MAJMAAH UNIVERSITY

ENGINEERING COLLEGE GUIDE

THIRD EDITION 2019

Engineering College Guide

Majmaah University

كلية الهندسة

College of Engineering

Third Edition 2019

PREFACE

In the name of Allah the most Beneficent and the most Merciful

The College of Engineering (CoE) established in 1430 H (2009 AD). Since its inception, the CoE has been taking great interest in the development and improvement of academic affairs and has been considered as one of the top goal-persuader to achieve its vision, mission and educational objectives amongst others.

The CoE at present has three Departments: Civil & Environmental Engineering, Electrical Engineering, and Mechanical and Industrial Engineering.

It gives me immense pleasure to present the "College of Engineering Guide" for students, faculty members and visitors of this college, which contains pertinent guidelines and information. Additionally, the guide contains important information that will help in the understanding the CoE, its vision, mission, and objectives. The guide also contains important information for students such as available academic programs, specialization (Tracks), admission requirements, conditions of graduation and academic plans to name a few.

This guide also presents a description of the curriculum and the distribution of credits and contact hours for various academic programs offered by the college, which will facilitate our students to know the scientific content as they grow academically in the due course of study.

The guide apprises the students about supported deanships and channels to communicate with them. The employees of the College of Engineering, students will get information such as admissions, registration, scientific research, student and faculty affairs, and the available learning resources etc.

I beseech Almighty God that this guide will be of the benefit for all the stakeholders of this University.

Dr. Abdullah Alabdulakrim
Dean, CoE

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About The College

History and Evolution

The College of Engineering (CoE), being one of thirteen colleges at Majmaah University (MU) was established in 2009 to meet the need in the Kingdom of Saudi Arabia for engineering professionals. Since its establishment, it has been playing a significant role in providing both the private and the public engineering sectors with highly competent professional graduates who are equipped with the most recent knowledge and skills in their engineering fields. CoE currently operates three undergraduate programs running under three academic departments Civil and Environmental Engineering, Electrical Engineering, and Mechanical and Industrial Engineering.

Contact Information

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Website: http://www.mu.edu.sa/en/colleges/college-engineering

Visiting the Campus

College of Engineering is located in the main campus of Majmaah university administration building, office of the dean, departments take up the second floor of Block A. Laboratory, and classrooms are distributed in the ground, first, and second floors in Blocks A and B

Guide and Class Schedules

College of Engineering publishes an annual undergraduate guide and class schedules for fall, spring, and summer semesters. This guide provides information about academic programs; class schedules about courses offered in each semester. This guide and schedules are available online on the college website.

Vision, Mission, and Objectives

Vision

To be internationally well recognized engineering college in top engineering education, scientific research, and service to the community

Mission

To provide and educate students with the highest quality in engineering knowledge and to facilitate cutting edge research for the benefit of the society

Objectives

- To attract high quality faculty and well prepared students.
- To continuously improve and revise the academic programs.
- To build a strategic alliance with the industry.
- To be sensitive to the needs of the society.

Areas of Excellence

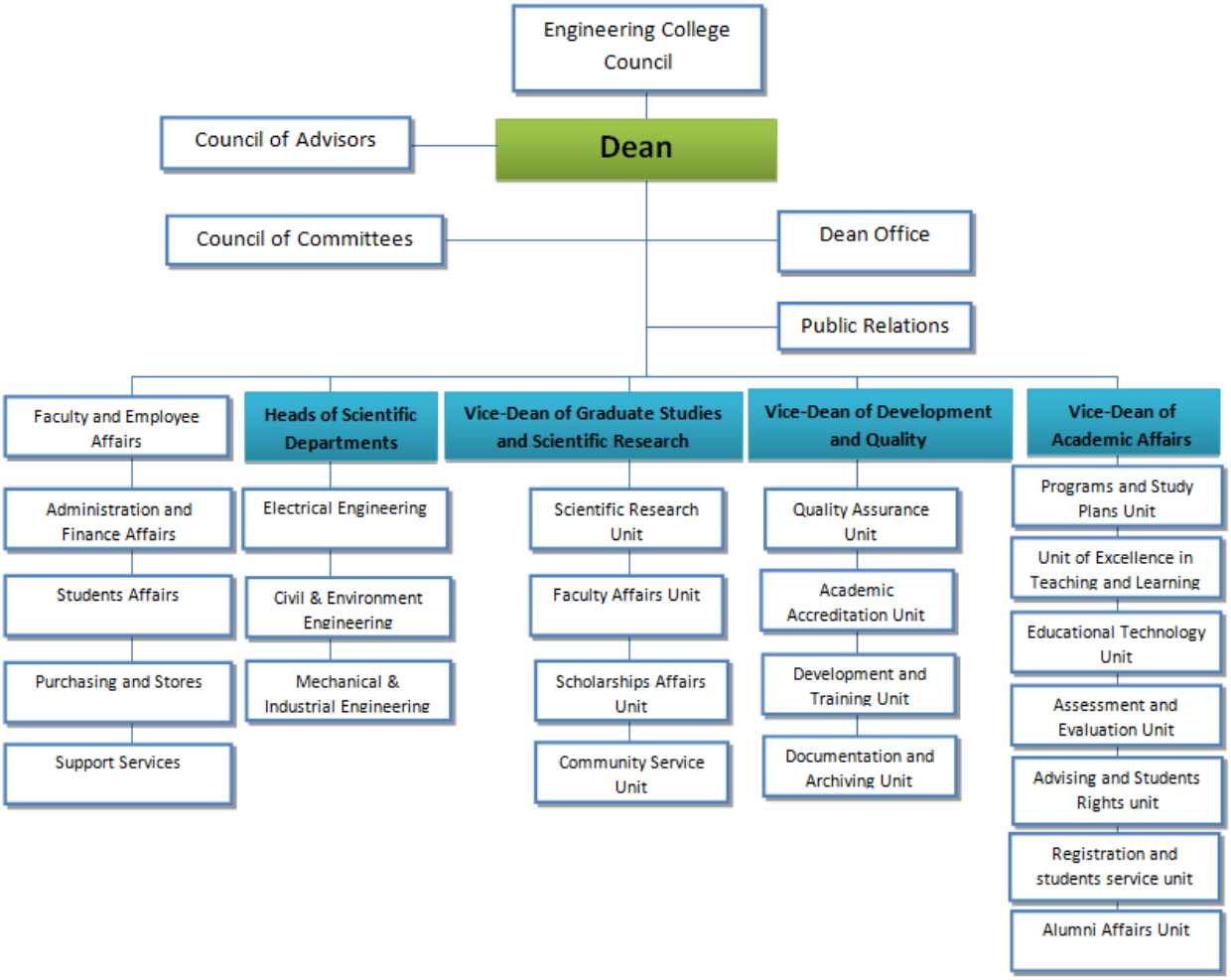
The CoE academic programs are accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org/.

The CoE is running many specialized tracks in the departments, which are a unique in the region. It has highly educated faculty members from Kingdom as well as from other countries e.g. US.UK, Canada, Egypt, India, Pakistan, Tunisia etc.

The CoE also has following areas of excellence:

- A good S/F ratio (about 16 per faculty)
- A high number of publications (300 published research papers and many under process)
- 9 registered patents one of them KAUST registered (Mechanical Engineering Department)
- More than 31 awards for the students and participation in international exhibitions.
- The college is playing a progressive role in providing consultation to the local societies especially in Civil, Mechanical, and electrical engineering projects.
- Good number of participation in the international and national conferences.
- Several research projects (34 as of now) have been completed during the past years (refer to the engineering Research centre at MU for the total number).

Organizational Structure



Duration of Study at the College

The duration of study in the college of engineering at Majmaah University is 4 years (8 levels) after completion the preparatory year.

Employers

Civil engineers are employed in the public and private sectors in large numbers in all branches of design, construction, and maintenance of roads, highways, bridges, dams, canals, docks, airports, and housing complexes and in environment management etc. Civil engineers also make a career in quality testing laboratories, join military and defense services, or work as consultants. Civil engineers work as construction engineers, transportation engineers, hydraulic and irrigation engineers, geotechnical engineers, environmental engineers, public works engineers.

Students majoring in Electrical Engineering find career opportunities in a wide variety of professional fields, including all engineering administrations in the governmental authorities, the projects operation and maintenance administrations in the governmental authorities, the ministry of water and electricity, the ministry of municipal and village affairs, the Saudi Council of the Engineers, the general institution for the waters refinement, the general institution for ports, the Saudi airlines, the military occupations management, the Ministry of transportations, the Ministry of agriculture and water recourses, the general institution for the electricity, the water and sewage authority, the Saudi Arabian American Oil (Aramco) company, the Saudi company for the basic industries (SABIC), the unified Saudi company for electricity (SCECO) and all factories.

Graduates in Mechanical engineering are among the most versatile engineers and enjoy professional employment in industry, government, consulting, and research organizations. Industrial engineers are needed in virtually all types of enterprises, ranging from industries such as manufacturing, distribution, logistics, transportation, and construction; service sectors such as health care, retail, banking, and engineering consulting to government agencies, military, and nonprofit organizations.

EDUCATION SYSTEM

The educational system of the college of engineering follows the Educational system of the MU. https://www.mu.edu.sa/en/deanships/deanship-admission-and-registration)

Article V: University System

a. The student is graded in the study according to the operational rules approved by the University Council.
b. Academic programs are designed equivalent to at least eight semesters for the university level.

***Operational Rule for Majmaah University*:**

1. The college determines an academic supervisor for every student to help him in matters related to the university system and his educational progress such as choice of specialization, registration of courses and other academic affairs.
2. The student assumes the responsibility of knowing and following up the academic system and the regulating by-laws, including the requirements of graduation.
3. The student is graded in accordance with the courses he passes successfully within the approved academic program. He becomes eligible for graduation if he completes the requirements of graduation.
4. Each academic program is designed as equivalent to at least eight semesters for the university level. The student may complete the requirements of graduation in less than that period.

5. The University system covers both the students at the university stage and the transitional stage.

Article VI:

The academic system in some colleges may be on basis of full academic year, in accordance with the principles and procedures approved by the University Council. The academic year is counted as two semesters.

Operational Rule for Majmaah University:

The academic system in some colleges may be on basis of full academic year, in accordance with the principles and procedures of this by-law, after substitution of the expression "academic year with "semester" wherever it comes, not conflicting the following:

a. In the Annual System, courses are taught throughout the year, in a duration of not less than (30) weeks. The periods of registration and final examination are not counted within this period.
b. A final examination is conducted for every course at the end of the year. Examination for the practical course or the clinical courses may be conducted by the end of the training period.
c. Second Test or clearance exams shall be conducted before the beginning of the academic year in duration not less than two weeks. Students who failed in the courses are allowed for the clearance examination. The College Board determines the nature of the courses and the credit hours for each course. The result is sent to the Deanship of Admission and Registration before the end of the third week from the beginning of the academic year. The grade (D 2) will be entered for those who pass in place of the previous failure grade (F), irrespective of the grade obtained.
d. The student, who fails in the first term of the first final examinations in courses more than allowed by the College Board in paragraph (C), shall not be allowed to sit for the Second Term Exams (F. Clearance Exam). He remains in the same level and only re-studies the courses he failed.
e. The student who fails in the Second Exam (F. Clearance) or the courses that have no second term, remains in the same year and studies again the courses he failed in. The College Board or whoever it delegates may allow studying some courses of the following year.
f. The student shall not be promoted from one year to another until he completes the requirements of promotion according to the syllabus.

Article VII: Levels System

A university system dividing the academic year into two semesters. There may be a summer semester, the period of which is half the duration of the basic semester. The requirements of graduation for obtaining the degree are divided into levels in accordance with the syllabus approved by the University Council.

Article VIII:

The University Council sets the regulations of registration, addition and dropping of the courses within the approved syllabus as it guarantees registration of the minimum of the academic load.

Operational Rule for Majmaah University:

The regulations for promotion from one level to another:

The student must commit to attending the classes from the first day for the beginning of the semester in accordance with the university academic calendar.

Firstly: Early Registration:

Early registration can be made according to the mechanism set by the Deanship of Admission and Registration in coordination with the colleges.

Secondly: Formal Registration:

1. The student is availed the courses he wishes to study or drop according to the following:
   a. The student may add the courses he wishes to study a week before the beginning of the academic year and ends by the end of the first week.
   b. The student may drop the courses he does not wish to study until the end of the second week from the beginning of the academic year.
   c. Registration must not exceed the maximum credit hours and not be less than the minimum as shall be mentioned in the fourth paragraph of this regulation.
2. The process of the registration of the courses for the student is done in consultation with his academic supervisor. The student bears the responsibility of any deficiency or errors caused by ignorance of the instructions.
3. The student must complete the procedures of registration by himself; he is not entitled to assign this responsibility to his representative at all.
4. The registration process can be performed automatically for students of a certain college or level if necessary.
5. If the student does not register for any course during the regular registration period, he shall be considered as leaving study.

Thirdly: Accreditation of Registration

1. The student must, in case of automatic registration, accredit his academic schedule through his personal file in the university website, during dropping/ addition period.
2. The student shall be considered as leaving study during dropping /addition period of registration if he does not accredit his academic schedule during addition/dropping period until the end of the second week from the beginning of the academic year.

Fourthly: Academic Load:

1. Academic load refers to the total credit hours for the courses the student registers for in the semester. It is determined in accordance to the following regulations:
   a. **The minimum:** The minimum academic load is 12credit hours for a semester.
   b. **The maximum:** The maximum academic load is 20 credit hours per semester and 10 credit hours for the summer semester.
2. The student who has an academic probation shall not be allowed to increase his academic load to more than 14 credit hours.
3. The student who has a Pass Grade shall not be allowed to increase his academic load to more than 16 credit hours.
4. The student on the threshold of graduation is allowed to exceed the maximum, the increase being not more than three credit hours.
5. The students who have GPA more than or equal to 4.5 can register up to 26 hours.
6. If a student has 23 hours or less he can register them all in the final one.

Fifthly: Academic Probation

The student shall be given an academic probation if his CGPA becomes less than 2.00 out of 5.00.

Attendance and Withdrawal

Article IX:

The regular student must attend the lectures. He shall be debarred from the final examination if the percentage of his attendance is less than the percentage fixed by the University Council, provided it is not less than (75%) of the lectures for each course during the semester. The student

who is debarred, because of absence, is considered as a failure in the course, and will be awarded the denial grade (DN).

Operational Rule for Majmaah University:

1. The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.
2. The student who is debarred from the examination because of absence is considered as a failure in the course. He will be awarded the score of the course work and given the denial grade (DN).
3. The lists of the debarred students shall be approved by the concerned College Board.
4. The lists of the debarred students shall be announced before the beginning of the final examinations.

Article X:

The College Board or whoever it delegates may, exceptionally, forward the banned students list and allow the students for entering the examination, provided he will give an acceptable excuse to the board. The University Council will determine the percentage of absence, provided it shall not be less than (50%) of the lectures for the course.

Article XI

The grade of the absent student from final exam shall be zero in that exam. His grade in that course shall be counted according to the scores of the course work during the semester such as midterms and obtains.

Article XII

If the student is not able to attend the final examination in any course, for a compulsive excuse, the College Board, in very urgent cases, may accept his excuse and give him the permission for a substitute examination to be conducted within a period not exceeding the end of the following semester. He shall be given the grade he obtains after having his substitute exam.

Operational Rule for Majmaah University:

1. The excuse for absence from the final examination shall be accepted in the following cases:
   a. The excuse letter should be timely given until a week after the cause is over.
   b. The compulsive excuses accepted by the College Board.
2. The substitute examination and entering of the grade shall be within a period not exceeding the end of the following semester.

Article XIII

a. The student may withdraw from the semester without being considered as failure if he provides an acceptable excuse to the authority specified by the University Council, within a period of time specified by the operational rules, approved by the University Council. The grade (W) shall be given to the student. This semester will be counted as part of the time required to complete the requirements of graduation.
b. The student may withdraw from one course or more in a semester with an excuse, according to the operational rules approved by the University Council.

Operational Rule for Majmaah University:

(1) A student may withdraw from studying a semester without being considered a failure, if he forwards an application to that effect to the dean of his college, at least three weeks before the beginning of the final examinations in accordance with the university schedule. The students of the colleges that adopt the annual system may withdraw before at least five weeks from the beginning of the final examinations. The students of the short courses may withdraw before the beginning of the examinations, equivalent to one third of the duration of the course. The university Rector may exceptionally, consider some, very urgent cases if necessary, from these durations, in which cases the student is given the withdrawal grade (W) and this period is counted as part of the of the time for completing the requirements of graduation.

(2) Withdrawal chances shall not exceed two consecutive or three non-consecutive semesters. As for the students of the colleges that adopt the annual system, they may not withdraw for two consecutive years. Years of withdrawal should not exceed two non-consecutive academic years throughout the student's stay in the university, after which period, the student's registration is cancelled. The dean of Admission and Registration may consider some exceptional cases.

(3) Dean of Admission and Registration may ask for the acceptance of the guardian of the female-student when she applies for withdrawal from a semester.

(4) A student may withdraw from one course or more per a semester and no more than three courses throughout the period of his study in the university in accordance with the period specified in the rules, according to the following conditions:

a. Approval of the dean of the college.
b. Applying for withdrawal from the course before the deadline for withdrawal from the semester.
c. The abbreviation (W) is entered for the course a student withdraws from

Deferral and Leaving Study

Article XIV:

The student may apply for deferral of study for reasons acceptable to the University Council. Duration of deferral should not exceed two consecutive semesters, or maximally, three non-consecutive semesters throughout his study in the university. After that his registration shall be cancelled. The University Council may make exceptions if necessary. The period of deferral shall not be counted as part of the required period for completing the requirements of graduation.

Operational Rule for Majmaah University:

1. The student may apply for deferral of study before the end of the first week for an acceptable reason to the dean of his college or whoever he delegates, provided that the duration of deferral shall not exceed two consecutive semesters, or three non-consecutive semesters. The students in the colleges that adopt the annual system may not defer for two consecutive years. Maximally, the period of deferral should also not exceed two non-consecutive years during his study in the university, after that his registration shall be cancelled. If necessary, the University Council may consider some. Exceptional cases.
2. The period of deferral shall not be counted within the specified period for completing the requirements of the study.
3. Female student who escorts her husband or her legal escort may defer her academic situation (admission or registration) for a period not exceeding five years. If a female student wishes to resume her study, she is allowed to, taking into account the following:

a. If the syllabi is changed, the similar courses that the student had already studied shall be equated and the requirements of graduation to be completed in accordance with the new syllabus.
b. If the syllabus is not changed, the student resumes from her previous academic situation.
c. After five years, the chance of the female student may be preserved in the department for her to begin as a new comer.

4. The deferred student must register after the end of the deferral period otherwise he considered as leaving study.
5. The Dead ship of Admission and Registration shall require for the approval of the female student's guardian when she applies for the deferral of the semester.

Article XV

If the regular student leaves study for one semester without deferral, his registration in the university shall be cancelled. The University Council may cancel the registration of the student if he left study for less than that period. As for the external student, his registration will be cancelled if he absents himself from all the final examinations of the semester without an acceptable excuse.

Operational Rule for Majmaah University:

The registration of "the student leaving study because of non-registration", will be cancelled if he does not address his academic situation before the end of the week from the beginning of the semester.

Article XVI

The student shall not be considered as leaving study for the semesters s/he studies as a visiting student in another university

Operational Rule for Majmaah University:

See Article Fifty and its Operational Rule related to the visiting student.

Article XVII

The student whose registration has been closed may apply for re-registration with his number and file before dropping according to the following regulations:

a. Application for re-registration within four semesters from the date of registration closing.
b. The concerned College Board and the relevant authorities should approve the re-registration of the student.
c. If four semesters or more lapse after student's registration closing he can apply to the university as a newcomer without reference to his previous academic record, provided all declared admission requirements apply for him. The University Board has the right for some exceptions according to the regulations issued by the board.
d. The student may not be re-registered more than once. The University Board, if necessary, has the right for exception to that.
e. The student whose registration is closed may not be re-registered if he is academically dismissed**.**

Executive Rule for Majmaah University:

1. The student's registration is deemed closed in the following cases:
   a. Drop out from the university.
   b. Withdrawal from the university.

c. Academic dismissal.

2. The student whose registration is closed can apply to his college for re-registration with his number and file, before dropping out, according to the following regulations:
   a. He has to apply for re-registration within four semesters (or two years for the colleges that apply the annual system) from the closing of date of registration.
   b. The College Board concerned should approve of re-registration of the student.
   c. If four semesters or more (or two years for the colleges that apply the annual system) lapse on a student's registration closing, he can apply to the university as a newcomer without referring to his previous academic record, provided all declared admission requirement are timely applicable to him. The Standing Committee for Students Problems has the right for some exceptions according to the regulations it determines.
   d. The student may not be re-registered more than once. The rector of the university, if necessary, has the right for exception, according to the recommendation of the standing committee of student's academic affairs.
   e. The student whose registration is closed may not be re-registered if he is academically dismissed. Taking into account what is stated in Article XX of the Regulations.

Article XIX

- The student graduates after completing the requirements of graduation successfully, according to the syllabus, provided that his Cumulative Average is not less than the rate determined by the concerned university council for each specialization. In all cases it should not be less than the Pass grade.
- Based on the recommendation of the Department Board, the College Board may determine suitable courses for the student to study in order to raise his Cumulative Average if he passes on the courses and fails in the Cumulative Average.

Executive Rule for Majmaah University:

1. The student graduates after completing graduation requirements successfully according to the syllabus, provided that his rate is not less than Pass (or his Cumulative Average is not less than (2.5). According to the recommendation of the concerned Department Board, the College Board may require the student to repeat, based on his Cumulative Average, in case of his success in the courses and failure in Cumulative Average, according to the following rules:

   a. A condition for eliminating any grade for a course the student had studied is that he repeats and passes it.
   b. The total credit hours for the courses eliminated from the Cumulative Average should not be more than 15% of the total credit hours of the syllabus.
   c. In re-calculating the Cumulative Average, only the following grades may be eliminated: Fail (F), (Debarred (D), and Withdrawal because of failure (WF).
   d. His recalculated Cumulative Average should not exceed 2.00 out of 5.00.
   e. The academic record should include grades of all the courses the student has taken.
   f. In the academic record a special notice, marking the eliminated courses, is made after applying recalculating Cumulative Average.

2. What is contained in the paragraphs: B and C of Article XX shall be considered.
3. The student shall not be considered a graduate until the issuance of approval of the University Council, awarding him the degree.

4. Graduation Day is schedule in according to the Academic Calendar approved by the University Council.
5. The Deanship of Admission and Registration, or whoever it delegates, forwards graduation memoranda to the University Council, to be forwarded in turn, at the nearest session after the end of the final examinations. Individual graduation memoranda are forwarded for the students who have incomplete grades (IC), or permitted to sit for substitute exam(s) in the final year or the like, when completing graduation requirements. Graduation semester is considered the final in the student's record.

Certificate

a. Every graduate is awarded certificate in both Arabic and English, containing the following information: Date of graduation in both Hijri and Gregorian, student's full name, nationality, Civil Registry Number, college, specialization, path (if any), degree, honours (if any). The certificate is to be signed and stamped by the Dean of Admission and Registration.
b. A substitute for a lost certificate may be issued, including the expression "Instead of a Lost Certificate".

Dismissal from the University

Article XX:

The student shall be dismissed from the university in the following cases:

a. Maximally, if he has got three consecutive probations, because of his decreasing CGPA to less than the fixed rate for graduation in accordance with the Article (19) of this by-law. According to a recommendation from the College Board, the University Council may give a fourth chance for those who can raise their CGPAs by studying the available courses.
b. If he does not complete the requirements of graduation maximally within half the period for his graduation in addition to the duration of the program. The University Council may give an
c. Exceptional chance for the student to complete the requirements of graduation within a period that should not exceed double the period fixed for graduation.
d. The University Council may, in exceptional instances, treat the cases of the students to whom the provisions of the preceding two paragraphs apply, by giving them an exceptional chance that does not exceed two semesters, maximally.

