic Academic English II	3	ENGL 101
MATH 102	Calculus II	3	MATH 101
PHYS 102	Physics II	3	PHYS 101
CHEM 101	Chemistry I	3	
ELEE 230	Programming for Engineers	3	CSC 101
	Total Credits	18	

Year II

Third Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ENGL 203	Advanced Academic English I	3	ENGL 102
MATH 201	Calculus and Analytic Geometry III	3	MATH 102
MATH 202	Differential equations	3	MATH 102
PHYS 103L	Physics Lab.	1	PHYS 102
CHEM 101L	Chemistry Lab	1	CHEM 101
CIVE 215	Computer Aided Engineering Drawing (AutoCAD)	1	MATH 102
MECH 230	Engineering Materials	3	CHEM 101
SOCS 201	Islamic Civilization II	3	SOCS 101
	Total Credits	18	

Fourth Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
STAT 230	Probability and Statistics	3	MATH 101
MATH 215	Linear algebra and Numerical Techniques	3	MATH 202
REE 260	Thermodynamics	2	MATH 202
ENGL 206	English Technical Writing	3	ENGL 203
REE 210	Circuits for Renewable Engineering	3	MATH 202
REE 250	Digital Systems	3	MATH 202
	Total Credits	17	

Year III**Fifth Semester (18 Credit Hours)**

Course	Title	Credits	Prerequisites
ELEE 360	Machines	3	REE 210
ELEE 350	Signals and Systems	3	REE 210 + MATH 202
REE 320	Fundamental of Renewable Energy	3	REE 210
MECH 342	Heat Transfer	3	REE 260
REE 240	Electronics for Renewable Engineering	3	REE 210
COEN 300	Engineering Economy	3	MATH 202
	Total Credits	18	

Sixth Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
ELEE 380	Control Systems	3	ELEE 350
REE 310	Fundamental of Power Electronics	3	REE 240
COEN 401	Engineering ethics	1	COEN 300
REE 340	Fundamental of Power Systems	3	ELEE 360
REE 420	Renewable Engineering I: Applied Photovoltaic	3	REE 320
REE 240L	Circuit and Electronics Lab	1	REE 240
ELEE 480L	Control Systems Lab.	1	ELEE 480
	Total Credits	15	

Summer Semester (1 Credit Hour)

Course	Title	Credits	Prerequisites
REE 400	Summer Internship Training	1	Senior Standing
	Total Credits		

Year IV

Seventh Semester (17 Credit Hours)

Course	Title	Credits	Prerequisites
REE 350	Solar Thermal Energy Design	3	REE 310
REE 498	Final Year Project I	1	REE 320
REE 460	Renewable Engineering II: Wind Energy	3	REE 320
REE 460L	Photovoltaic Lab	1	REE 420
REE 473	Life Cycle Assessment	3	
	Specialization Elective	3	-
	Specialization Elective	3	-
	Total Credits	17	

Eight Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
REE 499	Final Year Project II	3	REE 498
REE 465	Smart City Applications	3	REE 320
REE 470	Renewable Engineering III: Other Renewable Energies	3	REE 320
REE 475	Energy Economics and Managements	3	REE 310
	Specialization Elective	3	-
	Free Elective	3	
	Total Credits	18	

Total Program Credits	140¹³	
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¹³ Completion of the Bachelor of Science in Renewable Energy Engineering

Course Descriptions

Core Courses:

ELEE 350 Signals and Systems **3(3, 0, 0)**
Signals and systems: definition, properties, and analysis; the Fourier series; the Fourier transform and its applications; the Laplace transformation and its applications; analysis and design of analog filters, MATLAB for analog signal processing.

Prerequisite: MATH 202

ELEE 360 Machines **3(3, 0, 0)**
A course on three-phase circuits and power calculations; magnetic circuits; single-phase and three-phase transformers; DC and AC machines under steady-state: construction, equivalent circuit, and testing and performance characteristics.

Prerequisite: REE 210

ELEE 380 Control Systems **3(3, 0, 0)**
A course that covers mathematical modeling (transfer functions, block diagrams, signal flow graph) of linear continuous single input/single output dynamical systems; Open-loop and Closed-loop systems analysis; First and second order systems, Systems Stability (Routh-Hurwitz criterion); Steady-state error analysis of unity-feedback control systems; Frequency response analysis (Bode plots, Nyquist, Root-locus method); Introduction to PID controllers.

Prerequisite: ELEE 350

ELEE 480L Control Systems Lab. **1(0, 0, 2)**
A laboratory course that covers analysis of linear systems; second order systems; effects of poles and zeros on the transient response; effect of gain on response and stability; compensation implementation.

Pre-requisite: ELEE 380.

MECH 230 Engineering Materials **3(3, 0, 0)**
The course introduces fundamental concepts in materials science as applied to engineering materials: crystalline structures; imperfections, dislocations, and strengthening, mechanisms; diffusion; phase diagrams and transformations. Ferrous and non-ferrous metal alloys, ceramics, and polymers. Structure-property relationships. Material selection case studies.

Prerequisite: CHEM 101

MECH 342 Heat Transfer **3(3, 0, 0)**
A course investigating steady and transient heat conduction; extended surfaces; numerical simulations of conduction in one and two-dimensional problems; external and internal forced convection of laminar and turbulent flows; natural convection; heat exchanger principles; thermal radiation, view factors and radiation exchange between diffuse and gray surfaces as well as the use of computer packages in problem solving.

Prerequisite: REE 260

REE 340 Fundamental of Power Systems 3(3, 0, 0)

Basic concepts and modeling of generation, transmission, and distribution systems; load flow analysis; economic load dispatch problem; symmetrical and asymmetrical short circuit studies; simplified power system stability analysis; introduction to power system

Prerequisite: ELEE 360

REE 350 Solar Thermal Energy Design 3(3, 0, 0)

Characteristics of solar radiation and solar collectors. Collector efficiency evaluation and prediction of long term performance. System modelling, energy storage; computer simulation and modelling of performance and economic worth.

Prerequisite: REE 310

REE 420 Renewable Engineering I: Applied Photovoltaic 3(3, 0, 0)

This course will cover main factors to the operation, design and construction of solar cells and PV system design. Solar cell loss mechanisms, design features to improve efficiency of solar cells and modules. In addition, Application and design of PV systems. Remote Area PV Power Supply systems. Grid-Connected PV systems.

Prerequisite: REE 320

REE 460 Renewable Engineering II: Wind Energy 3(3, 0, 0)

An overview of energy sustainability and wind energy history. Wind resources characteristics. Fundamentals of physical wind, basic meteorology of wind, extraction of energy from wind. Basic introduction to wind energy and energy conversion systems. Various types of wind energy, conversation systems and aerodynamics; blade and tower structural loads, kinematics of blades and meteorology. Wind plant development, and environment and ecological impact of wind energy plants.

Prerequisite: REE 320

REE 465 Smart City Applications 3(3, 0, 0)

This course will cover the main definitions, needs, challenges and disciplines in smart and sustainable cities. Introducing the historical development, present and future sustainability deficits of metropolitan areas. The course introduce criteria to measure sustainability, and political guiding principles and action plans formulated in order to achieve smart sustainable cities.

Prerequisite: REE 320

REE 470 Renewable Engineering III: Hydrogen Cells 3(3, 0, 0)

Production and storage of hydrogen. Electrical energy from fuel cells. Thermodynamic and kinetic calculations for fuel cells. Safety in hydrogen handling. Storage of electrical energy in batteries. Applications of hydrogen and fuel cells in stationary and mobile systems.

Prerequisite: REE 320

REE 473 Life Cycle Assessment 3(3, 0, 0)

This course will deal with life cycle analysis and its use for life cycle assessment of energy systems. Methodologies, boundary issues, data bases and applications will be studied. The uses of LCA will be illustrated with industrial case studies and with studies aimed at quantifying externalities associated with different electricity generation technologies.

Prerequisite: REE 320

REE 475 Energy Economics and Managements **3(3, 0, 0)**
Energy management principles; energy conversion; energy auditing; analysis; formulation of energy management options; economic evaluation, implementation & control; energy conservation techniques-conservation in energy intensive industries; steam generation, distribution systems, integrated resource planning; demand-side management; cogeneration; thermal insulation; energy storage; economic evaluation of conservation technologies; and analysis of typical applications
Prerequisite: REE 310

REE 460L Photovoltaic Lab **1(0, 0, 2)**
Introduction to photovoltaic cells, techniques used for processing and fabrication PV cells, and lab safety. Organic and inorganic solar cells design and simulation tools, and photovoltaic testing and measurement techniques to characterize solar cells. Calibration of solar cells.
Prerequisite: REE 460

Elective Courses:

REE 471 Renewable Energy Policy and International Programs **3(3, 0, 0)**
This course will review objectives and strategies of renewable energy policy, focusing on sustainable energy transitions, and the integration of renewable energy into electricity markets. Policy drivers, policy processes and relevant aspects of energy market structure and regulation. Selection and design of policy instruments, including regulation, taxation, tariffs, targets, incentives and market-based schemes will be explored. Specific policy and regulatory approaches, the views of different stakeholders and interaction with the broader policy regulatory environment will be examined for specific policy case studies.
Prerequisite: REE 320

REE 472 Energy and Environment **3(3, 0, 0)**
Energy System and Environment; conventional and renewable energy sources. The Impact of RE in reducing CO₂ emissions. Pollution growth and its sequences; Air, Water, soil, thermal, noise pollution – cause and effect; Causes of climate change in the global, the regional and the local regions
Prerequisite: REE 320

REE 474 Nuclear Energy **3(3, 0, 0)**
Introduction to nuclear energy. Atomic and nuclear physics, the interaction of radiation and matter. Nuclear reactor operation, reactor components, nuclear cycles, neutron diffusion and moderation. Reactor shielding. Fuel reprocessing and waste disposal. Reactor licensing and safety. Economics and environmental concerns.
Prerequisite: REE 320

REE 475 Nuclear Reaction **3(3, 0, 0)**
Energetic and kinetics of nuclear reactions and radioactive decay, fission, fusion, and reactions of low-energy neutrons; properties of the fission products and the actinides; nuclear models and transition probabilities; interaction of radiation with matters
Prerequisite: REE 320

REE 476 Principles of Green Building Design 3(3, 0, 0)

This course will cover the principles of green building design and construction, including incorporating green principles in renovating and remodeling, and preservation of historic structures as well as new buildings. Energy efficiency, indoor environmental quality, and sustainable building materials.

Prerequisite: REE 320

REE 477 Photovoltaic Energy System Design 3(3, 0, 0)

This course will cover the basic principles of the planning, design, installation, and operation of photovoltaic (PV) systems. Examination of PV system components, planning and design of grid-connected and stand-alone PV systems, analysis of PV systems at the residential scale through utility scale, including engineering, economic, and policy considerations.

Prerequisite: REE 420

REE 478 Biomass 3(3, 0, 0)

This course will introduce a range of biomass energy sources, including forestry, wastes and crops, as well as various technologies for capturing the stored chemical energy in biomass: direct combustion, pyrolysis, anaerobic digestion, gasification, fermentation, landfill gas and cogeneration.

Prerequisite: REE 320

REE 479 Wind Energy Converters 3(3, 0, 0)

This course will cover the principles of wind energy, design and operation of different types of wind energy converters. Water pumping machines, remote power supply and grid electricity generation. Wind energy site selection, monitoring and analyzing data, estimating output from wind generators, integrating wind generators into hybrid power systems or the grid, economics, standards and environmental impacts.

Prerequisite: REE 420

REE 481 Sustainable Energy Developing Countries 1(0, 0, 2)

This course covers many of the technical and non-technical issues relating to introducing photovoltaics and renewable energy systems and technology in developing countries. The course will cover various Recommended Practice Guides developed by industry expert groups in the areas of financing and investment mechanisms, capacity building, implementation models and quality assurance. Considering practical components related to design, implementation and maintenance of photovoltaic and renewable energy systems in developing countries and case studies will be also considered herein.

Prerequisite: REE 320

REE 482 Energy Efficiency 3(3, 0, 0)

This course will cover current and predicted energy use and associated GHG emissions; residential and commercial passive solar design; energy management programs; building management systems; heating, ventilation and air conditioning; and consumer products and office equipment. Impacts of transport, Opportunities to reduce transport energy with efficient engines, public transport, and urban design. Industrial systems examined include heat recovery; cogeneration; compressed air and steam distribution; and motor systems, pumps and fans. Barriers to improved energy efficiency such as up-front cost, lack of information are also covered.

Prerequisite: REE 320

DEPARTMENT OF MECHANICAL ENGINEERING

Mission

The mission of the Department of Mechanical Engineering is to instill in students an understanding of the fundamentals of mechanical engineering, to integrate classroom theory and practical hands-on design projects, to emphasize the process of learning and critical thinking, to develop in students the skills that are necessary to become lifelong learners, and to enlighten them of their leadership role in regional development.

Academic Programs

Currently, the Department of Mechanical Engineering offers an undergraduate program:

- Bachelor in Mechanical Engineering (BME)

BACHELOR IN MECHANICAL ENGINEERING (BME)

Program Objectives

The objectives of the Bachelor of Mechanical Engineering (BME) program include producing graduates who:

- Are equipped with a broad educational background in Mechanical Engineering needed to become leaders in industry and the public sector;
- Can correctly apply gained knowledge, work well with other people, effectively communicate technical information and ideas with the public, their peers, customers, and employers;
- Understand the need for life-long learning, the importance of community and professional involvement, are aware of cultural, societal, and professional issues;
- Can successfully pursue advanced studies.

Learning Outcomes

Each student receiving a Bachelor degree from the ME Department will be expected to demonstrate:

- a. Ability to apply knowledge of mathematics, science and engineering.
- b. Ability to design a system, component, or process to meet desired needs.
- c. Ability to develop, conduct and analyze experiments or tests and interpret data that may aid in the design process.
- d. Ability to identify, formulate and solve engineering problems.
- e. Ability to use computer-based techniques and modern engineering tools necessary for engineering practice.
- f. Understanding the importance of functioning on multi-disciplinary teams in the pursuit of a goal.
- g. Realization of the professional and ethical responsibilities of a practicing engineer;
- h. Ability to communicate effectively,
- i. Broad education necessary to understand the impact of engineering solutions in a global and societal context and increase the appreciation of the “non-technical” world.
- j. Awareness of the business environment in which engineering is practiced and other contemporary issues.
- k. Awareness and necessity of life-long learning experiences such as graduate studies or continuing education.

Career Opportunities

The Department of Mechanical Engineering is committed to providing its students with meaningful, up-to-date skills and knowledge that will allow them to pursue successful engineering careers and make deep impacts both within the Tabuk region and across the Gulf at large. With these objectives in mind, the ME program is designed around fostering contemporary best practices and skills in line with the job opportunities for mechanical engineers within Tabuk and the Gulf.

Mechanical systems are part of our everyday life, whether it is the car we drive, the plane we fly, the lift we use, or the products we handle. The fields that are part of mechanical engineering are numerous and cover a very large spectrum. This means that the mechanical engineering student has a challenging program to cover, but it also means that the opportunities offered to mechanical engineers are as wide and diverse.

Mechanical engineers are concerned with the planning, design, construction, implementation and operation of mechanical and related systems in a wide variety of situations. Other disciplines including biomechanics, environment protection and many other vital and emerging fields frequently rely on the expertise of mechanical engineers. Mechanical engineers work in a variety of areas including research and development, design, operations, maintenance, quality assurance, bioengineering, transportation (especially automotive and aerospace), energy, heating, ventilating, refrigeration and air conditioning, environmental and life-support systems, chemical, food production, materials processing, automated manufacturing and construction, heavy and precision machinery, robotics, and mechatronics. A wide spectrum of career opportunities is open to them. Because of the very broad nature of their discipline, mechanical engineers are usually in high demand. Beyond working for private enterprise, some graduates may work in government and non-government organizations, others may choose to pursue graduate studies or start their own business.

Curriculum and Program Structure

The curriculum is designed in conformance with the plan approved by the MOE. It includes courses in basic sciences and mathematics, engineering sciences, engineering design, communications skills, and humanities and social sciences. Lab hands-on experience and emphasis on design are important elements that are integrated throughout the curriculum.

The requirements of the BME include:

- At least 29 credit hours of mathematics and basic sciences,
- At least 68 credit hours of engineering sciences and engineering design, and
- At least 18 credit hours of social sciences and humanities
- At least 12 credit hours of English language and technical writing courses
- At least 7 credit hours in Computer and Programming

The curriculum is designed to allow students to receive the Bachelor of Engineering degree upon the successful completion of the four-year program. The first year is common with other engineering majors and it allows students to switch between the engineering majors at the start of the second year of their study.

Final Year Project

As part of their fourth year, students are required to carry out a project and submit a technical report. This project is a substantial piece of work that will require creative activity and original thinking. Students in groups, normally three per group, are supervised while working on a project accounting for four credit hours, extending over a full academic year. The project aims to provide students with a transitional experience from the academic world to the professional world. It is designed to serve as a platform in which ME students in teams engage in a meaningful design experience requiring the solution of engineering design projects.

The objectives of the final year project are:

- To allow students to demonstrate a wide range of the skills learned at the College of Engineering during their course of study by asking them to deliver a product that has passed through the design, analysis, testing and evaluation stages.
- To encourage multidisciplinary research through the integration of material learned in a number of courses.
- To allow students to develop problem solving, analysis, synthesis and evaluation skills.
- To encourage teamwork.
- To improve students' communication skills by asking them to produce both a professional report and a professional poster and to give an oral presentation on their work.

The project is important for a number of reasons:

- It is the largest single piece of design work that a student does during his/her BE degree program.
- It allows students to specialize in a topic that they enjoy.
- It is the work that prospective employers will most likely ask students about during an interview.
- It allows students to show a wide range of the skills learned since the first year.
- Students must demonstrate these skills by delivering a product that has passed through the design, analysis, manufacturing, testing and evaluation stages.

Practical Training/Summer Internship

All engineering students are required to fulfill a 1-credit hour internship period of 8 to 12 weeks. This graduation requirement entails that each senior student (one who has completed around 80% of the total credit requirement) gains practical training experience during the summer term prior to graduation, or in the graduation semester, with either a company or an academic institution while involved in a practical experience.

Degree Requirements

To graduate with a BME, a student must satisfactorily complete 134 credit hours. The distribution of courses is as follows:

University Requirements

The University requirements for the BME total 30 credit hours and are distributed as follows:

- 6 credits of Arabic: ARAB 101 and ARAB 201;
- 9 credits of English communication skills: ENGL 101, ENGL 102, and ENGL 203;
- 9 credits of social and cultural studies: SOCS 101, SOCS 201, and SOCS 202;
- 3 credits of computing essentials: CSC 101;
- 3 credits of mathematics: MATH 101.

College Requirements

The College requirements for the BME degree total 42 credit hours and are distributed as follows:

- 11 credit hours in sciences: PHYS 101, PHYS 102, PHYS 103L, and CHEM 101/ 101L;
- 15 credit hours in mathematics and statistics: MATH 102, MATH 201, MATH 202, MATH 215, and STAT 230;
- 3 credit hours in Technical Writing: ENGL 206;
- 3 credit hours in Engineering Economy: COEN 300;
- 3 credit hours in Engineering Programming: ELEE 230;
- 1 credit hour in Engineering Ethics: COEN 401;
- 1 credit hour in Engineering Drawings: CIVE 215;

The BME students must also complete a 4-credit hour final-year project during the senior year (MECH 401 and 402), and a 1-credit hour internship (MECH 400).