Operational Rule for Majmaah University:

1. The student shall be given probation if his CGPA decreases from 2.00 out of 5.00. That will be evident in his academic record.
2. If the student gets three consecutive probations, he will be deemed academically dismissed. His case shall be treated as follows:
   a. The University Council may give the student a fourth chance in accordance with a recommendation of the College Board for those who can raise their CGPAs by studying the available courses.
   b. The Standing Committee for Students' Academic Problems may recommend to the university Council to give the student a fifth chance according to the recommendation of the College Board, provided there is an improvement in his performance in the last semester, his CGPA being not less than 2.00 out of 5.00 and he can raise his it by studying the available courses.
   c. The University Council may exceptionally give the student a sixth last chance after the recommendation of the Standing Committee for the Students' Academic Problems.

3. For the colleges that adopt the annual system, the student is deemed academically dismissed if his CGPA decreased to less than (2.00) for two consecutive years, until the College Board takes a decision on it as follows:
    a. The College Board may recommend to the University Board to give the student a first chance. If the student fails to raise his CGPA, afterwards, the College Board recommends about him to the Standing Committee for Students' Academic Problems.
    b. The Standing Committee for Students' Academic Problems may recommend to the University Council to give the student a second chance based on the recommendation of the College Board. If the student fails to raise his CGPA afterwards, the committee may recommend about him, if necessary, to the University Council.
    c. The University Council may, exceptionally, give the student a last third chance after the recommendation of the Standing Committee for the Students' Affairs.
4. If the student does not complete the requirements of graduation within the limited period for graduation, his case will be addressed as follows:
    a. If he does not complete the requirements of graduation maximally within half the period for his graduation added to the period of the program, the College Board may give the student an exceptional chance to complete the requirements of graduation within a maximal period not exceeding twice the fixed original period for graduation, provided the cause of delay is e acceptable to the College Board.
    b. The University Council may give the dismissed students who have exhausted twice the period of the program, a chance not exceeding two semesters, recommended by the Standing Committee for the Students' Academic Affairs.
5. The College Board makes an inventory of all the cases it receives and presents them to the relevant councils and informs the Deanship of Admission and Registration within a period of time not exceeding the first two weeks from the commencement of the semester. In case of delay, the student shall not be permitted to register except for the following semester.

External Study

According to the recommendation of the colleges, the University Council may adopt study on external basis in the colleges and the specializations, which nature of study allow that. The university Council sets the principles and the procedures regulating that according to the following:

1. The required credit hours for graduation for an external student should not be less than the required credit hours for regular students in the available specializations for external study.
2. The external student is treated equally with a regular student concerning, admission grading, transference, dismissal, re-registration, etc. except for attendance of the classes.
3. According to the recommendations of the College boards, the University Council sets the required principles for the evaluating the achievement of the external students.
4. That the student has studied as an "external" student is written on his/her certificate.

Operational Rule for Majmaah University:

1. External study shall be in the departments approved by the University Council
2. The external student is treated as a full- time student in study by-laws, test regulations and other operational rules of Majmaah University except attendance of the lectures.
3. The University Council determines the number of external students to be enrolled and the conditions of enrolment.
4. The student may change from external to full time study according to conditions set by the University Council.

5. That the student has studied on an external basis is proved by writing it on his or her certificate, unless s/he has studied at least 60% credit hours on regular basis.

Final Examinations

Article XXII

The concerned College Board determines the midterm score according to the recommendation of the department board. It should not be less than 30% of the final score of the course.

Operational Rule for Majmaah University:

1. The concerned college board responsible for the course determines the midterm score according to the recommendation of the concerned department in the range between (40%) and (60%) of the final score.
2. According to the recommendation of the department board, the college board shall make decisions as regards the following:
   a. Amendment of the results
   b. Determining substitute exams

Article XXIII

The Midterm score is counted in one of the following ways:

1. Oral tests or practical tests, research, classroom activities, some or all of them, including at least one written test.
2. Two written tests at least.

Article XXIV

According to the recommendation of the department board, the concerned College Board responsible of the course may include the final examination in any course, written or oral. It may also determine the specified scores out of the final exam.

Article XXV

According to the recommendation of a course instructor, the department board assuming the responsibility of teaching a course may allow the student to complete requirements of any course in the following semester. The abbreviation (IC) is used to indicate to this. It will neither be included in the calculating Grade Point Average nor Cumulative Grade Point Average, until the student completes the requirements of that course. If a semester lapses without the student changing the (IC) in his academic record, it will be substituted for (F) and counted within his or her (GPA) and (CGPA).

Article XXVI

All or some of research, debate, science oriented or field work courses may be treated exceptionally from the provisions of articles (22, 23, and 24) by decision from the College Board. The College Board shall determine assessment of a student's achievement in these courses.

Operational Rule for Majmaah University:

All or some of research, debate, science oriented or field work courses which include the clinical courses may be treated exceptionally from the provisions of articles (22, 23, 24) by a decision from the college board according to the recommendation of the department board responsible for teaching the courses. The College Board determines the evaluation of the student's achievement in these courses.

Article XXVII

If research courses require more than one semester the grade (IP) shall be used. After completion of the course, the student is will be given the grade s/he obtains. If the course is not completed in the fixed time, the concerned department board may my approve entering the grade (IC) in the student's record.

Operational Rule for Majmaah University:

The fixed time for completing a course which grade is (IP) is one semester following the semester in which the student has obtained the grade (IP)

Article XXVIII

The grades the student obtains are counted as follows:

Percentage	Grade	Grade Code	Grade weight out of (5)	Grade weight out of (4)
95-100	Upper Distinction	A+	5.00	4.00
90 to less than 95	Distinction	A	4.75	3.75
85 to less than 90	Upper Very Good	B+	4.50	3.50
80 to less than 85	Very Good	B	4.00	3.00
75 to less than 80	Upper Good	C+	3.50	2.50
70 to less than 75	Good	C	3.00	2.00
65 to less than 70	Upper Pass	D+	2.50	1.50
60 to less than 65	Pass	D	2.00	1.00
Less than 60	Fail	F	1.00	.

Operational Rule for Majmaah University:

The grades the student obtains in every course are counted on the basis that the weight of the grade is (5,00) as follows:

Percentage	Grade	Grade Code	Grade weight out of (5)	Grade weight out of (4)
95-100	Upper Distinction	A+	5.00	4.00
90 to less than 95	Distinction	A	4.75	3.75
85 to less than 90	Upper Very Good	B+	4.50	3.50
80 to less than 85	Very Good	B	4.00	3.00
75 to less than 80	Upper Good	C+	3.50	2.50
70 to less than 75	Good	C	3.00	2.00
65 to less than 70	Upper Pass	D+	2.50	1.50
60 to less than 65	Pass	D	2.00	1.00
Less than 60	Fail	F	1.00	.

Article XXIX

Taking into account requirements of Article (19) of this By-law, when the student graduates, his general grade for Cumulative Average will be as follows:

1. (Distinction) if the CGPA is not less than 4.000-5.00, or 3.00 out of 4.00
2. (Very Good) if the CGPA is from 3.75-to less than 4.50 out of 5.00 or 2.75 to less than 3.50 out of 4.00.
3. (Good) if the CGPA is from2.75 to less than3.75 out of five or 1.75 to less than2.75 out of 4.00.
4. (Pass) if the CGPA is from 2.00 to less than 2.75 out of 5.00 or rom1.00 to less than 1.75 out of 4.00.

Operational Rule for Majmaah University:

The general grade for the CGPA when the student graduates are based on his CGPA according to the grade weight. Out of (5.00) points.

Article XXX

Honours Degree is awarded to the student who obtains CGPA (4.75) to (5.00) out of (5.00) or (3.75) to (4.00) out of (4.00) in graduation. The Second Class Honours is awarded to the student who obtains the CGPA (4.25) to less than (4.75) out of (5.00) or from (3.25) to less than (3.75) out of (4.00) in graduation**.**

The following conditions are required for obtaining the first Class or the Second

Class Honours Degree:

1. The student should not have failed in any course during his studies in the university or any other university.
2. The student should have completed the requirements of graduation within a period not more the average between the maximum and the minimum period for staying in his college.
3. The student should have studied at least 60% of graduation requirements in the university from which he obtains the degree.

Operational Rule for Majmaah University:

Honours Degree is awarded to the student who obtains CGPA (4.75) to (5.00) out of (5.00) or (3.75) to (4.00) out of (4.00) in graduation. The Second Class Honours is awarded to the student who obtains the CGPA (4.25) to less than (4.75) out of (5.00) or from (3.25) to less than (3.75) out of (4.00) in graduation**.**

The following conditions are required for obtaining the First Class or the Second

Class Honours Degrees:

1. The student should not have failed in any course during his studies in the university or any other university.
2. The student should have completed the requirements of graduation within a period not more the average between the maximum and the minimum period for staying in his college.
3. The student should have studied at least 60% of graduation requirements in the university from which he obtains the degree.

Exams Rules and Regulations

The following refers to the rules and regulations approved by the college council to accept excuses and this should serve as the guidelines for those who are in charge of the educational process as it was developed in accordance with executive affairs for Majmaah University.

1. Based on Examinations and Study Regulations at the university stage, "Executive Rules of MU" 1432-2010, approved by the University Council decree on its 6th session dated 27/3/1432-2/3/2011legal rules and regulations; related to final exams have been legislated without mentioning any mechanism to control absence cases from mid and final examinations.
2. Based on the first item, the Executive rule of Mu grants University Council the authorities concerning conducting final exams in a way that doesn't contradict the general policy.
3. According to the guidebook for academic systems issued by Registration and Admission Deanship "MU", page 6 includes the following paragraph:

"A student who is absent from the final exam gets Zero and his rating is calculated according to the marks of the Semester work obtained, in case of not attending the final exam in any of subjects as a result of crucial excuse, the college council may accept his excuse in case of dire necessity and grant him a chance to conduct an alternative exam according to the following terms:

1. To provide an excuse since the time of occurrence till a week after it is over.
2. The excuse must be one of the compelling reasons approved by the college council.
3. The alternative exam and its result should be managed within a period not exceeding the end of the following semester.

The rules set specifically for the college of Engineering, Majmaah University

- The decision to accept or reject excuses concerning exams is the responsibility of the instructor and the college council, hence informing the dean. Absence Form must be used.
- In accordance with the instructions issued by Registration and Admissions Deanship, the college council has a full authority to accept or reject absence excuses from final exams and this is after providing the excuse and filling in the Absence Form designed for this reason.
- In this case, the instructor, the head department and the examinations Committee must explain the following on the form:
  - The instructor: the percentage of absence and his marks during the term.
  - Head department: to what extent the excuse matches the regulations and absence rules of the university.
  - Examinations Committee: Student's previous absence from final exams, its frequency and excuses delivered before.
- The examinations committee receives copies of the excuses for mid and final exams and feed them in the data base for creating percentage statistics according to the number of students registered in the department.
- The examinations committee has announced the names of the students whose excuse have been accepted or rejected. The committee should state the time of conducting the alternative exam and its mechanism.
- The committee of registration, timetables and Examinations in corporation with the Academic Guidance Unit should announce the regulations and rules that govern the mechanism of acceptance or rejection; this should be uploaded to the university web site and announced on the notice boards of the college.

The terms approved by the college for accepting excuses

- ✓ The excuse must be issued by governmental medical clinic.
- ✓ The Excuse to be submitted within three days from the day of the exam and a week from the beginning of the final exam.
- ✓ The student himself or a representative must submit the excuse according the forms used in the university.
- ✓ In case of compelling excuse, documents necessary should be submitted by the students, and if it is not possible, the excuse must be handwritten clarifying the causes of absence.
- ✓ The department must decide on whether to accept or reject the excuse within two days of its submission and inform the student of the date of the alternative examination not later than the end of the semester.
- ✓ In case of rejection by the department or the college council, the student must be informed pointing out the reasons for rejecting his excuse.

Dear Students, you are kindly requested to adhere to the following during exams:

1. Attending in the exam room at least twenty minutes before the start of the exam.
2. Mobile phones are strictly forbidden in the Exam room or any anything that is not approved by the Examination Committee.
3. Being tardy for half an hour from the beginning of the exam deprives students from attending the exam also; they are not allowed to leave unless they have stayed for half an hour.
4. Programmed Calculators and Mathematical tables are not allowed to be used without permission from the instructor of the course.
5. No extra blank sheets are allowed to be used as a draft.
6. You are kindly requested to adhere to the place specified by the Exam Room Invigilator.
7. Make sure of writing your name and your Academic Number on both questions and answers sheet and any other information requested by the supervisor or the instructor of the course.
8. Show your ID to the invigilator if requested.
9. You are to keep silent, and not to look or talk to any student in the exam room, in case of queries talk to the invigilator or the instructor in need.
10. Bring all the tools necessary such as stationery for examination as you are not allowed to borrow any from others in the Exam room.

Transfer from Another University to MU

Article Forty-Two

A student's transfer from another university may be accepted according to the following regulations:

1. The student must have studied at a recognized university.
2. He must not be dismissed from the university he referred from for disciplinary reasons.
3. Terms of transfer, determined by the University Council, must be applicable to him.

Executive Rule for Majmaah University:

A student's transfer from another university may be accepted according to the following regulations:

a. He should have an academic record with a cumulative average of at least one semester and studied in a college or university recognized by the Ministry of Higher Education.
b. He should not have failed in the GPA.
c. He should not have been dismissed from the University for Disciplinary Reasons.
d. Transfer should not be from the lower academic degree to the higher.
e. Conditions of transfer, determined by the College Board, must be applicable to him.
f. Credit hours required from the transferred student to study, must not be less than 60% of the total credit hours for obtaining the BA degree from Majmaah University.
g. The total period spent by the student from the university he transfers from and the remaining period for him in Majmaah University should not be more than the average period between the minimum and the maximum for remaining in the college.
h. Procedures of transfer must be completed before the end of the first week from the beginning of the semester, or the beginning of the year for the colleges that adopt the annual system. If the procedures exceed this period, transfer shall be effective next semester.
i. Transfer must be written on the student's academic record.

Article Forty Three

The College Board equates the courses the student studies in another university, according to a recommendation of the Department Board that provides the courses. The courses equated are written on the student's record. They are not included in the calculation of cumulative GPA.

Executive Rule for Majmaah University:

The concerned College Board equates the courses the student passes in another university, according to a recommendation of the Department Board that gives the courses, provided the equated courses should not exceed 40% of the credit hours of the syllabus of the specialization transferred to. The courses equated are written on the student's record. They are not included in the calculation of cumulative GPA, on condition that the content of the course the student passes is equivalent to the course(s) to be equated.

Article Forty Four

If it appears after the student's transfer, that he had previously been dismissed for disciplinary reasons, his registration shall be deemed cancelled from the date of acceptance of his transfer to the university.

Article Forty Five

A student may be transferred in any semester, from a university to another, according to the procedures and declared schedules in the university transferred to, in the light of the general guidelines for transfer.

Transfer from College to Another within the University

Article Forty Six

The student may transfer from one college to another within the university in accordance with the regulation sap proved by the University Council.

Executive Rule for Majmaah University:

1. Firstly, transfer of a student from one college to another within the university is done according to the following regulations:
2. Acceptance of the students by deanship of the college is according to the regulations set by the College Board.
3. A student must not have spent more than four semesters, provided that the preparatory programs such as extensive language courses are not counted within that period.
4. Procedures of transfer should be completed within the first week of the semester or the academic year, for the colleges that adopt the annual system. If the procedures exceed this period, transfer shall be effective the following semester.
5. Transfer shall not be allowed except after a student spends at least one semester in the college he wishes to transfer from.
6. A student is allowed to transfer once during his university studies, or twice if one of these is the preparatory year or the intensive course of English.
7. A student transferred to the preparatory year or the intensive course, will be returned to his previous department if he does not pass, only once.
8. Specialization after passing the preparatory programs is not counted within the transfer movements.
9. Secondly, transfer of a student from the qualifying programs to the corresponding college that awards BA programs within the university is according to the following regulations:
    a. No student may transfer from BA to one of the qualifying programs.
    b. A student is allowed to move to the corresponding college, if he finishes all the courses of the qualifying program, with the Grade Point Average 2/5 (two out of five).
    c. If a student completes 50% of the total credit hours of the qualifying program, with a Grade Point Average of 4 to 5, or more, he can transfer to the corresponding college.
    d. If a student completes the qualifying program but six hours remain for him, he may transfer to the corresponding college, provided, his Grade Point Average is not less than 2.5 to 5.

Article Forty seven

All the previously studied courses shall be written in the academic record of the student who transfers from a college to another. This includes Grade Point Averages, and Cumulative Grade Point Averages, during his study in the university**.**

Transfer from Specialization to Another

Article Forty Eight

On the approval of the dean, a student may transfer from one specialization to another within the college, according to the regulations set by the University Council.

Executive Rule for Majmaah University:

1. A student may transfer from one specialization to another within the college after the approval of the dean of the college, according to regulations set by the College Board.
2. The remaining period for him in the university should be enough to finish graduation requirements.
3. Transfer procedures should be completed within the first week of the beginning of the semester or year for the colleges that adopt the annual system. If procedures exceed this period, transfer will be effective the following semester.
4. A student is allowed to transfer once during his university study.

Article Forty Nine

All the previously studied courses shall be written in the academic record of the student who transfers from one specialization to another. This includes, Grade Point Averages, and Cumulative Grade Point Averages, during his study in the university**.**

Visiting Student

Article L

A visiting student is he who studies some courses in another university or a branch of the same university without transferring to it. The courses he studies are equated according to the following regulations:

1. The student has to get the approval of the college in which he intends to study as a visiting student prior to admission.
2. The college or the university in which he intends to study should be a recognized institution.
3. The courses to be studied in another university should be equivalent to the requirements of graduation in his university.
4. If the visiting student studies in one of the branches of the college he studies in, he will be treated in accordance with Article (47).
5. The University Council determines the maximum percentage of credit hours to be considered for the external student.
6. The courses equated for the visiting student are not counted within his CGPA. The courses are written on his academic record.
7. Any other conditions set by the University Council.

Operational Rule for Majmaah University:

A visiting student is the student who studies some courses in another university or a branch of the same university without transferring to it. The courses he studies are equated according to the following regulations:

Firstly, any student from Majmaah University who wants to study as a visiting student:

1. Bring a prior permission from his college allowing him to study as a visiting student, determining the courses he would like to study. The college may condition that the student should attain a specific rate for the course equation. He will be given a letter from the Deanship of Admission and Registration to that effect.
2. The student should have an academic record with a (CGPA) for at least one semester in the university, before he applies as a visiting student.
3. The university or the college in which he intends to study should be a recognized institution.
4. The course the student intends to study in another university should be equivalent to one of the courses included as part graduation requirements.
5. Taking into account (Article 42), the maximum total for the credit hours to be counted for a visiting student is 20% from the total graduation credit hours in Majmaah University.
6. Equated courses of the visiting student shall not be counted as part of the student's (CGPA). The courses shall, however, be registered in his academic record.
7. The student should inform the Deanship of Admissions and Registration the results he obtains within the first week from the beginning of the semester following his study as a visiting student. If he does not provide his results, he shall be considered absent (except summer courses) and he shall be treated in accordance with (the Article 15).
8. A visiting student shall be paid a monthly bonus if he deserves it through manual files after forwarding his results of the semester to the Deanship of Admission and Registration.
9. The maximum numbers of the semester's students are allowed to study as visitors are two semesters. Secondly, any student from another university who wants to study in Majmaah University should:
    - Have an academic record with a (CGPA) of one semester at least from the university in which he had been admitted.
    - He should obtain a prior written approval from his university, permitting him to study as a visiting student in Majmaah University. In the letter he should mention the courses of Majmaah University he would like to study.
    - He should get the approval of the college in which he wishes to study as a visiting student.
    - The visiting student from another university would not be awarded a bonus from Majmaah University.
    - The courses the student takes are registered by the Deanship of Admission and Registration, taking into account all the regulation of registration.
    - At the end of his studies, the student shall be given a letter, showing the results of the courses.

General Provisions

Article Fifty One

This By-law cancels the preceding existing bylaws for regulating studies and tests at the university level:

Article Fifty Two:

The University Board sets the operational rules that do not clash with the principles of this bylaw

Article Fifty Three

The Higher Education Council has the right to interpret this bylaw

Operational Rule for Majmaah University:
The Higher Education Council has the right to interpret the operational rules of this bylaw.

Admission to the College of Engineering

Application to the College of Engineering must be directed to the Admission and Registration Dean, which sets university wide admission criteria and imposes the college's specific requirements. Acceptance to the College of Engineering passes through two tiers of selection. In the first tier, the applicant must attain a combined score of 75, where the combined score is calculated as:

$$combined\ score = 0.3\times high\ school\ GPA + 0.3\times GAT + 0.4\times [EAT]$$

GAT is the General Aptitude Test; and EAT is the Educational Attainment Test. Both tests are administered by The National Centre for Assessment in Higher Education. The college may impose other restrictions on admission, such as ceiling on the number of students the college can accept. The application for admission to the College of Engineering is open once per year, as opposed to every semester. Application dates and submission of documents are announced by Admission and Registration; visit www.mu.edu.sa for more information.

The second tier of admission to the College of Engineering requires applicants to pass the Preparatory Year, with its curriculum structured for engineering students. The preparatory year GPA necessary for admission to the college is at least 3.5 out of 5. Admission to the college does not require a student to pass all courses; however, the mandatory English, mathematics, and physics courses must be passed with at least D grade to be admitted to the college. The other courses, study skills and computer science, can be carried with the student to the first semester in the College of Engineering; but these courses must be completed by the first semester, otherwise, if the student cannot complete them by the first semester, he will be put on hold until these courses are completed.

Preparatory Year Program

The system of academic study

1. The student goes through two consecutive levels during the academic semester in order to cover all necessary requirements of the preparatory year.
2. The time table must be fixed and unchanged during the academic year as the students are not allowed to add or drop in once the academic year has started.
3. The registration process will be automatically implemented by the deanship of admission and registration in consistency the study plan of the preparatory year.
4. If the student fails to pass any of the subjects that he studies during preparatory year, he/she is allowed to study the subject in the next semester. However, if the subject is considered to be a previous requirement for other subject in the next semester, the other subject will be delayed to the next semester on the condition that the duration of his 4study must not exceed three academic semesters.
5. The student must pass the entire courses introduced in the preparatory year during the first academic year. The failing student is allowed to study an additional semester in 5order to meet the academic requirements of the preparatory year on the condition that the duration of his study must not be over three academic semesters.
6. The student is prohibited from sitting for the final exam due to his/her absence rate. In other words, if his/her absence rate surpasses 15% the total attendance rate of the lectures and academic lessons assigned to each course in the span of the academic year and without submitting an explanatory excuse, he / she will be banned from sitting for 6the final exam and he will be recorded as prohibited in the register of the final marks.
7. The student is allowed to study the preparatory year in any of the branches of the University, if he/she receives a prior consent from the dean of the preparatory year.

8. The admitted students should successfully pass the academic program of the preparatory year before being admitted to any of the available faculties in the University.
9. The admission in the faculties of medicine, dentistry, applied medical science, engineering, computer science and information technology and science is made through two paths , the first is the medical healthy path(the faculties of medicine, dentistry, applied medical sciences) and the second is the engineering scientific path (the faculties of engineering, computer sciences and information technology and science

Admission Requirements at colleges

First:

Student's GPA should be as the following:
(3.75) out of (5) for Engineering College if vacancies are available.
(4) Out of (5) for Medicine and Dentistry College.
(3) Out of (5) for IT College.
(3) Out of (5) or (2.50) out of (5) for Medical Science College if vacancies are available.
(2) Or (2.75) for Science college if vacancies are available.
Student shouldn't fail at any subject of the PYP for Medicine and Dentistry Colleges.
If rates are low, there might be more vacancies.

Second:

Student has to get the minimum score in IELTS test (4.5) or in another relevant international test like TOFEL. The test must be admitted by the PYP deanship.

Preparatory Year Program Courses

The students of PYP study in any tracks either the medical health track which qualifies students for medicine, dentistry colleges & the colleges of applied medical science or the scientific engineering course which qualifies students for colleges of engineering, science & computer science. Each track has two plans in which the courses are distributed on two semesters.

Scientific and Engineering Colleges Plan A

First Semester

Course code	**Course name**	**Credit hours**	**Prerequisite**	**Annual**	**Activity scheduled hours Lecture-Practice - Activities**
PENG111	English language 1 (PYP)	8	-	-	2-6-0
PMTH112	Introduction to Mathematics 1	2	-	-	1-1-0
PCOM113	Computer skills	2	-	-	1-1-0
PSSC114	Communication skills	2	-	-	1-1-0
Total					27-14

Second Semester

Course code	Course name	Credit hours	Prerequisite	Annual	Activity scheduled hours Lecture-Practical-Activities
PENG121	English language 2 (PYP)	6	PENG111	-	2-6-0
PENG123	English for	2	-	-	2-6-0

	engineering and scientific studies				
PMTH127	Introduction to Mathematics 2	4	PMTH112	-	4-0-0
PPHS128	Physics	3	-	-	2-1-0
Total					25-15

Scientific and Engineering Colleges Plan B
First Semester

Course code	Course name	Credit hours	Prerequisite	Annual	Activity scheduled hours Lecture-Practical-Activities
PENG111	English language 1 (PYP)	8	-	-	2-6-0
PMTH112	Introduction to Mathematics 1	2	-	-	2-0-0
PPHS128	Physics	3	-	-	2-1-0
PSSC114	Communication skills	2	-	-	2-1-0
Total					28-15

Second Semester

Course code	Course name	Credit hours	Prerequisite	Annual	Activity scheduled hours Lecture-Practical- Activities
PENG121	English language 2 (PYP)	6	PENG111	-	2-4-0
PENG123	English for engineering and scientific studies	2	-	-	2-0-0
PMTH127	Introduction to Mathematics 2	4	PMTH112	-	4-0-0
PCOM113	Computer skills	2	-	-	2-0-0
Total					24-14

For more information, visit the Preparatory Year Program
http://www.mu.edu.sa/en/deanships/deanship-preparatory-year/study-program-0

College of engineering admission criteria:

* ***Passing PYP courses score (3.75)***
* ***English proficiency STEP (67) or IELTS (4)***
* ***Grade point average (GPA) 85%***

The grade point average (GPA) for scientific departments- Engineering College:
The GPA is calculated as follows: 30% of the high school cumulative average + 30% of the assessment test score +40% of the educational test score. Admission is approved according to this criterion for applicants applying to scientific departments at the University. Students can calculate

their grade point average (GPA) as follows: the high school cumulative average high x 0.30 + assessment test score x 0.30 + educational test score x 0.40 Example of calculating the grade point average (GPA): If the student's high school cumulative average is = 80.00 and the assessment test score is = 70 and the educational test score is = 60, it is calculated as follows: 80 * 0.30 = (24) + 70 * 0.30 = (21) + 60 * 0.40 = (24) 24 + 21 + 24 = (69).

Change of Major – Transfer between Academic Programs

From the start, students are encouraged to choose their major wisely and must consider important factors before they make a decision about their major, such as their background, preferred future career, and individual preference. Admitted students to the College of Engineering are given the major selection form and must indicate their selection by the end of the fall semester of the freshman year. The regulations of Majmaah University put a limit on the number of a student can freely change his major. After the initial selection of the major, a student can only change his major once; and the change of major form must be submitted within the first two years after being accepted in the College of Engineering.

Class Attendance

The success of the student is highly related to the attention the student is given to the course. Therefore, class attendance is taken seriously by the College of Engineering; and Majmaah University's regulations regarding attendance are strictly applied. MU regulations regarding attendance state that a student missing 25% of the total number of classes in the semester will be banned.

Regulations:

1- ***Every 3 late in the attendance of the class equals one absent.***
2- ***A student coming within 10 minutes after starting time of class will be considered late***
3- ***A student coming later beyond 10 minutes will be considered absent***

Grading System

Majmaah University uses the grading symbols stated in the Study and Examination Rules for Saudi universities, which are:

A+	Exceptional	5 credit points
A	Excellent	4.75 credit points
B+	Superior	4.5 credit points
B	Very Good	4 credit points
C+	Above Average	3.5 credit points
C	Good	3 credit points
D+	High Pass	2.5 credit points
D	Pass	2 credit points
F	Fail	1 credit point
IC	In-Complete.	All work required for the course during the term has not been completed
DN	Denied	(1 credit point). Used when the student has missed 25% or more of the classes in a course
NP	No-Grade Pass	Used for courses taken under Pass/No Credit option
NF	No-Grade Fail	Used for courses taken under Pass/No Credit option
W	Withdrawal.	Authorized withdrawal - work may not normally be completed

Classification of Students

Students seeking their first bachelor's degree are classified according to the number of credit hours they have earned.

Freshman	0-34
Sophomore	35-69
Junior	70-103
Senior	104-136

One semester hour represents the work completed in a lecture course that students attend for 50 Minutes each week for 15 weeks. One laboratory hour is represented by one semester hour.

Calculation of the GPA

The grade point average GPA is a weighted average of the grades of the courses attempted by the student. The GPA is a point summary of the grades accumulated over all courses. The GPA is calculated by multiplying the point grades by the number of credit hours of the courses and dividing by the total credit hours. A student in one semester registered 21 hours and he received the grades as shown in the table below.

Course	Credit Hour	Letter Grade
MATH204	3	D
EE 205	1	C+
EE 208	3	A+
EE 207	1	A
EE 202	3	B
EE 206	3	C
EE 212	1	D+
MATH 107	3	B+
GE 108	3	F

To calculate the GPA, multiply the point grade by the credit hour, find the sum, and divide by the total credit hours:

Course	Credit Hour	Point Grade	Credit hour ×Point grade
MATH204	3	2	6
EE 205	1	3.5	3.5
EE 208	3	5	15
EE 207	1	4.75	4.75
EE 202	3	4	12
EE 206	3	3	9
EE 212	1	2.5	2.5
MATH 107	3	4.5	13.5
GE 108	3	1	3
		Total=21	Total=69.25

The GPA for this semester is 69.25/21 = 3.298, in a similar way, the overall GPA can be calculated.

Academic Advising

Students' understanding and following registrations procedures and taking the courses in the proper sequence as outlined in major curriculum have a positive effect on the students' success and completing the curriculum within the minimum time for graduation. Therefore, College of Engineering has given academic advising a decision support role by requiring approval from the academic advisor in every request submitted by students in cases related to changes in registration status, such as dropping of a course, change of major, medical excuses, etc. In addition to all of this, the college organizes an academic advising day, which is held every semester on Wednesday of the eighth week of the semester. For more information, see Academic Advising Day guide.

Visitor Student

Regulations of the registration in the university permit students to take credits for courses completed in other university. These courses will appear in the transcript of the student; but they are not used in the calculation of the GPA. An MU student can take the advantage of the visitor student status while observing the following conditions:

- The total credits earned as a visitor student must not exceed 27 hours, or 20% from the total hours of the major, which is 136 hours;
- The visitor student program permits a student to take credits from other universities for courses taken during a maximum of two semesters, with one semester in between to be in MU.
- The student must have a calculated GPA, which requires that the student must have registered and completed one semester in Majmaah University.

To take the visitor student status, a student must fill the visitor student form and get the approval from his department. The department might request specific information about the courses that will be taken outside MU, such as the official course syllabus from the university offering this course and the semester this course will be taken in. After the form is filled in and approved, the form is returned to the Registration Office. The process is completed by bringing approval from the host university, indicating the course details and the semester this course will be taken in. The College of Engineering requires a minimum of C+ in any course taken as a visitor student. For further information about the visitor student status, visit the Office of Registration website http://mu.sa/i1iZA

Transcripts

A copy of the unofficial transcript can be requested from the Student Affairs Office in the third floor. Official transcripts must be directed to the registration office in the Deanship of Admissions and Registrations. A student can request a copy of the transcript in person only; neither phone nor email requests can be accepted.

Examination Schedules

If a student finds that he has two exams or more scheduled for the same time, he can submit a request for reschedule to the schedules committee, office of the Vice Dean. The request must be received by the committee during the period of schedule revision set by the committee.

Course Requirements

The curriculum of each academic program in the College of Engineering is designed so that the student must meet university, college, and program requirements. The curricula in the College of Engineering require students to complete 136 credit hours (CH), which are composed of the following:

University Requirement	12 CH
College Requirement	42 CH
Major Requirement	48 CH
Track Requirement	34 CH Not all programs

University Requirements

The university course requirement for the BSc degree consists of 6 courses, distributed into 3 groups of electives, with a total of 12 credit hours. Each course has 2 credit hours. The course titles and codes are:

Course	**Code**
Introduction to Islamic Culture	SALM 101
Islam and Society Development	SALM 102
Economic System in Islam	SALM 103
Fundamentals of the Political System in Islam	SALM 104
Linguistic Skills	ARAB 101
Arabic Editing	ARAB 102
Contemporary Social Issues	SOCI 101
English Language	ENG 101
Entrepreneurship	ENT 101
Basics of Health and Fitness	HAF 101
Human Rights and Legislation	LHR 101
Volunteer Work	VOW 101

Islamic Studies Group

A student must select any three courses from the first group:

SALM 101	SALM 102	SALM 103	SALM 104

Arabic Language Group

A student must select one course from this group:

ARAB 101	ARAB 102

Social Studies Group

A student must select two courses from this group:

OCI 101	ENG 101	ENT 101	FCH 101	HAF 101	LHR 101	VOW 101

College Requirements

Engineering students need strong background in basic sciences to develop deep understanding of the application of engineering. In addition, the college required courses meet the requirement of academic accreditation. Therefore, the engineering curricula expose students to 15 credit hours in mathematics,4 credit hours in physics, 3 credit hours in statistics and probability, and 17 credit hours in support sciences, and 3 credit hours in general chemistry.

These courses along with their codes are:

Code	**Course**
MATH 105	Differential Calculus
MATH 106	Integral Calculus
MATH 107	Algebra and Analytical Geometry

MATH 204	Differential Equations
MATH 254	Numerical Methods
PHY 103	General Physics
GE 101	Fundamentals of Engineering Technology
GE 102	Fundamentals of Engineering Drawing
GE 103	Engineering Mechanics (Statics)
GE 108	Engineering Mechanics (Dynamics)
GE 105	Chemistry
GE 306	Engineering Report Writing
GE 407	Engineering Economy
GE 408	Engineering Project Management
STAT 201	Statistics and Probability

Mathematics, statistics and probability, chemistry, and physics are offered by the Basic Engineering Sciences Department.

Major Requirement

Each major in the College of Engineering provides students with the basic science of this specific engineering area and, in addition, courses in specialized fields of study within the general discipline. The curriculum consists of 12 credits of university requirements, and 42 credits of college requirements. The remaining of the 136 study plan credits are department and track requirements.

Engineering Practice

Engineering Practice is essential part of the curriculum and taken up by the students as per the following guidelines

1. The registration for Engineering Practice starts at the beginning of the third week of second semester and lasts for one week.
2. The student must have attained a total of 90 credit hours including registered credit hours. This restriction is applicable at the time of registration for EP.

The registration steps are:

- The applicant for Engineering Practice program should contact the coordinator of his department to complete the registration form (No. 2).
- Should the student decide to drop the Engineering Practice, he MUST complete form (No. 3), two weeks before the final examination.
- Engineering Practice Unit (EPU) contacts companies and governmental organizations to seek Engineering Practice opportunities.
- EPU provides departments with updated list of Engineering Practice opportunities.
- Department Engineering Practice Coordinator appropriately deputes students to training opportunities.
- Companies provide the university a letter that shows the starting date of the training and the training site, also the name and address of the supervisor.

Role of EPU

- Prepares letter of assignment to be sent to companies
- Collects acceptance letters from training sides.
- Handles a copy of the obtained letter of acceptance to student and Department Engineering Practice coordinator.
- Prepares a letter of training placement and acknowledgement to institutions and evaluation form.

- Arranges a seminar for the accepted Engineering Practice students before the end of the second semester

After the Engineering Practice, students should visit the EP coordinator at the beginning of the spring semester following the period of Engineering Practice to submit his report and schedule his presentation.

EP Coordinator's Responsibility:

- Collects reports from students and get reports from the companies
- Schedules presentations
- Reports grades to department council
- Department Council reports grades to college council.
- College reports the final results to the Deanship of Admission and Registration.

Senior Design Projects

Senior Design Project is compulsory for the students. It has two parts XX498, XX499. Following are the guidelines

Eligibility of senior design project

- GE 306.
- 94 Credit Hours. (After PYP)
- Specialize course in the track.

Number of student for each group

- Minimum two students.
- Maximum five students.
- Could be more than five in some exception cases.

Number of group supervisor can take

Two groups for academic year.

Report Format

Report must follow consistent format for Senior Design Project Report published by Engineering Faculty (page size, margining, font type, font size, spacing, caption of figure/table…etc.).

Final Report Submitting for examination:

Two (2) days before the Lab-Exam Week at the 14th week.

Exam/presentation Schedule Senior Design Project

The senior design exams are During the Lab-Exam Week, at the 15th week (In coordination with Exam Timetable Committee).

Corrected Final Report:

Two (2) weeks after the exam week.

FACILITIES AVAILABLE AT THE COLLEGE

There are 20 classrooms equipped with projectors, podiums and interactive boards, wireless internet access

1. Twenty-nine Engineering labs (all departments)
2. Two engineering drawing halls
3. Two computers labs, 60 PCs with internet access

4. College library contains more than 400 textbooks and references
5. Engineering club apartment and some entertainment and sport facilities
6. Cafeteria
7. STEM lab, equipped with robotics training kits for Physics and Math courses applications

STUDENTS' SERVICES

The college has an entertainments hall with the following facilities:

1. Pole table
2. Table tennis table
3. PlayStation 4
4. Tables for students' activities and workshops.

College of Engineering requires a medical check-up for all students before registering since engineering requires physical activities to perform various tasks.

Student services are also provided by deanship of student's affairs:

https://www.mu.edu.sa/en/deanships/deanship-student-affairs

ACADEMIC DEPARTMENTS

Department of Civil and Environmental Engineering

The department website can be reached via the web link:
http://www.mu.edu.sa/en/colleges/college-engineering/mission-vision

Academic Programs

Bachelor of Civil Engineering Specialization is acquired in one of the following three tracks:

a. Structural Engineering
b. Water and Environmental Engineering
c. Surveying and Transportation Engineering

Department of Electrical Engineering

The department website can be reached via the web link:
http://www.mu.edu.sa/en/departments/college-engineering/0-0

Academic Programs:

Bachelor of Electrical Engineering Specialization is acquired in one of the following three tracks:

a. Power and Electric Machines
b. Electronics and Communications
c. Control and Systems

Department of Mechanical and Industrial Engineering

The department website can be reached via the web link:
http://www.mu.edu.sa/en/colleges/college-engineering/mission-vision-1

Academic Programs:

Bachelor of Mechanical Engineering Specialization is acquired in one of the following three tracks:

a. Mechanical Power
b. Industrial Engineering
c. Design and Production

DEPARTMENTS AND PROGRAMS

Department of Civil and Environmental Engineering

Department of Civil and Environmental Engineering
The department website can be reached via the web link:
http://www.mu.edu.sa/en/colleges/college-engineering/mission-vision
E-mail to communicate with the program: ce@mu.edu.sa

Program name: Bachelor of Civil Engineering
Place where the program is taught: College of Engineering building - Main Campus
The program type: For Males
The language of Teaching: English
Initial requirements for admission to the program:
The student to be admitted to the Bachelor of Civil Engineering must:

- Complete the Preparatory Year Program with a GPA at least 3.75 out of 5.
- Complete all college fundamental courses, which are offered in the fall semester of the fresh year.

Graduation Requirements
The student has to pass:
1. University, College, and Department courses
2. Engineering Practice
3. Senior Design I and II

Mission and Objectives
Mission
To provide excellent engineering education that is conducive to talent and creativity and based on scientific knowledge, state of the art research, and expertise to serve the community in a professional and ethical manner

Objectives
The Graduates of the Civil Engineering program at Majmaah University will:

- Have a successful career in the civil engineering profession as practicing engineers and consultants in diverse areas that include structural, geotechnical, transportation, water resources and environmental engineering; or other related emerging fields.
- Demonstrate leadership and managerial skills through seeking professional licensure, and identifying and solving emerging issues of community, country and at global level.
- Be committed to have life-long learning and professional development in pursuing higher studies and state of the art research to identify and solve real life civil engineering problems.
- Gain high quality engineering expertise and maintain a keen awareness of ethical, social, environmental, and global engineering challenges.

Program Description
The department of Civil and Environmental Engineering offers undergraduate degree in Civil Engineering, with three tracks:

1. Structural Engineering,
2. Water and Environmental Engineering,
3. Surveying and Transportation Engineering.

Under graduate offerings in Civil Engineering include Engineering Mechanics, Engineering Geology, Civil Engineering Drawing, Structural Analysis, Hydraulics, Surveying, Reinforced Concrete Design, Properties and Strength of Materials, Soil Mechanics and Foundation Engineering, Hydraulics and Hydraulics Structure Design, Environmental Engineering, Water Supply and Sewage Engineering, Highway Engineering, Steel Structures Design, Water and Waste Engineering, Engineering Project Management, Methods and Equipment of Construction, Contracts & Specifications. The Department frequently visited to the ongoing projects, Industries to acquaint with practical and real life experience of the related stream.

Career Opportunities

Civil engineers are employed in the public and private sectors in large numbers in all branches of design, construction, and maintenance of roads, highways, bridges, dams, canals, docks, airports, and housing complexes and in environment management etc. Civil engineers also make a career in quality testing laboratories, join military and defence services, or work as consultants. Civil engineers work as construction engineers, transportation engineers, hydraulic and irrigation engineers, geotechnical engineers, environmental engineers, public works engineers.

CEE Laboratories

1. Surveying Lab
2. Structural Analysis Lab.
3. Soil Mechanics and Foundation Engineering Lab.
4. Hydraulics and Water Resources Lab.
5. Strength of Materials and Concrete Lab.
6. Highway Engineering Lab.
7. GIS and Remote Sensing Lab.
8. Environmental Engineering Lab.

Curriculum for the Bachelor Degree in Civil Engineering / Structural Engineering Track

First Year ***Fall Semester***

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Differential Calculus	MATH 105	3 (3,1,0)
3	General Physics	PHY 103	4 (3,1,2)
4	Fundamentals of Engineering Technology	GE 101	2 (1,0,2)
5	Fundamentals of Engineering Drawing	GE 102	3 (1,0,4)
6	Engineering Mechanics (Statics)	GE 103	3 (3,1,0)

Spring Semester

No	Course Name	Course code	Credit Hours
1	Integral Calculus	MATH 106	3 (3,1,0)
2	Algebra and Analytical Geometry	MATH 107	3 (3,1,0)
3	Engineering Mechanics (Dynamics)	GE 108	3 (3,1,0)
4	Chemistry	GE 105	3 (3,1,0)
5	Engineering Geology	CE 101	2 (2,1,0)
6	Civil Engineering Drawing	CE 102	3 (1,0,4)

Second Year ***Fall Semester***

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Differential Equations	MATH 204	3 (3,1,0)
3	Algebra and Analytical Geometry	MATH 107	
4	Soil Mechanics and Foundation Engineering I	CE 210	3 (2,1,2)
5	Structural Analysis I	CE 214	3 (3,1,0)
6	Hydraulics I	CE 240	3 (2,1,2)
7	Surveying I	CE 370	3 (2,1,2)

Spring Semester

No	Course Name	Course code	Credit Hours
1	Statistics and Probability	STAT 201	3 (3,1,0)
2	Computer Programming for Civil Engineering	CEN 209	3 (2,0,2)
3	Reinforced Concrete Design I	CE 217	3 (3,2,0)
4	Properties and Strength of Materials I	CE 212	3 (2,1,2)
5	Structural Analysis II	CE 215	3 (3,1,0)
6	Hydraulics II	CE 241	3 (2,1,2)

Third Year ***Fall Semester***

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Engineering Report Writing	GE 306	2 (2,0,0)
3	Soil Mechanics and Foundation Engineering II	CE 311	3 (2,1,2)
4	Environmental Engineering I	CE 360	2 (2,0,0)
5	Water Supply and Sewage Engineering	CE 363	2 (2,1,0)
6	Surveying II	CE 371	3 (2,1,2)
7	Highway and Traffic Engineering	CE 380	3 (3,1,0)

Spring Semester

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Numerical Methods	MATH 254	3 (3,1,0)
3	Properties and Strength of Materials II	CE 313	3 (2,1,2)
4	Structural Analysis III	CE 316	3 (3,1,0)
5	Reinforced Concrete Design II	CE 318	3 (3,2,0)
6	Structural Steel Design I	CE 320	3 (3,2,0)

Summer

No	Course Name	Course code	Credit Hours
	Engineering Practice	CE 399	0 CH 90 Credit Hours must be completed

Fourth Year ***Fall Semester***

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Engineering Economy	GE 407	2 (2,1,0)
3	Computer Application in Structural Engineering	CE 425	2 (1,0,2)
4	Reinforced Concrete Design III	CE 419	3 (3,2,0)
5	Structural Steel Design II	CE 421	3 (3,2,0)
6	Elective Course (1)	CE 42X	3 (3,2,0)
7	Senior Design I	CE 498	2 (1,0,2)

Spring Semester

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Engineering Project Management	GE 408	2 (2,1,0)
3	Methods and Equipment of Construction	CE 422	2 (2,1,0)
4	Contracts and Specifications	CE 423	2 (2,1,0)
5	Building Construction	CE 424	3 (3,1,0)
6	Elective Course (2)	CE 43X	3 (3,1,0)
7	Senior Design II	CE 499	2 (1,0,2)

Curriculum for the Bachelor Degree in Civil Engineering / Water and Environmental Engineering Track

First Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Differential Calculus	MATH 105	3 (3,1,0)
3	General Physics	PHY 103	4 (3,1,2)
4	Fundamentals of Engineering Technology	GE 101	2 (1,0,2)
5	Fundamentals of Engineering Drawing	GE 102	3 (1,0,4)
6	Engineering Mechanics (Statics)	GE 103	3 (3,1,0)

First Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1	Integral Calculus	MATH 106	3 (3,1,0)
2	Algebra and Analytical Geometry	MATH 107	3 (3,1,0)
3	Engineering Mechanics (Dynamics)	GE 108	3 (3,1,0)
4	Chemistry	GE 105	3 (3,1,0)
5	Engineering Geology	CE 101	2 (2,1,0)
6	Civil Engineering Drawing	CE 102	3 (1,0,4)

Second Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Differential Equations	MATH 204	3 (3,1,0)
3	Algebra and Analytical Geometry	MATH 107	
4	Soil Mechanics and Foundation Engineering I	CE 210	3 (2,1,2)
5	Structural Analysis 1	CE 214	3 (3,1,0)
6	Hydraulics I	CE 240	3 (2,1,2)
7	Surveying I	CE 370	3 (2,1,2)

Second Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1	Statistics and Probability	STAT 201	3 (3,1,0)
2	Computer Programming for Civil Engineering	CEN 209	3 (2,0,2)
3	Reinforced Concrete Design I	CE 217	3 (3,2,0)
4	Properties and Strength of Materials I	CE 212	3 (2,1,2)
5	Structural Analysis II	CE 215	3 (3,1,0)
6	Hydraulics II	CE 241	3 (2,1,2)