Program Requirements

The program requirements for the BME degree in ME total 62 credit hours and are distributed as follows:

- 53 credit for the following courses:
 - ELEE 210, CIVE 210, MECH 200, MECH 210, MECH 220, MECH 230, MECH 231, MECH 320, MECH 330, MECH 331, MECH 341, MECH 342, MECH 350, MECH 360, MECH 361, MECH 434, MECH 440, MECH 490, MECH 491, MECH 441, ELEE 360
- 9 credit hours electives from the ME Department from the following courses:
 - MECH 432, MECH 433, MECH 444, MECH 445, MECH 450, MECH 446, MECH 447, MECH 448, MECH 449, MECH 460, MECH 461

Study Plan of the BME Degree

(134 Credit Hours)

Year I

First Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ARAB 101	Arabic Communication Skills	3	
SOCS 101	Islamic Civilization I	3	
CSC 101	Introduction to Computing	3	
ENGL 101	Basic Academic English I	3	
PHYS 101	Physics 101	3	
MATH 101	Calculus I	3	
	Total Credits	18	

Second Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ARAB 201	Advanced Academic Arabic	3	ARAB 101
ENGL 102	Basic Academic English II	3	ENGL 101
MATH 102	Calculus II	3	MATH 101
PHYS 102	Physics II	3	PHYS 101
CHEM 101	Chemistry I	3	
ELEE 230	Programming for Engineers	3	CSC 101
	Total Credits	18	

Year II

Third Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
MATH 201	Calculus and Analytic Geometry III	3	MATH 102
ENG 203	Advanced Academic English I	3	ENG 102
SOCS 201	Islamic Civilizations II	3	SOCS 101
MATH 202	Differential equations	3	MATH 102
CHEM 101 L	Chemistry Lab	1	CHEM 101
PHY 103L	Physics Lab.	1	PHY 102
CIVE 215	Computer Aided Engineering Drawing (AutoCAD)	1	CSC 101
	Free Elective	3	
	Total Credits	18	

Fourth Semester (18 Credit Hours)

Course	Title	Credits	Prerequisites
ELEE 210	Electric Circuit I	3	PHYS 102
ENGL 206	English Technical Writing	3	ENGL 203
STAT 230	Probability and Statistics	3	MATH 101
MATH 215	Linear algebra and Numerical Techniques	3	MATH 202
CIVE 210	Statics	3	MATH 202
MECH 230	Engineering Materials	3	CHEM 101
	Total Credits	18	

Year III**Fifth Semester (16 Credit Hours)**

Course	Title	Credits	Prerequisites
MECH 220	Dynamics	3	MATH 201, CIVE 210
MECH 210	Thermodynamics I	3	PHYS 101
MECH 231	Strength Of Materials	3	CIVE 210
MECH 200	Engineering Graphics	1	MECH 200
ELEE 360	Electromechanical Devices	3	ELEE 210
MECH 320	Theory of Machines	3	MECH 220
	Total Credits	16	

Sixth Semester (16 Credit Hours)

Course	Title	Credits	Prerequisites
MECH 341	Fluid Mechanics	3	MECH 220
COEN 300	Engineering Economy	3	MATH 202
MECH 350	Instrumentation and Measurements	3	-
MECH 330	Mechanical Design	3	MECH 200, MECH 231
MECH 360	Manufacturing Processes I	3	MECH 230
MECH 331	Materials Lab	1	MECH 230, MECH 231
	Total Credits	16	

Summer Semester (1 Credit Hour)

Course	Title	Credits	Prerequisites
MECH 400	Internship for BME Students	1	-
	Total Credits	1	

Year IV

Seventh Semester (14 Credit Hours)

Course	Title	Credits	Prerequisites
MECH 401	Final Year Project I	1	ENGL 206
MECH 342	Heat Transfer	3	MECH 341 MECH 210
MECH 490	Control Systems	3	MECH 220, ELEE 210
MECH 361	Manufacturing Processes Lab	1	MECH 360
MECH 440	Internal Combustion Engines	3	MECH 210
	ME Elective	3	-
	Total Credits	14	

Eight Semester (15 Credit Hours)

Course	Title	Credits	Prerequisites
MECH 402	Final Year Project II	3	MECH 401
	ME Elective	3	
	ME Elective	3	
COEN 401	Engineering Ethics	1	COEN 300
MECH 491	Control Systems Lab	1	MECH 490
MECH 434	Mechanical Vibrations	3	MECH 220
MECH 411	Thermal Fluid Systems Lab	1	MECH 341, MECH 342
	Total Credits	15	

Total Program Credits	134¹⁴	
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¹⁴ Completion of the Bachelor of Science in Mechanical Engineering

Course Descriptions

Required Courses:

MECH 200 Engineering Graphics **2(1, 0, 2)**

An introductory course on 2-D drawing, orthogonal projection, auxiliary views, sectioning and sectional views, dimensioning and tolerance schemes, and standard drawing layouts and an introduction to the use of AutoCAD.

Prerequisite: Discretion of advisor.

MECH 210 Thermodynamics I **3(3, 0, 0)**

Thermodynamic concepts and definitions, states, properties, systems, control volume; processes, cycles, and units; pure substances, equation of states, table of properties; work and heat; the first law, internal energy and enthalpy; conservation of mass; SSSF and USUF processes; the second law, heat engines and refrigerators, reversible processes, Carnot cycle; entropy, Clausius inequality, principle of the increase of entropy, Efficiencies.

Prerequisite: Discretion of advisor.

MECH 211 Thermodynamics for Civil Engineering **2(2, 0, 0)**

Introduction to the thermodynamics: which include thermodynamics state and properties of a pure substance, system and control volume concepts, work and heat, the first law of thermodynamics, energy and mass conservation, entropy, the second law of thermodynamics; applications to closed setups and flow devices; simple vapor and gas cycles applications.

MECH 220 Dynamics **3(3, 1, 0)**

Kinematics of particles; Rectilinear and curvilinear motion in various coordinate systems. Kinetics of particles; Newton's second law, Central force motion, Work-energy equation, Principle of impulse and momentum, Impact, Conservation of energy and momentum, Application to a system of particles. Kinematics of rigid bodies; Relative velocity and acceleration, Instantaneous center, Analysis in terms of a parameter. Plane kinetics of rigid bodies with application of Newton's second law, Energy and impulse-momentum.

Prerequisites: MATH 201 and CIVE 210.

MECH 230 Engineering Materials **3(3, 0, 0)**

Atomic structure and bonding. Crystalline structure. Imperfections in solids (defects in crystals). Diffusion. Mechanical properties of metals. Classification of materials (properties and applications). Failure; Phase diagram and alloy systems. The iron phase diagram. Phase transformations. Ferrous and non-ferrous metal alloys, ceramics, and polymers. Structure-property relationships. Material selection case studies. Material selection case studies.

MECH 231 Strength of Materials **3(3, 0, 0)**

Axial loading, Material properties obtained from tensile tests, Stresses and strains due to axial loading, Thermal Stresses, Elementary theory of torsion, Solid and hollow shafts, Thin-walled tubes, Rectangular cross-section, Stresses in beams due to bending, shear and combined forces. Composite beams, Analysis of plane stress, Mohr's Circle, Combined stresses, Thin-walled pressure vessels, Deflection of beams, Buckling of columns.

Prerequisite: CIVE 210.

ELEE 360 Electromechanical Devices**3(3, 1, 0)**

A course on three-phase circuits and power calculations; magnetic circuits; single-phase transformers; three-phase transformers; DC and AC machines: construction and basic concepts; synchronous generators: construction, equivalent circuit, testing and performance characteristics.

Prerequisite: ELEE 210.

MECH 320 Kinematics of Mechanical Systems**3(3, 0, 0)**

A course that deals with the mechanization of motion, kinematics analysis of linkage mechanisms, synthesis of cam-follower mechanisms, gear terminology and types of gears, analysis and synthesis of gear trains, force analysis, and introduction to linkage synthesis; computer aided project.

Prerequisite: MECH 220.

MECH 330 Mechanical Design**3(3, 0, 0)**

Meaning and phases of design, considerations of design, stress analysis, deflection analysis, static strength and theories of failure, fatigue strength. Design of fasteners and connections; riveted joints, bolts and screws, force-deflection diagrams of bolted connections. Welded joints. Mechanical springs, helical, leaf, torsional spring Shafts.

Prerequisites: MECH 200, MECH 230 and MECH 231.

MECH 331 Materials Lab**1(0, 0, 2)**

A laboratory course consisting of standard metallurgical and mechanical characterization tests on metals. Stress-strain plots, derived properties, fracture toughness, crystallography, hardness, and other properties. Ceramic flexure testing; Weibull plots. Polymers: stress-strain plots and derived properties, impact properties, creep, and relaxation.

Prerequisite: MECH 230.

MECH 341 Fluid Mechanics**3(3, 0, 0)**

Basic and definitions, units, fluid properties, hydrostatics, basic control volume approach, continuity equation, Bernoulli equation, Euler's equation, energy equation, momentum principle and its applications, flow through orifice, pipe, major and minor losses in pipe.

Prerequisite: MATH 202.

MECH 342 Heat Transfer**1(1, 0, 0)**

Introduction to modes of heat transfer, one dimensional conduction; steady state and transient analysis, introduction to convection, forced and free convection analysis, internal and external flow, heat exchangers, introduction to thermal radiation heat transfer.

Prerequisite: MATH 202, MECH 210.

MECH 350 Instrumentation and Measurements**3(2, 0, 2)**

This course introduces general concepts of measurement systems; classification of sensors and sensor types; interfacing concepts; data acquisition, manipulation, transmission, and recording; introduction to LabVIEW; applications; team project on design, and implementation of a measuring device.

Pre- or co-requisite: MECH 341.

MECH 360 Manufacturing Processes I **3(3, 0, 0)**

A course on material removal processes, processes both traditional and non-traditional. Assembly processes such as welding, brazing, soldering, and fastening are also covered with an emphasis on process capabilities and limitations, relative cost, and guidelines for process selection. This course examines the behavior of materials under processing conditions and design for manufacturing guidelines, and involves hands-on exercises in a machine shop environment.

Prerequisite: MECH 230.

MECH 361 Manufacturing Processes Laboratory **1(0, 0, 2)**

An introduction to the use and operation of selected industrial machinery, various machining operations, selected welding processes and precision measuring instruments. Laboratory projects will emphasize safety and apply selected manufacturing processes, various inspection processes, fixturing and engineering materials.

Pre- or co-requisite: MECH 360.

MECH 400 Summer Internship **(1 Credit)**

This is an eight to twelve-week professional training course in mechanical engineering.

Prerequisite: Senior standing.

MECH 401 Final Year Project I **(1 Credit)**

A supervised project in groups of normally three students aimed at providing practical experience in some design aspects of mechanical engineering. Students are expected to complete a literature survey, to critically analyze, and to acquire the necessary material needed for their intended end product.

Prerequisite: Senior Standing.

MECH 402 Final Year Project II **(3 Credits)**

A course in which the student integrates his/her acquired knowledge to deliver the product researched and planned in MECH 401.

Prerequisite: MECH 401.

MECH 441 Thermal-Fluid Systems Laboratory **1(0, 0, 2)**

This lab includes a series of experiments on basic thermodynamic cycles, psychrometry, combustion, and elementary fluid mechanics, with special emphasis on the use of the computer as a laboratory tool for data acquisition, reduction, analysis, and report preparation.

Prerequisite: MECH 342.

MECH 490 Control Systems **3(3, 0, 0)**

This course is intended to provide students with the tools that enable them to model and control physical systems. It includes the following: modeling of mechanical, fluid, electrical, and thermal systems; transfer function and block diagrams; time-domain analyses; root-locus; frequency-domain methods; stability analysis; design of PID controllers and dynamic compensators via the root locus and frequency methods.

Prerequisites: MECH 220 and ELEE 210.

MECH 491 Control Systems Laboratory **1(0, 0, 2)**

This course involves a series of hands-on experiments on modeling and design of control systems using Matlab, Simulink, and/or LabVIEW. The course also includes a team project.

Pre- or co-requisites: MECH 350 and MECH 490.

MECH 430 Product Design and Development **3(3, 1, 0)**

This course covers modern tools and methods for product design and development. Teams of students conceive, design, and prototype a new physical product. Topics include identifying customer needs, product planning, product specifications, concept generation, industrial design, product architecture, product development economics, and design-for-manufacturing.

Prerequisites: MECH 320 and MECH 330.

MECH 431 Manufacturing Processes II **3(2, 0, 2)**

A course on heat treatments, deformation, phase-change, and particulate consolidation processing of metals; fabrication processing of non-metallic engineering materials such as ceramics, polymers, and composites; emphasis on process capabilities and limitations, relative cost, and guidelines for process selection; the behavior of materials under processing conditions; design for manufacturing guidelines. This course emphasizes hands-on training exercises.

Prerequisite: MECH 230.

MECH 432 Mechanical CAD/CAE/CAM **3(2, 0, 2)**

This course seeks to expose the senior ME students to the realm of computer-aided design (CAD), computer-aided engineering (CAE), and computer-aided manufacturing (CAM); geometric modeling; numerical control; dimensioning and tolerancing; statistical tolerancing; process selection; metrology.

Prerequisites: MECH 200, MECH 330, and MECH 360.

MECH 433 Mechatronics System Design **3(2, 0, 2)**

A course that discusses mechatronics; data; numbering systems, architecture of microcontrollers, assembly language programming, A/D and D/A conversion; parallel I/O, programmable timer operation, interfacing sensors and actuators, applications; a team project on design and implementation of a mechatronic system.

Prerequisites: MECH 350.

MECH 434 Mechanical Vibrations **3(3, 0, 0)**

A course on free and forced response of non-damped and damped system; damping vibration absorption; response of discrete multi-degree of freedom systems; modal analysis; vibration measurement, case studies, vibration analysis with Matlab and Simulink.

Prerequisite: MECH 220.

MECH 435 Dynamics and Applications **3(3, 0, 0)**

This course examines the dynamics of particles and rigid bodies moving in three dimensions. Topics include Lagrange's equations of motion for particles, rotations of rigid bodies, Euler angles and parameters, kinematics of rigid bodies, and the Newton-Euler equations of motion for rigid bodies. The course material will be illustrated with real-world examples such as gyroscopes, spinning tops, vehicles, and satellites. Applications of the material range from vehicle navigation to celestial mechanics, numerical simulations, and animations.

Prerequisites: MECH 220.

MECH 436 Intermediate Mechanics of Materials **3(3, 0, 0)**

Review of energy methods, Betti's reciprocal theorem; bending of beams of asymmetrical cross-section; shear center and torsion of thin-walled sections; membrane

stresses in axisymmetric shells; axisymmetric bending of circular plates; elastic, thermoelastic analysis of axisymmetric thick cylinders and rotating discs; bending of rectangular and circular plates, including asymmetric problems; beams on elastic foundations; axisymmetric bending of cylindrical shells; Analysis of torsion: non-circulation sections.

Prerequisites: MECH 231.

MECH 440 Thermodynamics II **3(3, 0, 0)**

A course investigating the availability and work potential of systems; irreversibility; second law efficiency; availability; gas mixtures, air-conditioning; chemical reactions; high speed flow, nozzles and diffusers, environmental, economic, and social implications.

Prerequisite: MECH 210.

MECH 442 Modeling and Design of Thermal Systems **3(3, 0, 0)**

This course covers analysis, modeling, and design of engineered systems involving applications of thermodynamics, economics, heat transfer, and fluid flow; selection of components in fluid- and energy-processing systems to meet system performance requirements; system simulation and optimization techniques; use of modern computational tools to model thermal performance characteristics of components and systems.

Prerequisite: MECH 342.

MECH 443 Intermediate Fluid Mechanics **3(3, 0, 0)**

A course that deals with potential flow and boundary layer analysis; lift and drag; flow separation; the use of computational techniques to solve boundary layer problems; viscous internal channel flow and lubrication theory; one-dimensional compressible flow in nozzles and ducts; normal shock waves and channel flow with friction or heat transfer; fluid machinery including pumps and hydraulic turbines.

Prerequisites: MECH 342.

MECH 444 Internal Combustion Engines **3(3, 0, 0)**

The course aims to give the student the theoretical background of internal combustion engines. It includes: description of engine classification and parts, Combustion and ignition processes, engine parameters and tests, analysis of two-stroke and four stroke internal combustion engines, rotary engines and thermodynamic cycle analysis, thermochemistry and fuel characteristics;

Prerequisites: MECH 210

MECH 445 Air Conditioning **3(3, 0, 0)**

A course on human thermal comfort and indoor air quality; solar radiation; heating and cooling load calculations in buildings; air conditioning systems; air and water distribution systems; computer- based calculations.

Prerequisite: MECH 342.

MECH 446 Gas Turbines **3(3, 0, 0)**

A course that introduces the thermodynamic and aerodynamic theory forming the basis of gas turbine design: shaft power cycles; gas turbine cycles for aircraft propulsion; turbofan and turbojet engines; design and analysis of centrifugal and axial flow compressors and turbines.

Prerequisite: MECH 341.

MECH 447 HVAC Systems**3(3, 0, 0)**

The course provides a thorough knowledge in the following subjects: review of basic concepts in thermodynamics and heat transfer in buildings, psychometry, human comfort, air-conditioning processes, ventilation and infiltration, heating and cooling load calculations, hot water heating systems, fans and duct design.

Prerequisite ME 210, ME 342

MECH 448 Aerodynamics**3(3, 0, 0)**

A course on theoretical and empirical methods for calculating the loads on airfoils and finite wings by application of classical potential theory, thin airfoil approximations, lifting line theory, and panel methods; wings and airplanes; application of linearized supersonic flow to supersonic airfoils; performance and constraint analysis; longitudinal stability and control.

Prerequisite: MECH 341.

MECH 449 Compressible Flow**3(3, 0, 0)**

This course covers general one-dimensional flow of a perfect gas homenergetic and homentropic flow in nozzles and constant area ducts, normal shock waves, and one-dimensional unsteady gas flow.

Prerequisite: MECH 341 and MATH 202.

MECH 450 Refrigeration**3(3, 0, 0)**

This course covers fundamental concepts and principles of mechanical vapor compression refrigeration cycles; gas cycle refrigeration; ultra-low- temperature refrigeration, cold storage refrigeration; functions and specifications of refrigeration equipment, applications.

Prerequisite: MECH 210 and MECH 342.

MECH 451 Solar Energy**3(3, 0, 0)**

This course discusses the fundamentals of solar radiation, collectors and concentrators, energy storage, estimation and conversion formulas for solar radiation.

Prerequisite: MECH 342.

MECH 460 Finite Element Methods in Mechanical Engineering**3(3, 0, 0)**

A course on the classification of machine components; displacement-based formulation; line elements and their applications in design of mechanical systems; isoparametric formulation; plane stress, plane strain, axi-symmetric, and solid elements and their applications; modeling considerations and error analysis; introduction to ALGOR general formulation and Galerkin approach; and analysis of field problems.

Prerequisites: MATH 215, MECH 330, and MECH 342.

MECH 461 Mechanical Engineering Analysis**3(3, 0, 0)**

A course dealing with the application of numerical techniques to the solution of a variety of mechanical engineering problems involving systems of linear or non-linear algebraic equations, systems of ordinary differential equations of the initial and boundary value types, systems of ordinary differential equations, and partial differential equations of the parabolic, elliptic, and hyperbolic types. Engineering applications are introduced through a number of case study problems.

Prerequisite: MATH 202, MECH 220, and MECH 231.

MECH 470 Mechanics of Composite Materials 3(3, 0, 0)

This course covers anisotropic elasticity and laminate theory, analysis of various members of composite materials, energy methods, failure theories, and micromechanics. Materials and fabrication processes are introduced.

Prerequisites: MECH 230 and MECH 231.

MECH 471 Fatigue of Materials 3(3, 0, 0)

A course that deals with high cycle fatigue; low cycle fatigue; S-N curves; notched members; fatigue crack growth; cycling loading; Manson-Coffin curves; damage estimation; creep and damping.

Prerequisite: MECH 231.

MECH 472 Metals and their Properties 3(3, 0, 0)

A course that investigates ferrous and non-ferrous alloys; industrial equilibrium diagrams; heat treatment of metals; surface properties of metals; plastic deformation of metals; elements of fracture mechanics; process-structure-properties relations.

Prerequisite: MECH 230.

MECH 473 Polymers and their Properties 3(3, 1, 0)

This course focuses on chemistry and nomenclature, polymerization and synthesis, characterization techniques, physical properties of polymers, viscoelasticity and mechanical properties and applications.

Prerequisite: MECH 230.

MECH 480 Design of Mechanisms 3(3, 0, 0)

A course involving graphical and analytical synthesis of single- and multi-loop linkage mechanisms for motion, path, and function generation through 2-3-4- and 5-precision positions; optimum synthesis of linkage mechanisms; synthesis of cam-follower mechanisms; synthesis of gear trains.

Prerequisite: MECH 320.

MECH 481 Micro Electro Mechanical Systems (MEMS) 3(3, 0, 0)

A course that deals with materials for micro-sensors and micro-actuators, materials for micro- structures, microfabrication techniques and processes for micromachining, computer-aided design and development of MEMS, commercial MEMS structures and systems, packaging for MEMS, future trends, and includes a team project.

Prerequisite: MECH 350.

MECH 492 Robotics 3(3, 1, 0)

A course discussing concepts and subsystems; robot architecture; mechanics of robots: kinematics and kinetics; sensors and intelligence; actuators; trajectory planning of end effector motion; motion and force control of manipulators; robot languages.

Prerequisites: MECH 350, MECH 490, and MECH 491.

MECH 493 Noise and Vibration Control 3(3, 0, 0)

This course covers fundamental concepts in noise and vibration, passive and active damping strategies, damping materials, control methods; and applications.

Prerequisites: MECH 220 and MECH 434.

MECH 499 Special Topics in Mechanical Engineering 3(3, 0, 0)

Any selected topic in the state-of-the-art in Mechanical Engineering.

Prerequisite: discretion of advisor.



جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY

College of Graduate Studies and Scientific Research

COLLEGE OF GRADUATE STUDIES AND SCIENTIFIC RESEARCH

Officers of the College

Acting Dean: Sameer Bataineh

Acting Vice-Dean: Ijaz Ali

Professors: Abdallah Malkawi, Sameer Bataineh, Ahmad Shiyab, Khaldoun Bani

Associate Professors: Amin Almasri, Mousa Btoosh, Hussam Bayoud, Amer Magableh, Nezar Elfadel, Abdullah Qudah, Taimour Aldalgamouni, Hassan Al-Essa

Assistant Professors: Ijaz Ali, Ahmad Alrefai, Saad Alqarni, Abdulghani Athamneh, Ali Gohar

College Overview

The College of Graduate Studies (CGS) was established in 2009 to satisfy the needs for postgraduate education in the region of Tabuk. The college currently offers six graduate programs in Business and Management, Engineering and Computer Science listed below

- Master Program in Business Administration (MBA).
- Executive Master Program in Business Administration (EMBA).
- Master program in Civil Engineering.
- Master program in Electrical Engineering.
- Master Program in Computer Engineering.
- Master program in Computer Science.

Vision

Excellence in the delivery of graduate programs to ensure quality and leadership in the outputs.

Mission

The CGS is committed to provide high-quality academic programs that serve the local community and prepare students for global competition through clear and consistent policies, high standards, effective procedures, direct support to students and faculty through increased contacts and collaboration with researchers and research centers in various fields.

Core Values

- Uncompromising pursuit of quality educational services
- Extensive use of research to enhance cognitive skills and help the development of character
- Critical thinking and broad exposure to major global currents
- Life-long learning and investment in self-development
- Integrity and adherence to ethical behavior in all ways at all levels
- Community spirit and commitment to social service

College Objectives

- Provide students with an in-depth understanding of the literature in the functional areas of their selected disciplines.
- Build research skills of students and give them opportunities to utilize the acquired skills to develop original ideas.
- Enhance the analytical skills of students to allow them develop informed judgment, independent thinking, and objective inquiry.
- Enrich students' knowledge about contemporary issues in their respective fields of study.
- Offer advanced courses, beyond the baccalaureate level, in various disciplines;
- Contribute to the advancement of knowledge for the benefit of a constantly changing Tabuk Community through the efforts of faculty and students.

Admissions and Graduation Requirements

Admission to the existing academic programs in the College of Graduate Studies follows the specific requirements adopted in each program independently.

Academic Programs

The College of Graduate Studies currently offers two graduate programs in Business and Management:

- Master Program in Business Administration (MBA)
- Executive Master Program in Business Administration (EMBA)

MASTER OF BUSINESS ADMINISTRATION (MBA)

Introduction

The economic growth in the Kingdom in general and Tabuk in particular necessitates a cadre of high-quality managers who can contribute effectively to the economic development strategies of the private as well as the public sectors.

The MBA Program at FBSU has been designed to provide an advanced business education for highly motivated Bachelor degree holders, mid-level managers and professionals in order to boost their performance, efficiency, and productivity in a variety of organizational settings. In addition, it has been tailored to build the necessary knowledge and skills for entrepreneurs to launch new businesses or improve existing ones.

Program Objectives

The MBA program at FBSU aims to provide students with the knowledge and skills that enable them to function as successful managers, leaders and entrepreneurs in the dynamic and globalized Saudi economy during the third millennium.

The MBA Program intends to:

- Provide students with an in-depth understanding of the literature in the functional areas of business.
- Develop the managerial capabilities of students on the basis of the core functions and disciplines of business administration.
- Enhance the analytical, organizational, and communication skills of students to become effective managers in a variety of organizational settings.
- Elevate the leadership and decision-making abilities of students to enable them to encounter effectively contemporary challenges in an increasingly complex business environment.

Admission Requirements

For admission, the applicant must satisfy the following:

1. Hold a Bachelor's degree in any field from an academic institution accredited/ recognized by the KSA's Ministry of Education (MOE) with a minimum ranking/rating of "Very Good": 3.75/5 or 2.75/4. However, applicants with a rating of "Good": equals to or greater than 3.25/5 and less than 3.75/5 or equals to or greater than 2.25/4 and less than 2.75/4 can be accepted if approved by the Council of Graduate Studies. Furthermore, applicants with a rating of "Good": equals to or greater than 2.75/5 and less than 3.25/5 or equals to or greater than 1.75/4 and less than 2.25/4 can be accepted if their GPA in their major of study is at least "Very good": Equal or above of 3.75/5 or 2.75/4.

2. Achieve a minimum score of 5.5 on the IELTS exam (about 500 in paper-based TOEFL or 61 in internet-based tests) or a minimum score of 75% on the University English placement exam.
3. Pass a personal interview with the MBA Admissions Officer.

Applicants with non-business backgrounds are normally required to pass the foundation courses with a minimum GPA of 3.75 out of 5 before starting the core courses.

Work experience gives the applicant an advantage but is not required for admission.

A program accepts candidates on a competitive basis as seats are limited. Criteria for selection include, but are not limited to, competitive GPA, English proficiency, work experience, supportive references and successful personal interview with an Admissions Officer.

Note: Students can also pursue the program on a part-time basis.

Program Structure

The program is composed of a total of 42 credits to be offered over 4 semesters. This excludes the pre-requisite foundation module (a maximum of 15 credits) that will be offered to compensate for any deficiency in the students' knowledge. The grades of the Foundation module are not included in the cumulative GPA. Students must normally pass these courses with a minimum GPA of 3.75 out of 5 before they can start Core courses.

Students can opt to pursue a general MBA program or a program with a concentration in one of the following areas: Marketing, Human Resource Management, Accounting, Finance, General Management, Management Information Systems or Engineering Management. The latter two are interdisciplinary in nature and are offered in collaboration with the Colleges of Computing and Engineering. To earn an MBA with a concentration, the student must pass 12 credits in courses of that concentration.

The degree requirements can be completed in four semesters (21 months of study). The program uses English language as the main medium of instruction.

MBA Program Plan of Study

Pre-MBA Foundation Courses (Credits not counted in GPA)		Credits
MBA 400	Introduction to Business Administration & Management	3
MBA 410	Introduction to Business Math & Statistics	3
MBA 420	Principles of Financial Accounting	3
MBA 430	Principles of Finance	3
MBA 440	Principles of Marketing	3
A Maximum of 15 credits depending on the background of the Applicant		15

First Semester (12 Credit Hours)

Course	Title	Credits
MBA 505	Organizational Behavior	3
MBA 510	Management Info. Systems	3
MBA 515	Quantitative Methods in Business	3
MBA 520	Managerial Accounting	3
Total Credits		12

Second Semester (12 Credit Hours)

Course	Title	Credits
MBA 525	Managerial Economics	3
MBA 530	Marketing Management	3
MBA 605	Corporate Finance	3
MBA 610	Leadership & Enterprise	3
Total Credits		12

Third Semester (9 Credit Hours)

Course	Title	Credits
MBA 615	Research Methods in Business	3
MBA 620	Management Info. Systems	3
	Course in Concentration (See Table 2)	3
Total Credits		9

Fourth Semester (9 Credit Hours)

Course	Title	Credits
	Course in Concentration (See Table 2)	3
	Course in Concentration (See Table 2)	3
MBA 690	Final Project in Concentration	3
Total Credits		9

Courses Description

Required Courses:

MBA 505 Organizational Behavior (3 Credits)

This course covers in-depth analysis of how the individual, the group, and the organization interact to influence the behavior of the corporate entity and that of its human resources. A focus on behavioral science applications to individual needs and organizational goals will be featured.

Pre-requisite: MBA 400, if applicable.

MBA 510 Management Information Systems (3 Credits)

This course is an overview of information systems from a managerial perspective. It covers basic information system concepts, applications of information systems, and building and managing information systems.

MBA 515 Quantitative Methods in Business (3 Credits)

This course applies quantitative methods to business problems with an emphasis on learning how to select the appropriate problem solving method, applying the chosen method, and translating the result into business strategy. Topics covered include the simplex method, linear programming, transportation models, and network models for project scheduling, in addition to other decision analysis tools. Students will be introduced to some related computer programs.

Pre-requisite: None.

MBA 520 Managerial Accounting (3 Credits)

This course covers how management use accounting data in planning, coordinating, and controlling the operations of the firm. Topics covered include cost concepts, cost-volume-profit relationships, budgeting, variance analysis, cost systems, Activity-based Costing, cost accumulation and allocation, and costing systems.

Pre-requisite: MBA 420, if applicable.

MBA 525 Managerial Economics (3 Credits)

This course is concerned with the application of economic principles and methodologies to business decision problems. Students will increase their understanding of economics and learn a variety of techniques that will allow them to solve business problems relating to costs, prices, revenues, profits, and competitive strategies. The course is concerned with both theory and practice in the context of microeconomic models: the theory serves to sharpen analytical skills, and the practice will enable students to apply these techniques to real-world business problems.

Pre-requisite: MBA 410, if applicable.

MBA 530 Marketing Management (3 Credits)

This course provides the students with an overview of the managerial aspects of marketing including analyzing marketing opportunities, developing marketing strategies, making marketing decisions, and managing marketing programs.

Pre-requisite: MBA 440, if applicable.

MBA 605 Corporate Finance (3 Credits)

This course introduces the students to the various concepts of corporate finance, which facilitates the decision making of managers in financing, investment and dividend decisions. Topics covered include discounted cash flow analysis, risk and asset valuation and management, financial analysis and forecasting, capital budgeting, cost and structure of capital, and short and long term sources of funds.

Pre-requisite: MBA 430, if applicable.

MBA 610 Leadership & Entrepreneurship (3 Credits)

This course introduces effective leadership theory and skills as key to individual and organizational success. It examines leader traits, abilities and behavior and relates them to entrepreneurial skills, performance and success.

Pre-requisite: MBA 505.

MBA 615 Research Methods in Business (3 Credits)

This course introduces students to the methodology and mechanics of conducting applied business research with emphasis on field applications, including the design of research, data collection, analysis and reporting. Qualitative and quantitative research tools are covered.

Pre-requisite: None.

MBA 620 Strategic Management (3 Credits)

This course deals with strategy formulation and implementation in a changing global environment. Strategy deals with the positioning the firm, articulating a vision, and designing action to take advantage of the firm's short and long-term competitive position. Students are expected to integrate the different functional areas covered in their graduate studies. Case studies are used extensively to strengthen the applied aspects.

Prerequisite: Completion of core courses adding up to at least 24 graduate credits.

Concentration Courses:

MBA 630 International Business Management (3 Credits)

This course is about managing effectively in different international environments. Conceptually, the course will revolve around the notion that differences exist in the way that management is practiced from country to country and that those differences can be attributed to two major sets of variables, namely: external environmental forces, such as economic, political, social and cultural elements found within each nation; and the organization's own cultural variables.

Prerequisite: MBA 505.

MBA 640 Operations and Production Management (3 Credits)

This course is concerned with the processes of producing and delivering goods and services. The focus is to ensure the business operations are efficient in terms of the use of resources and in meeting customer needs. The aim is to give students a set of frameworks and concepts that can be used to understand the operations functions and strategies within a company. Topics to be covered include process analysis, quality management, inventory management, and supply chain management, waiting line analysis, demand forecasting, and project management.

Prerequisite: MBA 515.

MBA 642 Organization theory, Design and Change (3 Credits)

This course aims to show students how structures can be designed to fit the organization's strategy, size and innovation needs. Different kind of structures (functional, divisional, matrix, organic networks) are analysed, and the situations in which each structure is effective are explained using examples and case studies. Additionally, the course will touch on Organisational Change, an important topic that is needed by managers during restructurings, mergers and acquisitions.

Prerequisite: MBA 505.

MBA 644 Managing Organizations and People (3 Credits)

This course is intended to help students understand and appreciate the strategic role of Human Resource Management. It introduces them to both the methods and practices relating to the key functions and activities of human resource management, and seeks to develop a critical understanding of the role and functions of human resource activities within an organizational context. A range of topics will be examined such as: Planning for Human Resources, Job Design, Managing Employee Performance, Managing Pay and Compensation, and Managing Diversity.

Prerequisite: MBA 505.

MBA 646 Human Resource Development and Planning (3 Credits)

This course examines the primary role of human resources development (HRD) in the organization to help people and organizations effectively manage change. This course focuses on strategies for assessing, designing, and implementing training and organizational development efforts that positively impact the performance of the individual and the work group. It also provides an overview of change interventions, including training and staff development; succession planning and performance management.

Prerequisite: MBA 644.

MBA 648 Special Topics in HRM (3 Credits)

The Special Topics in HRM is a specialized course intended to reinforce the student's knowledge in this functional area of Business Administration. The topics to be included are usually not offered in one of the regular core or other elective courses. Through a combination of lectures, case studies and independent reading, the course aims to expand the students' knowledge of the related concepts and applications.

Pre-requisite: MBA 644.

MBA 652 Consumer Behavior (3 Credits)

This course examines the underlying dynamics of customer behavior drawing from a wide range of behavioral sciences concepts. It analyses the role of individual (e.g., perception, motivation, attitudes) and environmental (e.g., culture, social groups, the family) factors in the buying decision process. The focus of the course is on practical implications of this knowledge for the marketer. Key to the course is demonstrating how an understanding of buyer behavior can help to improve strategic decision making.

Pre-requisite: MBA 530.

MBA 654 Strategic Marketing (3 Credits)

The objective of this course is to demonstrate the benefits of undertaking marketing actions from a strategic context. The aim is to teach students how to conduct a complete audit of the marketing environment facing the firm, understand how to generate new marketing options and use the marketing mix and management strategies to maximize

the market performance of the organization, regardless of its status as a commercial, government or social enterprise.

Pre-requisite: MBA 530.

MBA 656 Marketing Research (3 Credits)

The course is an overview of the application of scientific research methods to solve marketing problems. It stresses the need for building a marketing decision that is based on a sound marketing research and plan. It examines issues involving trends, factors, and forces (institutions, culture, politics, law, and environment) which affect companies' marketing programs (customer satisfaction, branding, corporate image, communication strategies). Steps include defining the problem to developing an approach, to formulating a research design, and designing questionnaires. Case studies and a research project are used to explore the different dimensions of the problems and opportunities facing the firm when formulating and implementing their marketing strategies.

Pre-requisite: MBA 530.

MBA 658 Cost Accounting (3 Credits)

This course involves in-depth study of the techniques and theories used in managerial accounting. Topics relating to the implementation and control of management decisions, capital budgeting, manufacturing accounting, management control systems, performance measurement, performance evaluation, transfer pricing, and cost prediction and control are emphasized. The impact of technology and new operating philosophies on integrated accounting systems are also explored.

Pre-requisite(s): MBA 520.

MBA 662 Auditing (3 Credits)

This course is planned to cover the fundamentals of auditing principles and procedures under generally accepted auditing standards. Auditor's reports, professional ethics and legal responsibilities, EDP considerations, statistical sampling, applications in auditing, the role of internal control in relation to the auditor and substantive audit procedures of assets, liabilities and equity capital will be reviewed. Communication of auditor findings to applicable parties will also be studied.

Pre-requisite(s): MBA 520.

MBA 664 Financial Statements Analysis (3 Credits)

The course aims at describing the process of analyzing and interpreting financial statements, and its role in the evaluation of the firm's financial performance and the prediction of its future condition. Topics covered include objectives of financial statement analysis, standards for financial statement analysis, sources of information, issues related to evaluating the quality of a company's earnings, horizontal analysis, trend analysis and vertical analysis, ratio analysis, and comprehensive evaluation of a company's financial situation.

Pre-requisite: MBA 520.

MBA 666 Financial Markets & Institutions (3 Credits)

This course offers an analysis of existing financial systems, money and capital markets, banks and non-bank financial intermediaries, term structure of interest rates, and securities markets including the stock and bond exchanges. It introduces the role of risk management in the financial institutions industry. The course focuses on the emerging money and capital markets in the Arab Gulf region.

Pre-requisite: MBA 605.

MBA 668 Investment Analysis (3 Credits)

This course covers portfolio selection theory and security valuation models. It provides a comprehensive coverage of basic concepts, theories, applications and decision-making rules in financial investments. In particular, the course will focus on the analysis of stocks, bonds, financial futures, options and other derivatives. Additionally, the course will examine the role and performance of portfolio managers, mutual funds and other investment companies.

Prerequisite: MBA 605.

MBA 672 Financial Risk Management (3 Credits)

The course aims to develop an understanding of the key risks facing financial organisations, the ways they manage the risks and the role capital plays in buffering the risks. The course complements and builds on other finance-related subjects by providing a more in-depth examination of specific topics. From a practical perspective, the course assists managers in assessing their company's banking relationships as well as managing internal financial risks.

Pre-requisite: MBA 605.

MBA 674 Information Management (3 Credits)

This course provides an understanding of the issues in managing database systems as an essential organizational resource. Students learn the enterprise data architecture components, data storage configurations, and information retrieval methods. Focus will expand from the relational model to the multidimensional model, and include object-relational techniques, data security and data recovery.

Pre-requisite: MBA 510.

MBA 676 Analysis & Design of Information Systems (3 Credits)

In today's business environment, information systems are continuously being developed, updated, or reengineered. This course is designed to enable students to understand the analysis and design of IS systems as well as the requirements or expectations for these systems from different perspectives so as to have systems that can be more effective in organizations.

Pre-requisite: MBA 510.

MBA 678 Management Support Systems (3 Credits)

This course is designed to enable business managers to understand the application of decision support systems in making timely and accurate business decisions. It also serves to encourage the usage of decision support systems by business managers. Supportive information systems are also examined from comparative and complimentary perspectives.

Pre-requisite: MBA 510.

MBA 690 Final Project in Concentration (3 Credits)

In partial fulfillment of the requirements for the MBA degree, a student must carry out individually a Final Project (FP); MBA 690; equivalent to 3 credits, during the last semester of his/her studies. The project entails the application of the concepts learned in the program to address a real management issue on behalf of an organization. It must show adequate analysis and creative problem solving techniques. The scope and nature of the assignment will be agreed upon with the client through a proposal process. The students may also submit a case study.

Pre-requisite: Graduation Semester

EXECUTIVE MASTER OF BUSINESS ADMINISTRATION (EMBA)

Background

The Executive MBA Program has been designed to deliver excellence in business education to middle and upper level managers in the private and public sectors.

The rigorous program will enable participants to acquire the conceptual knowledge and improved decision-making skills to improve their on-the-job performance in an increasingly complex business environment.

During the course of study, participants are guided through case analyses and simulations to ensure a quick transfer of skills and knowledge from the seminar room to the workplace with a special attention to the present and future needs of Saudi and foreign firms across the Kingdom. As a result, participants will quickly realize personal and professional benefits and their contributions will be recognized through greater responsibilities, promotions and self-satisfaction.

Program Objectives

FBSU's EMBA program will strive to:

- Enhance the general managerial capabilities of participants by building upon the core functions and disciplines of business administration.
- Develop leaders and entrepreneurs with a clear strategic vision, strong critical analytical skills, a problem-solving orientation and a broad sensitivity to global issues.
- Strengthen the leadership, creative and teamwork skills that would sharpen the participants' competitive edge, and add value to their organizations.

Admission

Admission to the program is based on a combination of academic and professional criteria. To be admitted, the applicant must satisfy the following conditions:

1. Hold a Bachelor's degree in any field from a KSA-accredited university.
2. Have a cumulative GPA with a minimum rating of "Good; 2.75/5".
3. Have at least three years of work experience in a middle or upper management position.
4. Achieve a score of at least 5 in the IELTS exam or Pass the FBSU English Entrance Exam.
5. Pass the interview with the Program Director.

Program Structure

The program is composed of a total of 42 credits divided over 8 semesters. This excludes the pre-requisite foundation module that covers Math and Computer skills, and which is given at the beginning of studies. Lectures are scheduled on weekends twice per month. The degree requirements can be met in 21 months of study. The program uses both Arabic and English languages for instruction.