Third Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Engineering Report Writing	GE 306	2 (2,0,0)
3	Soil Mechanics and Foundation Engineering II	CE 311	3 (2,1,2)
4	Environmental Engineering I	CE 360	2 (2,0,0)
5	Water Supply and Sewage Engineering	CE 363	2 (2,1,0)
6	Surveying II	CE 371	3 (2,1,2)
7	Highway and Traffic Engineering	CE 380	3 (3,1,0)

Third Year ***Spring Semester***

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Numerical Methods	MATH 254	3 (3,1,0)
3	Hydraulic Structures I	CE 342	3 (3,1,0)
4	Irrigation and Drainage Engineering	CE 343	3 (3,1,0)
5	Reinforced Concrete Design II	CE 318	3 (3,2,0)
6	Structural Steel Design I	CE 320	3 (3,2,0)

Summer

No	Course Name	Course code	Credit Hours
	Engineering Practice	CE 399	0 CH 90 Credit Hours must be completed

Fourth Year ***Fall Semester***

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Engineering Economy	GE 407	2 (2,1,0)
3	Computer Applications in Water Engineering	CE 444	2 (1,0,2)
4	Hydrology	CE 445	3 (3,1,0)
5	Environmental Engineering II	CE 461	3 (2,0,2)
6	Elective Course (3)	CE 4XX	3 (3,1,0)
7	Senior Design I	CE 498	2 (1,0,2)

Fourth Year ***Spring Semester***

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Engineering Project Management	GE 408	2 (2,1,0)
3	Methods and Equipment of Construction	CE 422	2 (2,1,0)
4	Contracts and Specifications	CE 423	2 (2,1,0)
5	Water and Wastewater Treatment	CE 463	3 (3,1,0)
6	Elective Course (4)	CE 45X	3 (3,1,0)
7	Senior Design II	CE 499	2 (1,0,2)

Curriculum for the Bachelor Degree in Civil Engineering / Surveying and Transportation Engineering Track

First Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Differential Calculus	MATH 105	3 (3,1,0)
3	General Physics	PHY 103	4 (3,1,2)
4	Fundamentals of Engineering Technology	GE 101	2 (1,0,2)
5	Fundamentals of Engineering Drawing	GE 102	3 (1,0,4)
6	Engineering Mechanics (Statics)	GE 103	3 (3,1,0)

First Year Spring Semester

No	Course Name	Course code	Credit Hours
1	Integral Calculus	MATH 106	3 (3,1,0)
2	Algebra and Analytical Geometry	MATH 107	3 (3,1,0)
3	Engineering Mechanics (Dynamics)	GE 108	3 (3,1,0)
4	Chemistry	GE 105	3 (3,1,0)
5	Engineering Geology	CE 101	2 (2,1,0)
6	Civil Engineering Drawing	CE 102	3 (1,0,4)

Second Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Differential Equations	MATH 204	3 (3,1,0)
3	Algebra and Analytical Geometry	MATH 107	
4	Soil Mechanics and Foundation Engineering I	CE 210	3 (2,1,2)
5	Structural Analysis 1	CE 214	3 (3,1,0)
6	Hydraulics I	CE 240	3 (2,1,2)
7	Surveying I	CE 370	3 (2,1,2)

Second Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1	Statistics and Probability	STAT 201	3 (3,1,0)
2	Computer Programming for Civil Engineering	CEN 209	3 (2,0,2)
3	Reinforced Concrete Design I	CE 217	3 (3,2,0)
4	Properties and Strength of Materials I	CE 212	3 (2,1,2)
5	Structural Analysis II	CE 215	3 (3,1,0)
6	Hydraulics II	CE 241	3 (2,1,2)

Third Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Engineering Report Writing	GE 306	2 (2,0,0)
3	Soil Mechanics and Foundation Engineering II	CE 311	3 (2,1,2)
4	Environmental Engineering I	CE 360	2 (2,0,0)
5	Water Supply and Sewage Engineering	CE 363	2 (2,1,0)
6	Surveying II	CE 371	3 (2,1,2)
7	Highway and Traffic Engineering	CE 380	3 (3,1,0)

Third Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Numerical Methods	MATH 254	3 (3,1,0)
3	Geodetic Surveying	CE 372	3 (3,1,0)
4	Highway Materials and Construction	CE 381	3 (3,1,0)
5	Reinforced Concrete Design II	CE 318	3 (3,2,0)
6	Structural Steel Design I	CE 320	3 (3,2,0)

Summer

No	Course Name	Course code	Credit Hours
	Engineering Practice	CE 399	0 CH 90 Credit Hours must be completed

Fourth Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Engineering Economy	GE 407	2 (2,1,0)
3	Computer Applications in Surveying	CE 473	2 (1,0,2)
4	Photogrammetry	CE 474	3 (3,1,0)
5	Railway Engineering	CE 482	3 (3,1,0)
6	Elective Course (5)	CE 47X	3 (3,1,0)
7	Senior Design I	CE 498	2 (1,0,2)

Fourth Year Spring Semester

No	Course Name	Course code	Credit Hours
1	University Requirement	MURE	2 (2,0,0)
2	Engineering Project Management	GE 408	2 (2,1,0)
3	Methods and Equipment of Construction	CE 422	2 (2,1,0)
4	Contracts and Specifications	CE 423	2 (2,1,0)
5	Remote Sensing	CE 475	3 (3,1,0)
6	Elective Course (6)	CE 48X	3 (3,1,0)
7	Senior Design II	CE 499	2 (1,0,2)

Study Plan:

Study Plan for the program with levels **(Link to Study Plan)**

- **Number of Study Levels** 8 levels (after PYP)
- **Number of Program Teaching Units:** 136 (CH)

Tracks (if any) Degree Programs

Bachelor of Civil Engineering Specialization is required in one of the following the three tracks:

a. Structural Engineering,

b. Water and Environmental Engineering,

c. Surveying and Transportation and Engineering.

Course Descriptions

CE 101 Engineering Geology 2 :(2,1,0) Credits. Principles of physical and structural geology, Geology of Saudi Arabia, The influence of geological factors on planning design and construction of works- Geological and geophysical exploration for structures in rocks, Natural aggregate for engineering constructions, Geological engineering of underground openings, Earthquakes, Groundwater, Tunnels, Foundations, Evaluation of dams sites.

CE 102 Civil Engineering Drawing 3:(1,0,4) Credits. Introduction, the principal components of Civil Engineering construction, Components of a building, Civil Engineering Drawing for Walls and columns, Brick walls (Stretcher bond, Header bond, English bond, French bond), Masonry walls, Concrete footings, retaining walls, Details of reinforced concrete sections, Buildings (plans, elevations, sections, foundations, plan and working drawings), Geometric design of stairs, Steel construction, Wood construction, Selected Civil Engineering works. Architectural drawings. Roads and earth works, Culverts and bridges.

CE 210 Soil Mechanics and Foundation Engineering I 3:(2,1,2) Credits. Introduction, Soil Identification Index properties of soils, Soil classification, Water in soil, Stress within the soil, Settlement and consolidation of soils, Compaction of soils, Stability of slopes, Earth pressure and retaining wall, Settlement of structures. Shear strength of soils, Stability of slopes, Excavation and bracing, Site investigation.

CE 212 Properties and Strength of Materials I 3:(2,1,2) Credits. Engineering materials: properties, testing, specifications, statistical evaluation; bricks, lime, gypsum, timber, wood, metals, plastics, ceramics, glasses. Testing machines, measuring devices Tests: tension, compression, bending, shear, hardness, impact. Non-destructive tests. Laboratory Part: aggregate tests to determine (Moisture Content of fine Aggregate, Moisture content of coarse aggregate, Specific gravity and absorption of fine aggregate, Specific gravity and absorption of coarse aggregate, Abrasion test for coarse aggregate using Los Angeles machine, Bulk density and void ratio for fine aggregate, Bulk density and void ratio for coarse aggregate, Sieve analysis for fine aggregate, Sieve analysis for coarse aggregate), Cement tests (The fineness of cement, The normal consistency, Initial and final time of set ,Density and specific gravity of cement), Bricks tests (Compressive strength, absorption test).

CE 214 Structural Analysis I 3:(3,1,0) Credits. Types of structures, Supports and loads. Idealization of structures and loads. Geometric stability and determinacy. Analysis of determinate trusses, beams, plane frames and arches; reaction computation; axial force, shear force and bending moment diagrams. Influence lines of determinate structures.

CE 215 Structural Analysis I 3:(3,1,0) Credits. Properties of plane area, straining actions, Normal stresses, Shear stresses, combined stresses. Analysis of indeterminate structures; trusses, beams, plane frames and arches. Load-shear- moment relationship. Differential equation of elastic curve, deflections by integration, moment-area.

CE 217 Reinforced Concrete Design I 3:(3,2,0) Credits. Fundamentals and design theories based on ultimate (Limit) strength design and elastic concept. ACI Code requirements. Load factors. Analysis and design of reinforced concrete members subject to flexure, shear and diagonal tension in accordance to ACI strength method. Development length of reinforcement. Deflection and crack controls. The course should have also some drawing part. The course will therefore design and draw RC structures.

CE 240 Hydraulics I 3:(2,1,2) Credits. Fluid properties, Fluid static and hydrostatic forces, buoyancy and flotation Kinematics of fluid, Fluid Dynamics, Energy equation and momentum equation and their applications, Viscous effect and fluid resistance, Fluid measurements, dimensional analysis and similarity.

CE 241 Hydraulics II 3:(2,1,2) Credits. Laminar and turbulent flow in pipes, Friction factor in smooth and rough pipes. Moody's diagram, Flow in open channels, Specific energy, flow transitions, gradually varied flow and rapidly varied flow, Introduction to pumps and turbines.

CE 311 Soil Mechanics and Foundation Engineering II 3:(2,1,2) Credits. Soil and rock investigations, methods and properties evaluation for design of foundations. Types of foundation. Bearing capacity and design of shallow foundation (isolated, combined, strip and raft foundation). Bearing capacity and design of deep foundations. Pile foundations and caissons. Sheet piling. Retaining walls.

CE 313 Properties and Strength of Materials II 3:(2,1,2) Credits. Definitions and classification of fresh concrete (Consistency, Workability, Bleeding), Segregation of aggregate, Hardened Concrete Strength (Compressive Strength, Tensile Strength, Shear Strength, Bond with reinforcement, Factors affecting strength), Elasticity, Durability, Creep and Shrinkage of concrete, Mix Design (Trial Method, ACI Method, British Method). Laboratory Part: Cement Mortar Tests (Compressive Strength of Cement Mortar, Tensile Strength of Cement Mortar), Fresh Concrete Tests (Slump Test, Compacting Factor Test) Hardened Concrete Tests (Cubic Compressive Strength, Cylinder Compressive Strength, Split Cylinder Test) Trial Mix Design, ACI Method for Mix Design.

CE 316 Structural Analysis III 3:(3,1,0) Credits. Analysis of indeterminate structures; trusses, beams, plane frames and arches. Deflection of statically determinate beams: double integration method moment – area method, elastic weight method. Analysis of statically indeterminate Beams and frames by equation of three moments due to: Transverse loads Settlement of supports. Analysis of continuous beams by fixed points, Analysis of beams under moving loads. Buckling of columns. Method of consistent deformation; flexibility matrix formulation; prestrain, temperature change and support movement effects. Sway consideration. Analysis of non-prismatic members.

CE 318 Reinforced Concrete Design II 3:(3,2,0) Credits. Design of slabs and different floor systems, one way, two ways, ribbed and flat slabs. Design for torsion, combined shear and torsion by the strength method. Design of continuous beams. ACI moment redistribution for minimum rotation capacity. Design of columns under axial and eccentric loadings, short and long columns. Staircases. Types of footings and their structural designs.

CE 320 Structural Steel Design I 3:(3,2,0) Credits. Analysis and design of roof trusses. Design of tension and compression members, columns under eccentric loadings, column bases and footings. Design of beams. Welded and bolted connections. Design of building frames. Introduction to plastic analysis. Industrial building project. All according to AISC specifications.

CE 342 Hydraulic Structures I 3:(3,1,0) Credits. Theory of subsurface flow, Khosla's theory, Bligh's creep theory, Canal Falls, Cross Drainage Works, culverts, siphons and aqueducts. Energy dissipation downstream of hydraulic structures. Introduction to storage schemes, Design of Spillways.

CE 343 Irrigation and Drainage Engineering 3:(3,1,0) Credits. Fundamentals of Irrigation Engineering. Crop water relationships. Consumptive use of water and water application schedule. Sprinkler, trickle, surface and subsurface irrigations, design of water conveyance and measurement structures: weirs, Partial flume and culverts, Water logging, remedial measures. Different types of drainage systems: Open drains, tile drainage, drainage depth and spacing and reuse of drainage waters. Soil erosion.

CE 360 Environmental Engineering I 2:(2,0,0) Credits. Impact of Development on environment and Introduction to pollution problems, liquid wastes and their disposals: overland, in streams, lake and sea. Solid wastes, and management, characteristics, storage, collection, disposal, and recycling. Air pollution: sources, pollutants, effects and control. Noise pollution: sources, effect and control. E-wastes, Environmental regulations, Concept of sustainable development.

CE 363 Water Supply and Sewage Engineering 2:(2,1,0) Credits. Water quality parameters, estimating the quantity of water and wastewater, water treatment process, Planning and Design of water supply networks, wastewater characteristics, Planning and Design of sanitary and storm sewers, introduction to process of waste water treatment.

CE 370 Surveying I 3:(2,1,2) Credits. Definitions and concepts in land surveying, divisions and importance of surveying, Types of measurements, Units of measurements, Linear measurements, Angular measurements, Directions, Compass surveying, Levelling and contouring, International and local arrangement of maps, reading of different maps and standard specifications, Traverses, Planimeter and its applications, Plate table surveying, Levelling, Profiles, Earthwork quantities.

CE 371 Surveying II 3:(2,1,2) Credits. Introduction and application of electronic surveying measuring equipment (EDM, Total Station), Introduction to horizontal control survey (Traversing, Intersection, resection), Horizontal curves and vertical curves, Introduction to photogrammetry and Digital mapping.

CE 372 Geodetic Surveying 3:(2,1,2) Credits. Geodetic Surveying: Intersection Methods for Computation Rectangular coordinates, Computation Elements Spherical Triangles, Computation geographic coordinates of Spherical triangles, Computation Distances between two points on spherical surface. Cartography: Coordinate References System on the Spherical, Distortions Classification of Projections and their properties, Cylindrical and Conical Projections, Project.

CE 380 Highway and Traffic Engineering 3:(3,1,0) Credits. Highway planning and capacity. Design controls and criteria. Cross sectional elements. Sight distances. Horizontal and vertical alignments. Intersections. Highway materials characterization. Bituminous mixtures design. Flexible pavement design. Highway drainage. Pavement evaluation and maintenance. Components of Traffic system, Traffic-stream characteristics, Traffic studies, Parking, Pedestrians, Traffic safety, Traffic signals, Signs and Markings, Capacity of urban streets and Intersections, Congestion management.

CE 381 Highway Materials and Construction 3:(2,1,2) Credits. Highway materials, Soils, Soil classification for Highway purposes, testing of soil strength, Soil stabilization, Aggregates, Requirement of a good highway aggregate, Binder for Highway construction, Bituminous materials, Testing of Bituminous materials, Bituminous pavement, component parts of highway pavement structure, Types of highway pavement, Preparation of Subgrade. Design of road and street drainage works.

CE 419 Reinforced Concrete Design III 3:(3,2,0) Credits. Design of long R.C. columns, Design of deep Beams, Corbels, Analysis of R.C. sections using Working Stress Method, Serviceability, Deflections and Cracking, Design of frames and special R.C. structures, Design of dams and revolution structures, Design project.

CE 421 Structural Steel Design II 3:(3,2,0) Credits. Compound Beams, Crane Beams, Purlins, Sheeting Rails, Plate Girders, Beam Columns, Slide Column for a Single Storey Industrial Building, Crane Columns, Column Bases, Trusses.

CE 422 Methods and Equipment of Construction 2:(2,1,0) Credits. Overview of the construction industry. Earthmoving machinery and operations. Excavation and lifting. Loading & hauling. Compacting & finishing. Concrete construction. Concrete form design. Construction economics. Contract construction.

CE 423 Contracts and Specifications 2:(2,1,0) Credits. Legal aspects of engineering public works, general and special conditions, tenders, different types of tenders, estimation of rates. Rate analysis, Depreciation, Arbitration. Professional ethics. Specifications of construction materials according to different standards. Quantity surveying for civil engineering works.

CE 424 Building Construction 3:(3,1,0) Credits. Building structures, main buildings elements, engineering drawings required in design and implementation stages. Reading and analyzing architectural drawings. Reviewing studies and research work about engineering projects such as economical studies, soil and water research, etc. Studying some building elements as ladders, beams, installation materials in buildings.

CE 425 Computer Applications in Structural Engineering II 2:(1,0,2) Credits. Part A: Writing Computer Programs using BASIC or VISUAL BASIC, C++ or Excel in Civil Engineering (Structural Analysis, Reinforced Concrete Design, Steel structures Design, Foundation Engineering, hydraulics and water engineering). Part B: Training on using software (such as STAAD-III, EXCEL, AUTOCAD) Part C: utilization of internet resources in civil engineering.

CE 426 Earthquake Engineering 3:(3,2,0) Credits. Introduction to earthquake engineering, origin and characteristics of earthquakes, introduction to structural dynamics, vibration characteristics of buildings, periods and mode shapes, response spectrum, earthquake induced forces and displacements. Introduction to inelastic behaviour, force reduction and ductility requirements for concrete and steel material, seismic and design and provisions of reinforced concrete frames and shear walls according to ACI Code and international building seismic codes like UBC code.

CE 427 High-Rise Buildings 3:(3,2,0) Credits. Introduction, High-rise buildings structural frames, Loadings on High Rise Buildings, Analysis methods for high-rise building, Safe lateral deflection for H.R.B., Stability of H.R.B.

CE 428 Bridges Design 3:(3,2,0) Credits. Types of bridges; loads on bridges, analysis and design of reinforced concrete slab and girder type bridges, precast pre-stressed concrete bridge, metallic bridges. Substructure design. Construction details.

CE 429 Reinforced Concrete Design IV 3:(3,2,0) Credits. Introduction, design of sections of liquid containers (section subject to axial tension, simple bending and eccentric tension or compression), Design of elevated, rest and underground water tanks and pumping rooms. Design of different elements and method of constructions of swimming pools. Design of different elements and method of constructions of diving pools.

CE 430 Finite Element 3:(3,1,0) Credits. What are finite elements? What are boundary elements? Frames, Plane problems, Slabs, shells, theoretical details.

CE 431 Dynamics of Structures 3:(3,1,0) Credits. Equations of motion by equilibrium and energy methods, free and forced vibration of single degree of freedom systems effect of damping transmissibility. Equations of motion of two-degree freedom systems, normal modes of vibration, applications. Multi degree of freedom systems, orthogonality of normal methods, superposition technique numerical integration procedure. Idealization and formulation of mathematical models for wind, earthquake, blast and impact loading, aerodynamics gust phenomenon, principles of analysis.

CE 432 Concrete Structures Rehabilitation 3:(3,1,0) Credits. Students are acquainted with durability problems of concrete in the Gulf environment. They also study factors causing deterioration in the local conditions; manifestations and mechanisms of sulphate attack, corrosion of

reinforcement, salt weathering, environmental cracking and cement aggregate reaction; deterioration of concrete in sea water; preventive measures; diagnosis and evaluation of deterioration, repair materials and techniques.

CE 433 Prestressed Concrete 3:(3,1,0) Credits. Properties of P.R.C, Pre-stressing methods, Development of pre-stressed P.R.C. Theory, Properties of materials used in P.R.C, Losses in pre-stressing, Study of determinate P.R.C. elements subjected to bending and shear, Study of Indeterminate P.R.C. elements, End-Blocks for P.R.C. elements.

CE 434 Soil Mechanics and Foundation Engineering III 3:(3,1,0) Credits. Design of Retaining Walls, Introduction to Deep Foundation, Pile Foundation (Classification of Piles, Description of Pile Types, Structural Design of Piles, Static Pile Capacity, Single Piles, Dynamic Analysis, Pile Load Test, Pile Groups) Walls for Excavations, Drilled Piers or Caissons.

CE 444 Computer Applications in Water Engineering 2:(1,0,2) Credits. Introduction, Computer models in water and environmental engineering, Mathematical modelling: Mathematical tools and techniques. Artificial intelligence techniques: Artificial neural networks, Genetic algorithms, Fuzzy logic, Applications in water resources and environmental engineering, computational environmental hydraulics. Development of computer codes for problems in hydraulics, water resources. Hydrological studies, environmental engineering modelling. Introduction to specialized software: MATLAB, Flow Master, Storm CAD, Sewer CAD, Water GEMS,
AUTOCAD, AUTOCIVIL, STRAP).

CE 445 Hydrology 3:(3,1,0) Credits. The hydrologic cycle. Fundamentals of meteorology, temperature, humidity, wind, precipitation, evaporation. Stream-flow and run-off. Streamflow hydrographs. Unit hydrographs for various durations and its applications. Flood routing. Introduction to Water Resources management and its demand, Water Resources management in arid and semi-arid regions and its application in Saudi Arabia.

CE 446 Hydraulics III 3:(3,1,0) Credits. Pipeline and pumping systems, pipe networks, unsteady flow in pipeline water hammer and surge, unsteady free surface flow, loose boundary hydraulics, stable channel design.

CE 447 Hydraulic Structures II 3:(3,1,0) Credits. Definition of dams and the purpose of its construction, factors governing the selection of particular type and site of dams, planning for reservoirs, Design and construction of gravity dams, Construction of drainage gallery in gravity dams, Design and construction of earthen dams, Seepage through earthen dams and seepage control, Arch dams, Outlet works through dams Reservoirs. River training works.

CE 448 Environmental Hydraulics 3:(3,1,0) Credits. Convection and dispersion of pollutants in surface and ground water. Studying water quality in water supply pipes networks. Effect of hydraulic structures on environment. Hydraulic methods for domestic and industrial waste water discharge in water courses and coastal regions. Soil erosion by floods runoff.

CE 449 Groundwater Hydrology 3:(3,1,0) Credits. Groundwater, Porous -media porosity, Groundwater motions, Flow net and solving methods, Hydraulic of wells, Design of wells, Pumping Tests, Analysis and evaluation of pumping test data. Sea water intrusion. Unsaturated groundwater flow. Ground water in KSA.

CE 450 Ports and Coastal Engineering 3:(3,1,0) Credits. Harbor planning and construction, theory of periodic waves, wave energy, power, refraction, diffraction and reflection, winds, tides and

waves, wave-structure interaction, wave forces on structures, design of coastal structures, coastal zone processes, long shore sediment transport.

CE 451 Water Resources Engineering 3:(3,1,0) Credits. Planning, organizing, leading, controlling. Planning stages and levels, decision making techniques. Water demand and supply: water demand estimation methods, water supply estimation methods, water balance between supply and demand. Important aspects in water resources planning: economic, legislative, environmental, social and political aspects. Case study: Water resources planning and management in KSA.

CE 461 Environmental Engineering II 3:(2,0,2) Credits. Measurements of water quality: (sampling, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, turbidity, colour, taste, odour, pH, Alkalinity, solids), Hazardous waste, Radioactive waste, Measurement of air quality, Noise pollution.

CE 464 Solid Waste Management 3:(3,1,0) Credits. Sources of solid waste and models of its quantity prediction. Define components of solid waste and collection system. Design of functional elements of solid waste management (transfer station, material recovery facilities, landfills, treatment plants).

CE 465 Groundwater Contamination 3:(3,1,0) Credits. Causes and sources of groundwater contamination, dispersion of contaminants in groundwater, Soil treatment technologies, Pump and treat technologies, In situ treatment technologies.