EMBA Program Structure & Plan of Study

Term	Module No.	Course No.	Module & Courses	Course Credits	Module Credits	Term Credits	
			Pre-requisite: Basic Math & I.T. Skills	3 + 0			
1	1	Module 1. Foundation & Business Environment				10	10
		1	EMBA 500 – Graduate Studies in Business	1			
			EMBA 505 – Contemporary Business Environment	2			
		2	EMBA 510 – Business Mathematics	2			
			EMBA 515 – Data Analysis	1			
		3	EMBA 525 – Managerial Economic Decisions	1			
			EMBA 520 – Financial Economics	1			
4	EMBA 530 – Financial Accounting Decisions	1					
	EMBA 535 – Managerial Accounting Decisions	1					
2	2	Module 2. Business Communication				4	11
		5	EMBA 555 – Information and Communication Technologies	1			
			EMBA 560 – Managerial Communication	1			
		6	EMBA 565 – Business Negotiations	1			
	7	EMBA 550 – Business- Government Relations	1				
	3	Module 3. Functional Competency				7	
		8	EMBA 600 – Organizational Behavior &	1			
			EMBA 620 – Change Management	1			
		9	EMBA 605 – Strategic Marketing	1			
		10	EMBA 610 – Corporate Finance	1.5			
		11	EMBA 615 – Operations and Production Management	1			
EMBA 660 – Project Management			1.5				
3	4	Module 4. Leadership & Entrepreneurship				10	10
		12	EMBA 670 – Management Skills Development	1.5			
		13	EMBA 675 – Leadership Development	1.5			
		14	EMBA 655 – Global Corporate Financial Decisions	1			
		15	EMBA 680 – Leadership and Entrepreneurship Lecture Series	1.5			
		16	EMBA 685 – Entrepreneurship Development	1.5			
			EMBA 690 – Global Entrepreneurship Project	3			
4	5	Module 5. Strategic Thrust & Application				11	11
		17	EMBA 650 – International Business Decisions	1.5			
			EMBA 699 – Current Business Challenges	1.5			
		18	EMBA 700 – Strategic Management Decisions	3			
		19	EMBA 665 – Business Research Methods	1.5			
			EMBA 695 – Management Consulting	1			
		EMBA 698 – Business Consulting Project	3				

Course Descriptions

EMBA 500 Graduate Studies in Business (1 Credit)

This course defines the frontiers of graduate studies in business administration with an emphasis placed on analyzing and developing business cases, performing secondary research using business databases such as Proquest, digesting scholarly papers published in journals such as Journal of Finance, importance of reading business magazines such as Harvard Business Review, and Economist, importance of reading business newspapers such as Financial Times, Wall Street Journal etc., and the use of American Psychological Association (APA) guidelines for the preparation of research projects. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 505 Contemporary Business Environment (1 Credit)

This course provides background information related to the field of business administration. Being a survey course, emphasis is placed to introduce the students to all functional areas of business with an emphasis on Saudi economy, and the Saudi corporate sector. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 510 Business Mathematics (2 Credits)

The analytical nature of EMBA course work requires that all candidates have a mathematical background in linear algebra, calculus, and general business mathematics. This course will be offered through a series of modules delivered through a combination of advanced web-based self-learning tools as well as classroom instruction in order to prepare participants for the mathematical components of the EMBA program. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 515 Data Analysis (2 Credits)

This course will provide an introduction to statistical data analysis for problem solving and decision-making using data. Participants will apply univariate and bivariate methods to various datasets, utilize software to analyze data and interpret statistical output. Statistical models and tools will be introduced to assist participants in collecting, organizing, understanding, analyzing, presenting and communicating data. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 520 Financial Economics (1 Credit)

This course covers fundamental economic principles, theories and models (both micro and macro); that business executives ought to know for managing firm's resources and for ensuring firm's economic security. Participants will acquire the skills to understand their economic environment and be able to predict how changes in global trends and government policy impact their sectors and particular businesses. EMBA participants will acquire the necessary conceptual skills to analyze the economic consequences of their decisions. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 525 Managerial Economic Decisions (1 Credit)

This course will provide participants with an interpretation and understanding of a broad range of economic concepts such as the Market Model, elasticity and pricing decisions, market structures and optimal managerial decisions, strategy and tactics in Game Theory, role of intellectual capital and Modern Growth Theory, Theory of Outsourcing, Aggregate Demand and Supply Models, IS-LM- BP model, international regulations'

constraints as well as the theories of productivity. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 530 Financial Accounting Decisions (1 Credit)

This course will focus on the role of the accounting function external to the organization. It will take a broad view of financial accounting, encompassing a wide range of external financial and economic information, both national and international. Financial statement ratios and other analytical tools will be introduced and applied in real-world corporate analyses. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 535 Managerial Accounting Decisions (1 Credit)

This course focuses on the role of the accounting function internal to the organization. It takes a broad view of managerial accounting, introducing participants to costing systems, cost behavior patterns, cost structures and the evaluation of product, managerial and divisional performance with accounting. The course emphasizes the strategic importance of aligning accounting systems with firm technologies and goals highlighting what accounting can do for decision-makers and how accounting choices affect decisions. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 550 Business-Government Relations (1 Credit)

The course is a primer on how business executives and other leaders can most effectively manage their organization's dealings with governments and the threats and opportunities presented by domestic and foreign, federal, provincial or local government legislation, regulation, policies or programs. It includes an examination of the various assumptions, considerations, strategies, tactics, analytical, advocacy and communications tools used by public-policy advocates; and the ethical and systemic issues associated with lobbying across Saudi Arabia and abroad. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 555 Information and Communication Technologies (1 Credit)

Executives are confronted with an information technology function that presents strategic opportunities and threats. This course will aim at better understanding the "management" aspects of information and communication technologies (ICTs). Participants will be introduced to information and communication technology foundations, systems development, database systems, enterprise resource planning, customer relationship management, decision support systems of IT management, social issues and learning and knowledge management, as well as IT and globalization to consider the impact of ICTs on business processes. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 560 Managerial Communication (1 Credit)

The course focuses on oral and written communication abilities of students. It allows them to respond to complete inter-personal and inter-group scenarios. The students will also learn about the techniques of structuring and delivering business-related contents in a logical and effective manner. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 565 Business Negotiations (1 Credit)

This course will aim to develop the aptitudes, intuitions and understandings of the strategies essential to successful business negotiations. A thorough analysis of the nature of negotiation, distributive and integrative bargaining, planning and preparation, intercultural differences, bargaining style and personality will be considered. The role of power, strategy and tactics will also be considered, including coalition behavior, communication, persuasion, conflict resolution and multi-party negotiation.

EMBA 600 Organizational Behavior (1 Credit)

This course will review the strategic advantage of understanding and integrating organizational behavior (OB) frameworks in designing and implementing effective human resources (HR) activities (namely recruitment, development, maintenance and retention of employees), in measuring performance and in achieving high-performance outcomes in Saudi organizational contexts. OB topics covered will include motivation, rewards, leadership, group dynamics, organizational politics, organizational design and corporate culture. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 605 Strategic Marketing (1 Credit)

This course will provide an overview of the marketing process, including key concepts, tools and procedures, in the context of a technology-intensive Saudi economy. Participants will analyze market opportunities, set performance goals and formulate marketing and implementation plans to meet those goals. Consideration will be given to trends and techniques like experience-based marketing, relationship marketing, and e-marketing. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 610 Corporate Finance (1.5 Credits)

The fundamental concepts of corporate financial management will be examined to emphasize that a realistic general management perspective requires supportive data and numerical calculations. Participants will be required to demonstrate their ability to analyze and think critically. Course content will cover both sides of the balance sheet with the analysis of both investment and financial decisions. Participants will consider the cost of capital, capital budgeting, cash flow analysis, capital structure decisions including common shares and long-term debt, financial planning and control, short-term financing, working capital management, treasury management, options, derivatives and hybrid financing. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 615 Operations and Production Management (1 Credit)

This course will examine framework for analyzing the behavior of complex supply chain networks, that exhibit a strategic understanding of the value of information and techniques to avoid the bullwhip effect, will examine the impact of supply chain strategic alliances and global sourcing as well as technologies and approaches used to reduce supply chain lead times. The course will also introduce the use of performance management tools and Business Intelligence Tools through the application of Business Intelligence software to specific cases. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 620 Change Management (1 Credit)

The purpose of this course will be to develop skills in the effective conceptualization, planning, implementation and evaluation of change interventions in human systems. Behavioral science frameworks will be introduced to explain and guide the practice of change in the organization. The systemic nature of change and intervention practice, including the generation and management of resistance to change, will be analyzed. Organizational change processes at the individual, team and organizational level and human system intervention efforts will be considered. The importance of context will be emphasized with cases of cross-cultural change, knowledge-based organizations, socio-technical change processes and system vs. cultural change analyses. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 650 International Business Decisions (1.5 Credits)

This course looks into the business activities aimed at directing the flow of a company's products to foreign markets. International business should be viewed as an integrated discipline that combines several other disciplines such as economics, management, marketing, finance, anthropology, cultural studies, history, demographics, languages, law, statistics, geography, and international trade. This course will stimulate intellectual curiosity on various critical issues and provide analytical frameworks that are necessary for understanding different cultural environments in global markets and assessing global business opportunities. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 655 Global Corporate Financial Decisions (1 Credit)

Participants will be introduced to the management of foreign exchange risk by corporate treasurers; financial management of multinational firms; determination of a corporation's transaction and operating exposures; use of foreign exchange derivatives such as currency futures, options and swaps, to hedge foreign exchange risk; international portfolio and direct investments; international capital structure and cost of capital of multinational firms and capital budgeting techniques used for foreign operations. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 660 Project Management (1.5 Credits)

This course examines project management roles and environments, the project life cycle and various techniques of work planning, and control and evaluation to achieve project objectives. Students will be exposed to relevant and latest simulations and software in the field.

EMBA 665 Business Research Methods (1.5 Credits)

The objective of this course is for participants to acquire and improve knowledge and understanding regarding how different fields of business theory relate to business administrative research methods. The course begins with a discussion of the knowledge-acquiring process where the creating of knowledge is emphasized. Frames of reference, scientific ideals and the choice of perspective are regarded as important bricks in the research process. This subject area will be followed by a thorough discussion regarding the choice of subject and the research question, where the importance of an extensive problem background is made clear. The chosen research question has methodological implications, and the possibilities and limitations of both quantitative and qualitative methods for the research question are discussed and exemplified. Participants will be exposed to statistical packages such as SPSS-X, LIZER and AMOS.

EMBA 670 Management Skill Development (1.5 Credits)

This course is focused on the development of skills needed to be effective and successful managers. Participants explore interpersonal communication, problem solving, decision-making, team dynamics, conflict resolution and negotiation. The impact of diversity, personal and national culture and emotional intelligence are considered. Emphasis is placed on developing managerial skills in participants for success on jobs. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 675 Leadership Development (1.5 Credits)

A course designed to develop leadership skills of participants by emphasizing the application of behavioral concepts and theory in leading an organization. Besides examining relevant leadership theories in Saudi context, it examines a scientific way of integrating the employees' interests with the goals/profit intentions of the organization. The course is expected to improve participants' leadership styles, human skills and team work initiatives. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 680 Leadership and Entrepreneurship Lect. Series (1.5 Credits)

This seminar will consist of a series of lectures by eminent Saudi business leaders and entrepreneurs from the public, private and civic/ not-for- profit sectors, who have had an opportunity to play a key role in the governance of Saudi business organizations. Expert leaders will discuss their success, failures and leadership styles in regard to the issue, while examining the organization's interest and the interest of the Saudi public. Cumulatively, lectures will provide a 360-degree perspective of a topical leadership and entrepreneurship issue.

EMBA 685 Entrepreneurship Development (1.5 Credits)

Participants will critically analyze the launch of a venture, from pre-start-up to start-up and early growth, through seed, start-up, development and execution stage (preparation for exit strategies such as IPO). Participants will be required to develop a winning business plan that leads to an enticing Investors Package for venture financing. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 690 Global Entrepreneurship Project (3 Credits)

This course will provide a thorough practical experience so that participants will develop a better understanding of global business and entrepreneurship abroad. During this field trip to a foreign destination, participants will be exposed to a series of expert presentations and company visits supporting the course objectives. The students will be required to present a report aiming at comparing various functional operations with that of the Saudi business environment and perhaps apply international business concepts to practical business situations solving. The field engagement will be completed through expert interviews at a foreign destination.

EMBA 695 Management Consulting (1 Credit)

This course will provide an introduction to management consulting: the five-phase consulting process and business models associated with managing a consulting practice. The course will take a broad view of consulting both internal and external to the organization to solve management problems. The course will focus on the skills and processes involved within a consulting engagement, including project planning, project management; data gathering and analysis; generating findings; and reporting, presentation and feedback, to prepare participants for the project engagements of the curriculum. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 698 Business Consulting Project (3 Credits)

The Business Consulting Project (BCP) will be an integral part of the curriculum of the FBSU'S EMBA. This major independent consulting project will address a management issue on behalf of a client. Organizations are expected to be proven to be the source of career leaps and thriving new businesses. A faculty supervisor will be assigned to coach, mentor and assist the participant in the engagement. The scope and nature of the consulting assignment will be agreed upon with the client through a proposal process. The findings will be delivered to the client in terms of a presentation and a formal written report. Students will be exposed to relevant and latest simulations and softwares in the field.

EMBA 699 Current Business Challenges (1 Credit)

The theme and focus of this course would change with the passage of time, interests of the students, and the challenges being confronted by the Saudi and global economies.

EMBA 700 Strategic Management Decisions (3 Credits)

Providing an introduction to the concept of strategy and alternative models of strategic decision making, this course will require participants to understand the role of a leader in setting direction, creating competitive advantage, allocating resources, integrating operations and projects and framing the organizational infrastructure and its context. Students will be exposed to relevant and latest simulations and softwares in the field.

MASTER OF CIVIL ENGINEERING

Introduction:

The Master of Science in Civil Engineering program at FBSU comprises of different areas of specialization, namely:

- Structural Engineering
- Water and Environmental Engineering
- Geotechnical Engineering
- Transportation Engineering
- Construction Engineering and Management

The program offers research opportunities and advanced courses in a broad range of the aforementioned areas. The student may transfer from one major to another, or from one track to another (thesis or non-thesis) after the first semester of the study.

Program Objectives:

The Master of Science in Civil Engineering program at FBSU aims at applying knowledge, strong reasoning, and quantitative skills to design and implement creative and sustainable solutions. It also helps graduate students to engage in life-long learning to meet evolving engineering challenges facing society. Furthermore, they are expected to exhibit strong communication, critical thinking, interpersonal, and management skills as leaders and contributors in the civil engineering profession.

Admission Requirements:

1. Hold a Bachelor's degree in civil engineering, or a very related field (may be accepted with some conditions) from an academic institution accredited/recognized by the KSA's Ministry of Education (MOE) with a minimum ranking/rating of "Very Good": 3.75/5 or 2.75/4. However, applicants with a rating of "Good": equals to or greater than 3.25/5 and less than 3.75/5 or equals to or greater than 2.25/4 and less than 2.75/4 can be accepted if approved by the Council of Graduate Studies. Furthermore, applicants with a rating of "Good": equals to or greater than 2.75/5 and less than 3.25/5 or equals to or greater than 1.75/4 and less than 2.25/4 can be accepted if their GPA in their major of study is at least "Very good": Equal or above of 3.75/5 or 2.75/4.
2. Achieve a minimum score of 5.5 on the IELTS exam (about 500 in paper-based TOEFL or 61 in internet-based tests) or a minimum score of 75% on the University English placement exam.
3. Pass a personal interview with the department academic committee.

Program Structure

The program is composed of two tracks; thesis track and non-thesis track. Thesis track has 39 credit hours, distributed over 4 semesters; 27 credits in the form of courses, and 12 credits for the thesis. The Non-Thesis track is composed of 42 credit hours, also distributed over 4 semesters.

1) Thesis Track¹⁵ (39 credit hours)

The program is composed of 39 credit hours to be offered over 4 semesters; 27 credits as taught courses and 12 credits for the thesis. (See the attached list of core courses and elective courses) as follows:

Semester 1	Semester 2
Core Course - 3 hours	Elective Course - 3 hours
Core Course - 3 hours	Elective Course - 3 hours
Core Course (Seminar) - 3 hours	Core Course (Seminar) - 3 hours
Total: 9 Credit Hours	Total: 9 Credit Hours
The total credit hours are 18 credits during the first academic year.	

Semester 3	Semester 4
Elective Course - 3 hours	Elective Course - 3 hours
Elective Course - 3 hours	Master thesis - 9 hours
Master thesis - 9 hours	
Total: 9 Credit Hours	Total: 12 Credit Hours

2) Non-Thesis Track (42 credit hours)

This program is composed of 42 credit hours to be offered over 4 semesters as follows:

Semester 1	Semester 2
Core Course - 3 hours	Elective Course - 3 hours
Core Course - 3 hours	Elective Course - 3 hours
Core Course - 3 hours	Elective Course - 3 hours
	Core Course (Seminar) - 3 hours
Total: 9 Credit Hours	Total: 12 Credit Hours
The total credit hours are 21 credits during the first academic year.	

Semester 3	Semester 4
Elective Course - 3 hours	Elective Course - 3 hours
Elective Course - 3 hours	Elective Course - 3 hours
Elective Course - 3 hours	Project - 3 hours
Elective Course - 3 hours	
Total: 12 Credit Hours	Total: 9 Credit Hours
The total credit hours are 21 credits during the second academic year.	

¹⁵ The student shall submit a thesis proposal to the department Chair during the first 8 weeks of the second semester in order to be approved and accepted by the end of the semester.

Core Courses and Elective Courses

A) Core Courses (For all majors)

Course #	Course name	Cr.
MATH 505	Advanced Engineering Mathematics	3
MATH 506	Advanced Engineering Statistics	3
CIVE 507	Computer Application in Civil Engineering	3
CIVE 598	Engineering Design Project (Non-Thesis Program only)	3
CIVE 599	Seminar	3
CIVE 600-A	Research Thesis (Thesis-Program only)	3
CIVE 600-B	Research Thesis (Thesis-Program only)	3
CIVE 600-C	Research Thesis (Thesis-Program only)	3
CIVE 600-D	Research Thesis (Thesis-Program only)	3

B) Elective Courses

1. Structural Engineering

Course #	Course Name	Cr.
CIVE 510	Advanced Reinforced Concrete	3
CIVE 511	Evaluation And Testing Of Concrete Structures	3
CIVE 512	Concrete Materials	3
CIVE 513	Advanced Structural Mechanics	3
CIVE 514	Advanced Structural Analysis	3
CIVE 515	Earthquake Engineering	3
CIVE 516	Behaviour And Design Of Steel Structures	3
CIVE 517	Finite Elements Methods	3
CIVE 518	Pre-Stressed Concrete	3
CIVE 519	Special Topics In Structural And Material Engineering	3

2. Water and Environmental Engineering

Course #	Course Name	Cr.
CIVE 530	Environmental Impact Assessment	3
CIVE 531	Environmental Chemistry and Microbiology	3
CIVE 532	Solid Waste Management	3
CIVE 533	Air Pollution and Control	3
CIVE 534	Special Topics in Water and Environmental Engineering	3
CIVE 540	Advanced Engineering Hydrology	3
CIVE 541	Groundwater Flow & Contaminant Transport	3
CIVE 542	Hydrogeology	3
CIVE 543	Hydrodynamics	3
CIVE 544	Surface and Ground Water Hydrology	3

3. Geotechnical Engineering

Course #	Course Name	Cr.
CIVE 550	Advanced geotechnical Engineering	3
CIVE 551	Advanced foundation Engineering	3
CIVE 552	Soil Behavior	3
CIVE 553	Soil and Site Improvement	3
CIVE 554	Environmental Geotechnics	3
CIVE 550	Geotechnical earthquake engineering	3
CIVE 556	Special Topics In geotechnical engineering	3

4. Transportation Engineering (Elective Courses)

Course #	Course Name	Cr.
CIVE 570	Advanced Transportation Engineering	3
CIVE 571	Pavement Structures And Design	3
CIVE 572	Urban Transportation Planning	3
CIVE 573	Advanced Traffic Engineering	3
CIVE 574	Geometric Design of Highways	3
CIVE 575	Transportation System Management	3
CIVE 576	Public Transportation Systems	3
CIVE 577	Special Topics In Transportation Engineering	3
CIVE 584	Construction Cost Estimating and Bidding	3

5. Construction Engineering and Management

Course #	Course Name	Cr.
CIVE 580	Engineering Quality Management	3
CIVE 581	Construction Engineering, Equipment, and Methods	3
CIVE 582	Advanced Project Management	3
CIVE 583	Construction Liability and Contracts	3
CIVE 584	Construction Cost Estimating and Bidding	3
CIVE 585	Techniques of Project Planning and Control	3
CIVE 586	Construction Cost Engineering	3
CIVE 587	Operation Management	3
CIVE 588	Construction of Building	3
CIVE 589	Special Topics in Construction Engineering	3

Course Description

1. Core Courses

MATH 505 Advanced Engineering Mathematics (3 Credits)

Series solutions of ordinary differential equations; Special functions; Laplace transform; Fourier transform; Fourier series; Partial differential equations; and Complex analysis.

Prerequisite: Graduate Standing

MATH 506 Advanced Engineering Statistics (3 Credits)

Random sampling and data description, Tests of hypotheses, Simple and multiple linear regression and correlation, and Design of experiments with single and several factors.

Prerequisite: Graduate Standing

CIVE 507 Computer Applications in Civil Engineering (3 Credits)

Review of essential math, One dimensional finite element theory, Two and three dimensional finite element theory, Finite element process, Computer modeling, and application in case studies.

Prerequisite: Graduate Standing

CIVE 598 Engineering Design Project (Non-Thesis Program Only) (3 Credits)

Application of knowledge and skills acquired during the study of the graduate program in the solution of open-ended, advanced-level design problems from a technical, environmental and socio-economic viewpoint. Students can work with senior engineers from industry on a specific design project.

Prerequisite: Consent of the Advisor

CIVE 599 Seminar (0 Credit)

Graduate students working towards the M.S. degree are required to attend the seminars given by faculty, visiting scholars, and fellow graduate students. Additionally, each student must present at least one seminar on a timely research topic. Among other things, this course is designed to give the student an overview of research in the department, and a familiarity with the research methodology, journals and professional societies in his discipline.

Prerequisite: Graduate Standing

CIVE 600 Research Thesis (Thesis-Program only) (9 Credits)

The student has to undertake and complete a research topic under the supervision of a graduate faculty member in order to probe in-depth a specific problem in the research area.

Prerequisite: CIVE 599

2. Elective Courses:

Structural Engineering:

CIVE 510 Advanced Reinforced Concrete (3 Credits)

Moment-curvature for RC members, design and behavior of continuous flexural members, two-way floor systems, design of slender columns, beam-column joints; deflection of RC members; design for shear and torsion; foundation design; computer modeling for analysis and design of RC structures, designs of shear walls.

Prerequisite: Graduate Standing

CIVE 511 Evaluations and Testing of Concrete Structures (3 Credits)

Introduction to in-situ testing and planning of test programs; various nondestructive tests (NDT), tests for concrete strength, quality, composition and durability; measurement of corrosion activity; chemical tests for cement, chloride and sulphate contents; cracking of concrete; in-situ load tests; condition assessment with case studies; types of concrete repair; repair strategy, compatibility and selection of repair materials, patch repair, corrosion repair and crack repair.

Prerequisite: CIVE 510

CIVE 512 Concrete Materials (3 Credits)

Properties of concrete constituents; types of cements and their composition; cement hydration; microstructure of hydrated cement paste and its influence on strength, shrinkage and creep; chemical admixtures; alternate cement matrices; concrete durability and sustainability; introduction to repair materials.

Prerequisite: Graduate Standing

CIVE 513 Advanced Structural Mechanics (3 Credits)

Unsymmetrical bending of beams; shear center; bending of curved beams; torsion of prismatic bars; beams on elastic foundations; introduction to Cartesian tensors; tensorial transformation of stress; Mohr's circle for 3-D stress transformation; dyadic symbols; finite and infinitesimal strain tensors; Mohr's circle for 3-D strain; constitutive equations for anisotropic materials and application to composite laminates; theories of yield and fracture.

Prerequisite: Graduate Standing

CIVE 514 Advanced Structural Analysis (3 Credits)

Matrix algebra, solution of equations, review of energy principles, virtual work; degree of redundancy, choice of redundants, flexibility method, kinematic indeterminacy, development of element stiffness matrices, stiffness method of analysis of structures, computer applications and software development, axial force effects and eigenvalue analysis, introduction to the finite element method.