CE 466 Water Desalination 3:(3,1,0) Credits. Introduction, desalination methods, Pre-treatment, single effect evaporation, multiple effect evaporation, multistage flash distillation, reverse osmosis, economic analysis of desalination processes. Case study to existing desalination station, components of desalination station, application in industry.

CE 467 Wastewater Reuse 3:(3,1,0) Credits. Potential reuse applications. Sources of water for reuse. Treatment technologies suitable for water reuse applications. Criteria for each type of reuse application. The overall procedures for determining the feasibility and planning of water reuse systems as well as the management structure of reuse projects. The management of the bio solids resulting from the treatment of wastewater and related regulations governing their use and disposal.

CE 468 Environmental Impact Assessment 3:(3,1,0) Credits. Introduction – Law and legislations governing EIA –Importance of EIA studies- Planning and Management of impact studies – Simple methods for impact identifications (Matrices network – checklists) – Description of Environmental Setting-Environmental indices and indicators for describing the effected environment – Prediction and assessment of impacts on the air, surface water, groundwater, and soil environment – Environment monitoring – case study and field visit to conduct EIA.

CE 469 Environment Management 3:(3,1,0) Credits. The importance of environmental management systems at the international level and at the enterprise level, Recycling, Cleaner production methods, Evaluate the product life cycle, Role of technology in environmental management, Environmental management systems used in the world system (ISO 14000).

CE 473 Computer Applications in Surveying 2:(1,0,2) Credits. Introduction, Computer models in Surveying and transportation Engineering, Mathematical modelling: Mathematical tools and techniques Artificial intelligence techniques: Artificial neural networks, Genetic algorithms, Fuzzy logic, Applications

in surveying and transportation engineering. development of computer codes for solving, planning, design, and operations problems in transportation. Introduction to some (up-to-date) software's: MATLAB, AUTOCAD, AUTOCIVIL, CDS Cogo, EasySurf).

CE 474 Photogrammetry 3:(3,1,0) Credits. The history of photogrammetry, aerial cameras and camera calibration, geometry of the aerial photograph, stereoscopy and stereoscopes, parallax and the theory and techniques of plotter orientation. Extraction of engineering information from single aerial photo and from two interfaced photos, transformation, least squares, preparation and measuring of coordinates from aerial photos, introduction to analytical photogrammetric surveying, outputs of aerial surveying, planning a photogrammetric project, Applications using computer software.

CE 475 Remote Sensing 3:(3,1,0) Credits. Fundamentals of remote sensing and its development, The effect of the atmosphere, The camera systems in remote sensing, Information processing and circulation of digital images of the American Landsat and French SPOT satellite, Other satellite remote sensing, Radar imaging, Digital image processing, Some remote sensing applications in engineering (soil classification, explore the site and planning, water resources and their uses, and transportation), remote sensing applications in the areas of urban planning and agriculture, A practical application using one of the software for the analysis and study of satellite images using a computer.

CE 476 Adjustment of Survey Measurements 3:(3,1,0) Credits. Analysis of theory of observations as applied to surveying, Weights of the observations, Statistical analysis of survey measurements, Analysis of the nature and propagation of random errors in surveying measurements, Adjustment techniques using least squares adjustment technique, Computer application for adjustments and analysis of survey measurements.

CE 477 Global Positioning System 3:(3,1,0) Credits. How does GPS work? Including detailed information of the satellite signals, type of signals, error sources in GPS measurements, the GPS segments, and the classification along with explanations of the different types of positioning solutions. Determination of coordinates from space and its applications – Systems development in last years (From Dupler system to GPS) – The main elements of the Earth coordinate system – Satellites-Tracks - The periodic time - The laws of Keller – Ground monitoring stations - Types of waves used - Wave receiving systems – Calculation of ground coordinates in cases of movement and rest - Application of GPS in geodesy.

CE 478 Geographic Information System 3:(3,1,0) Credits. Introduction to the application of geographic information systems (GIS) to civil engineering problems. GIS as a tool for analysis, modelling, and evaluation of civil engineering problems. The design of spatial databases, assembly of requisite data, and the development of analysis tools within GIS. Definition of spatial data, data types, spatial relationships, computer operation on spatial data, topology in spatial data, representation of features in a GIS, data models, data dictionaries, data capture techniques; database types, composition of spatial queries, analysis of engineering data using a GIS, complex analysis of polygon and linear features, presentation of results, use of a GIS as an engineering model test bed. Software applications using Arc/GIS 9.1.

CE 479 High Resolution Satellite Images 3:(3,1,0) Credits. Introduction to Remote Sensing, Digital Image Processing, Digital Image Corrections, Image Enhancement and Filtering, Image Restoration and Transformation, Discrete Wavelet transform, Image Classification Techniques, Stereo Image Analysis Techniques, Image application using Fuzzy Logic, Texture Analysis, SAR Image Processing and applications, Hyperspectral Image Analysis.

CE 482 Railway Engineering 3:(3,1,0) Credits. Introduction, Resistance and tractive efforts, Railway track, Rails, Rail joints, Sleepers, Rail to sleeper fastening, Railway Curves, Ballast, Subgrade and embankments, Tack alignments, Surveying, Geometric design of track, defects and failure in railroad, subgrade embankments, Railway stations, Cross cuts.

CE 483 Pavement Maintenance 3:(3,1,0) Credits. Essential terminologies and concepts of preserving existing highway pavements; characterizing of flexible and rigid pavements distresses and identifying possible cause of distresses; relating pavement distress types and distress severity to cost-effective repair alternatives; simple procedure to inventory pavement conditions and select maintenance methods. Example applications will be provided on various topic areas.

CE 484 Soil Improvement 3:(3,1,0) Credits. Purposes of soil stabilization, principles of soil stabilization, mechanical stabilization, cement stabilization, asphalt stabilization, lime stabilization, chemical stabilization, preloading and vertical sand drains, reinforced earth, reinforced retaining walls, stabilization by heating, grouting, compaction of granular soils, using blasting, heavy tamping and vibroflotation.

CE 485 Transportation Engineering 3:(3,1,0) Credits. The transportation systems and its characteristics, Transportation and society, Transportation technology: components of transportation systems, Vehicle motion, flow, and performance. Continuous flow, Terminals, Introduction to transportation demand.

CE 486 Urban Transportation Planning 3:(3,1,0) Credits. Characteristics of urban transportation systems, the methods through which they are planned and analyzed. Urban transportation planning process, Environmental impacts on urban travel, the application of systems approach to transport planning, survey design and data management, calibration of urban transport demand and supply models.

CE 487 Airport Planning and Design 3:(3,1,0) Credits. Introduction to airport planning and design parameters, site selection, configuration, development and design of terminal areas, demand forecasting, access, traffic control.

CEN 209 Computer Programming for Civil Engineering 3:(2,0,2) Credits. Introduction, Computers systems, problem solving techniques, flowcharts and algorithms, Introduction to programming languages, C/C++, Source programming, compilation and debugging. C/C++ programming basics, basic program construction, pre-processor directives, header and library functions, keywords, INPUT-OUTPUT statements, character set, constants, variables, declarations, operations and expressions, control statements – While, Do-While, for loops, If, If-else, Switch, Break, GOTO statements. Functions, Arrays and pointers, Object Oriented Programming (OOP) concepts.

GE 103 Engineering Mechanics (Statics) 3:(3,1,0) Credits. Introduction, Forces in plane, Forces in space, Statics of rigid bodies, Equilibrium of rigid bodies (2 and 3 dimensions), Centroids and centres of gravity, Moments of inertia of areas and masses, Analysis of structures (trusses, frames and machines), Forces in beams, Friction. Principal of Virtual Work method.

The Faculty Members

Faculty Members Websites

Head of Department

Dr. Abdul Majeed AlManie

Associate Professors

1. Dr. Sameh Saadeldin Ahmed Mohamed
2. Dr. Mohammad Tharwat Azmi

Assistant Professors

1. Dr. Abdullah Al Shehri
2. Dr. Yassir Gism Elkhalig Elaraki
3. Dr. Oussama El Alaoui
4. Dr. Omar Alawad
5. Dr. Mahmoud Owais
6. Dr. Ahmed Mohamed Sayed

Lecturers

1. Eng. Yahiya Yaseen Yahya Al Jahmany
2. Eng. Zia Ur Rehman Abdulrahman
3. Eng. Mashaal Jarbou
4. Eng. Asim Al Okayli
5. Eng. Mohammed Al Turki
6. Eng, Ahmed Ahulil Al Aoni
7. Eng. Hani M Alenezi
8. Eng. Abdullah ElZelfawi
9. Eng. Mohamed AL Boghmi
10. Eng. Abdelmalek M

Department of Electrical Engineering

Department of Electrical Engineering

The department website can be reached via the web link:
http://www.mu.edu.sa/en/departments/college-engineering/0-0

E-mail to communicate with the program: ce@mu.edu.sa
Program name: Bachelor of Electrical Engineering
Place where the program is taught: College of Engineering building - Main Campus
The program type: Males
The language of Teaching: English
Initial requirements for admission to the program:
The student to be admitted to the Bachelor of Electrical Engineering must:

- Complete the Preparatory Year Program with a GPA at least 3.75 out of 5.
- Complete all college fundamental courses, which are offered in the fall semester of the freshman year.

Graduation Requirements

The student has to pass:

1. University, College, and Department courses
2. Engineering Practice
3. Senior Design I and II

Program Description

The department of Electrical Engineering offers undergraduate degree in electrical engineering, with three tracks:

1. Electronics and Communication Engineering,
2. Power and Electrical Machinery Engineering,
3. Control and Systems Engineering.

The electrical engineering core curriculum focuses on fundamental electrical engineering knowledge: circuits, systems, electromagnetic, semiconductor devices, computer engineering; circuits and signal processing; communication; electronics; control systems; power and energy systems.

Career Opportunities

Students majoring in art find career opportunities in a wide variety of professional fields, including all engineering administrations in the governmental authorities, the projects operation and maintenance administrations in the governmental authorities, the ministry of water and electricity, the ministry of municipal and village affairs, the Saudi Council of the Engineers, the general institution for the waters refinement, the general institution for ports, the Saudi airlines, the military occupations management, the Ministry of transportations, the Ministry of agriculture and water recourses, the general institution for the electricity, the water and sewage authority, the Saudi Arabian American Oil (Aramco) company, the Saudi company for the basic industries (SABIC), the unified Saudi company for electricity (SCECO) and all factories.

Laboratories

1. Digital Logic Lab.
2. Electric Circuit Lab.

3. DSP Lab
4. Electronics and Measurement lab.
5. Machines and power systems Lab.
6. Microprocessor Systems Lab.
7. Digital and Analog Control lab.
8. Communication Lab
9. Microwaves & Optical Fibre Lab
10. Antennas Lab
11. Power Systems Protection
12. Electronics and projects workshop

The curriculum of EE program (133 Credit Hours)
Preparatory Year

No	Course Title	Course Code	Credit Hours
1	English Language 1	PENG 111	8
2	Introduction to Mathematics 1	PMTH 112	2
3	Computer Skills	PCOM 113	2
4	Communication and Education Skills	PSSC 114	2
5	English Language	PENG 121	6
6	Introduction to Mathematics 2	PMTH 127	4
7	Scientific and Engineering English Language	PENG 123	2
8	Physics	PPHS 128	3

General Courses

First year Fall *semester*

No	Course Title	Course Code	Credit Hours
1	University Requirement	MURE	2
2	Differential Calculus	Math 105	3
3	General Physics	PHY 103	4
4	Fundamentals of Engineering Technology	GE 101	2
5	Fundamentals of Engineering Drawing	GE 102	3
6	Engineering Mechanics (Statics)	GE 103	3

First year *Spring semester*

No	Course Title	Course Code	Credit Hours
1	Integral Calculus	Math 106	3
2	Algebra and Analytical Geometry	Math 107	3
3	Engineering Mechanics (Dynamics)	GE 108	3
4	Engineering Chemistry	GE 105	3
5	Fundamentals of Electric Circuits	EE 101	3
6	Basic Electronic Devices and Circuits	EE 111	3

Second year *Fall semester*

No	Course Title	Course Code	Credit Hours
1	University Requirement	MURE	2
2	Differential Equations	Math 204	3
3	Electric Circuits Lab.	EE 205	1
4	Logic Design	EE 207	3
5	Logic Design Lab.	EE 208	1
6	Electric Circuits Analysis	EE 202	3
7	Electromagnetic 1	EE 206	3
8	Basic Electronic Devices and Circuits Lab.	EE 212	1

Second year *Spring semester*

No	Course Title	Course Code	Credit Hours
1	Statistics and Probability	STAT 101	3
2	Introduction To Programming	CEN 210	3
3	Principles of Electric Machines	EE 288	3
4	Electromagnetic 2	EE 234	3

5	Signals and Systems Analysis	EE 221	3
6	Fundamentals of Electrical Power Systems	EE 270	2
7	Principles of Electric Power and Machines Lab	EE 271	1

Third year *Fall semester*

No	Course Title	Course Code	Credit Hours
1	University Requirement	MURE	2
2	Engineering Report Writing	GE 306	2
3	Automatic Control Systems	EE 341	3
3	Analog and Digital Measurements	EE 307	3
5	Measurements and Control Lab.	EE 308	1
6	Communications Principles	EE 322	3
7	Communications Principles Lab.	EE 323	1
8	Microprocessors	EE 360	3

Summer

No	Course Name	Course code	Credit Hours
	Engineering Practice	EE 399	0 CR 90 Credit Hours must be completed

Communications and Electronics Track

Third year *Spring semester*

No	Course Title	Course Code	Credit Hours
1	University Requirement	MURE	2
2	Numerical Methods	Math 254	3
3	Microprocessors Lab	EE 361	1
4	Analogue and Digital Electronic Circuits	EE 314	3
5	Analogue and Digital Electronic Circuits Lab	EE 315	1
6	Digital Signal Processing	EE 324	3
7	Digital Communications	EE 325	3

Forth year *Fall semester*

No	Course Title	Course Code	Credit Hours
1	University Requirement	MURE	2
2	Engineering Economy	GE 407	2
3	Antenna & Wave Propagation	EE 435	3
4	Wireless Communications	EE 426	3
5	Communication and Signal Processing Lab.	EE 427	1
6	Antennas and Wave Propagation Lab.	EE 436	1
7	Elective (1)	EE 4**	3
8	Senior Design (1)	EE 498	2

Forth year *Spring semester*

No	Course Title	Course Code	Credit Hours
1	University Requirement	MURE	2
2	Project Management	GE 408	2
3	VLSI	EE 415	3
4	Elective (2)	EE 4**	3
5	Senior Design (2)	EE 499	2

Power and Machine Track:

Third year *Spring semester*

No	Course Title	Course Code	Credit Hours
1	University Requirement	MURE	2
2	Numerical Methods	Math 254	3
3	Microprocessors Lab	EE 361	1
4	Electric Machines	EE 389	3
5	Electric Power Systems Analysis	EE 372	3
6	Electric Power and Machine Lab 2	EE 373	1
7	Power Electronics	EE 374	3

Forth year *Fall semester*

No	Course Title	Course Code	Credit Hours
1	University Requirement	MURE	2
2	Engineering Economy	GE 407	2
3	Applied Control	EE 475	3
4	Electric Power Systems Protection	EE 476	3
5	High-Voltage Systems	EE 477	2
6	Elective (1)	EE 4**	3
7	Senior Design (1)	EE 498	2

Forth year *Spring semester*

No	Course Title	Course Code	Credit Hours
1	University Requirement	MURE	2
2	Project Management	GE 408	2
3	Planning of Electric Distribution Systems	EE 478	2
4	Protection & High Voltage Lab.	EE 479	1
5	Elective (2)	EE 4**	3
6	Senior Design (2)	EE 499	2

Control and Systems Track:

Third year *Spring semester*

No	Course Title	Course Code	Credit Hours
1	University Requirement	MURE	2
2	Numerical Methods	Math 254	3
3	Microprocessors Lab	EE 361	1
4	Automatic Control	EE 343	3
5	Discrete Event and Hybrid Systems	EE 350	2
6	Introduction to Robotics and Mechatronic	EE 362	3
7	Programmable Log Controllers	EE 363	2

Forth year *Fall semester*

No	Course Title	Course Code	Credit Hours
1	University Requirement	MURE	2
2	Engineering Economy	GE 407	2
3	Modelling and Simulation of Dynamic Systems	EE 451	3
4	Automatic Control Lab	EE 442	1

5	Advanced system Engineering	EE 452	3
6	Elective (1)	EE 4**	3
7	Senior Design (1)	EE 498	2

Forth year ***Spring semester***

No	Course Title	Course Code	Credit Hours
1	University Requirement	MURE	2
2	Project Management	GE 408	2
3	Robotics and Mechatronics Lab	EE 464	1
4	Introduction to Intelligent Systems	EE 453	3
5	Elective (2)	EE 4**	3
6	Senior Design (2)	EE 499	2

Study Plan:

Study Plan for the program with levels **(Link to Study Plan)**

- **Number of Study Levels** 8 levels (after PY two levels)
- **Number of Program Teaching Units**: 133 (CH)

Tracks (if any) Degree Programs

Bachelor of Electrical Engineering Specialization is required in one of the following tracks:

a. Electronics and Communication
b. Power and Electrical Machinery
c. Control and Systems

The study plan is updated based on the external review requirement (ABET). The current study plan for new students from First 2018\2019 can be found on https://www.mu.edu.sa/en/colleges/college-engineering/new-ee-curriculum-first-semester-20182019

- Number of Study Levels 8 levels (after PY two levels)
- Number of Program Teaching Units: 139 (CH)

Tracks (if any) Degree Programs

Bachelor of Electrical Engineering Specialization is required in one of the following tracks:

a. Electronics and Communication
b. Power and Electrical Machinery
c. Control and Systems

Course Descriptions

EE 101 Fundamentals of Electric Circuits 3:(3,1,0) Credits. Basic circuit elements and concepts; Basic laws of circuit theory: Ohm's law, Kirchoff's law; Circuit theorems: superposition principle, Thevenin and Norton theorems; maximum power transfer theorem; techniques of circuit analysis: Nodal and mesh analysis.

EE 111 Basic Electronics Devices and Circuits 3:(3,1,0) Credits. Students in this course are introduced to learn: Semiconductors and its properties. PN junction diode: basic structure, I-V characteristics, large and small-signal models. Bipolar junction transistor (BJT): basic structure, modes of operation, dc biasing, dc and small-signal models, single stage BJT amplifiers. Field-effect transistors (FET): structure and operation of enhancement MOSFETs, I-V characteristics, dc biasing. Linear and nonlinear applications of op-amp. Current Mirror. Negative and positive feedback. CMOS logic gates and pass transistor logic gates. Dynamic logic gates.

EE 202 Electric Circuits Analysis 3:(3,1,0) Credits. Frequency response of RLC and resonance circuit: concept of transfer function, resonance, bode plots, introduction to filters; Two-Port networks; Mutual inductance and transformers; Transient analysis of first and second order circuits; Three phase circuits; Introduction to Op-Amp, ideal characteristics with simple applications; Diode characteristics, clipping and rectification.

EE 205 Electric Circuits Lab 1:(0,0,2) Credits. General introduction to the laboratory Voltage, current, and power in DC circuits using KVL and KCL. Superposition, Thevenin's, and Maximum power transfer theorems in DC circuits; Series and parallel AC circuits; Maximum power transfer theorem.

EE 206 Electromagnetic I 3:(3,1,0) Credits. Vector Algebra; Coordinate Systems and Transformation; Vector Calculus; Coulomb's Law; Electric Fields; Electric Flux Density; Gauss's Law-Maxwell's Equation; Electric Potential; Maxwell's Equations; Properties of Materials; Conductors; Dielectrics; Continuity Equation; Boundary Conditions; Poisson's and Laplace's Equations; Uniqueness Theorem; Biot-Savart's Law; Ampere's Circuit Law and its Applications; Magnetic Flux Density; Magnetic Torque and Moment; Magnetic Dipole; Magnetization in Materials; Magnetic Energy; Magnetic Circuits.

EE 207 Logic Design Lab 1:(0,0,2) Credits. Experiments on logic gates; Experiments on analysis and design of combinational logic circuits; Experiments on synchronous sequential logic; Experiments on flip flops; Experiments on analysis and design of clocked synchronous sequential circuits.

EE 208 Logic Design 3:(3,1,0) Credits. Number systems; Boolean algebra and logic gates; simplification of Boolean functions; Analysis and design of combinational logic circuits; Introduction to synchronous sequential logic; flip flops; Analysis and design of clocked synchronous sequential circuits.

EE 210 Electrical and Electronic Circuits 3:(3,1,0) Credits. Circuit elements and laws, Network theorem, Nonlinear networks-AC Circuits: Phasors, Circuit analysis, Frequency response, Resonance - Ideal Amplifiers, Ideal diodes, Rectifiers, Wave shaping circuits – Junction diodes – FETs and BJTs transistors- Logic circuits – Small signal models of Diodes, FETs, and BJTs – RC-Coupled Amplifiers. (for mechanical and industrial engineering major)

EE 212 Basic Electronic Devices and Circuits Lab 1:(0,0,2) Credits. Students in this course are introduced to learn: Introduction to the lab tools. I-V characteristics of diode. Clipping circuits using diodes. Rectification using diodes. Zener diode and regulators. BJT dc biasing. CE BJT amplifier. MOSFET dc biasing. CS MOSFET amplifier. Simple AM receiver circuit, MOS digital circuits.

EE 221 Signals and Systems Analysis 3:(3,1,0) Credits. Students in this course are introduced to learn: Motivation and Applications, Signal Classifications, Signal Operations, Singularity Functions; Linear Time-Invariant Systems and Convolution; Correlation; Fourier Series and Transform for continuous and discrete time signals; Applications; Laplace transform and applications; Introduction to z-transform.

EE 234 Electromagnetic II 3:(3,1,0) Credits. Time varying fields; Faraday's law. Transformer and motional emfs; Displacement current; Maxwell's equations and time harmonic fields; Wave equation; Power transfer and Poynting vector; Plane wave propagation in free space, in lossy dielectrics and in good conductors; Polarization; Reflection of plane wave at normal and oblique incidence; Transmission lines; Impedance matching; waveguides. Introduction to radiation and antennas; Antenna parameters; Wire antennas.

EE 270 Fundamentals of Electrical Power Systems 3:(2,1,0) Credits. Power system components and elements: generation –transmission - distribution; Generation of electrical energy: main sources – alternative sources; Transmission line conductors; Electric insulators: types – parameters; Transmission line parameters: series impedance, shunt admittance; Analysis of transmission lines: short line – medium line – long line; Power cables parameters: series impedance, shunt admittance; Analysis of distribution systems: radial system – ring system.

EE 271 Electric Power & Machines Laboratory 1:(0,0,2) Credits. Determination of Transmission Lines (TL) parameters; TL loading characteristics; TL reactive power compensation; TL insulators voltage characteristics; Reactive power compensation for industrial loads; Equivalent circuit of transformers; Three phase connections and harmonic problems; Equivalent circuit of three-phase synchronous machine; Parallel operation of synchronous generator. Steady state operation of synchronous motor, Starting of synchronous motor.

EE 288 Principles of Electric Machines 3:(3,1,0) Credits. Transformers (construction, operation of single-phase transformers, equivalent circuit, voltage regulation and efficiency, auto-transformers, three-phase transformers), AC machinery fundamentals, Synchronous machines (components, internal voltage, equivalent circuit, phasor diagram, performance of turbo-alternator, generator operating alone, parallel operation of AC generators, synchronous motors, steady-state operation, motor starting), synchronous machine dynamics: the swing equation, steady state and transient stability.

EE 307 Analog and Digital Measurements 3:(3,1,0) Credits. Measurements fundamentals: units and standards, errors, statistical analysis; DC/AC meters construction; loading effect; insertion loss; Difference and instrumentation amplifiers; Oscilloscope: CRT, amplifiers, triggered sweep circuits, attenuation, specifications; Spectrum analyzer, Transducers and sensors: passive and self-generating transducers; Liquid crystal displays (LCDs), CCDs, and optical fibre sensors; Digital measurements: Data conversion principles; Digital voltmeter; grounding, shielding, and noise.

EE 308 Measurements & Control Lab 1:(0,0,2) Credits. This lab course includes various experiments to study various aspects of Measurements and control that applied these processes: Pressure measurements, Torque Measurement, Load measurement Temperature measurement, Strain

measurement, Level measurement, Displacement measurement, Air velocity measurements, measurement and control with microprocessor controls: Pressure - Control with tank and other Accessories-Flow Control- Level Control- Temperature Control.

EE 314 Analog and Digital Electronic Circuits 3:(3,1,0) Credits. Description: Introduction to various analog and digital circuits such as: op-amp, ideal op-amp characteristics and applications, non-ideal op-amp, difference amplifier and multistage amplifiers. Current mirrors and current sources. Feedback. CMOS digital circuits. BJT digital circuits; TTL and ECL gates

EE 315 Analog and Digital Electronic Circuits Lab 1:(0,0,2) Credits. Introduction to the lab contents, the different devices used for analysis and measurements of analog and digital electronics. Ideal Op-Amp characterization and implementation, Non-ideal op Amp characterization and implementation, Execution of different Op-amp circuits, current mirrors, sources, and analog and digital BJT, CMOS, TTL and ECL, Extensive use of PSpice and LabView in circuit analysis.

EE 322 Communications Principles 3:(3,1,0) Credits. Students in this course are introduced to learn: Overview and Basic elements of communication systems; Signal Analysis; Transmission through Systems and Channels; Modulation; AM; Frequency Conversion; FM and PM; Super-heterodyne Receiver; FDM; Stereo Broadcasting; Sampling; Pulse Modulation (PAM, PWM, PPM); TDM; Pulse Code Modulation (PCM); DPCM and DM; Regenerative Repeaters; Advantages of Digital Communication; Line Coding (Binary Signalling);Introduction to Digital Modulation (ASK, FSK, PSK). Effect of noise on analog modulation systems.

EE 323 Communications Principles Laboratory 1:(0,0,2) Credits. Students in this course are introduced to learn: Design methods and laboratory experiments dealing with practical aspects of analog and digital communications schemes. Experiments involve component-level circuit

Construction, interconnection of modular subsystems, and use of interactive, graphics-based, system simulation software packages for the following topics: Amplitude Modulation AM, Frequency Modulation FM, Phase Modulation PCM. Sampling. Pulse Amplitude Modulation, Pulse time Modulation, Pulse width Modulation. Pulse Code Modulation, Delta Modulation. Amplitude Shift Keying ASK. Frequency Shift Keying FSK. Phase Shift Keying. TDM. FDM. Fiber optic transmitter. Fiber optic receiver. Fiber Optic characteristics.

EE 324 Digital Signal Processing 3:(3,1,0) Credits. Introduction to digital signal processing and Applications-Digital processing of continuous-time signals - Discrete-time signals and systems - convolution and correlation - z-Transform - Discrete-time LTI systems in Transform Domain – Basic digital filter structures - IIR digital filter design; FIR digital filter design - Discrete-time Fourier transform - Discrete Fourier transform.

EE 325 Digital Communications 3:(3,1,0) Credits. Students in this course are introduced to learn: Basic elements of communications systems; Review of probability theory; baseband pulse transmission (matched filters, inter-symbol interference); Eye pattern, Nyquist criteria; Equalization; Digital Pass-band transmission: Coherent PSK,FSK,QPSK,MSK; No coherent orthogonal modulation; Power spectra and bandwidth efficiency of binary and quaternary modulation schemes; Information theory: Mutual information and channel capacity; Source coding; Error control coding (channel coding).

EE 341 Automatic Control Systems 3:(3,1,0) Credits. Introduction to Control Systems: Examples of Control Systems-Closed-Loop Control versus Open-Loop Control. Mathematical Background: Review of Complex Variables and Complex Functions- Laplace Transformation-

Solving Linear, Time-Invariant, Differential Equations. Modelling of Dynamic Systems: Transfer Function and Impulse-Response Function-Modelling of Mechanical and Electrical, Fluid and Thermal Systems- Signal Flow Graphs. Transient and Steady-State Response Analyses: First, Second and Higher-Order Systems-Transient-Response Analysis- Routh's Stability Criterion- Steady-State Errors. Root-Locus Analysis: Root-Locus Plots-Positive-Feedback Systems- Conditionally Stable Systems-Control Systems Design by the Root-Locus Method. Frequency-Response Analysis: Bode Diagrams- Polar Plots- Nyquist Stability Criterion- Stability Analysis- Closed-Loop Frequency Response. Control Systems Design by Frequency Response: Lead Compensation- Lag Compensation- Lag-Lead Compensation. Matlab: Application of MATLAB/SIMULINK to verify all the above topics.

EE 343 Automatic Control 3:(3,1,0) Credits. Introduction to Control Systems- Mathematical Models of Systems- State Variable Models- Feedback Control System Characteristics- The Performance of Feedback Control Systems- The Stability of Linear Feedback Systems- The Root Locus Method- Frequency Response Methods- Stability in the Frequency Domain-The Design of Feedback Control Systems-The Design of State Variable Feedback Systems-Introduction to Robust Control Systems-Introduction to Digital Control Systems.

EE 360 Microprocessors 3:(3,1,0) Credits. Basic microprocessor architecture, timing and signalling for interface applications and control, instruction execution cycles and sequencing, interrupts, memory systems design and organization, basic peripheral interfacing and interface design, software topics including assembly language programming, interrupt handlers, fast arithmetic algorithms and hardware description languages (HDL).

EE 361 Microprocessors Lab 1:(0,0,2) Credits. This lab course includes various experiments to study various aspects of Microprocessors (MP) that cover these topics: Function of microprocessors. Interfacing, Memory organization, Machine cycles Timers.

EE 372 Power Systems Analysis 3:(3,1,0) Credits. Per unit system; Power system matrices: bus admittance matrix – bus impedance matrix; Load flow analysis: Gauss-Seidel method –Newton-Raphson method; Economic operation of generators :neglecting transmission line losses – including transmission line losses; Symmetrical faults: Thevenin’s method – bus impedance matrix method; Unsymmetrical faults: symmetrical components – Thevenin’s method – bus impedance matrix method; Stability analysis: steady state stability – transient stability – equal area criterion.

EE 373 Electric Power & Machines Laboratory II 1:(0,0,2) Credits. Symmetrical and unsymmetrical fault analysis; Load flow simulation; Transient stability simulation; Active and reactive power generator control; Characteristics of isolated and interconnected systems. Equivalent circuit of transformers; Three-phase connections and harmonic problems; Equivalent circuit of three-phase and single-phase induction motors; Load testing of induction motors; Starting of single-phase induction motors; Terminal characteristics of dc machines.

EE 374 Power Electronics 3:(3,1,0) Credits. Power semiconductor devices: terminal characteristics; Power converters: AC-AC converters, rectifiers, inverters, dc-dc converters and resonant converters; Applications in power systems. Experiments Basic Rectifier Circuits, Single-phase Rectifiers—Poly phase rectifiers-- One-Quadrant DC-DC Conversion-- One-Quadrant DC-DC Conversion- DC-AC Conversion.

EE 389 Electric Machines 3:(3,1,0) Credits. Three-phase induction machines (construction, operation, equivalent circuit, performance calculations, starting of induction motors, speed control), single-phase induction motors, reluctance motors, stepper motors, fundamentals of D.C machines,

DC machines (components, classification, performance, motor characteristics, starting of DC motors, speed control of DC motors), servo motors, universal motors.

EE 398 Electrical Machines 2:(2,1,0) Credits. Transformers (construction, types, operation, equivalent circuit); Synchronous machines (construction, generator performance, motor characteristics, starting); induction machines (construction, three phase motor: types, operation, equivalent circuit, starting speed control); Introduction to DC machines. (for mechanical and industrial engineering major only).

EE 415 VLSI 3:(3,1,0) Credits. Introduction to VLSI systems -review of digital systems - CMOS logic and fabrication – MOS transistor theory -Layout design rules - Circuit characterization and performance Estimation-Circuit Simulation Combinational and sequential circuit design - Static and dynamic CMOS gates - Memory system design -Design methodology and tools.

EE 416 Industrial Electronics 3:(3,1,0) Credits. Power semiconductor devices: terminal characteristics; Power converters: ac-ac converters, rectifiers, inverters, dc-dc converters and resonant converters; Applications in power systems. Experiments Basic Rectifier Circuits-- Single-phase Rectifiers—Poly phase rectifiers-- One-Quadrant Dc-Dc Conversion-- One-Quadrant Dc-Dc Conversion- Dc-Ac Conversion

EE 417 Electronic Communication 3:(3,1,0) Credits. Oscillators, phase-locked loops, filters, carrier modulators and demodulators, analog-to-digital and digital-to-analog converters, examples of commercially available integrated circuits for communication systems.

EE 418 FPGA 3:(3,1,0) Credits. This course introduces fundamentals and circuit architectures of field programmable gate arrays (FPGAs), design tools supporting FPGA-based system designs, and their applications in reconfigurable computing. Students will gain hands-on experience of designing system with FPGAs, and learn the basics of design tools targeted for FPGA based designs. The applications of FPGAs in various custom computing environments will also be examined.

EE 419 Analysis of Electronic Circuits Using Computer 3:(3,1,0) Credits. Solve equations of electrical circuits. The formulation of equations of electrical circuits in a graphic form. Drafting General equations for electrical circuits. Simulation of large circuits, defining network equations, Sensitivity – the expense of sensitivity using a computer: (sensitivity of the linear systems as well as the associated systems, sensitivity to amplifier processes and parasitic elements, derivatives, differential of the higher orders. Circuit analysis as a function of frequency. Numerical integration of differential equations. Models of electronic components. Analysis and design of analog and digital circuits, analysis and Computer Aided Design with a focus on amplifier circuits with higher performance.

EE 426 Wireless Communications 3:(3,1,0) Credits. Practical and theoretical aspects of wireless communication system design are studied; particular emphasis is on mobile communications. frequency reuse, hand-off, cell splitting, indoor/outdoor propagation, co-channel interference, frequency management channel assignment techniques cell-site antennas, handset antenna/human body interaction, switching and traffic, AMPS, GSM, TDMA, and CDMA are studied.

EE 427 Communication and Signal Processing Lab 1:(0,0,2) Credits. Experiments on communication and digital signal processing. The communication part includes: Amplitude Shift Keying (ASK); Frequency Shift Keying (FSK); Phase Shift Keying (PSK); Fibre optic transmitter; Fiber optic receiver; Fiber optic characteristics. The digital signal processing part includes: Digital

systems; Finite Impulse Response (FIR) digital filter design; Infinite Impulse Response (IIR) digital filter design; Discrete Fourier transform (DFT).

EE 428 Communication Networks 3:(3,1,0) Credits. Introduction to data networks; Data transmission over the telephone networks; Modems, multiplexers, concentrators and communication processors; Local area networks; Interfaces and protocols; Packet switching; Analysis of multiple access algorithms

EE 429 Simulation of Communication Systems using MATLAB 3:(3,1,0) Credits. Role of simulation in communication systems engineering, Simulation approaches and methodologies, Signal and system representations, filter models, noise generation, modelling and simulating nonlinear and time varying systems, Waveform level and discrete channel models, Co-channel interference in wireless communication systems.

EE 430 Speech Signal Processing 3:(3,1,0) Credits. Fundamentals of speech science; Modelling speech production; Short-term processing of speech; Linear prediction analysis; Cepstral analysis; Speech coding; Speech synthesis; Speech enhancement; Speech Recognition.

EE 431 Digital Image and Video Processing 3:(3,1,0) Credits. Review the basics of digital signal processing one dimensional, the two-dimensional systems and signals, two-dimensional templates, two-dimensional filters and wavelet, designs and applications of linear filters, the formation of digital images, quantification of sample images, retrieval and image enhancement, coding, basic ways to analyse the images, extract features, the discovery and identification of the border and forms, compressed-domain video processing, and digital TV.

EE 432 Exchange and Switching 3:(3,1,0) Credits. This course will emphasize the very different roles of voice networks in the telecom/datacom. industry - the different approaches and technologies used to support these approaches. Switched voice Network and VoIP networks - the legacy Class 5/4 switches -compare legacy PSTN switches to IP soft switches – essential role of network planning and operational excellence in the support of such networks. Structure of a voice network and its elements –introduction to VoIP Signalling protocols (H.323 and SIP) and their architecture – Introduction to Quality of Service (QoS) and various QoS protocols - The role of the network operations centre will be examined, as will the requirements for high availability in networks.

EE 435 Antennas and Wave Propagation 3:(3,1,0) Credits. Basic propagation modes and antenna parameters; Ground wave propagation; Sky wave propagation; Space wave propagation; Statistical models and diversity principles; Propagation models in mobile radio systems; Antenna engineering in LF, MF, HF, VHF and UHF systems; Reflector antennas, linear and planar antenna arrays.

EE 436 Antenna and Wave Propagation Lab 1:(0,0,2) Credits. The dipole in free space. Dual sources. Gain, directivity and aperture. Ground reflections. The monopole. Phased monopoles. Resonance, impedance and standing waves. Return loss and VSWR measurements. Parasitic elements. Stacked and bayed arrays. The horn antenna. The log periodic antenna. The dish antenna.

EE 437 Electronics of Microwave 3:(3,1,0) Credits. The course covers following topics. Theory and design of passive and active microwave components and monolithic integrated circuits including: micro- strip, lumped inductors and capacitors, GaAs FETs, varactor and mixer diodes, monolithic phase shifters, attenuators, amplifiers and oscillators. Experimental characterization of the above components using network analyzer, spectrum analyzer, power and noise meter.

EE 438 Microwave Circuits and Devices 3:(3,1,0) Credits. Describes the principles of device operation and circuit characteristics for the microwave/millimetre-wave FET, IMPATT, TRAPATT, Gunn diode, varactor diode, p-i-n diode and tunnel diode. Sub-millimetre-wave and terahertz-wave devices are also considered. The emphasis is on physical explanations of how devices and systems work rather than on elaborate mathematical models.

EE 439 Optical Fibre Communications 3:(3,1,0) Credits. Introduction of optical fibre communications, Ray optics and wave equations, Wave equations for slab waveguide and optical fibres, Wave solutions for optical fibres, LP modes, Dispersions, Fibre loss and fibre manufacturing, Optical transmitters, Laser diodes, Laser modes and optical receivers, Photo-detectors, Noises and sensitivity, System performance, Light-wave systems, Optical amplifiers.

EE 442 Automatic Control Lab 1:(0,0,2) Credits. This Lab provides the introduction of hardware, and software needs for introducing fundamental control systems theory with stress on design and implementation. The labs experiments focus on technical implementation issues of classical control theory in the frequency domain and time domain in addition to modern control theory in the state-space. Design and implementation for this course is done using based on simulations with LabVIEW and/or MATLAB. The Hardware for control should be a complete Educational Control Plant.

EE 451 Modelling and Simulation of Dynamic Systems 3:(3,1,0) Credits. Introduction: Essentials of system modelling and analysis- Cause-Effect relationship- Variables and system classification- Basic concepts of state variable and Input/output modelling. Background: Laplace Transform- Theory and application to solution of linear time-invariant ordinary differential equation. Mechanical systems modelling: Basic elements and motion laws- Free-body diagrams- Systems with mass, spring and pulleys- Series and parallel combinations of Systems. Electrical systems modelling: Passive elements and circuit laws. Input/output and state variable models. Controlled sources and Op. Amps. Dynamic system analysis and control: Free Response in the

Frequency –Domain- System Modes-Forced response in the frequency and time domain- Concept of Transfer Function. Controller design via pole-zero assignment, - Complete controlled system response- Closed loop frequency response- linearization of nonlinear systems, Time response.

EE 453 Introduction to Intelligent Systems 3:(3,1,0) Credits. Introduction to Artificial Intelligence (AI)- Intelligent Agent-Search- Informed Search- Uninformed (Blind) Search- Propositional Logic- 1'st Order Logic- Knowledge Representation- Inference in 1'st Order Logic- Prolog, Planning-Neural Networks- Uncertainty- Machine Learning- Natural Language Processing (NLP).

EE 464 Robotics and Mechatronics Lab 1:(0,0,2) Credits. This Robotics and Mechatronics Lab can be considered as a design project course. The lab will focus on the application of theoretical principles in electrical engineering and computer science to control a mechatronics system. The designed mechatronics should include sensors, actuators and intelligence. The student will have the chance to use his theoretical knowledge of electronics, filtering and signal processing, control, electro mechanics, microcontrollers, and real-time embedded software in designing a small robot that may be used in racing.

EE 475 Applied Control 3:(3,1,0) Credits. Introduction to control systems and their classifications. Advantages of using feedback in control systems. Basics of system modelling and analysis. Examples of applied control systems: speed control system, temperature control system,

liquid-level control system. State-space models. Derivation of state-space model from transfer function and vice versa. Time response of state-space model. Transient response characteristics. Classifications of industrial controllers. Automatic controller. Basics of PID controller. PID controller design methods; Transducers and actuators; Control applications in power systems: turbine governor control, generator voltage control, and load frequency control.

EE 476 Power Systems Protection 3:(3,1,0) Credits. Protection system principles and components; Short circuit calculations; Protective instrument transformers: VT- CVT- CT; Protective relays: electromechanical- static- digital- numerical; Over-current protection; Distance protection systems; Power frequency and carrier systems; Protection of generators- motors transformers-bus bars- reactors- capacitors; Protection of distribution system feeders.

EE 477 High Voltage Engineering Systems 3:(3,1,0) Credits. Generation and measurements of high DC, AC and impulse voltages; Conduction and breakdown processes in gaseous, liquid, and solid insulating media; High voltage test techniques.

EE 478 Distribution System Planning 2:(2,1,0) Credits. Basic load forecast methodologies, Electric loads types and characteristics, Electric energy consumer categories, Distribution system reliability evaluation, Distribution system cost assessment, Distribution system planning: feeder expansion, distribution transformer expansion.

EE 479 Protection & High-Voltage Laboratory 1:(0,0,2) Credits. Characteristics of different protective relays, coordination of protective relays, relay testing, breakdown of a solid, liquid, and gas insulating medium, corona phenomena.

EE 480 Electric Energy Utilization 3:(3,0,1) Credits. Illumination types of lamps, illumination schemes, calculation of illumination, requirements of proper lighting. Electric Heating: advantages of electrical heating, heating methods, design of resistance heating element. Electric Welding: advantages of electric welding, welding methods, comparison between AC and DC arc welding, welding control circuits. Electrolytic Processes: laws of electrolysis, process of electrode position, factors affecting electro-deposition, manufacturing of chemicals by electrolysis process. Refrigeration and Air Conditioning: principle of air conditioning, refrigeration cycle, eco-friendly refrigerants, electric circuits used in refrigerator and air-conditioner. Electric Traction: advantages of electric traction, systems of electric traction, types of motors used for electric traction, starting and braking of traction motors.

EE 481 Power System Planning 3:(3,1,0) Credits. 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.

EE 482 Control and Operation of Power Systems 3:(3,0,1) Credits. Concepts of Power System Operation; Formulation of Unit Commitment problem, Solution Methods; Principles of power system security assessment, Contingency Analysis, (DC and AC load flow methods), Correcting Generation; Introduction to OPF, Solution of the OPF, Linear sensitivity analysis, Linear programming methods, Security-constrained OPF; An Introduction to the operation of AGC, EMS and Control centre, Models of Generator, Load , Prime Mover and Governor, Generation Control AGC Implementation; State Estimation: An overview of state estimation, Power system state estimation, weighted least-square estimation, state estimation of an Ac network, Application of power systems state estimation.

EE 483 Selected Topics in Power Systems 3:(3,1,0) Credits. The contents of this course will be determined according to the recent topics in this field which will serve the work market or according to the interest area of the instructor to enhance the experience and knowledge of the student.

EE 484 Switchgear Protection in Power Systems 2:(2,1,0) Credits. Switchgear system layout - LV, MV & HV circuit breakers (CB) – Switching phenomena – Arc extinction – HRC fuses – LV, MV & HV metal enclosed switchgear – Surge arrester – Isolator – Load break switch – Earth switch.

EE 485 Computer Applications in Power Systems 3:(3,0,1) Credits. Computer applications in power system planning, Computer applications in power flow solution and control, Computer applications in power system fault analysis, Computer applications in power system dynamics and control, Computer applications in power system economic operation.

EE 486 Grounding and Safety Systems 3:(3,1,0) Credits. Grounding aspects, grounding resistance, soil resistivity, power system grounding methods, substation grounding, equipment grounding, measurements of grounding system parameters, GIS grounding, TL tower grounding, LV grounding. Safety means in power systems.

EE 487 Advanced Topics in Power System Protection 3:(3,1,0) Credits. The contents of this course will be determined according to the recent topics in this field which will serve the work market or according to the interest area of the instructor to Enhance the experience and knowledge of the student.

EE 490 Special Electrical Machines 3:(3,0,1) Credits. Reluctance motor, stepper motor, eddy current motors, hysteresis motors, AC commutator motors, universal motor, two phase servo motor, linear induction motor, linear DC motor.

EE 491 Selected Topics in Electrical Machines 3:(3,0,1) Credits. The contents of this course will be determined according to the recent topics in this field which will serve the work market or according to the interest area of the instructor to enhance the experience and knowledge of the student.

EE 492 Electric Drive Systems 3:(3,0,1) Credits. Drive system components, D.C motor drive systems, D.C motors fed from single-phase rectifier circuits, D.C motors fed from three phase rectifier circuits, chopper-fed D.C motors, and induction motor drive systems, induction motors fed from A.C voltage controller, inverter-fed induction motors.

EE 493 Selection and Installation of Motors 3:(3,1,0) Credits. Motor duty types; motor mounting arrangement: IM code, cable selection, cable layout (power cable, control cable);motor methods of cooling: IC code, motor auxiliaries, impeded temperature detectors (ETD), requirements of motors thermal protection; short circuit protection: selection and sizing of load break switch, fuse and circuit breaker; selection and sizing of motor automatic starter: DOL, star/delta (open & closed transition) starter, auto transformer starter, SRIM starter, DC motor starter, Automatic starting of synchronous motor; selection of motor overload protection; selection and sizing of motor power factor correction capacitors; selection and sizing of motor controller.

EE 498 Senior Design I & EE 499 Senior Design II 2:(2,0,1) Credits. The student is assigned, among a team of students and one or more faculty members, the design of an applied project which simulates the real working condition to which the student will be exposed after graduation. The project should be comprehensive and includes all the necessary preliminary field studies, feasibility

studies, final design drawings, bill of quantities, and the total operating cost of the project. The senior design continues for one semester. At the end of the semester, there will be a seminar held for the working team of students to present the details of the project. The working team will be orally examined and evaluated based on the presentation as well as the oral discussion.

CEN 210 Introduction to Programming 3:(2,0,2) Credits. This course provides a solid grounding in programming, in addition to the basic concepts of problems solving and computer programming, including algorithms, pseudo code, Tokens, Keywords Identifiers, Constants, operators, Manipulators Expressions and control structure, Pointers, Functions, Function prototype, Parameters passing in functions, Values Return by functions, Applications of C++, Introduction to MATLAB.