Prerequisite: Graduate Standing

CIVE 515 Earthquake Engineering (3 Credits)

This course is to serve as an introduction to the multi-disciplinary field of earthquake engineering. Topics covered in the course include tectonics, ground motion characterization, probabilistic hazard analysis, response spectra, inelastic structural analysis, and performance-based earthquake-resistant design.

Prerequisite: Graduate Standing

CIVE 516 Behaviors and Design of Steel Structures (3 Credits)

Elastic-plastic concepts of structural behavior; plastic design of beams and frames; design of plate girders, compression members with large width-thickness ratio and stiffened plate; composite design and behavior, behavior of rigid and semirigid connections; design considerations for fracture and fatigue; design of rigid frames; behavior of multistory frames and second-order analysis.

Prerequisite: Graduate Standing

CIVE 517 Finite Element Methods (3 Credits)

Basic equations of elasticity; virtual work; stiffness properties of structural elements; variational and weighted residual methods, applications to trusses, beams, plane frames, two-dimensional, axi-symmetric and three-dimensional solids; higher order and isoparametric elements; field and time-dependent problems of fluid and heat flow; software development.

Prerequisites: CIVE 513, CIVE 514, or Consent of the Instructor

CIVE 518 Prestressed Concrete (3 Credits)

Prestressing systems; materials; behavior of prestressed concrete beams; criteria for analysis and design; losses; analysis of stresses; flexural design; shear; end blocks; deflection; composite members; continuous beams; partial prestressing, design applications; introduction to segmental construction.

Prerequisite: Graduate Standing

CIVE 519 Special Topics in Structural Engineering (3 Credits)

Advanced topics selected from the broad area of structural and material engineering to provide the student with knowledge of recent applications and development in this specialty.

Prerequisite: Graduate Standing

Water and Environmental Engineering:

CIVE 530 Environmental Impact Assessment (3 Credits)

All basic environmental impact assessment and auditing, topics related to description of environmental settings, prediction of impacts, evaluation of impacts & their mitigation plan, environmental impact assessment methodologies, environmental settings, prediction of impacts, evaluation of impacts & their mitigation plan

Prerequisite: Graduate Standing

CIVE 531 Environmental Chemistry and Microbiology (3 Credits)

This course gives complete understanding of all basics of Environmental Chemistry and Microbiology, basic concepts of water chemistry, chemical reactions and contaminants in water and wastewater, biological treatment of wastewater

Prerequisite: Graduate Standing.

CIVE 532 Solid Waste Management (3 Credits)

All basic and advanced Solid Waste Management, basic knowledge of solid waste in terms of characteristics and composition, processes used for sustainable solid waste disposal systems, concepts of water chemistry, chemical reactions and contaminants in solid waste.

Prerequisite: CIVE 531

CIVE 533 Air Pollution and Control (3 Credits)

Introductory course in air pollution and its control; air pollution and effects, sources, dispersion models, engineering controls, and air quality legislation.

Prerequisite: Graduate Standing

CIVE 534 Special Topics in Water and Environmental Engineering (3)

Advanced topics selected from the broad area of water resources and environmental engineering to provide the student with knowledge of recent applications and developments in the specialty.

Prerequisite: Graduate Standing

CIVE 540 Advanced Engineering Hydrology (3 Credits)

Introduction to the elements of the hydrologic cycle; frequency analysis of precipitation and runoff; relationship between rainfall and runoff; flood routing; watershed modelling; and urban hydrology.

Prerequisite: Graduate Standing

CIVE 541 Groundwater Flow and Contaminant Transport (3 Credits)

Properties of porous media; Fluid storage and flow in saturated media; Transport equations in porous media; Equation of motion; Darcy's law; Continuity and conservation equation; well hydraulics; principle of superposition; contaminants transport by advection; modelling of advective transport.

Prerequisite: Graduate Standing

CIVE 542 Hydrogeology (3 Credits)

Hydrologic cycle; Aquifers and their properties; Basics of groundwater flow; Flow to wells, aquifer testing, well installation; (Hydro) Geochemistry and water quality; Groundwater pollution and contaminant transport.

Prerequisite: Graduate Standing

CIVE 543 Hydrodynamics (3 Credits)

Continuity: plane flow, axis-symmetric flow, stream flow functions, circulation, velocity potential; dynamics of frictionless fluids: Eulerian equations of motion, rotational incompressible flow, some elementary symmetric and axis-symmetric flow, rotational flow, equations in a moving coordinate system, flow past spheres and cylinders.

Prerequisite: Graduate Standing

CIVE 544 Surface and Ground Water Hydrology (3 Credits)

Design concepts of hydrological structure, physical processes of the hydrology cycle, the computational fundamentals of hydrologic analysis, and the elements of design hydrology, catchment's surface water and groundwater resources.

Prerequisite: Graduate Standing

Geotechnical Engineering:

CIVE 550 Advanced Geotechnical Engineering (3 Credits)

Permeability and seepage, consolidation theory, secondary compression, three dimensional consolidation, settlement analysis, stress-strain-strength behavior of soils: drained and undrained conditions for cohesive and cohesionless soils, anisotropy of soils, classes of stability.

Prerequisite: CIVE 330 or equivalent

CIVE 551 Advanced Foundation Engineering (3 Credits)

Bearing capacity of shallow foundations; factors affecting bearing capacity; immediate and consolidation settlement of shallow foundations; mat foundations; analysis, design, and installation of pile foundations; capacity and settlement of piles and pile groups; drilled piers and caissons

Prerequisite: CIVE 330 or equivalent

CIVE 552 Soil Behavior (3 Credits)

Advanced knowledge and skills in soil behavior. the course includes soil formation, bonding, phyllosilicates and clay mineralogy, soil composition and engineering properties, soil structure and soil fabric, soil–water–chemical interactions, : effective, and total stress, volume change behavior, strength and deformation behavior, time effects on strength and deformation.

Prerequisite: CIVE 330 or equivalent

CIVE 553 Soil and Site Improvement (3 Credits)

Behavior of natural soils; shallow and deep mechanical modifications; improvement by admixtures; grouting; hydraulic modifications; thermal and electrical treatments; modifications by inclusions and confinement; development of marginal lands; treatment of local problematic soils; landfills.

Prerequisite: CIVE 330 or equivalent

CIVE 554 Environmental Geotechnics (3 Credits)

Geotechnical engineering of land disposal of hazardous and nonhazardous wastes; fate and transport of contaminants; compacted clay and synthetic liners; leachate collection and removal system; landfill cover and gas venting systems; design and stability of landfill elements; construction quality assurance and control; performance monitoring; remediation technologies.

Prerequisite: CIVE 250 and CIVE 330 or equivalent

CIVE 555 Geotechnical Earthquake Engineering (3 Credits)

A brief review of seismicity, fault-rupture mechanisms, and fundamentals of vibrations. Discussion of attenuation relationships, design motions and influence of soil behavior on ground shaking characteristics. Methods of analyzing seismic site response. Soil liquefaction phenomena and methods to predict seismic soil liquefaction initiation. Use of in-situ index tests in the estimation of seismic liquefaction risk. Seismic performance of slopes and earth structures and soil-structure interaction effects.

Prerequisite: CIVE 330 or equivalent

CIVE 556 Special Topics in Geotechnical Engineering (3 Credits)

Advanced topics selected from the broad area of geotechnical engineering to provide the students with knowledge of recent applications and developments in this specialty.

Prerequisite: Consent of Instructor

Transportation Engineering:

CIVE 570 Advanced Transportation Engineering (3 Credits)

Principles of traffic flow elements, capacity analysis of highways and intersections; design and analysis of signalization including warrants, timing, phasing and coordination; intelligent transportation systems.

Prerequisite: Graduate Standing

CIVE 571 Pavement Structures and Design (3 Credits)

Fundamentals of pavement-vehicle interaction and the mechanics of pavement response; stress analysis in flexible and rigid pavements; material characterization; design of flexible and rigid pavements for highways and airports; surface, base and subgrade courses evaluation and design; modern design techniques and their applications.

Prerequisite: Graduate Standing

CIVE 572 Urban Transportation Planning (3 Credits)

Transportation planning processes, transportation land use interaction, travel evaluation and demand estimation, traffic generation theories and assignment models, and transit analysis.

Prerequisite: Math 505

CIVE 573 Advanced Traffic Engineering (3 Credits)

Macroscopic and microscopic characteristics of flow, speed and density; statistical distribution of traffic characteristics; shock wave analysis; queuing theory; application of theory of traffic flow to design and control of traffic; fundamentals and applications of existing tools and softwares.

Prerequisite: Consent of the Instructor

CIVE 574 Geometric Design of Highways (3 Credits)

Geometric configuration and design of streets and freeways, design of intersections and interchanges, parking facilities design, roadside and guardrail design; and safety issues.

Prerequisite: Consent of the Instructor

CIVE 575 Transportation System Management (3 Credits)

Application of systems approach to transportation; the determination of transportation demand and supply; the equilibrium process; transportation system evaluation; cost effectiveness techniques; use of optimization techniques in transportation.

Prerequisite: Graduate Standing

CIVE 576 Public Transportation Systems (3 Credits)

Mass transit operation and management, development in urban public transportation modes; systems and services, transit characteristics and vehicle technology, demand forecasting, routing and scheduling problems, and land-use impact.

Prerequisite: Graduate Standing

CIVE 577 Special Topics in Transportation Engineering (3 Credits)

Advanced topics selected from the broad areas of transportation engineering to provide the knowledge with the recent applications and development.

Prerequisite: Graduate Standing

Construction Engineering and Management:

CIVE 580 Engineering Quality Management (3 Credits)

concepts of total quality management in the engineering context including: philosophies and frameworks of quality management, quality assurance and quality control incorporating quality into strategic planning and execution of large engineering projects and processes, leadership, process measurement and management, continuous quality improvement, standardization, and total quality management.

Prerequisite: Graduate Standing

CIVE 581 Construction Engineering, Equipment, and Methods (3 Credits)

Major construction equipment and concrete construction. Selection of scrapers, dozers, cranes, etc. based on applications, methods, and production requirements. Power generation, transmission, and output capacity of equipment engines. Calculation of transport cycle times and equipment productivity. Construction methods of earthworks; grouting; and earth reinforcing; dredging and dewatering; concrete mixing, delivery, and placement. Design of forms for concrete walls and supported slabs. Equipment cost and procurement decisions. Equipment economic life; productivity estimation; and cost of production.

Prerequisite: Graduate Standing

CIVE 582 Advanced Project Management (3 Credits)

Skills generally required for sound project management in a variety of management settings are studied in addition to specific management issues typically associated with engineering and construction companies. Students are introduced to the Project Management Institute's Body of Knowledge (PMBOK). A discussion of project organizational structures and the evolving use of project management processes helps establish an appreciation for the role of a Project Manager. The elements of a project and the role and responsibilities of the Project Manager are studied in depth. Students are also acquainted with risk management concepts, labor, safety, procurement. The course will also cover construction operation planning, job site layout, supervision, measurement, analysis, and improvement. Dimensions of performance: safety, quality, quality of work life, productivity, and innovation.

Prerequisite: Consent of the Instructor

CIVE 583 Construction Liability and Contracts (3 Credits)

This course provides an overview of the fundamental aspects of the laws that affect construction and engineering companies as well as the project owners. The FIDIC conditions of EPC, BOT, and PPP contracts with Particular emphasis is placed on contract forms and provisions related to liability for engineering design and construction companies, bonds and sureties, the roles and responsibilities of the typical participation in the process, variation orders, claims and dispute resolution. Students will learn the importance of contract language negotiations.

Prerequisite: COEN 300

CIVE 584 Construction Cost Estimating and Bidding (3 Credits)

A broad study of estimating methodologies ranging from order of magnitude to detailed estimates are presented focusing on labor, equipment, materials, subcontractors, job conditions, location, project overhead, general and administrative cost, and profit. The course will also cover cost indices, parametric estimates, unit price proposals, and measuring work in addition to life-cycle costing and value engineering. Students will learn about the importance of constructing a detailed Work Breakdown Structure in the estimating process. Substantial course focus will be placed on the term group project which consists of the development of a bid estimate for a small construction project.

Prerequisite: CIVE 581

CIVE 585 Techniques of Project Planning and Control (3 Credits)

This course provides a thorough understanding of the project scheduling process in construction planning and control. Students learn the relationship between the work breakdown structure, organization breakdown structure and the activities used in developing project schedules. The Critical Path Method, the Program Evaluation and Review Technique, overlapping networks, and the Line of Balance scheduling methods are discussed. The use of scheduling techniques for project control, resources leveling and resources constraint management, cash flow management, time-cost relationships and schedule crashing at minimum cost are investigated as is the importance of communications in the planning and monitoring/controlling processes. The use of project schedule to assess the time and cost impacts of delays and variations orders and claims are examined. Students will experience hands on use with project scheduling software.

Prerequisites: CIVE 582 or CIVE 583

CIVE 586 Construction Cost Engineering (3 Credits)

Cost engineering for construction organizations, projects, and operations. Construction financing; break-even, profit, and cash flow analyses; capital budgeting. Construction financial accounting, cost accounting, and cost control systems including earned value analysis. This course also provides an extensive overview of financial and managerial accounting concepts for non-financial managers and the elements of accounting (Generally Accepted Accounting Practices), financial records and financial statements are established. Fundamental financial calculations associated with the time value of money, decision making problems and relevant techniques, benefit/cost analysis, methods of economic appraisal, and consideration of inflation and taxation in investment decisions. Students are expected to demonstrate proficiency in the use of Excel functions in solving financial problems.

Prerequisite: CIVE 584

CIVE 587 Operations Management (3 Credits)

This introductory level course provides students with an understanding of the latest quantitative tools for management decision-making. Topics include quality-control applications, optimization techniques including break-even analysis, linear and integer programming, the Simplex method, multicriteria decisions, the transportation model, and the allocation and assignment model. Other topics include time-series analysis, queuing theory, simulation, and decision trees analysis. Computer applications, case analysis and problem-solving sets are used throughout the course.

Prerequisite: CIVE 584 or CIVE 585

CIVE 588 Construction of Buildings (3 Credits)

Material selection, construction details, manufacture, fabrication, and erection of building structures using steel, light wood, timber, cast-in-place concrete, precast concrete, and masonry; and of building materials for roof, floor, and wall surfaces. Life Cycle Cost Analysis Methods and Applications in Buildings; Building Energy Modeling and Simulation; Energy Management in Buildings; Impact of Building Occupants and Behavioral Challenges; Renewable Energy and Efficiency in Buildings; Existing Buildings and Technical/Social Challenges of Energy Retrofits; and Building Certifications. Field trips to fabrication plants and construction sites.

Prerequisite: CIVE 580, CIVE 582

CIVE 589 Special Topics in Construction Engineering (3 Credits)

Any selected topic in state-of-the-art in construction engineering and management. Selected topics might include: agile management, process reengineering, and management of specific projects (technology, construction, industrial).

Prerequisite: Consent of the Instructor

MASTER OF ELECTRICAL ENGINEERING

Program Overview and Objectives:

Engineering, in general, is the application of scientific and mathematical principles to analyze and design systems. So in the core of engineers work is manufacturing, processes and systems. Electrical engineering has contributed drastically and strikingly to the construction of the modern world. Electrical engineers have been responsible for the creation for all kinds of means of communications; from classical communications: planes, trains and ships to the cyber communications resembled in the digital revolution manifested in the Internet and mobile communications. He is also behind the creation of electric power, modern electronics, computers, electronic systems, modern flight controllers, automated manufacturing and medical diagnostic tools.

Working in the field of electrical engineering is itself a challenge to share the world with the booming industry and build the future of technology in the world. For this purpose, the Master's program in Electrical Engineering at the FBSU aims to provide the students with a solid theoretical and practical background and methods of scientific research to qualify the graduates to contribute effectively in human attempts to enter the twenty-first century in the areas of energy and digital communication. Moreover, the program is designed to match the programs in world class International universities, which qualifies the student to pursue his/her study in the most prestigious institutions worldwide. Moreover, the program seeks enhancing and deepening Electrical engineers' qualification, critical thinking, innovation and lifelong learning in various areas of Electrical Engineering.

To maintain a high quality program the university make sure that the Department has faculty, labs and nice environment

English is the a language that is most spread and most of the journals articles are printed in it, hence the admission criteria and program is designed and executed in a way that students graduated and can fluently express themselves in English language in writing and verbally.

Areas of Specialization:

- Energy and Power Systems
- Communications and Network Systems

A student may transfer from one major to another, and from one program to another (with or without a thesis) after the first semester of the study. This can be attained by submitting a request to the head of the department showing his/her desire to transfer to another major or program.

The student shall lodge an application so that the thesis supervisor can be assigned and then a 3 credit-hour research proposal shall also be submitted during the first semester. The student shall not register the thesis in the next semester unless the research proposal is already approved by the supervisor, the academic department, and the College of Graduate and Scientific Research.

Admission Requirements:

FBSU invites students with a sound academic record, good personal character, strong interest to serve their communities and eagerness to serve as professionals in allied fields.

Applicants must satisfy the following eligibility requirements:

1. Hold a Bachelor degree in Electrical Engineering or related streams from an academic institution accredited/ recognized by the KSA's Ministry of Education (MOE). The field including, but not limited to software engineering, information systems, business information systems, electrical engineering, and electronics.
2. Hold a Bachelor's degree with a minimum ranking/rating of "Very Good": 3.75/5 or 2.75/4. However, applicants with a rating of "Good": equals to or greater than 3.25/5 and less than 3.75/5 or equals to or greater than 2.25/4 and less than 2.75/4 can be accepted if approved by the Council of Graduate Studies. Furthermore, applicants with a rating of "Good": equals to or greater than 2.75/5 and less than 3.25/5 or equals to or greater than 1.75/4 and less than 2.25/4 can be accepted if their GPA in their major of study is at least "Very good": Equal or above of 3.75/5 or 2.75/4.
3. Achieve a minimum score of 5.5 on the IELTS exam (about 500 in paper-based TOEFL or 61 in internet-based tests) or a minimum score of 75% on the University English placement exam. In case this condition is not met, a student may requested to take some additional English courses based on his scores in IELTS, TOEFL or FBS University Placement Test.
4. General Graduate Record Examination (GRE) score will be the advantageous at the time of admission.
5. At least three letters of recommendation from the faculty who taught the applicant undergraduate courses. [Sealed and signed]
6. Satisfactorily meeting any additional departmental or university admission requirements. Present a "No-Objection" letter from the employer, if applicable.

Program Structure

The program is composed of two tracks; thesis track and non-thesis track. Thesis track has 42 credit hours, distributed over 4 semesters; 30 credits in the form of courses, and 12 credits for the thesis. The Non-Thesis track is composed of 42 credit hours, also distributed over 4 semesters.

A) Non-Thesis Track (42 credit hours)

Semester 1	Semester 2
Core Course - 3 hours	Elective Course - 3 hours
Core Course - 3 hours	Elective Course - 3 hours
Core Course - 3 hours	Core Course - 3 hours
	Core Course (Seminar) - 3 hours
Total: 9 Credit Hours	Total: 12 Credit Hours
The total credit hours are 21 credits during the first academic year.	

Semester 3	Semester 4
Elective Course - 3 hours	Elective Course - 3 hours
Elective Course - 3 hours	Elective Course - 3 hours
Elective Course - 3 hours	Core Course (Project) - 3 hours
Elective Course - 3 hours	
Total: 12 Credit Hours	Total: 9 Credit Hours
The total credit hours are 21 credits during the second academic year.	

B) Thesis Track¹⁶ (42 credit hours)

Semester 1	Semester 2
Core Course - 3 hours	Elective Course - 3 hours
Core Course - 3 hours	Elective Course - 3 hours
Core Course - 3 hours	Core Course - 3 hours
	Core Course (Seminar) - 3 hours
Total: 9 Credit Hours	Total: 12 Credit Hours
The total credit hours are 21 credits during the first academic year.	

Semester 3	Semester 4
Elective Course - 3 hours	Elective Course - 3 hours
Elective Course - 3 hours	Master thesis - 9 hours
Master thesis - 3 hours	
Total: 9 Credit Hours	Total: 12 Credit Hours
The total credit hours are 21 credits during the first academic year.	

¹⁶ The student shall submit a thesis proposal to the department Chair within 8 weeks of the second semester in order to be approved and accepted by the end of the semester.

Core Courses and Elective Courses

1. Energy and Power Systems

Core Courses:

Course Code	Course Title	Credit Hours
ELEE 501	Linear System Analysis	3
ELEE 502	Optimization Techniques for Electrical Engineering	3
ELEE 504	Advanced Power System Analysis	3
ELEE 506	Advanced Analysis of Electric Machines	3
ELEE 599	Seminar	3
Total		15
ELEE 610	Research Thesis	12
ELEE 611	Engineering Design Project (Non-Thesis Program only)	3

Elective Courses:

Students with Power Specialization should take 4 elective courses from Table 1 and 1 elective course from Table 2 for thesis track, and should take 6 elective courses from Table 1 and 2 elective courses from Table 2 for non-thesis track.

Course Code	Course Title	Credit Hours
ELEE 512	Power System Planning	3
ELEE 513	Renewable Energy Systems	3
ELEE 514	Environmental Impacts of Energy Systems	3
ELEE 515	Energy Policy and Planning	3
ELEE 516	Power Electronics Systems and Applications	3
ELEE 517	Electric Power Systems Control and Stability	3
ELEE 518	Energy Efficiency in the Power Sector	3
ELEE 519	Smart Grids	3
ELEE 520	Protection of Power Systems	3
ELEE 521	Electric Safety and Grounding System Design	3
ELEE 522	Special Topics in Energy and Power Systems	3
ELEE 500	Probability and Stochastic Processes	3
ELEE 511	Modeling and Simulation of Communication Systems	3
ELEE 524	Advanced Distribution Systems	3

2. Communications and Network Systems

Core Courses:

Course Code	Course Title	Credit Hours
ELEE 500	Probability and Stochastic Processes	3
ELEE 507	Digital Communications	3
ELEE 508	Advanced Digital Communications	3
ELEE 511	Modeling and Simulation of Communication Systems	3
ELEE 599	Seminar	3
Total		15
ELEE 610	Research Thesis	12
ELEE 611	Engineering Design Project (Non-Thesis Program only)	3

Elective Courses:

Students with Communications Specialization should take 4 elective courses from Table 1 and 1 course from Table 2 for thesis track, and should take 6 elective courses from Table 1 and 2 elective courses from Table 2 for non-thesis track.

Course Code	Course Title	Credit Hours
ELEE 531	Information Theory	3
ELEE 532	Queuing Theory	3
ELEE 533	Stochastic Processes, Detection, and Estimation	3
ELEE 534	Multimedia and Advanced Signal Processing	3
ELEE 535	Computer Network Architectures and Protocols	3
ELEE 536	Wireless Networks	3
ELEE 537	Mobile Communications Networks	3
ELEE 538	Optical Fiber Communication	3
ELEE 539	Advanced Electronics	3
ELEE 540	Introduction to Optical Electronics	3
ELEE 541	Special Topics in Communication and Network Systems	3
ELEE 513	Renewable Energy Systems	3
ELEE 514	Environmental Impacts of Energy Systems	3
ELEE 519	Smart Grids	3

Course Description

ELEE 500 Probability and Stochastic Processes (3 Credits)

This course is intended as a first semester graduate course on probability and stochastic processes with application to signal processing, communications, estimation and control. The objective is to present a comprehensive coverage of the basic tools needed by an electrical engineering graduate student specializing in the above areas.

Prerequisite: STAT 230, ELEE 350

ELEE 501 Linear System Analysis (3 Credits)

Fundamental concepts in linear system theory: matrix algebra, linear vector space, linear operator; linearity, causality, relaxedness, and time invariance. Input-output and state-space models. Solutions of linear dynamic equations and impulse responses. Characteristics of linear systems: controllability, observability and stability.

Prerequisite: ELEE 380, MATH 215

ELEE 502 Optimization Techniques for Electrical Engineering (3 Credits)

Optimization theory and algorithms and their application to electrical engineering. Sparse optimization methods, Eigen-decomposition techniques, the expectation-maximization algorithms, stochastic optimization techniques, and special techniques relevant to large-scale optimization.

Prerequisite: MATH 215

ELEE 503 Advanced Control Systems (3 Credits)

This is a first graduate level course on control systems with an emphasis on controller design. The course will deal mainly with linear systems (or linearized systems), some nonlinear control concepts will be introduced. In class and homework examples will be taken from various application domains and research projects, and MATLAB will be used for analysis, design and simulations of these systems.

Prerequisite: ELEE 380, ELEE 399L

ELEE 504 Advanced Power System Analysis (3 Credits)

A course on optimal dispatch of generation, symmetrical components and unbalanced faults, transient stability, control of generation, state estimation in power systems, and power system simulation.

Prerequisite: ELEE 461

ELEE 505 Robotics I (3 Credits)

A course that introduces robotic manipulators classification and work envelope; robot kinematics, dynamics and forces; joints trajectory planning for end effector desired tracking and constrained motion; control of robots using linear, non-linear, and adaptive controllers.

Prerequisite: ELEE 380

ELEE 506 Advanced Analysis of Electric Machines (3 Credits)

Generalized theory of electrical machines, transient analysis in transformers: short circuit forces, inrush currents, transients and dynamics of DC and AC machines (synchronous and induction), special machines: brushless AC motors, switched reluctance motors, linear motors, stepper motors, computer implementation and analysis of electrical machines.

Prerequisite: ELEE 360, ELEE 463

ELEE 507 Digital Communications (3 Credits)

Elements of communication theory and information theory applied to digital communications systems. Characterization of noise and channel models. Characterization of communication signals and systems, representation of digitally modulated signals and spectral characteristics. Optimum receivers for AWGN channels: evaluation of error rate performance and channel bandwidth requirements. Broadcast and Multiple access channels. FDMA, TDMA, and CDMA.

Prerequisite: ELEE 470

ELEE 508 Advanced Digital and Data Communications (3 Credits)

Digital signaling over channels with intersymbol interference and AWGN. Wireless multipath channel models: time and frequency dispersive channels, level crossing and average fade duration. Diversity concepts: modeling and error probability performance evaluation. Spread spectrum in digital transmission over multipath fading channels, performance analysis and fading mitigation techniques.

Prerequisite: ELEE 507

ELEE 509 RF and Microwave Fundamentals (3 Credits)

The course introduces the fundamentals in designing RF and microwave circuits, provides hands on experience of RF test and measurement. Students in the course shall gain appreciation for the practical challenges in building such circuits.

Prerequisite: ELEE 390

ELEE 510 Logic Synthesis (3 Credits)

This course covers the process of transforming high-level circuit descriptions into optimized gate-level descriptions. The main topics include: Design of exact and heuristic algorithms for logic synthesis, synthesis of two-level circuits, synthesis of multi-level circuits, synthesis of finite-state machines and technology mapping.

Prerequisite: ELEE 290

ELEE 511 Modeling and Simulation of Communication Systems (3 Credits)

The course covers the principles and methods for simulation of computer networks and data communication systems. Topics include: Simulation and modeling basics (traffic modeling, link-, system-, packet level simulation, SW/HW in the loop), probability theory fundamentals, random number generation, mobility models, channel models, topology models, graph theory and algorithms, queuing models, queuing networks, network calculus, discrete event-based simulation, Monte-Carlo simulation, rate-based simulation, analysis of simulation results, statistical analysis, visualization of results, simulation languages and tools, simulation packages.

Prerequisite: ELEE 470, ELEE 500

ELEE 512 Power System Planning (3 Credits)

Mathematical methods and modern approaches to power system planning. Demand forecasting. Generation system planning: deterministic and probabilistic methods. Transmission system planning: heuristic and stochastic methods. Optimization methods for transmission planning. Route selection: environmental and other considerations. Distribution system planning: system layout, and choice of components.

Prerequisite: Advisor Consent

ELEE 513 Renewable Energy Systems (3 Credits)

This course seeks to impart in students a sound understanding of renewable energy systems. The course includes: wind energy, solar energy, hydro power and geothermal energy systems.

Prerequisite: Advisor Consent

ELEE 514 Environmental Impacts of Energy Systems (3 Credits)

World energy resources and classifications. Sources and effects of air pollution. Air quality modeling, Gaussian dispersion models. Motor vehicles emissions and noise pollution, mitigation strategies. Environmental impacts of electricity generation, pollution control systems, electromagnetic radiations. Environmental impact assessment.

ELEE 515 Energy Policy and Planning (3 Credits)

A course that focuses on features of modern energy planning and policy. Topics covered include the interaction among the technological, economic, environmental, and sociopolitical aspects of energy supply and use; electricity, oil, and gas industries, and their market structures; elements of energy planning on the sector and national levels; energy decision-making under conditions of uncertainty, risk management in energy planning; liberalization of energy markets; case studies.

Prerequisite: Graduate standing.

ELEE 516 Power Electronics Systems and Applications (3 Credits)

A course that reviews converter topologies for AC/DC, DC/AC, and DC/DC; power supply applications; converter applications to motor drives; utility interface of distributed energy systems; static VAR systems; flexible AC transmission; high voltage DC; power quality control; active and passive harmonics compensation.

Prerequisite: ELEE 461, ELEE 462

ELEE 517 Electric Power Systems Control and Stability (3 Credits)

A course on short-term load forecasting, generation unit commitment, economic load dispatch, loss formula coefficients, nonlinear programming, optimal power flow, security assessment, security dispatch, spinning reserve evaluation, automatic generation control, reactive power and voltage control, and state estimation.

Prerequisite: Senior or graduate standing.

ELEE 518 Energy Efficiency in the Power Sector (3 Credits)

Topics covered in the course include: utility companies and energy supply; energy sustainability; cogeneration systems: CHP and CCGT; reciprocating engines; distributed generation; demand side management; energy audit: types and data analysis, monitoring and targeting of energy, energy- efficient rotating machines, design and performance optimization. Case studies.

ELEE 519 Smart Grids (3 Credits)

The concept of Smart-grid, with network, components, technologies and trends. Significance to participants throughout the value chain, opportunities, threats, business models and regulatory issues. Integration of distributed variable generation, planning, management, operation, voltage stability and protection Advanced metering systems and intelligent buildings with demand side management and energy efficiency.

Prerequisite: ELEE 461

ELEE 520 Protection of Power Systems (3 Credits)

A course on the elements of protection in power systems mainly targeting design and implementation of protective relays: operating characteristics; power and current directional relays; differential relays; distance and wire pilot relays; protection of generators, busbar, capacitors and reactors; reclosers; under frequency relays; heating and harmonic effects; and Computer-based protective device coordination; instrument transformer (effect of dc component, estimation of CT performance), coupling capacitor voltage transformer.

Prerequisite: ELEE 469

ELEE 521 Electric Safety and Grounding System Design (3 Credits)

This course discusses grounding of power systems and equipment; the impact of grounding on system performance, system equipment integrity, safety of personnel as well as safety of the public at large. The course addresses the problem of grounding mainly in distribution systems: the effects on reliability of supply to customers, survivability of end-use equipment, and safety of individuals.

Prerequisite: ELEE 469

ELEE 522 Special Topics in Energy and Power Systems (3 Credits)

Advanced topics selected from the broad area of energy and power systems to provide the student with knowledge of recent advances and contemporary development in this area.

Prerequisite: Graduate Standing, Advisor Consent

ELEE 523 Modern Control Engineering (3 Credits)

Further state-space analysis: Linear systems with multiple eigenvalues, Non-linear state-space representation, Linearization, Jacobian matrices, Decomposition of system into controllable and uncontrollable parts, Deadbeat response-pole assignment with state and with output feedback. Use of observer. Introduction to advanced control topics: optimal control. Adaptive control systems. System identification of dynamic systems, least squares, Theory and implementation for system estimation.

Prerequisite: ELEE 380, ELEE 501

ELEE 524 Optimal Control (3 Credits)

The theory of Optimal Control is to evaluate the control signals that satisfy some physical constraints and minimize or maximize some performance measure. Calculus of Variation as well as State Variable methods are discussed and reviewed. Pontryagin's maximum principle and dynamic programming to problems of optimal control theory. Interactive numerical techniques for finding optimal trajectories.

Prerequisite: ELEE 501, ELEE 502

ELEE 525 Digital Control Systems (3 Credits)

The course covers the design of practical control systems intended for implementation using digital controllers and embedded systems. In particular, the course covers: digital control systems, discrete systems, stability analysis, digital controller synthesis, digital PID controllers, design of digital controllers, state-space models, observability and controllability, pole placement design, optimal design methods, nonlinear discrete-time systems, digital control of power systems, case studies.

Prerequisite: ELEE 501, ELEE 503

ELEE 526 Robotics II (3 Credits)

Survey of research issues in robotics. Force control, visual servoing, robot autonomy, on-line planning, high-speed control, man/machine interfaces, robot learning, sensory processing for real-time control. Primarily a project-based lab course in which students design real-time software executing on multi-processors to control an industrial robot. Recommended preparation.

Prerequisite: ELEE 525

ELEE 527 Adaptive Control (3 Credits)

Introduction to the various approaches of adaptive controller design. Real-time parameter estimation. Model reference adaptive control. Self-tuning controllers. Variable structure systems. Gain Scheduling. Robustness issues. Practical aspects and implementation. Typical Industrial applications.

Prerequisite: ELEE 501

ELEE 528 Intelligent Control (3 Credits)

Intelligent control strategies: Expert systems, Fuzzy logic control, Neural networks. Optimization control techniques: genetic algorithms, simulated annealing, Tabu search. Hybrid systems.

Prerequisite: Graduate Standing

ELEE 529 Computer Vision (3 Credits)

This course covers the field of computer vision and its applications in robotic systems. The course coverage includes fundamental topics like image formation and low level image processing. The course also addresses the theory and techniques for extracting features from images, measuring shape and location, and recognizing objects. Design ability and hands-on projects will be emphasized, using image processing software and hardware systems.

Prerequisite: ELEE 505

ELEE 530 Data Acquisition and Control (3 Credits)

Data acquisition (theory and practice), digital control of sampled data systems, stability tests, system simulation digital filter structure, finite word length effects, limit cycles, state-variable feedback and state estimation. Laboratory includes control algorithm programming done in assembly language.

Prerequisite: ELEE 290, ELEE 525

ELEE 531 Special Topics in Control and Robotics (3 Credits)

Advanced topics selected from the broad area of control and robotics to provide the student with knowledge of recent advances and contemporary development in this area.

Prerequisite: Graduate Standing, Advisor Consent

ELEE 532 Information Theory (3 Credits)

This course introduces the field of information theory and its applications to communications theory, computer science, statistics, and probability theory. Covering all the essential topics in information theory, we introduce the basic quantities of entropy, relative entropy, and mutual information, and show how they arise as natural answers to questions of data compression, channel capacity, rate distortion, and hypothesis testing.

Prerequisite: Graduate standing.

ELEE 533 Queuing Theory (3 Credits)

A course that covers Poisson counting and renewal processes; Markov chains and decision theory, branching processes, birth death processes, and semi-Markov processes; simple Markovian queues, networks of queues, general single and multiple-server queues, bounds and approximations.

Prerequisite: ELEE 500

ELEE 534 Stochastic Processes, Detection, and Estimation (3 Credits)

This is a graduate-level introduction to the fundamentals of detection and estimation theory involving signal and system models in which there is some inherent randomness. The concepts that we'll develop are extraordinarily rich, interesting, and powerful, and form the basis for an enormous range of algorithms used in diverse applications. The material in this course constitutes a common foundation for work in the statistical signal processing, communication, and control areas.

Prerequisite: ELEE 500

ELEE 535 Multimedia and Advanced Signal Processing (3 Credits)

The course provides an overview of the current multimedia standards and technologies and a brief description of future technologies. It also addresses the fundamental principles and techniques in multimedia signal processing: text, graphics, speech, audio, image, video; standards for multimedia coding, processing and compression.

Prerequisite: ELEE 350

ELEE 536 Computer Network Architectures and Protocols (3 Credits)

This course introduces the concepts and techniques used to model and implement communications between processes residing on independent hosts. The course examines the conceptual framework for specifying a computer network - the network architecture, and investigates the set of relevant protocols. The OSIRM is presented, and the service definitions and protocol specifications for implementing each of the seven layers of the Reference Model are analyzed in detail.

Prerequisite: ELEE 431

ELEE 537 Wireless Networks (3 Credits)

The objective of this course is to give an introduction to the fundamentals of the wireless communications systems, the wireless network architectures, protocols, and applications. Topics of study include an overview of wireless communications and mobile computing systems, signal propagation characteristics of wireless channels, wireless channel modeling, frequency reuse/cellular/microcellular concepts, spread-spectrum modulation for wireless systems, multiple access techniques, and wireless networking standards (e.g., 2.5G, 3G, IEEE 802.11, IEEE 802.15, IEEE 802.16/WiMAX, LTE).

Prerequisite: ELEE 508

ELEE 538 Mobile Communications Networks (3 Credits)

Cellular networks, ad hoc networks; access protocols; radio and network resource management; quality of service; mobility and location management; routing; mobile-IP; current wireless technologies for personal, local and satellite networks.

Prerequisite: ELEE 434

ELEE 539 Optical Fiber Communication (3 Credits)

Dielectric slab waveguides. Classification of mode types. Parabolic two-dimensional media. Circular waveguides. Step-index and graded-index optical fibers. Effect of loss. Dispersion effects. Fabrication methods in integrated optics and optical fibers. Light sources. Light Detectors. WDM concepts and 19 components. Optical Amplifiers. Point-to-point link system considerations. Photonic devices. Applications in communication systems.

ELEE 540 Advanced Electronics (3 Credits)

Characteristics and detailed modeling of operational amplifiers. Applications to waveform generation, analog multiplication, modulation, and data conversion. IC and special amplifiers. Illustration of general analog principles and design methodologies, with focus on: Operational Amplifiers (OpAmps) and applications, Current feedback amplifiers, Active filters, and D-A, A-D converters.

Prerequisite: ELEE 340, ELEE 470

ELEE 541 Introduction to Optical Electronics (3 Credits)

Principles, devices and materials used to generate, modulate, and detect optical radiation. Review of important properties of light and semiconductors. Light-emitting diodes and lasers. Electro-optic modulation. Thermal and quantum detection. Emphasis on semiconductor-based devices and application to fiber-optical communications.

Prerequisites: ELEE 539

ELEE 542 Advanced Coding Theory (3 Credits)

A course that addresses digital communication principles and techniques aimed at achieving improved reliability. The course examines information measures such as entropy and mutual information for discrete and waveform channels, source coding, channel capacity and coding theorem, linear block and cyclic codes, hard and soft decision decoding, spread spectrum modulation.

Prerequisite: ELEE 470, ELEE 473

ELEE 543 Special Topics in Communication and Network Systems (3 Credits)

Advanced topics selected from the broad area of communication and network systems to provide the student with knowledge of recent advances and contemporary development in this area.

Prerequisite: Graduate Standing, Advisor Consent

ELEE 552 Radio Frequency (RF) Circuits Design (3 Credits)

This course deals with design of CMOS circuits for wireless communications. The theoretical component consists of: introduction to wireless communications, modulation schemes for wireless communications, characterization of RF circuits, architecture of RF transceivers, building block of RF transceivers (LNAs, mixers, RF filters, VCOs, frequency synthesizers, and power amplifiers), and electromagnetic compatibility. Students are required to complete a design project with a professionally prepared project report.

Prerequisite: ELEE 340

ELEE 553 Antennas for Wireless Communications (3 Credits)

The principles of analysis and design of antenna arrays are discussed. Special attention is paid to antennas popular in mobile (cellular, satellite) telecommunications: Fundamental parameters; radiation integrals; wireless systems; wire, loop, and microstrip antennas; antenna arrays; smart antennas; ground effects; multipath.

Prerequisite: ELEE 490

ELEE 554 Satellite Communications Fundamentals (3 Credits)

This course provides the student with an overall understanding of satellite communication systems, technologies and techniques and equips him/her with the design tools to enter employment in the sector.

Prerequisite: ELEE 509

ELEE 555 RF System Engineering for Wireless Communications (3 Credits)

This course introduces students to system blocks, system parameters, and architectures of RF systems for wireless communications. It focuses on the design of a radio system for transmission and reception of voice and data information: receivers and transmitters system topologies, key system blocks in a wireless system, determination of system block parameters from radio requirements and system analysis, tradeoffs between various blocks in a radio system, and frequency planning. It discusses how modulation and demodulation schemes and multiple-access techniques used in present wireless applications influence RF systems requirements. The last part of the course focuses the link budget analysis of RF radio links.

Prerequisite: ELEE 536, ELEE 552

ELEE 556 RF and Microwave Amplifier Design (3 Credits)

Design of narrow band, and broadband amplifiers. Study of stability on amplifiers. Study of noise figure, noise parameters and noise sources. Low noise amplifier design. Study of distortion on amplifiers. Introduction to power amplifiers. Microwave amplifier design in integrated circuits.

Prerequisite: ELEE 509

ELEE 557 Microwave Design and Measurement (3 Credits)

This lecture and lab course covers the fundamentals of microwave component design and measurements, including vector impedance (scattering parameters), scalar measurements and spectrum analysis. Microwave components, such as filters, directional couplers, switches, amplifiers, and oscillators, will be designed and simulated with various CAD tools and then built and measured to compare performance with theory.

Prerequisite: ELEE 509

ELEE 558 RF and Microwave Integrated Circuits (3 Credits)

This course examines the design of RF integrated circuits for communications systems, primarily in CMOS and provides an overview of microwave circuits technologies (MIC, MHEMIC, MMIC). Modulation, transmitters and receivers.

Prerequisite: ELEE 557

ELEE 560 Special Topics in RF and microwave engineering (3 Credits)

Advanced topics selected from the broad area of RF and microwave engineering to provide the student with knowledge of recent advances and contemporary development in this area.

Prerequisite: Graduate Standing, Advisor Consent

ELEE 561 Computer System Analysis (3 Credits)

This course addresses the development of analytical models of computer systems and application of such models in performance evaluation. Topics covered also include scheduling policies, paging algorithms, multi-programmed resource management, and queuing theory.

Prerequisite: Advisor Consent

ELEE 562 Design of Digital Systems (3 Credits)

Hardware organization of digital systems. Synchronous sequential machines. Arithmetic and logic units: high speed addition, multiplication and division algorithms and implementation. Control units and Data Path designs. ASMD design and implementation. Memory Devices and their Structure. Use of Hardware Description Languages (Verilog, VHDL) to design complete digital systems and FPGA implementation. Transistor Level design of basic digital systems. Introduction to High Speed Digital Design and Signal Integrity.