The Faculty Members

Faculty Members Websites

Head of Department

Dr. Ali S. Alghamdi

Associate Professors

1. Dr. Abdel Rahman Al-Qawasmi
2. Dr. Ahmaed Galal Abo Khalil

Assistant Professors

1. Dr.Abdullah A. Al Muhaisen-Vice Dean for Quality and Development
2. Dr. Praveen R.P.
3. Dr. Yazeed Qasaymeh
4. Dr. Abdullah Al-Ahmadi
5. Dr. Saeed Alyami
6. Dr. Abdul Aziz AlMutairi
7. Dr. Ahmad Bilal
8. Dr. Walied Alharbi
9. Dr. Muhamad Zubair
10. Dr.Tawfeq Al Kanhal
11. Dr.Naser Albugami

Lecturers

1. Eng. Talha Moaiz Yazdani
2. Eng. Hussam Habibeh
3. Eng. Muhammad Humran Khan
4. Eng. Mohammad Abdul Baseer
5. Eng. Naief Al Baghmee
6. Eng. Ibrahim Naqa Al Mutari
7. Eng. Aldafeeri, Bndar Hulayyil
8. Eng. Abdala Saleh Al Tamimi
9. Eng. Omar Hmud Gzai Al Harbi
10. Eng. Anas Abdu Almuhsain Al Manief
11. Eng. Faisal Saad Hilal Al Harbi
12. Eng. Abdi Aziz Saud Al Twiejari
13. Eng. Ahmad Abdu Allah Al Twejari
14. Eng. Badr Saud Daaies Al Harbi
15. Eng. Abdalah Aljumaa

Department of Mechanical and Industrial Engineering

Department of Mechanical and Industrial Engineering

The department website can be reached via the web link:
http://www.mu.edu.sa/en/colleges/college-engineering/mission-vision-1

E-mail to communicate with the program: ce@mu.edu.sa
Program name Mechanical Engineering
Place where the program is taught: College of Engineering building - Main Campus
The program type: For Males
The language of Teaching: English
Initial requirements for admission to the program:
The student to be admitted to the Bachelor of Mechanical Engineering must:

- Complete the Preparatory Year Program with a GPA at least 3.75 out of 5.
- Complete all college fundamental courses, which are offered in the fall semester of the fresh year.

Program Description

The Department of Mechanical and Industrial engineering offers a bachelor degree in Mechanical engineering. The program puts emphasis on three major areas: thermo systems, design and production and industrial engineering. Thermal systems include thermodynamics, heat transfer, fluid mechanics power plants and refrigeration and air-conditioning. Design and production includes material science, machine elements design, mechanics of materials, machine dynamics, welding Technology. Industrial engineering includes reliability engineering, operations management, industrial management, facility design and material handling, supply chain, lean manufacturing and quality management.

Career Opportunities

Graduates in mechanical engineering are among the most versatile engineers and enjoy professional employment in industry, government, consulting, and research organizations. Industrial engineers are needed in virtually all types of enterprises, ranging from industries such as manufacturing, distribution, logistics, transportation, and construction; service sectors such as health care, retail, banking, and engineering consulting to government agencies, military, and nonprofit organizations. Mechanical Power as well as Design and Production engineers are employed in industries related to Oil and Gas, manufacturing technologies, power stations, desalination plants, refrigeration and air-conditioning, and petrochemical industries.

Laboratories

1. Mechanical Design
2. Thermodynamics
3. Manufacturing Process
4. Mechanical Vibration
5. Mechatronics
6. Engineering Materials
7. Metallurgy
8. Advanced Manufacturing Systems
9. Fluid Mechanics
10. Heat Transfer
11. Air Conditioning and Refrigeration
12. Mechanical Measurement
13. System Dynamics
14. Environmental Measurement

15. Human Engineering Work
16. Work Design and Analysis

Graduation Requirements

The student has to pass:

1. University, College, and Department courses
2. Engineering Practice
3. Senior Design I and II

The Study Plan:

Study Plan for the program with levels **(Link to Study Plan)**

- Number of Study Levels 8 levels (After PY two levels)
- Number of Program Teaching Units 136 (CH)
- Tracks (if any) Degree Programs

Program Description

The Bachelor of Electrical Engineering Specialization is acquired in one of the following tracks:

a. Mechanical Power
b. Design and Production
c. Industrial Engineering

Curriculum for the Bachelor Degree in Mechanical Engineering/ Mechanical Power

First Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Differential Calculus	MATH 105	3 (3,1,0)
3	General Physics	PHY 103	4 (3,1,2)
4	Fundamentals of Engineering Technology	GE 101	2 (1,0,2)
5	Fundamentals of Engineering Drawing	GE 102	3 (1,0,4)
6	Engineering Mechanics (Statics)	GE 103	3 (3,1,0)

First Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1	Integral Calculus	MATH 106	3 (3,1,0)
2	Algebra and Analytical Geometry	MATH 107	3 (3,1,0)
3	Engineering Mechanics (Dynamics)	GE 108	3 (3,1,0)
4	Engineering Chemistry	GE 105	3 (3,1,0)
5	Mechanical Measurements	ME 111	2 (1,1,2)
6	Mechanical Eng. Drawing	ME 121	3 (1,0,4)

Second Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Differential Equations	MATH 204	3 (3,1,0)
3	Manufacturing Processes	ME 212	3 (2,1,2)
4	Material Engineering	ME 231	3 (2,1,2)
5	Machines Dynamics	ME 243	3 (3,1,0)
6	Thermodynamics I	ME 251	3 (3,1,0)

Second Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1	Statistics and Probability	STAT 201	3 (3,1,0)
2	Electrical and Electronic Circuits	EE 210	3 (3,1,0)
3	Machine Elements Design	ME 222	3 (2,1,2)
4	Mechanics of Materials	ME 232	3 (3,1,0)
5	Mechanical Vibrations	ME 242	3 (3,1,0)
6	Thermodynamics II	ME 252	2 (2,1,0)

Third Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Engineering Report Writing	GE 306	2 (2,0,0)
3	Computer Programming for Mechanical Engineering	CEN 307	3 (2,0,2)
4	Mechanical Design	ME 323	3 (2,1,2)
5	System Dynamics	ME 343	2 (2,1,0)
6	Fluid Mechanics	ME 353	4 (3,1,2)
7	Electrical Machines	EE 398	2 (2,1,0)

Third Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Numerical Methods	MATH 254	3 (3,1,0)
3	Automatic Control	ME 344	2 (2,1,0)
4	Heat Transfer	ME 354	3 (3,1,0)
5	Refrigeration & Air conditioning	ME 355	3 (2,1,2)
6	Turbulent Flow	ME 356	3 (3,1,0)
7	Membrane Desalination Processes	ME 357	2 (2,1,0)

Summer

No	Course Name	Course code	Credit Hours
	Engineering Practice	ME 399	0 CR 90 Credit Hours must be completed

Fourth year *Fall Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Engineering Economy	GE 407	2 (2,1,0)
3	Turbo Machines	ME 458	3 (3,1,0)
4	Internal Combustion Engines	ME 459	3 (3,1,0)
5	Elective	ME 46X	3 (3,1,0)
6	Mechanical Power Lab I	ME 493	1 (0,0,2)
7	Senior Design I	ME 498	2 (1,0,2)

Fourth year *Spring Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Engineering Project Management	GE 408	2 (2,1,0)
3	Power Plants	ME 460	3 (3,1,0)
4	Elective	ME 46X	3 (3,1,0)
5	Elective	ME 46X	3 (3,1,0)
6	Mechanical Power Lab. II	ME 494	1 (0,0,2)
7	Senior Design II	ME 499	2 (1,0,2)

Curriculum for the Bachelor Degree in Mechanical and Industrial Engineering / Design and Production

First Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Differential Calculus	MATH 105	3 (3,1,0)
3	General Physics	PHY 103	4 (3,1,2)
4	Fundamentals of Engineering Technology	GE 101	2 (1,0,2)
5	Fundamentals of Engineering Drawing	GE 102	3 (1,0,4)
6	Engineering Mechanics (Statics)	GE 103	3 (3,1,0)

First Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1	Integral Calculus	MATH 106	3 (3,1,0)
2	Algebra and Analytical Geometry	MATH 107	3 (3,1,0)
3	Engineering Mechanics (Dynamics)	GE 108	3 (3,1,0)
4	Engineering Chemistry	GE 105	3 (3,1,0)
5	Mechanical Measurements	ME 111	2 (1,1,2)
6	Mechanical Eng. Drawing	ME 121	3 (1,0,4)

Second Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Differential Equations	MATH 204	3 (3,1,0)
3	Manufacturing Processes	ME 212	3 (2,1,2)
4	Material Engineering	ME 231	3 (2,1,2)
5	Machine Dynamics	ME 243	3 (3,1,0)
6	Thermodynamics I	ME 251	3 (3,1,0)

Second Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1	Statistics and Probability	STAT 201	3 (3,1,0)
2	Electrical and Electronic Circuits	EE 210	3 (3,1,0)
3	Machine Elements Design	ME 222	3 (2,1,2)
4	Mechanics of Materials	ME 232	3 (3,1,0)
5	Mechanical Vibrations	ME 242	3 (3,1,0)
6	Thermodynamics II	ME 252	2 (2,1,0)

Third Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Engineering Report Writing	GE 306	2 (2,0,0)
3	Computer Programming for Mechanical Engineering	CEN 307	3 (2,0,2)
4	Mechanical Design	ME 323	3 (2,1,2)
5	System Dynamics	ME 343	2 (2,1,0)
6	Fluid Mechanics	ME 353	4 (3,1,2)
7	Electrical Machines	EE 398	2 (2,1,0)

Third Year Spring Semester

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Numerical Methods	MATH 254	3 (3,1,0)
3	Automatic Control	ME 344	2 (2,1,0)
4	Heat Transfer	ME 354	3 (3,1,0)
5	Material Removal Processes	ME 313	3 (2,1,2)
6	Materials Selection in Design and Manufacturing	ME 333	3 (2,1,2)
7	Fault Diagnosis of Mechanical Systems	ME 345	2 (1,1,2)

Summer

No	Course Name	Course code	Credit Hours
	Engineering Practice	ME 399	0 CR 90 Credit Hours must be completed

Fourth Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Engineering Economy	GE 407	2 (2,1,0)
3	Computer Aided Design	ME 424	3 (2,0,3)
4	Metal Forming Processes	ME 414	3 (2,1,2)
5	Elective	ME 43X	3 (2,1,2)
6	Design and Production Lab I	ME 491	1 (0,0,2)
7	Senior Design I	ME 498	2 (1,0,2)

Fourth Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Engineering Project Management	GE 408	2 (2,1,0)
3	Computer Aided Manufacturing	ME 415	3 (2,1,2)
4	Elective	ME 42X	3 (2,1,2)
5	Elective	ME 41X	3 (2,1,2)
6	Design and Production Lab II	ME 492	1 (0,0,2)
7	Senior Design II	ME 499	2 (1,0,2)

Curriculum for the Bachelor Degree in Mechanical Engineering/ Industrial Engineering

First Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Differential Calculus	MATH 105	3 (3,1,0)
3	General Physics	PHY 103	4 (3,1,2)
4	Fundamentals of Engineering Technology	GE 101	2 (1,0,2)
5	Fundamentals of Engineering Drawing	GE 102	3 (1,0,4)
6	Engineering Mechanics (Statics)	GE 103	3 (3,1,0)

First Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1	Integral Calculus	MATH 106	3 (3,1,0)
2	Algebra and Analytical Geometry	MATH 107	3 (3,1,0)
3	Engineering Mechanics (Dynamics)	GE 108	3 (3,1,0)
4	Engineering Chemistry	GE 105	3 (3,1,0)
5	Mechanical Measurements	ME 111	2 (1,1,2)
6	Mechanical Eng. Drawing	ME 121	3 (1,0,4)

Second Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Differential Equations	MATH 204	3 (3,1,0)
3	Manufacturing Processes	ME 212	3 (2,1,2)
4	Material Engineering	ME 231	3 (2,1,2)
5	Machines Dynamics	ME 243	3 (3,1,0)
6	Thermodynamics I	ME 251	3 (3,1,0)

Second Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1	Statistics and Probability	STAT 201	3 (3,1,0)
2	Electrical and Electronic Circuits	EE 210	3 (3,1,0)
3	Machine Elements Design	ME 222	3 (2,1,2)
4	Mechanics of Materials	ME 232	3 (3,1,0)
5	Industrial Operation Research I	ME 242	3 (3,1,0)
6	Thermodynamics II	ME 252	2 (2,1,0)

Third Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Engineering Report Writing	GE 306	2 (2,0,0)
3	Computer Programming for Mechanical Engineering	CEN 307	3 (2,0,2)
4	Mechanical Design	ME 323	3 (2,1,2)
5	System Dynamics	ME 343	2 (2,1,0)
6	Fluid Mechanics	ME 353	4 (3,1,2)
7	Electrical Machines	EE 398	2 (2,1,0)

Third Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Numerical Methods	MATH 254	3 (3,1,0)
3	Automatic Control	ME 344	2 (2,1,0)
4	Heat Transfer	ME 354	3 (3,1,0)
5	Industrial Operations Research I	ME 371	3 (3,1,0)
6	Quality Management	ME 372	3 (3,1,0)
7	Reliability & Maintenance Engineering	ME 373	2 (2,1,0)

Summer

No	Course Name	Course code	Credit Hours
	Engineering Practice	ME 399	0 CR 90 Credit Hours must be completed

Fourth Year *Fall Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Engineering Economy	GE 407	2 (2,1,0)
3	Industrial Operations Research II	ME 474	3 (3,1,0)
4	Computer Aided Design & Manufacturing	ME 475	3 (2,1,2)
5	Elective	ME XXX	3 (3,1,0)
6	Work Study Lab	ME 495	1 (0,0,2)
7	Seiner Design I	ME 498	2 (1,0,2)

Fourth Year *Spring Semester*

No	Course Name	Course code	Credit Hours
1		MURE	2 (2,0,0)
2	Engineering Project Management	GE 408	2 (2,1,0)
3	Industrial Operations Management	ME 476	3 (3,1,0)
4	Elective	ME XXX	3 (3,1,0)
5	Elective	ME XXX	3 (3,1,0)
6	Human Factors Engineering Lab	ME 496	1 (0,0,2)
7	Seiner Design II	ME 499	2 (1,0,2)

Course Description:

ME 111 Mechanical Measurements 2:(1,1,2) Credits. Measuring concepts; Uncertainty analysis; Instrumentation specifications; Analog and digital signal analysis including Lab View tutorials; Data collection and analysis; Applications on Measurements.

ME 121 Mechanical Eng. Drawing 3:(1,0,4) Credits. Introduction to CAD. Skills of using a drafting package. Geometrical and dimensional tolerances. Applications on mechanical elements (bolted, welded and riveted joints, shafts and keys, springs, gears). Applications on assembly and working drawings (valves, presses etc.).

ME 212 Manufacturing Processes 3:(2,1,2) Credits. Introduction, casting processes (solidification and melting, furnaces, expendable and permanent mold casting). Bulk deformation processes (hot and cold forming processes, workability and limits of forming). Sheet metal processes (formability of sheets and sheet forming processes, processing of polymers). Metal powders and ceramics, welding processes. Heat treatment of metals, Principles of metal cutting (machining processes, types of chips, process sheet).

ME 222 Machine Elements Design 3:(2,1,3) Credits. Review of stress analysis (combined stress, bending). Buckling, failure theories, fatigue failure. Materials in mechanical design and safety factors. Design of fasteners: riveted, welded, bolted and fitted joints. Power screws, springs, ball bearing, sliding bearings, power transmission gears, shafts, couplings, clutches, brakes, belts, chains and ropes.

ME 251 Thermodynamics I 3:(3,1,0) Credits. Concepts and definitions, Properties of pure substances, Different forms of energy, Concepts of Heat and work. First law of thermodynamics. Applications of first law on closed system and control volume. Second law of thermodynamics. Entropy, isentropic efficiency. Some power and refrigeration cycles (including Rankin Cycle, vapor compression cycle, Otto cycle, Diesel cycle, Brayton cycle).

ME 232 Mechanics of Materials 3:(3,1,0) Credits. Types of loads and stresses. Mechanical behaviour of materials. Shearing forces and bending moment diagrams. Shearing stresses in beams. Stresses in compound bars. Bending stresses and deflection. Torsion of bars. Principal stresses, and Mohr's circle. 3-Dimensional stresses. Principal strains and Mohr's circles of strain. Stress-strain relations. Strain energy. Yield criteria. Thin and thick cylinders, fatigue analysis. Lab work.

ME 241 Machine Dynamics 3:(3,1,0) Credits. Design of ordinary gear trains and analysis of epicyclical gear trains. Analytical design of disk cams. Grash of rules. Design of mechanisms in terms of transmission angle and time ratio. Kinematic and force analysis of linkages and machinery with the aid of computers. Flywheel design. Balancing. Lab work includes applications on gear trains and linkages.

ME 242 Mechanical Vibrations 3:(3,1,0) Credits. Free and damped vibration of single degree of freedom systems. Viscous damping. Forced vibration. Resonance. Harmonic excitation. Rotating unbalance. Base motion. Vibration isolation. Fourier analysis. Vibration measuring. General excitation. Step and impulse response. Two degree of freedom systems. Frequencies and mode shapes. Modal analysis. Undamped vibration absorber. Multidegree of freedom systems. Matrix methods. Raleigh and Raleigh- Ritz methods. Continuous systems, axial, torsional and bending vibrations. Finite element method. Applications with computer programs.

ME 231 Material Engineering 3:(2,1,2) Credits. Classification of engineering materials, atomic and molecular bonding. Properties and microstructure, elastic and plastic behavior. Order in solids, phases and solid- solutions, crystal geometry. Disorder in solids, atomic movement and rearrangement, phase diagrams, solid-state transformations. Applications of metals, ceramics, polymers and composites.Service stability, corrosion and failure. Involves laboratory experiments and practices.

ME 252 Thermodynamics II 2:(2,1,0) Credits. Irreversibility and availability. Thermodynamic relations. Mixtures and solutions. Chemical reactions and combustion. Phase and Chemical equilibrium. Thermodynamics of compressible flow. Applications using computer.

ME 313 Material Removal Processes 3:(2,1,2) Credits. Fundamentals of cutting. Mechanics of chip formation. Cutting forces and power. Effect of temperature on cutting. Tool life. Mach inability: Metal removal rate, Cutting tool materials and fluids. Machining processes: turning, thread cutting, boring, drilling, reaming, milling, shaping and planning, broaching, gear cutting. Abrasives, grinding wheels, grinding processes. Super finishing process: Lapping, honing. blasting and preening. Nonconventional machining. Numerical control of machine tools.

ME 323 Mechanical Design 3:(2,1,2) Credits. Introduction. Design methodology (concept, alternatives, and considerations, skills of teamwork, reports, and construction and detail drawings of machines). Comprehensive design projects include: fixed and moveable joints, shafts, sliding and rolling bearings, gears, couplings, clutches and brakes, belt drivers. Use of standards and technical manuals. Application of computer programs.

ME 333 Materials Selection in Design and Manufacturing 3:(2,1,2) Credits. Product life cycle. Performance of materials in service (failure of materials under mechanical loading, environmental degradation, selection of materials), effect of shape and manufacturing processes. Cost-per-unit-property method. Weighed properties method. Limits-on-properties method. Selection charts, computer-aided material and process selection (material databases). Case studies.

ME 343 System Dynamics 2:(2,1,0) Credits. Analytical and computer techniques for kinematic and dynamic analysis of linkages. Virtual links. Method of kinematic coefficients. Inversion. Geared linkages. Mechanisms with actuators. System response to dynamic inputs.

ME 344 Automatic Control 2:(2,1,0) Credits. Introduction. Laplace transforms. transfer function. Block diagrams. Mathematical modeling of dynamic systems Industrial automatic controllers: basic control actions. Pneumatic and hydraulic controllers. Transient response analysis: First and second order systems. Root locus analysis. Frequency response. Application of computer programs.

ME 345 Fault Diagnosis of Mechanical Systems 2:(1,1,2) Credits. Review of vibration: Free Vibration, Harmonically Excited Vibration, Fourier Analysis. Instruments: Transducers, FFT Analyzer, Sampling and Aliasing. Vibration problems: Imbalance, Misalignment, Bearings, Gears, Fans, Belts. Techniques and Maintenance Management. Sound; Basic Properties of Waves, Intensity, Power Level. Balancing: Static Unbalance, Dynamic Unbalance, Field Balancing.

ME 353 Fluid Mechanics 4:(3,1,2) Credits. Concepts and definitions, Fluid statics. Forces on submerged surfaces and bodies. Non-viscous flow, conservation of mass, momentum and energy. Bernoulli equation. Dimensional analysis. The PI Theorem, similarity. Viscous flow, pipe flow, losses in conduit flow. laminar and turbulent flow.

ME 354 Heat Transfer 3:(3,1,0) Credits. Principles of Heat Transfer, steady state and transient conduction in different coordinates, extended surfaces. Convective heat transfer. Analysis and empirical relations for forced and natural convection. Radiation heat transfer, radiation exchange between black and gray surfaces. Heat transfer applications (Heat Exchangers). Numerical methods in heat transfer with computer applications.

ME 355 Refrigeration & Air conditioning 3:(2,1,2) Credits. Review of basic thermodynamics, vapor compression cycles, multi-stage and cascade vapor compression refrigeration. Refrigerants and their characteristics. Basic vapor compression equipment, Introduction to absorption refrigeration. Psychrometry and psychrometric processes. Human comfort. Heat gain-through walls and fenestrations. Cooling load calculations. Calculation using software packages.

ME 356 Turbulent Flow 3:(3,1,0) Credits. Fundamentals of turbulent flows; the basic equations and the characteristic scales, statistical description of turbulence. Review of experimental results on the statistics and structure of turbulent flows. Methods for calculation of turbulent flows; the problem of closure, semi empirical, Phenomenological and analytical theories of turbulence, large eddy and direct simulations of turbulence.

ME 357 Membrane Desalination Processes 2:(2,1,0) Credits. Intake, pumping, Filtration, ion exchange, pre-treatment, Membranes, Membrane technology, Reverse Osmosis systems (RO) principles, system design, RO membranes characteristics. Electro dialysis (ED), Other membrane processes, introduction to fouling, Computer applications.

ME 372 Quality Management 3:(3,1,0) Credits. Introduction to quality systems. Cost of quality. Total quality management. Quality systems and standards: six sigma and ISO. Reengineering. Statistical quality control: control charts for variables and attributes, process capability analysis, acceptance sampling plans. Quality function deployment. Quality circles. Quality loss functions.

ME 373 Reliability & Maintenance Engineering 2:(2,1,0) Credits. Maintenance systems. Maintenance operation and control. Preventive Maintenance: concepts, modeling, and analysis. Maintenance planning and scheduling. Maintenance material control. Computerized Maintenance Management Systems. Replacement studies. Case studies.

ME 414 Metal Forming Processes 3:(2,1,2) Credits. Yield criteria, plastic stress-strain relations. Plane stress, plane strain. Determination of flow stress. Applications in beam bending, instability in thin shells. Classification of metal forming processes. Bulk deformation processes. Techniques of analysis: slab method, upper bound method. Slip-line fields, application to indentation problem. Forging, rolling, extrusion. Rod and wire drawing equipment and dies.

ME 415 Computer Aided Manufacturing 3:(2,1,2) Credits. Automation strategies. Production economics. High volume production systems. Automated flow lines. Assembly and line balancing. Numerical control. NC part programming. DNC, CNC, and adaptive control. Industrial robots. Material handling and storage. Group technology and flexible manufacturing. Quality control and automated inspection. Control systems. Programmable controllers. Computer networks.

ME 416 Welding Technology 3:(2,1,2) Credits. Fusion welding. Weldability. Selection of welding electrodes. Hot cracking. Cold cracking. Welding metallurgy, heat affected zone. Welding of heat-treatable alloys. Welding of dissimilar alloys. Destructive and nondestructive testing of welds. Weld thermal cycles and residual stresses. Welding in manufacturing: pressure vessels, boilers and ship building industries; welding in automotive maintenance. Welding codes.

ME 417 Advanced Manufacturing Technology 3:(2,1,2) Credits. Non-conventional machining: Principles, Ultrasonic machining, Electromechanical Machining, Electro-discharge Machining, Plasma Arc Machining, Laser Beam Machining, Electron Beam Machining. Numerical Control of machine Tools: Automation of Manufacturing Processes, Numerical Control, Coordinate systems, Types and components of CNC systems, Programming for CNC, Adaptive control, Computer Integrated Manufacturing.