Prerequisite: ELEE 290, ELEE 340

ELEE 563 Embedded System Design (3 Credits)

A course on embedded hardware and software design; the system design process: requirements analysis, specification, hardware/software co-design, testing; embedded computing platforms: general- and special-purpose processors, hardware accelerators, systems-on-a-chip, intellectual property (IP) core-based design, embedded networks; software design tools and technologies: CAD tools, compilers, and assemblers; hardware design tools and technologies: hardware-description languages, high-level synthesis tools, ASIC and FPGA design flows; real-time operating systems: multiple tasks and processes, context switching, task scheduling, inter-process communication mechanisms; low-power computing: circuit, architecture, and application techniques; system reliability and fault tolerance.

Prerequisite: ELEE 510

ELEE 564 Hardware Software Co-Design (3 Credits)

An introduction to the design of mixed hardware-software systems, focusing on common underlying modeling concepts, the design of hardware-software interfaces, and the trade-offs between hardware and software components. Students will use simulation tools to conduct experiments with mixed hardware-software systems in the area of embedded systems.

Prerequisite: ELEE 562

ELEE 565 Networked Embedded Systems (3 Credits)

This courses is meant to teach the fundamental concepts associated with: Networked Embedded Systems, wireless sensor networks; Wireless channel propagation and radio power consumption; Wireless networks, ZigBee, Bluetooth, etc.; Sensor principle, data fusion, source detection and identification; Multiple source detection, multiple access communications; Network topology, routing, network information theory; Distributed source channel coding for sensor networks; Power-aware and energy-aware

communication protocols; Distributed embedded systems problems such as time synchronization and node localisation; Exposure to several recently developed solutions to address problems in wireless sensor networks and ubiquitous computing giving them a well-rounded view of the state-of-the-art in the networked embedded systems field.

Prerequisite: ELEE 563

ELEE 566 Advanced Computer Architecture (3 Credits)

This course focuses on modern advancements in parallel computer architecture, with emphasis on advanced instruction level parallelism (ILP) and multiprocessor architectures. Topics include: advanced branch prediction, data speculation, computation reuse, memory dependence prediction, trace caches, dynamic optimizations, checkpoint architectures, latency-tolerant processors, simultaneous multithreading, speculative multithreading, virtual machines, message passing multiprocessors, UMA, NUMA and COMA shared-memory multiprocessors, single-chip multiprocessors, wormhole routing techniques, cache coherence, memory consistency models, high performance synchronization methods, speculative lock elision and transactional memory. A key component of the course is a research project in which students use architecture performance simulator to investigate novel architecture techniques.

Prerequisite: ELE 422

ELEE 567 Fundamentals of Parallel Computing (3 Credits)

In this course students will learn about the foundations of parallel computing. The emphasis will be on algorithms that can be used on shared- and distributed-memory systems. The course will include both a theoretical component and a programming component. The topics covered will encompass on fundamentals of parallel computing, parallel computer architectures, performance, communication, decomposition techniques for parallel algorithms, parallel programming models such as Open MP and MPI models, analytical modeling of parallel programs, algorithms and languages.

Prerequisite: Advisor Consent

ELEE 568 Hardware Modeling and Verification (3 Credits)

This course offers a comprehensive understanding of the technologies behind hardware verification. The students will be introduced to existing capabilities and limitations of various hardware modeling and verification methods. The course will cover the basics of modeling and simulation using VHDL/Verilog, and hardware verification using formal techniques such as symbolic simulation, model checking, theorem proving, satisfiability solving, and equivalence checking. The lectures will also cover relevant case studies.

Prerequisite: Graduate Standing

ELEE 569 Distributed Systems (3 Credits)

This course covers abstractions and implementation techniques for the design of distributed systems. Topics include: server design, network programming, naming, storage systems, security, and fault tolerance. The assigned readings for the course are from current literature.

Prerequisite: Graduate Standing

ELEE 570 Computer Systems Security (3 Credits)

Computer Systems Security is a class about the design and implementation of secure computer systems. Lectures cover threat models, attacks that compromise security, and techniques for achieving security, based on recent research papers. Topics include operating system (OS) security, capabilities, information flow control, language security, network protocols, hardware security, and security in web applications.

Prerequisite: Graduate Standing

ELEE 571 Special Topics in Digital and Computer Systems (3 Credits)

Advanced topics selected from the broad area of Digital and Computer Systems to provide the student with knowledge of recent advances and contemporary development in this area.

Prerequisite: Graduate Standing, Advisor Consent

ELEE 599 Seminar (0 Credit)

Graduate students working towards the M.S. degree are required to attend the seminars given by faculty, visiting scholars, and fellow graduate students. Additionally, each student must present at least one seminar on a timely research topic. Among other things, this course is designed to give the student an overview of research in the department, and a familiarity with the research methodology, journals and professional societies in his/her discipline.

ELEE 610 Research Thesis (9 Credits)

The student has to undertake and complete a research topic under the supervision of a faculty member in order to analyze and solve a specific problem in the research area related to his/her specialization.

Prerequisite: ELEE 599

ELEE 611 Engineering Design Project (3 Credits)

Application of knowledge and skills acquired during the study of the graduate program in the solution of open-ended, advanced level design problems from a technical, environmental and socio-economic viewpoint. Students can work with senior engineers from industry on a specific design project.

Prerequisite: Advisor Consent

MASTER OF SCIENCE IN COMPUTER ENGINEERING

Introduction and Program Objectives:

Computer Engineering Department was established in 1424 H. The department has graduated hundreds of students from its BS programs. The primary mission of the Computer Engineering department is to provide quality education in different advanced Computer Engineering fields by exposing students to both theoretical and practical experiences. Preparing them to contribute significantly to the research and advancement of new and emerging technology in computing, and fostering perception and awareness of their leading role in the development of their community.

In 1440 H, the department introduced a Master of Science in Computer Engineering program, which was prepared according to the highest standards to match similar programs taught in a world class international universities, this is to prepare graduates for employment in, governmental organizations, educational institutions and other computer engineering enterprises. Moreover through its curriculum the program allows students to contribute significantly to the scientific society, and qualifies them to pursue further studies in respected universities worldwide.

The Master program designed to foster principles such as critical thinking, innovation and lifelong learning in various areas of computer engineering and to raise the awareness of their leading role in the development of their community.

As the graduate programs objectives integrates together to achieve the FBSU mission, consequently, the university, over the past few years, have hired qualified faculty members of different ranks who have graduated from top universities all over the world and have rich experience in the research and teaching as well.

Degree Requirement:

A) Project Track (42 credit hours)

- Successful completion of a minimum of 39 credit hours of graduate courses.
- Completion and successful defense of a research project of 3 credit hours.

B) Thesis Track (42 credit hours)

- Successful completion of a minimum of 30 credit hours of graduate courses.
- Completion and successful defense of a research project of 12 credit hours.

Admission Requirements

FBSU invites students with a sound academic record, good personal character, strong interest to serve their communities and eagerness to serve as professionals in allied fields.

Applicants must satisfy the following eligibility requirements:

1. Hold a Bachelor degree in computer engineering or related computer streams or scientific stream from an academic institution accredited/recognized by the KSA's Ministry of Education (MOE). The field including, but not limited to software engineering, information systems, business information systems, electrical engineering, and electronics.
2. Hold a Bachelor's degree with a minimum ranking/rating of "Very Good": 3.75/5 or 2.75/4. However, applicants with a rating of "Good": equals to or greater than 3.25/5 and less than 3.75/5 or equals to or greater than 2.25/4 and less than 2.75/4 can be accepted if approved by the Council of Graduate Studies. Furthermore, applicants with a rating of "Good": equals to or greater than 2.75/5 and less than 3.25/5 or equals to or greater than 1.75/4 and less than 2.25/4 can be accepted if their GPA in their major of study is at least "Very good": Equal or above of 3.75/5 or 2.75/4.
3. Achieve a minimum score of 5.5 on the IELTS exam (about 500 in paper-based TOEFL or 61 in internet-based tests) or a minimum score of 75% on the University English placement exam. In case this condition is not met, a student may requested to take some additional English courses based on his scores in IELTS, TOEFL or FBSUniversity Placement Test.
4. General Graduate Record Examination (GRE) score will be the advantageous at the time of admission.
5. At least three letters of recommendation from the faculty who taught the applicant undergraduate courses. [Sealed and signed]
6. Satisfactorily meeting any additional departmental or university admission requirements. Present a "No-Objection" letter from the employer, if applicable.

Program structure

The Master of Computer Engineering curriculum is a two-year program designed to grant students the Master of Science in Computer Engineering upon the successful completion of the requirements. In the first year; the student study the required core courses, then in the second year students are allowed to determine which electives they prefer along with writing project or thesis distributed in the last two terms of the program.

A) Project Track :

----	5 Required Courses	15 credit hours
----	8 Elective Courses	24 credit hours
CEN 599	Project	3 credit hours
	Total	42 credit hours

Curriculum Study Plan Table

Semester	Course Code	Course Title	Required or Elective	Credit Hours
Semester 1	CEN 571	Advanced Computer Networks	R	3
	CEN 574	Advanced Computer Architecture	R	3
	CEN 576	Advanced Embedded Systems	R	3
	CEN 580	Programmable System-on-Chip	R	3
	Total			12
Semester 2	CEN 592	Research Methodology	R	3
		Elective course 1	E	3
		Elective course 2	E	3
		Elective course 3	E	3
	Total			12
Semester 3		Elective course 4	E	3
		Elective course 5	E	3
		Elective course 6	E	3
		Elective course 7	E	3
	Total			12
Semester 4		Elective course 8	E	3
	CEN 598	Project	R	3
	Total			6
Total				42

B) Thesis track:

----	5 Required Courses	15 credit
----	5 Elective Courses	15 credit
CEN 599	Thesis (A, B, C, D)	12 credit
Total		42 credits

Curriculum Study Plan Table (Thesis Track)

Semester	Course Code	Course Title	Required or Elective	Credit Hours
Semester 1	CEN 571	Advanced Computer Networks	CEN 571	3
	CEN 574	Advanced Computer Architecture	CEN 574	3
	CEN 576	Advanced Embedded Systems	CEN 576	3
	CEN 580	Programmable System-on-Chip	CEN 580	3
	Total			12
Semester 2		Elective course 1	E	3
		Elective course 2	E	3
		Elective course 3	E	3
	CEN 592	Research methodology	R	3
	Total			12

Semester	Course Code	Course Title	Required or Elective	Credit Hours
Semester 3		Elective course 4	E	3
		Elective course 5	E	3
	CEN 599	Thesis (A, B)	R	6
	Total			12
Semester 4	CEN 599	Thesis (C, D)	R	6
	Total			6
Total				42

Required and Elective Courses

Required Courses:

Course Code	Course Title	Credit Hours
CEN 571	Advanced Computer Networks	3
CEN 574	Advanced Computer Architecture	3
CEN 576	Advanced Embedded Systems	3
CEN 580	Programmable System-on-Chip	3
CEN 592	Research Methodology	3
Total		15 Credits

Elective Courses:

1. Networks Courses Group

Course Code	Course Title	Credit Hours
CEN 511	Distributed Systems	3
CEN 512	Mobile Computing and Wireless Networks	3
CEN 513	Network Security	3
CEN 514	Wireless Ad-hoc Networks	3
CEN 515	Advanced Wireless Sensor Networks	3
CEN 516	Robotics	3
CEN 517	Fault Tolerance and Reliability in Computer Networks	3
CEN 518	Queuing Theory and Network Applications	3

2. Embedded Systems Courses Group

Course Code	Course Title	Credit Hours
CEN 516	Robotics	3
CEN 519	Digital Image Processing	3
CEN 520	Intelligent Systems	3
CEN 523	Information Theory	3
CEN 524	High Performance Computation	3
CEN 525	Electronic Devices	3

3. General Elective Courses

Course Code	Course Title	Credit Hours
CEN 526	Artificial Intelligence	3
CEN 527	Web Database & information Retrieval	3
CEN 528	Advanced Computer Graphics	3
CEN 529	Graphical User Interface	3
CEN530	Software Project Management	3
CEN531	Data Warehouse and Mining Systems	3
CEN532	Interconnection Networks	3
CEN533	Advanced Topics in Databases	3
CEN534	Expert Systems & Knowledge Engineering Applications	3
CEN535	Software Quality Management	3
CEN536	Advanced Topic in Artificial Intelligence	3
CEN537	Advanced Topics in Software Engineering	3
CEN538	Designing Software Systems	3
CEN539	Neural Networks & Machine learning applications	3
CEN540	Selected Topics in Computer Engineering	3

B) Elective Courses

CEN 570 Simulation and Modeling (3 Credits)

This course covers second year graduate level material in the area of simulation and modeling with an emphasis on discrete-event simulation approaches, simulation cycle, probability, statistics in simulation, mathematical and statistical models, validation and verification of simulation models, random number generation, building valid and credible simulation models, modeling of simulation data, output data analysis, simulation software, distributed and parallel simulation, simulation techniques of some well-known systems such as queues, and applications to computer systems.

CEN 511 Distributed System (3 Credits)

This course covers graduate level material in the area of distributed systems and emphasizes on architectural models varying from client/server to peer-to-peer, grid-computing, communication models varying from client-pull to server-push models, synchronization techniques, logical clock communications, timestamps, token ring, and communication standards such as RPC, RMI, CORBA and SOAP.

CEN 512 Mobile Computing & Wireless networks (3 Credits)

This course covers graduate level material in the area of mobile computing and wireless networks and emphasizes on digital modulation techniques, multiple access techniques for wireless systems, frequency reuse, cellular, microcellular, Pico cell, femtocell concepts, wireless networking standards, PAN (IEEE 802.15.1 (Bluetooth) and IEEE 802.15.4 (Zigbee)), wireless LAN (IEEE 802.11 a/b/g/n), 4G mobile wireless (LTE, LTE-advanced, and mobile WIMAX IEEE802.16e/m), radio and network resource management, systems issues such as performance evaluation, quality of service guarantees and reliability, cognitive radio networks, and mobile IP.

CEN 513 Network Security (3 Credits)

This course covers graduate level material in the area of computer security and focuses on topics such as introduction to networks security, symmetric encryption and message confidentiality, public key cryptography and message authentication, key distribution and user authentication, transport level security, wireless networks security, intruders, and IP security.

CEN 533 Performance Analysis of Computer Networks (3 Credits)

This course covers graduate level material in the area of performance analysis of computer networks and explains fundamental performance analysis techniques, performance measurement methods, performance metrics, monitoring, experimental design, system modeling, queuing theory, Markov chains, performance bottleneck identification, characterizing the load on the system, determining the number and size of components, and mean value analysis.

CEN 514 Wireless Ad-hoc Networks (3 Credits)

This course covers graduate level topics in the area of wireless Ad-hoc networks that covers basics of wireless communication, multipath, loss, noise, and interference, multiplexing techniques, wireless media access control protocols, Ad-hoc networks design, routing techniques, QoS in wireless networks, wireless networks standards such as Bluetooth, IEEE 802.11 a/b/g/n, IEEE 802.15 standards, and IEEE802.11e for differentiated services

CEN 515 Advanced Wireless Sensor Networks (3 Credits)

This course covers graduate level material in the area of advanced wireless sensor networks with emphasis on wireless sensor networks protocols, deployment & coverage issues, applications, sensor hardware platforms (MOTES), Tiny OS, physical and link layers, MAC issues, localization, self-organization, time synchronization, power management, network layer protocols (energy-aware or attribute-based routing), node discovery protocols, data dissemination, data aggregation, cluster-based protocols (LEACH), query models, reliable transport protocols, and security issues in sensor networks.

CEN 516 Robotics (3 Credits)

This course provides graduate level material in the area of robotics with the focus on topics such as robotics systems overview, mobile robotics analyzes, challenges for autonomous intelligent systems, present the state of the art solutions, kinematics, sensors, vehicle localization, Map building, SLAM, path planning, and the exploration of unknown terrain.

CEN 517 Fault Tolerance and Reliability in Computer Networks (3 Credits)

This course provides graduate level material in the area of fault tolerance and reliability in computer networks where the student will study introduction to concepts of faults, errors, and failures, basic concepts of dependable computing including dependability attributes, means, and validation, stochastic modeling techniques in the context of network reliability analysis. Error detection and correction techniques, fault tolerant, topology design, and the practices of reliable and fault-tolerant computer networks design.

CEN 518 Queuing Theory and Network Applications (3 Credits)

This course provides graduate level material in the area of queuing theory and network applications and covers introduction to network applications, discrete random variables, continuous random variables, characteristic functions, stochastic processes, discrete-time Markov chains, continuous time Markov chains, introduction to queuing theory, M/M/1 and derivative queues, and M/G/1 queues, Burke's theorem, Jackson's theorem, finally open and closed network of queues.

CEN 519 Digital Image Processing (3 Credits)

This course provides graduate level material in the area of digital image processing and explains topics such as fundamentals of digital image processing, image enhancement in spatial and frequency domain, image restoration, color image processing, image compression and multi-resolution image processing.

CEN 520 Intelligent systems (3 Credits)

This course provides graduate level material in the area of intelligent systems with an emphasis on knowledge based intelligent systems overview, rule based expert systems, uncertainties management in rule based expert systems, fuzzy expert systems, frame based expert systems, artificial neural networks, evolutionary algorithm, hybrid intelligent systems, knowledge engineering and data mining.

CEN 523 Information Theory (3 Credits)

This course provides graduate level material in the area of information theory and its applications to communications theory, computer science, statistics, and probability theory, quantities of entropy, relative entropy, and mutual information, and show how they arise as natural answers to questions of data compression, channel capacity, rate distortion, and hypothesis testing.

CEN 524 High Performance Computation (3 Credits)

This course provides graduate level material in the area of high performance computation and focuses on reviewing major causes of performance degradation in scientific computing, scheduling problem, classification and solutions, task scheduling, load balancing algorithms, and deadline scheduling for real-time systems.

CEN 525 Electronic Devices (3 Credits)

This course provides graduate level material in the area of electronic devices and covers diodes, P-N junctions, Schottky barrier junctions, heterojunctions and ohmic contacts, bipolar junction transistors, field effect transistors, amplifiers, electronic devices for embedded systems, semiconductors and diodes in optoelectronics.

CEN 526 Artificial Intelligence (3 Credits)

This course provides graduate level material in the area of artificial intelligence with an emphasis on advanced techniques implemented to AI, problem solving, knowledge representation, evolutionary algorithms, supervised learning, learning by analogy, learning by discovery, self-reference and self-production, reasoning, causal reasoning, common sense reasoning, Bayesian network, logical agents and approaches, reasoning with uncertainty, confirmation theory, Belief theory, necessity and possibility theory, theory of endorsements, and finally spatial and temporal reasoning.

CEN 527 Web Database & Information Retrieval (3 Credits)

This course provides graduate level material in the area of web database & information retrieval with an emphasis on modeling, query operations, Markup languages, XML technologies and its applications, Searching the Web, IR models and languages, Indexing, searching, and finally digital libraries.

CEN 528 Advanced Computer Graphics (3 Credits)

This course provides graduate level material in the area of advanced computer graphics with an emphasis on mathematics for three dimensional computer graphics, hierarchical representation and basic shapes, surfaces and curves in three dimensions, three-dimensional modelling, solid bodies modelling, three-

dimensional viewing, visible surface, illumination and shades, texture mapping, computer graphics systems such as open GL, and finally animation techniques.

CEN 529 Graphical User Interface (3 Credits)

This course provides graduate level material in the area of graphical user interface with an emphasis on foundations of human computer interaction, structural approaches of design, interactive SW systems, techniques, interaction styles, interactive software systems design, usability, finally systems attribute and evaluation.

CEN 530 Software Project Management (3 Credits)

This course provides graduate level material in the area of software project management and aims to introduce project management, basic activities of software project management, charts used in project management, evaluation and acceptance of project phases, advanced techniques of project management as for maintenance, project scheduling, project insurance, and project management tools.

CEN 531 Data Warehouse and Mining Systems (3 Credits)

This course provides graduate level material in the area of data warehouse and mining systems and explains topics such as introduction to decision support systems (DSS), development of DSS, data modelling techniques and development of data warehouse in an architecture environment, different data warehouse architectures and development techniques, user-interface for data warehouses, data mining, application domains for data warehouse and mining, and project.

CEN 532 Interconnection Networks (3 Credits)

This course provides graduate level material in the area of interconnection networks and covers review of general concepts, LAN and WAN, management of token ring networks, ISO model of seven layers, network standard specifications, urban networks, large bandwidth networks, network design and performance, network programming, error detection, security and privacy, interconnection networks evaluation criteria, interconnection networks design, classification and evaluation.

CEN 533 Advanced Topics in Databases (3 Credits)

This course provides graduate level material in the area of advanced topics in databases and focuses on new trends in the area of software engineering, methodology of application, current research topics.

CEN 534 Expert Systems & Knowledge Engineering Applications (3 Credits)

This course provides graduate level material in the area of expert systems & knowledge engineering applications and covers introduction to expert systems, a brief presentation of knowledge representation paradigms, inference rules, resolution, and basic aspects of reasoning under uncertainty.

CEN 535 Software Quality Management (3 Credits)

This course provides graduate level material in the area of software quality management and focuses on introduction to quality management systems and total quality, ISO quality system and its application to software industry, capability maturity model (CMM) and its five levels, tick IT system, quality assurance, application of quality systems, and software tools for quality.

CEN 536 Advanced Topic in Artificial Intelligence (3 Credits)

This course provides graduate level material in the area of advanced topic in artificial intelligence and focuses on the following topics contemporary topics and research in artificial intelligence, methodology of application, and current research topics.

CEN 538 Designing Software Systems (3 Credits)

This course provides graduate level material in the area of designing software systems and provides a review of known methodologies and principles of object engineering, unified modelling language (UML), comparative study of available methodologies, conversion methodology to object design, evaluation of object design and use of object metrics, and use of object methodology.