ME 418 Computer Integrated Manufacturing 3:(2,1,2) Credits. Introduction; Computer Aided Process Planning; Automated handling system and AS/RS concept, and configuration; Industrial Robots; Cellular Manufacturing Systems (CMS); Flexible Manufacturing Systems (FMS); Enterprise Integration and ERP.

ME 419 Finite Elements Methods 3:(2,1,2) Credits. Virtual formulation. Finite element analysis: shape formation, equilibrium conditions, element classification, assembly of elements, modeling methodology. Structures and elements: trusses, beams, 2-D solids, 3-D solids, axisymmetric solids, thin-walled structures. Dynamic analysis. Heat transfer and thermal analysis.

ME 424 Computer Aided Design 3:(2,0,3) Credits. Introduction to computer aided engineering environment. Solid modeling. Introduction to Finite Element Method. CAD packages. Static linear analysis in one, two, and three dimensions. Thermal analysis, introduction to nonlinear analysis. Optimum design. Computer applications in mechanical design.

ME 425 Machine Tools Design 3:(2,1,2) Credits. Design and working principles of machine tool elements (Speed and feed of gear boxes. spindle and spindle bearings, rigidity and strengthening of structures- frames, beds and design of slideways against wear). Power sources and types of drives. Mechanisms design, motion control and transmission systems in machine tools. Safety devices. Static and dynamic acceptance tests for machine tools.

ME 426 Design of Production Facilities 3:(2,1,2) Credits. Hoisting machinery: crane chains, sprockets, pulleys, drums, ropes, sheaves and hooks. Gain in force and gain in speed systems. Wheels, rails, and drives. Jigs and fixtures: specifications of jigs and fixtures, conventions in fixture design. Degrees of freedom, location points, fixation point. Clamping devices, fool-proofing, Rigidity and wear considerations.

ME 427 Product Design and Innovation 3:(2,1,2) Credits. Introduction to manage innovation; Idea generation: use of scientific and technical knowledge to build product ideas; Product specification and quality Standardization of product; Product structure and components. Implementing prototype metrologies. Reverse engineering process and procedures & prototyping.

ME 428 Tribology 3:(2,1,2) Credits. Nature of solid surfaces. Interaction of solid surfaces. Friction of metals and non-metals (mechanisms, theories, applications). Wear of metals and nonmetals (types, mechanisms, theories, applications). Lubrication (methods, types, theories, applications). Lubricants (types, utilization) Selection of materials for tribological applications. Surface Engineering.

ME 434 Powder Metallurgy 3:(2,1,2) Credits. Introduction, powder metallurgy process, production of ferrous powder, powder, shaping, compaction, sintering behaviour, microstructure changes, full-density, processing, heat treatment, finishing operations and properties, design consideration, products and applications.

ME 435 Composite Materials 3:(2,1,2) Credits. Classification. Applications. Processing and fabrication of composites (metalmatrix, ceramic-matrix, reinforced plastics, honeycomb materials, forming structural shapes). Design Considerations. Laminate structures. Stress-strain characteristics of fiber-reinforced materials. Lamination theory. Failure theories of fiber-reinforced materials. Environmentally induced stresses in laminates.

ME 436 Introduction to Nanomaterials 3:(2,1,2) Credits. Introduction and Definition, Types of nanomaterials, Nano composites, Mechanical Behavior of materials from Micro to nano level, Nanomaterials and nanostructures, Mechanical, physical, electrical, optical and magnetic properties of nanomaterials, Failure mechanism in nanomaterials, Fatigue and Fracture of MEMS and NEMS, Characterization Techniques HRTEM, AFM, Raman Spectroscopy, Potential applications of nano materials.

ME 437 Non-Destructive Examination of Materials 3:(2,1,2) Credits. Introduction to the fundamentals and applications of non-destructive examination. Non-destructive Examination Methods: Ultrasonics, Magnetic Particle, Liquid Penetrant, Acoustic Emission, Eddy Current, Radiography; Qualification and Certification of NDT Personnel.

ME 458 Turbo Machines 3:(3,1,0) Credits. Fluid mechanics and energy transfer in turbo – machines, Centrifugal and axial compressors. Centrifugal and axial flow turbines. Applications, including industrial gas turbine engines and aircraft engines.

ME 459 Internal Combustion Engines 3:(3,1,0) Credits. Spark ignition and compression ignition engine types, design and operating parameters; thermo chemistry of fuel-air mixture and thermodynamic models of working fluids and engine cycles. Gas exchange processes and volumetric efficiency. carburetors and electronic fuel injection. Performance parameters. Combustion chamber design, and octane number. Diesel fuel injection, supercharging of 4-stroke and 2-stroke S.I. and C.I. engines.

ME 460 Power Plants 3:(3,1,0) Credits. Energy demand and power generation systems. Steam and gas power cycles. Fuels and combustion. Basic and auxiliary systems of a steam p.p. Steam generator analysis. Steam turbines and their controls. Diesel engine and gas turbine power plants. Overall plant performance. Economics of power plants.

ME 461 Applied Fluid Mechanics 3:(3,1,0) Credits. Differential forms of the governing equations for fluid flow. Inviscous flow, compressible flow, boundary layer flow. Flow machines, Flow in pipe networks with applications using computer codes.

ME 462 Bio Fluid Mechanics 3:(3,1,0) Credits. Introduction to thermodynamics: Concepts of heat and work, specific heat and enthalpy, Fluid statics and hydrostatic pressure. Viscous and non-viscous, laminar and turbulent flows, Circulatory biofluid mechanics, Properties of flowing blood, Models of biofluid flows, non-Newtonian fluids. Heat generation by metabolism, modeling of heat transfer in human bodies.

ME 463 Gas Dynamics 3:(3,1,0) Credits. Introduction to the frictionless compressible flow. Internal flow with friction and heat transfer. Acoustics and wave motion. Oblique shocks and expansion waves. Two-dimensional subsonic and supersonic flow including hodograph transformations, linearized theory of thin airfoils, and the method of characteristics. Introduction to transonic and hypersonic flow and reentry problems.

ME 464 Desalination Plants 3:(3,1,0) Credits. Comparison of different desalination systems. Development of desalination processes, characteristics of varies systems. System design and selection, intake and disposal, water pretreatment, post treatment processes, corrosion and material selection. Desalination system economy.

ME 465 Energy Conversion 3:(3,1,0) Credits. Review of indirect energy conversion systems, (ICE, gas turbine engines, steam pp): energy storage; thermoelectric; photovoltaic; magneto hydrodynamic gen.; fuel cells; other energy conversion Systems

ME 466 Renewable Energy 3:(3,1,0) Credits. Review of heat transfer, solar angles, and solar radiation on earth's surface. Solar radiation on tilted surfaces. Radiation measurements. Solar collectors and concentrators, storage, photovoltaic, wind energy, geothermal energy. Other renewable energy sources.

ME 467 Ventilation and Air Conditioning Systems 3:(3,1,0) Credits. Cascade V.C. cycle, Gaseous air refrigeration cycles. Absorption refrigeration systems. Thermoelectric cooling. Cold storage and applications. Refrigeration control systems, Air distribution systems (duct design). Air conditioning systems and their representation on psychometric chart. Air conditioning control. Air conditioning equipment.

ME 468 Applied Heat Transfer 3:(3,1,0) Credits. Classification of Heat Exchangers, Design Correlations and Fouling, Basic Thermal Design Methods and Iterative Techniques, types of heat exchanger: Double-Pipe Heat Exchangers, Shell-and-tube Heat Exchangers, Compact Heat Exchangers, Other Heat Exchangers, Correlations for Two-Phase Flow, Condensers and Evaporators.

ME 469 Modeling & Simulation of Thermal Systems 3:(3,1,0) Credits. Basic considerations and types of modeling, Numerical modeling and simulation of thermal systems, Optimization and search techniques, Examples and applications using computer.

ME 474 Industrial Operations Research II 3:(3,1,0) Credits. Non-linear programming. Dynamic programming. Inventory models. Waiting line models. Markov analysis. Introduction to Game theory. Applications in industrial, service and public systems.

ME 475 Computer Aided Design & Manufacturing 3:(2,1,2) Credits. Introduction to CAD/CAM; Computer technology and CAD/CAM software and hardware; Geometric modeling and its approaches; Geometric transformations; Viewing in 3D; Numerical control; Types of numerical control; Numerical control programming.

ME 476 Industrial Operations Management 3:(3,1,0) Credits. Basic concepts of Production and Operations Management (POM). Design of products and services. Processes and technologies, Inventory management. Forecasting. Material Requirements Planning (MRP). Scheduling. Supply-Chain management. Just-in-time and lean production Introduction to Enterprise Requirement Planning (ERP).

ME 477 Engineering Design 3:(3,1,0) Credits. Engineering design process. Computer modeling and heuristics for solving problems, in teams, in the areas of comparison of strategies, trade-offs, decision making, stochastic processes, optimization and expert systems. Interpretation of results. Preparation of professional technical reports of engineering work and multimedia presentation**.**

ME 478 Industrial Management 3:(3,1,0) Credits. Introduction to industrial management. Economic concepts in industry. Organizational structure and design. Human resource management.

Motivating the work force. Managing information technology. Financial management. Engineers in marketing and services. Job analysis, job description, and job specification. Preparation of business plan.

ME 479 Manufacturing Economics 3:(3,1,0) Credits. Basic accounting concepts; Cash flow and financial statements analysis; Standard costs and variance analysis; Cost analysis and operation decisions; introduction to cost reduction programs.

ME 480 Industrial Information Systems 3:(3,1,0) Credits. General concepts. Values and attributes of information. Different types of information systems. Concepts of managerial information systems. Emphasis on analysis, design, and development of industrial information systems. Developing information systems by using microcomputers.

ME 481 Safety Engineering 3:(3,1,0) Credits. Accident: causes and costs. Appraising safety performance and risk assessment. Analysis of accident causes. Accident reports and records. Job safety analysis. Plant inspection. Accident investigation. Plant layout and arrangement. Plant housekeeping. Maintenance and safety. Material handling and safety. Machine guarding. Explosion and fire prevention. Personal protection. First aid. Planning for emergencies.

ME 482 Industrial Systems Simulation 3:(2,1,2) Credits. Basic theory of industrial simulation. Building simulation models. Organization of simulation studies. Simulation modeling and application to medium and large-scale production and service system problems. Output analysis. Variance reduction and optimization. Use of software such as ARENA for discrete and continuous system simulation.

ME 483 Design & Analysis of Experiments 3:(3,1,0) Credits. Principles of experimental design. Randomized complete block designs. Latin square and Graeco-Latin square designs. General factorial designs. 2k Factorial designs. Response surface methodology and robust design. Planning, performing and analyzing industrial experiments.

ME 484 Industrial Facilities Planning 3:(3,1,0) Credits. Fundamentals of facilities planning. Facilities design. Flow, space, and activity relationships. Material handling systems. Layout planning models. Warehouse operations. Quantitative facilities planning models. Preparing, presenting, implementing and maintaining facilities plan.

ME 485 Occupational Biomechanics (Ergonomics) 3:(2,1,2) Credits. Introduction to Occupational Biomechanics. Review of kinematics and kinetics. Anthropometry. Mechanical work capacity evaluation. Bio-instrumentation for Occupational Biomechanics. Biomechanical models. Methods of classifying and evaluating manual work. Manual material handling limits. Biomechanical considerations in machine control and workplace design. Hand tool design guidelines. Guidelines for seated work.

ME 486 Design of Manufacturing Systems 3:(2,1,2) Credits. Study of recent developments in manufacturing, Japanese manufacturing techniques, hybrid manufacturing management system, supply chain management, total quality management, design for manufacturing and assembly. Manufacturing automation fundamentals and strategies; High volume manufacturing systems; Automated handling and storage systems; Automated inspection systems; Flexible manufacturing systems; Modeling of manufacturing systems.

ME 491 Design and Production Lab I 1:(0,0,2) Credits. The design, execution, and evaluation of physical experiments in the area of solid mechanics, dynamics of physical systems and control.

Digital simulation of linear systems using a software package (MATLAB). Emphasis on the application of classroom theory to experimental engineering and interpretation and presentation of results.

ME 492 Design and Production Lab II 1:(0,0,2) Credits. Continue the course of Mechanical Design and Production Lab I concerning the design, execution, and evaluation of physical experiments in the area of solid mechanics, dynamics of physical systems and control. Digital simulation of linear systems using a software package (MATLAB). Emphasis on the application of classroom theory to experimental engineering and interpretation and presentation of results.

ME 493 Mechanical Power Lab I 1:(0,0,2) Credits. The design, execution, and evaluation of physical experiments in the area of fluid mechanics, thermodynamics, heat transfer, and air conditioning. Digital simulation of linear systems using a software package (MATLAB). Emphasis on the application of classroom theory to experimental engineering and interpretation and presentation of results.

ME 494 Mechanical Power Lab. II 1:(0,0,2) Credits. Continue the course of Mechanical Power Lab (I) concerning the design, execution, and evaluation of physical experiments in the area of fluid mechanics, thermodynamics, heat transfer, and air conditioning. Digital simulation of linear systems using a software package (MATLAB). Emphasis on the application of classroom theory to experimental engineering and interpretation and presentation of results.

ME 495 Work Study Lab 1:(0,0,2) Credits. Introduction to Work Study (WS). Productivity and WS. WS approaches. Basic procedure of method study involving job selection, recording facts, critical examination etc. String diagram, Multiple activity chart, Travel chart. Principles of motion economy. Two-handed chart. Fundamental hand motions. Micro-motion and Memomotion studies. Cyclograph and Chrono-cyclegraph. Work Measurement (WM). Work sampling. Time study. Computerized WM. PMTS: MTM, Work factor and Standard data. Wage payment and incentive plans.

ME 496 Human Factors Engineering Lab 1:(0,0,2) Credits. Introduction to human factors engineering. Muscular work. Nervous control. Work efficiency. Body size and anthropometrics. Work station design. Heavy work. Handling loads. Man-machine systems. Mental activity. Fatigue. Stress and boredom. Vision and lighting. Noise and vibration.

CEN 307 Computer Programming for Mechanical Engineering 2:(2,0,2) Credits. Introduction to computers. Simple algorithms and flowcharts. Basics of computer programming languages. Object oriented programming concepts. Solving engineering and mathematical problems using a mathematically-oriented programming language. Programming concepts: I/O, assignment, conditional loops, functions and subroutines. Programming selected numerical and non-numerical problems of mathematical and engineering nature.

GE 101 Fundamentals of Engineering Technology 2:(1,0,2) Credits. Introduction to principles of production, Function and planning of workshop, Industrial safety, Measurements, Engineering materials (crystalline structure, properties of materials and their applications, heat treatment of materials), Bench work and filling, sheet metal work, Metal machining (drilling, turning, shaping, milling, grinding), Metal forming; forging processes, rolling, extrusion, Foundry and patternmaking, Joining of materials (fastening, riveting, welding).

GE 102 Fundamentals of Engineering Drawing 3:(1,0,4) Credits. Introduction, Skills of freehand sketching, Basics of lettering, Methods of projection and orthographic projection using

drawing tools, Dimensioning of views, Third view prediction, Auxiliary views, Intersections of surfaces and bodies, Isometrics, Sectional views.

GE 108 Engineering Mechanics (Dynamics) 3:(3,1,0) Credits. Module to cover Kinetics and Kinematics of Particles and Bodies. Review of particle motion. Rotation and translation of a rigid body in the plane. General motion. Displacement, velocity, and acceleration of rigid bodies, including Coriolis motion. Motion about a fixed point. Equations of motion for a rigid body. Constrained plane motion. Work and energy. Impulse and momentum. Principle of Conservation of Energy. Gyroscopic motion. Introduction to mechanical vibrations.

The Faculty Members

Faculty Members Websites

Head of Department- Vice Dean for Academic Affairs of Preparatory Year

Dr. Ibrahim Mohammad Alarifi

Associate Professors

1. Dr. Mohammad Al Salamaah
2. Dr. Abdulaziz Mohammed Alklaibi - Vice Dean for Scientific Research Affairs
3. Dr. Vakkar Ali
4. Dr. Iskander Tlili
5. Dr. Abdelrasoul Gadelmoula

Assistant Professors

1. Dr. Abdullah Al Abdulkarim - Dean of the college
2. Dr. Salah Aldahash -Vice-Dean For Academic Affairs
3. Dr. Abdul Majeed
4. Dr. Mohammad Nadeem Khan
5. Dr. Tarek Elbagory
6. Dr. Chandra Mouli
7. Dr. Osama Abdelaal

Lecturers

1. Eng. Mohamed Othman Ibrahim

Basic Engineering Sciences

The department website can be reached via the web link:
http://www.mu.edu.sa/en/colleges/college-engineering/vision-and-mission-1

The Department of Basic Engineering Sciences is one of the academic departments in the College of Engineering. The department provides the support for other academic programs and it does not offer a degree program of its own. Mathematics, physics, and chemistry are the basic science courses offered by the department.

Mission

Our aim is to provide moderate courses in various fields of basic sciences (Mathematics, Physics, and Chemistry) for the students of the College of Engineering, also take care with scientific and creative skills of the students.

Vision

To become nationally and locally recognized in basic engineering science education, scientific research and community services.

Objectives & Goals

- To provide an education based on scientific principles and engineering practice, that forms the foundation for leadership in career vital to society
- Strengthening students' skills and talents to become successful engineer.
  Built a strong foundation and knowledge in engineering fundamentals with a capacity to know how, when and where to use the knowledge in specific way.
- Built strong oral and written communication skills with a capacity to produce effective technical documents and use current communication techniques and tools
- Develop the ability to use the technical skills and modern engineering tools necessary for engineering application.

Laboratories:

- STEM lab, equipped with robotics training kits for Physics and Math courses applications
- Physics Lab

Course Description

MATH 105 Differential Calculus 3:(3,1,0) Credits. Derivatives, differentials, chain rule, implicit differentiation. Higher order derivatives, local extrema, concavity, horizontal and vertical asymptotes, applications of extrema, related rates. Inverse trigonometric functions. The logarithmic, exponential, hyperbolic and inverse hyperbolic functions. Functions in two or three variables: their limits, their continuity and their partial derivatives.

MATH 106 Integral Calculus 3:(3,1,0) Credits. The definite integral, fundamental theorem of calculus, the indefinite integral, change of variable, numerical integration. Area, volume of revolution, work, arc length. Integration of inverse trigonometric functions, of logarithmic and exponential functions, of hyperbolic and inverse hyperbolic functions. Techniques of integration: substitution, by parts, trigonometric substitutions, partial fractions, miscellaneous substitutions, indeterminate forms, improper integrals. Double integral, areas and volumes. Double integrals in polar coordinates. Triple integral in cylindrical and spherical coordinates, volume, moment and center of mass. Vector fields, line integrals, surface integrals, Green's theorem, the divergence theorem, Stoke's theorem.

MATH 107 Algebra and Analytical Geometry 3:(3,1,0) Credits. Systems of linear equations: matrices, determinants, inverse of a matrix, Cramer's rule. Vectors in two and three dimensions, scalar and vector products, equations of lines and planes in space, surfaces, cylindrical and spherical coordinates. Vector valued functions. Motion of a particle in space, tangential and normal components of acceleration. Directional derivatives, tangent planes and normal lines to surfaces. Infinite series, convergence and divergence of infinite series, integral test, ratio test. Power series. Taylor and Maclaurin series.

MATH 204 Differential Equations 3:(3,1,0) Credits. First order and first-degree differential equations: equations with separable variables, homogeneous and non-homogeneous equations, exact and non-exact equations, linear and nonlinear equations. The linear first order equations of higher degree. The linear second order equations: direct deduction, comparison theorems, variation of parameters, and the inverse differential operator. Systems of differential equations. Laplace transform and Fourier Series, their applications to solve linear differential equations.

MATH 254 Numerical Methods 3:(3,1,0) Credits. Resolution of non-linear equations by numerical methods, estimation of the errors committed by these methods and rates of convergence of iterative methods. Resolution of linear equations by direct methods and recurring methods, calculate the errors related to these methods. The interpolation by using the polynomials and the formula of error committed by this interpolation. Numerical differentiation and integration, including errors relating to them. Introduction to numerical solution of ordinary differential equations.

PHY 103 General Physics 4:(3,1,2) Credits. Thermodynamics: temperature scales, thermometers, thermal expansion, heat and the first law of thermodynamics. Wave Motion: sinusoidal waves, reflection, diffraction and transmission, the linear wave equation Sound Waves: speed of sound waves, intensity of periodic sound waves, the Doppler Effect. Light Waves: nature of light waves, interference, diffraction patterns and polarization. Electricity: Electric potential, capacitance and inductance, current and resistance, direct current circuits.

GE 105 Engineering Chemistry 3:(3,1,0) Credits. Fundamentals of Chemistry: Stoichiometry, Atomic structure, Chemical bonding, Kinetics Chemistry, chemical equilibrium, Energy and Matter: Gas state and gas laws, liquid and solution properties, Classical Chemical thermodynamics, laws, common terms and concepts. Fundamentals of organic chemistry. Applications: Basics of chemical metallurgy, Building materials, Rust and corrosion resistance. Polymers industry, and their applications. Industrial using of water and pollution, industrial gases. Some important industries: Iron and steel, aluminium, cement, high performance ceramics and glasses.

GE 306 Engineering Report Writing 2:(2,0,0) Credits. Definition of technical reports – Types of reports – Cover and page title, Abstract, Table of contents, Lists of Abbreviations, Figures and Tables, Introduction, Report body, Analysis of results, Tables and graphs, Conclusions and Recommendations, References, Appendix. Exercises showing common mistakes in writing the technical reports. Presentation skills.

GE 407 Engineering Economy 2:(2,1,0) Credits. Introduction to engineering economy, The time value of money, Analysis of break-even point (BEP), Assessment of the benefit/cost, Decision-making and the choice between alternatives, Laws of return and the Effective Rate of Return (ERR), Economic analysis, Replacement policy, Depreciation rates, Fundamentals of inflation, Introduction to cost accounting.

GE 408 Engineering Project Management 2:(2,1,0) Credits. Introduction to Project planning and scheduling, Project charter, Scope statement, Work Breakdown structure, Responsibility Chart.

Network diagram, Schedule analysis and possibilities using the Critical Path Method (CPM) and the Program Evaluation and Review Technique (PERT). Resource leveling and allocation, Time-cost trade off (Crashing a schedule), Gantt Chart, Time overlaps, Time and cost control, Risk monitoring and control, Computer applications.

STAT 201 Statistics and Probability 3:(3,1,0) Credits. Descriptive statistics: statistical classification of data, measures of central tendency (mean, median, mode for raw and grouped data), measures of dispersion (range, mean deviation, quartile deviation, standard deviation and variance). Simple and multiple linear regressions, significance tests, estimation, sampling. Statistical software (Excel, StatGraph, MiniTab) and their applications. Probability: introduction, properties, Conditional probability, Bayes law, applications. Random variables: discrete and continuous random, the expected value and variance, sums of discrete random variables. Selected distributions: Uniform, Poisson, Exponential, and Normal

The Faculty Members

Faculty Members Websites

Coordinator of Department

Dr. Tarek Nabil Ahmed

Assistant Professor

1. Dr. Muhammad Gul Bahar Ashiq
2. Dr. Mohammed Kashif Uddin
3. Dr. Mukhtar Mohammad Al Shelleh Salah
4. Dr. Ilyas Khan
5. Dr. Ahmad Matouq

DEANSHIP OF FACULTY AND STAFF
(https://www.mu.edu.sa/en/departments/deanship-faculty-and-staff)
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DEANSHIP OF ADMISSION AND REGISTRATION
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ENGINEERING COLLEGE GUIDE

THIRD EDITION 2019