CEN 539 Neural Networks & Machine learning applications (3 Credits)

This course provides graduate level material in the area of neural networks & machine learning applications with an emphasis on explanation based learning, learning by observation and discovery, analogical and case-based learning, learning models, evaluation of learning algorithms, experimental methodology, empirical learning, reinforced learning and genetic algorithms, neural computations, examples and applications, history of artificial neural system development, fundamental concepts and models of artificial neural system, finally applications like neural network simulation and implementations.

CEN 540 Selected Topics in Computer Engineering (3 Credits)

This course provides graduate level material in a company of topics of interest to the students.

MASTER OF SCIENCE IN COMPUTER SCIENCE (MSC)

Program Information

Computer Science Department is a leading department in College of Computing. It was established in 1424 H. The department has graduated hundreds of students from its BS programs.

Program Mission Statement

To provide quality education in different advanced Computer Science fields by exposing students to both theoretical and practical experiences. Preparing them to contribute significantly to the research and advancement of new and emerging technology in computing, and fostering perception and awareness of their leading role in the development of their community.

Degree Requirement:

- 1) Project Track (42 credit hours)
 - Successful completion of a minimum of 39 credit hours of graduate courses.
 - Completion and successful defense of a research project of 3 credit hours.
- 2) Thesis Track (42 credit hours)
 - Successful completion of a minimum of 30 credit hours of graduate courses.
 - Completion and successful defense of a research project of 12 credit hours.

Admission Requirements:

FBSU invites students with a sound academic record, good personal character, strong interest to serve their communities and eagerness to serve as professionals in allied fields.

Applicants must satisfy the following eligibility requirements:

1. Hold a Bachelor degree in Computer Science or related computer streams or scientific stream from an academic institution accredited/ recognized by the KSA's Ministry of Education (MOE). The field including, but not limited to software engineering, information systems, business information systems, electrical engineering, and electronics.
2. Hold a Bachelor's degree with a minimum ranking/rating of "Very Good": 3.75/5 or 2.75/4. However, applicants with a rating of "Good": equals to or greater than 3.25/5 and less than 3.75/5 or equals to or greater than 2.25/4 and less than 2.75/4 can be accepted if approved by the Council of Graduate Studies. Furthermore, applicants with a rating of "Good": equals to or greater than 2.75/5 and less than 3.25/5 or equals to or greater than 1.75/4 and less than 2.25/4 can be accepted if their GPA in their major of study is at least "Very good": Equal or above of 3.75/5 or 2.75/4.
3. Achieve a minimum score of 5.5 on the IELTS exam (about 500 in paper-based TOEFL or 61 in internet-based tests) or a minimum score of 75% on

the University English placement exam. In case this condition is not met, a student may requested to take some additional English courses based on his scores in IELTS, TOEFL or FBSUniversity Placement Test.

4. General Graduate Record Examination (GRE) score will be the advantageous at the time of admission.
5. At least three letters of recommendation from the faculty who taught the applicant undergraduate courses. [Sealed and signed]
6. Satisfactorily meeting any additional departmental or university admission requirements. Present a “No-Objection” letter from the employer, if applicable.
7. Should not have been dismissed from any academic institution.
8. Fulfill program requirements.
9. Fulfill other University requirements.

A student who satisfies the above criteria except English language requirement then English language test may be taken at FBSU.

Program structure:

The Master of Computer Engineering curriculum is a two-year program designed to grant students the Master of Science in Computer Engineering upon the successful completion of the requirements. In the first year; the students study the required core courses, then in the second year students are allowed to determine which electives they prefer along with writing project or thesis distributed in the last two terms of the program.

A) Project Track:

	5 Required Courses	15 credits
	8 Elective Courses	24 credits
MCS 598	Project	3 credits
	Total	42 credits

Curriculum Study Plan

Semester	Course Code	Course Title	Required or Elective	Credit Hours
Semester 1	MSC 501	Advanced Design and Analysis of Algorithms	R	3
	MSC 502	Software Engineering	R	3
	MSC 503	Database Systems	R	3
	MSC 504	Computer Networks and Security	R	3
	Total			12
Semester 2		Elective course	E	3
		Elective course	E	3
		Elective course	E	3
	MCS 597	Research Methodology	R	3
	Total			12

Semester	Course Code	Course Title	Required or Elective	Credit Hours
Semester 3		Elective course	E	3
		Elective course	E	3
		Elective course	E	3
	MCS 598	Project	R	3
	Total			12
Semester 4		Elective course	E	3
		Elective course	E	3
	Total			9

B) Thesis Track:

----	5 Required Courses	15 credits
----	4 Elective Courses	15 credits
MSC 599	Thesis (A, B, C, D)	12 credits
Total		42 credits

Curriculum Study Plan Table (Thesis Track)

Semester	Course Code	Course Title	Required or Elective	Credit Hours
Semester 1	MSC 501	Advanced Design and Analysis of Algorithms	R	3
	MSC 502	Software Engineering	R	3
	MSC 503	Database Systems	R	3
	MSC 504	Computer Networks and Security	R	3
	Total			12
Semester 2		Elective course	E	3
		Elective course	E	3
		Elective course	E	3
	MSC 597	Research Methodology	R	3
	Total			12
Semester 3		Elective course	E	3
		Elective course	E	3
	MCS 599	Thesis (A, B)	R	6
	Total			12
Semester 4	MCS 599	Thesis (C,D)	R	6
	Total			6

Required and Elective Courses

Required Courses:

Course Code	Course Title	Credit Hours
MSC 501	Advanced Design & Analysis of Algorithms	3
MSC 502	Software Engineering	3
MSC 503	Database Systems	3

Course Code	Course Title	Credit Hours
MSC 504	Computer Networks and Security	3
MSC 597	Research Methodology	3
MCS 598	Project (for Project Track only)	3
Total		21

Elective Courses:

1. Artificial Intelligence and Machine Learning

Course Code	Course Title	Credit Hours
MSC 520	Artificial Intelligence	3
MSC 522	Web Database & information Retrieval	3
MSC 526	Data Warehouse and Mining Systems	3
MSC 534	Expert Systems & Knowledge Engineering Applications	3
MSC 536	Advanced Topic in Artificial Intelligence	3

2. Computer Systems and Databases

MSC 522	Web Database & information Retrieval	3
MSC 526	Data Warehouse and Mining Systems	3
MSC 533	Advanced Topics in Databases	3
MSC 538	Designing Software Systems	3
MSC 530	High Performance Computation	3
CEN 570	Simulation and Modelling	3
MSC 523	Advanced computer Graphics	3
CEN 580	Programmable System-on-Chip	3

3. Computer Networks and Security

MSC 521	Computer Security	3
MSC 530	High Performance Computation	3
MSC 531	Distributed Systems	3
MSC 532	Interconnection Network	3
CEN 531	Distributed Systems	3
MSC 538	Designing Software Systems	3
MSC 541	Advanced Topics in Cyber Security	3)

4. Software Engineering

MSC 524	Graphical User Interface	3
CEN 570	Simulation and Modelling	3
MSC 538	Designing Software Systems	3
MSC 537	Advanced Topics in Software Engineering	3
MSC 535	Software Quality Management	3
MSC 525	Software Project Management	3
MSC 540	Database System Implementation	3

motivation, and concept of theory, deductive and inductive theories. Characteristics of scientific method, understanding the language of research, research process, problem identification and formulation, research question, research design such as concept and importance in research and features of a good research design.

MCS 598 Project (3 Credits)

A dissertation project that is accomplished via the formal, academic, and scientific approach under the supervision of an academic advisor.

MCS 599 Thesis (12 Credits)

A dissertation thesis that is accomplished via the formal, academic, and scientific approach under the supervision of an academic advisor.

B) MCS Elective Courses:

MCS 520 Artificial Intelligence (3 Credits)

This course aims to apply advanced techniques implemented to AI problem solving - Knowledge representation – Evolutionary algorithms – supervised learning - Learning by analogy - Learning by discovery - Self-reference and Self-production - Reasoning: causal reasoning - common sense reasoning - Bayesian network – logical agents and approaches - reasoning with uncertainty - Confirmation theory - Belief theory - Necessity and possibility theory - Theory of endorsements - Spatial and temporal reasoning.

MCS 521 Computer Security (3 Credits)

Threats and vulnerabilities - Identification and authentication - Access control - Intrusion detection - Encryption and privacy - Security policies and their evaluation.

MCS 522 Web Databases and Information Retrieval (3 Credits)

Modeling - Query operations - Markup languages - XML technologies and its applications - Searching the Web - IR models and Languages - Indexing and Searching - Digital libraries - Project: Designing and developing parts of IR Systems.

MCS 523 Advanced Computer Graphics (3 Credits)

Mathematics for computer graphics in three dimensions - Hierarchical representation and basic shapes - Surfaces and curves in three dimensions - Three-dimensional modelling - Solid bodies modelling – Three-dimensional viewing - Visible surface - Illumination and shades - Texture mapping - Computer Graphics Systems: Open GL - Animation techniques - Case study.

MCS 524 Graphical User Interface (3 Credits)

This course aims to introduce the foundations of human computer interaction, to examine and teach structured approaches to the design of human computer interaction and how it fits into overall system development, to show how concepts from different disciplines are applied to the design of interactive SW systems, implement the techniques and skills to develop usable interactive SW systems, to be aware of the different interaction styles that can be used in the design of interactive software systems, to enable students to make sound judgments about the design of the user interface and its usability based on usability attributes and evaluation.

MCS 525 Software Project Management (3 Credits)

Introduction to project management - Basic activities of software project management - Charts used in project management - Evaluation and acceptance of project phases - Advanced techniques of project management as for maintenance - Project scheduling - Project insurance and arbitrage - Project management tools - Case study.

MCS 526 Data Warehouse and Mining Systems (3 Credits)

Introduction to Decision Support Systems (DSS) - Development of DSS - Data Modelling Techniques and Development of Data Warehouse in an architecture Environment - Study of different Data Warehouse Architectures and Development Techniques - User-Interface for Data Warehouses - Data Mining - Application Domains for Data Warehouse and Mining - Project: Development of a Prototypical Data Warehouse/Mining System.

MCS 528 Selected Topics in Computer Science (3 Credits)

New trends in Computer science - methodology of application - current research topics.

MCS 530 High Performance Computations (3 Credits)

Review of major causes of performance degradation in scientific computing - The scheduling problem: classification and solutions - Task scheduling - Load balancing algorithms - Deadline scheduling for real-time systems.

MCS 531 Distributed Systems (3 Credits)

General concepts of operating systems - Distribution: concepts and definitions – architecture of distributed systems - Control in distributed systems: centralized versus distributed - Concept and forms of transparency in distributed systems - Naming concepts – classification and Implementation of different naming schemes – Inter-process communication: concepts, mechanisms, and implementation - Resource allocation and implication on load sharing - Load balancing - Process migration - Clock synchronization: concepts, problems and solutions - Concurrency control in distributed environments: concepts, approaches and implementation.

MCS 532 Interconnection Networks (3 Credits)

Review of general concepts - LAN and WAN - Management of token ring networks - ISO model of seven layers - Network standard specifications - Urban networks - Large bandwidth networks - Gates - Network design and performance - Network programming - Error detection - Security and privacy. The graph-theoretical approach - Criteria to evaluate interconnection networks - Issues in designing interconnection networks - Classification and evaluation - The need for higher-performance computers - Flynn's taxonomy - Computational speedup - Factors that limit speedup - Grosch's and Amdahl's laws - Different interconnection networks: Mesh Networks - Binary Tree Networks - Hypertree Networks - Pyramid Networks - Butterfly Networks - Hypercube Networks - Cube Connected Cycles Networks - Shuffle Exchange Networks - de Bruijn Networks - Star Networks and Star Connected Cycle Networks

MCS 533 Selected Topics in Database Systems (3 Credits)

Contemporary topics - recent research directions.

MCS 534 Expert Systems and Knowledge Eng. Applications (3 Credits)

A brief introduction to expert systems – A brief presentation of knowledge representation paradigms (the emphasis will be put on rule-based systems) - inference rules - resolution - basic aspects of reasoning under uncertainty - Case studies: MYCIN - CLIPS - Application Modeling in CLIPS.

MCS 535 Software Quality Management (3 Credits)

Introduction to Quality Management Systems and Total Quality - ISO Quality System and its application to software industry - Capability Maturity Model (CMM) and its five levels - Tick IT system - Quality Assurance - Application of Quality Systems - Software Tools for Quality - Case Study.

MCS 536 Selected Topics in Artificial Intelligence (3 Credits)

Contemporary topics and research in Artificial Intelligence - methodology of application - current research topics.

MCS 537 Selected Topics in Software Engineering (3 Credits)

New trends in the area of software engineering - methodology of application - current research topics.

MCS 538 Designing Software Systems (3 Credits)

Review of known methodologies and principles of Object Engineering - Unified Modelling Language (UML) - Comparative study of available methodologies - Conversion methodology to object design - Evaluation of object design and use of object metrics - Use of object methodology - Case Study.

MCS 539 Neural Network and Machine Learning Applications (3 Credits)

Approaches to machine learning: Explanation-based learning - Learning by observation and discovery - Analogical and Case-based Learning - Learning Models - Evaluation of Learning Algorithms - Experimental Methodology - Empirical Learning - Reinforced Learning and Genetic algorithms - Neural Computations: examples and applications - History of Artificial Neural System development - Fundamental Concepts and Models of Artificial Neural systems. Applications: Neural Network Simulation and Implementations and other emerging applications of Neural Algorithms and Systems.

MCS 540 Database System Implementation (3 Credits)

In this course we will study four major topics relating to database system implementation. The emphasis is on the "systems" components of a database management system. To better understand these components, a database implementation project will be required where you will build some of the basic "system" components for a simple database management system. We start with a brief overview of the basic components of a database system and discuss a set of open issues in designing and implementing a database management system, including relational DBMS and NoSQL database system before we detail the four core system components: Storage, Query Processing, Transaction Management and Distributed Data Management

MCS 541 Advanced Cyber Security (3 Credits)

This course in cyber security explores advanced technological techniques and tools in cybersecurity. Students will use these technologies and skills to identify different categories of threats, and implement corresponding countermeasures. Student will build knowledge of the tools and protocols needed to perform, encryption and authentication of data, operating system and application security, malware operation and analysis, code-level exploits, reverse engineering, security design principles, techniques for reducing complexity, and formal security models.



جامعة فهد بن سلطان
FAHAD BIN SULTAN UNIVERSITY

Faculty List

FACULTY LIST

- Abdelrahman, Mustafa; Instructor,
MA English Language and Literature, Mina University, Egypt, 2016.
- Abu Atieh, Amani; Instructor,
MA Translation, University of Jordan, Jordan, 2002.
- Abu Omar, Amer; Associate Professor,
Ph.D. Mathematics, University of Jordan, Jordan, 2013.
- Ahmad, Yasser; Assistant Professor,
Ph.D., Materials Science, Blaise Pascal University, France, 2013.
- Akhtar, Mohammad; Instructor,
MS Civil Engineering, Aligarh Muslim University, India, 2011.
- Al-Alawneh, Hamzeh; Instructor,
MA English Methodology, Mu'tah University, Jordan, 2007.
- AlBalawi, Abdullah; Instructor,
MA. Information and Network Security, University of Limerick, Ireland, 2014.
- Al-Balawi, Abdullah Eid; Instructor,
MS Information Technology, Rochester Institute of Technology, USA, 2001.
- Al-Balawi, Sultanah; Instructor,
MS Mathematics. Middle Tennessee State University, USA, 2017.
- Aldalgamouni, Taimour; Associate Professor,
Ph.D. Electrical Engineering, Concordia University, Montreal, Canada, 2009.
- Al-Damen, Ahmad; Instructor,
MA Applied Linguistics & TESOL, Ohio State University, USA, 2010.
- Al-Dowiri, Waleed; Instructor,
MA English Literature, Yarmouk University, Jordan, 2012.
- Aleassa, Hasan; Associate Professor,
Ph.D. Business Administration, Southern Illinois University, USA, 2009.
- Ali, Ijaz; Assistant Professor,
Ph.D. Accounting, University of Grenoble, France, 2013.
- Al-Itiwi, Abdolmin'im; Instructor
MSc. Chemistry, University of Jordan, Jordan 2016
- AlMasri, Amin; Associate Professor,
Ph.D. in Civil Engineering, Louisiana State University, USA 2008

- Al-Mograbi, Fedaa; Instructor,
MA Applied Linguistics, Mu'tah University, Jordan, 2009.
- Al-Nefaie, Raghad; Assistant Instructor,
B.S. Computer Science, Fahad Bin Sultan University, KSA, 2012.
- Algarni, Saad; Assistant Professor,
Ph.D. in Business Administration, University of Hull, UK, 2015.
- AlRawashdeh, Nusaibah; Instructor,
MA Finance and Banking, Hashemite University, Jordan, 2007.
- Alrefai, Ahmad; Assistant Professor,
Ph.D. in Economic, University of Illinois at Urbana – Champaign, USA, 1992.
- AlSayed, Marwan; Assistant Professor,
Ph.D. Computing and Software Engineering, University of Bradford, UK, 2009.
- Al-Sayed, Waad; Assistant Professor,
Ph.D. Mathematics, University of Francois Rabelais, France, 2008.
- Al-Senawi, Hiba; Instructor,
MS Commuter Science, Al Balqaa University, Jordan, 2010.
- Aqil, Raed; Lecturer,
MSc. Electrical Engineering, Yarmouk University, Jordan 2011
- Athamneh, Abdulghani; Assistant Professor,
Ph.D. Electrical Engineering, University of Texas, USA, 2009.
- Bani Hani, Khaldoun; Professor,
Ph.D. Civil Engineering, University of Illinois at Urbana-Champaign, Urbana, USA.
- Barake, Taha; Instructor,
MS Electrical and Computer Engineering, Virginia Tech, USA, 1997.
- Bataineh, Sameer; Professor,
Ph.D. Computer and Network Engineering, State University of New York at Stony Brook, USA.1992.
- Bayoud, Husam; Associate Professor,
Ph.D. Mathematics, University of Jordan, Jordan, 2007.
- Btoosh, Mousa; Associate Professor,
Ph.D. Linguistics, University of Texas, USA, 2004.
- El-Fadil, Nazar; Associate Professor,
Ph.D. Electrical and Computer Engineering, University of Technology, Malaysia, 2002.

- Eyadeh, Ali; Associate Professor,
Ph.D. Electrical and Telecommunications Engineering, University of University of
Wales Swansea, UK, 1997.
- Farhat, Fedaa; Instructor,
ME Electrical and Computer Engineering, American University of Beirut,
Lebanon, 1998.
- Gohar, Ali; Assistant Professor,
Ph.D. Finance, Hefei University of Technology, China, 2013.
- Haidar, Abdulhameed; Assistant Professor,
Ph.D. Mathematics, Tours University, France, 2010.
- Halahleh, Abdulsamee; Assistant Professor,
Ph.D. Civil engineering, King Fahd University of Petroleum and Minerals, KSA,
2014.
- Hamadsheh, Ali; Instructor,
MA Linguistics, San Jose State University, USA, 2012.
- Issa, Yazan; Assistant Professor,
Ph.D. Civil Engineering, King Fahd University of Petroleum and Minerals, KSA,
2012.
- Jarajreh, Mutasem; Assistant Professor,
Ph.D. Computer Engineering, University of Northumbria at Newcastle, UK, 2012.
- Kaiser, Jihan; Instructor,
MA English Literature, N.S.P. Orissa, India, 2008.
- Kanani, Khalid; Instructor,
MA Applied Linguistics, Jordan University of Science and Technology, Jordan,
2012.
- Ladadwa, Imad; Assistant Professor,
Ph.D. Physics, University of Bergen, Norway, 2001.
- Magableh Amer, Associate Professor,
Ph. D. in Electrical Engineering, University of Mississippi, USA, 2010
- Malkawi, Abdallah; Professor,
Ph.D. in Geotechnical Engineering, University of Akron, U.S.A., 1992
- Mezher, Mohammed; Assistant Professor,
Ph.D. Computer Science, Brunel University, UK, 2011.
- Nejem, Jamal, Assistant Professor,
Ph.D. Civil Engineering, University of Technology, Australia, 2012.

- Qudah, Abdullah, Associate Professor,
Ph.D. Construction Engineering and Management, University of Michigan, USA
1992.
- Rababah, Hussein, Assistant Professor,
Ph.D. Linguistics, University of Birmingham City University, UK 2007.
- Ramadan, Ali; Assistant Professor,
Ph.D. in Electrical and Computer Engineering, American University of Beirut,
Lebanon, 2014.
- Salhab, Ma`an; Instructor,
MA Human Resource Management, University of South Wales, UK, 2014.
- Sariera, Anas; Instructor,
MA Applied Linguistics, Mu'tah University, Jordan, 2012.
- Shiyab, Ahmad; Professor,
Ph.D. Business Administration, Saint Louis University, St. Louis, Missouri, USA
1991.
- Suliman, Ahmad; Instructor,
MA English Language, Yarmouk University, Jordan, 2014.
- Tantawi, AbdelRahman; Instructor,
M.SC Degree in computer science, University of Jordan, Jordan, 2015.
- Zaatreh, Mohammed; Instructor,
MS Physics, University of Jordan, Jordan, 2010.
- Zabadi, Sameer; Instructor,
MA Literature, Swansea University, UK, 2013.
- Zoubi, Mohammad; Associate Professor,
Ph.D. in Mechanical Engineering, Wayne State University, USA, 2012.

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