PREFACE

The College of Engineering in Qassim (QEC) has started in 2003. Its mission and goals were very clear. The college is looking for excellent outcomes. The curriculums of the college were designed according to ABET requirements.

The staff members of the College of Engineering were selected very carefully, they have graduated from famous international universities.

The College possesses modern facilities given by the government. Its laboratories contain the newest high technology.

Concerning students, they are serious and very polite. Since these three: professor, facilities and student are excellent then we expect to get excellent outcomes.

I am very glad to offer this bulletin to the students and I hope this will guide them clearly in their studies in the college.

Sulaiman Al Yahya, Professor
Dean, College of Engineering
# TABLE OF CONTENTS

THE COLLEGE OF ENGINEERING: ................................................. - 1 -
- The college education system ............................................. - 4 -
- The college physical facilities ............................................. - 11 -
- The college administration ................................................. - 13 -
- The degree requirements: college courses’ description ....... - 14 -

THE DEPARTMENT OF ELECTRICAL ENGINEERING ........... - 23 -
- The electrical engineering department members ............... - 32 -
- The electrical engineering department laboratories ......... - 32 -
- The electrical engineering program ................................. - 40 -
  1- Electrical Power engineering track ......................... - 40 -
  2- Electronics and Communication track ................. - 43 -
- The electrical engineering courses .............................. - 47 -

THE DEPARTMENT OF CIVIL ENGINEERING ..................... - 65 -
- The civil engineering department members .................. - 32 -
- The civil engineering department laboratories .......... - 68 -
- The civil engineering program .................................. - 72 -
- The civil engineering courses ................................. - 76 -

THE DEPARTMENT OF MECHANICAL ENGINEERING ........... - 85 -
- The mechanical engineering department members ......... - 32 -
- The mechanical engineering department laboratories .. - 88 -
- The mechanical engineering program ....................... - 94 -
- The mechanical engineering program courses .......... - 97 -
COLLEGE OF ENGINEERING

Contact Information:

The College Dean: Prof. Sulaiman Al Yahya

Tel:  (+966)(6)3803373 –Ext. 5800
Fax:  (+966)(6)3801152
Secretary: (+966)(6)3800050 –Ext. 5000
Email: syhya@qec.edu.sa
P.O.B 6677 - Buraydah 51452 - Saudi Arabia
About the College

On 17/1/1423 A.H.; the council of King Saudi University (KSU) recommended the transformation of the Department of Agriculture Engineering from the College of Agriculture and Veterinary at its Qassim campus (branch) into an engineering college. The college is to start with three main departments: the electrical, the mechanical and the civil engineering.

The recommendation was then discussed in the meeting of the Saudi Council for Higher Education on 2/11/1423 A.H. and headed by his majesty King Fahd (God bless him) as the Pri-Minister and the Head of Council for Higher Education. The council approved the recommendation on 23/11/1423-A.H.

Consequently, a committee of specialists from KSU was selected and assigned the task of developing the curriculums for the three programs. The committee approved the general requirements of the B. Sc degree in engineering. This includes the fulfillment of the university, the college, and the department requirements. Therefore; the schooling process, according to the programs previously set by KSU, started and continued for two full academic years. In "1426-A.H.", Qassim University decided to adopt the Preparatory (foundation) Year Program (PYP) for all its scientific colleges. It was a good chance for the Engineering College to enhance and improve its programs with the objectives of satisfying the new-university-system (PYP) in addition to the job market demands.

Mission of the College

The Qassim College of Engineering seeks to meet the needs of the Saudi society and the region with outstanding engineering programs in education, research and community service.

Vision of the College

The Qassim College of Engineering aims to be recognized locally, regionally, and internationally as a leading institution providing high quality programs and services.

The College Educational Objectives

The educational objectives of Qassim Engineering College (QEC) are stated such that the graduate will:
- Possess the skills and knowledge necessary for work environment including design, installation, operation, maintenance and inspection of engineering systems.
- Utilize information technology; data analysis; and mathematical, computational, and modern-experimental techniques in formulating and solving practical problems.
- Fit in various working environments through effective communication skills and the ability to work in teams.
- Continue life-long learning and gain skills to promote professional development, creative thinking, and career planning based on social and professional ethics.

**Scientific Departments**
1. Electrical Engineering Department
2. Civil Engineering Department
3. Mechanical Engineering Department

**Major Programs**
The Engineering College offers three B.Sc. programs:
1. Electrical Engineering Program.
2. Civil Engineering Program
3. Mechanical Engineering Program

**Admission conditions**
The admission to College of Engineering requires the completion of the preparatory year program of Qassim University. The number of students who can be accepted in the College of Engineering is determined yearly by the University Council taking into consideration the College capacity. Then, the students who have the desire to join the College of Engineering compete based on their GPA in the preparatory year program.
THE COLLEGE EDUCATION SYSTEM

The educational system in the college is based on two main semesters per educational year – each semester is fifteen week length. In addition; an optional eight week summer semester may be offered.

According to the educational plans; a student may complete any of the engineering programs in 8 semesters (4 years) after the Preparatory year Program (PYP). A successful student may complete the full requirements of the selected program if he completed (after the PYP) a total of 139 credit-hours. In details the 139 credit-hours include:

- **University requirements (12 credit-hours):** a list of these courses comes next.

- **College requirements (54 credit-hours):**
  The college of engineering requires that student must complete 54 credit hours before graduation. Nine credit hours -out of these 54- are assigned for the cooperation training. The rest is distributed between 15 courses in physics, mathematics and general engineering courses -a list of these courses comes next. A student can start his cooperation training after completion a minimum of 100 credit hours. The training must be for seven months and through a governmental or private party. The training party must be approved from the college. It may be necessary to mention here that this training is supervised and evaluated by the college faculties.

- **Program and/or Departmental requirements (68 credit-hours),**
  Each department requires the completion of 68 credit hours distributed between specialized courses offered by the department itself or offered by other departments of the college.

- **The Free Courses (5 credit-hours),**
  Five credit hours have to be selected among the set of courses offered by the university.
Academic Supervision
An academic advisor is assigned to each student. The advisor guides the student in selecting the appropriate course each semester. In addition the advisor helps the student in following the ideal educational approach and helps him in solving the academic problems he may meet.

Withdrawal
A student has the right to withdraw from an academic semester –without being considered fail- within the withdrawal period announced in the academic calendar for the current semester. The withdrawal must be submitted to the college dean. No withdrawal is allowed during the last five weeks before the final examinations. If the college council accepted the student excuse, the council may search for additional chance of final examinations.

Transfer to the college of engineering
The college of engineering accepts the transfer applications from other colleges whether belong to the Qassim University or from outside Qassim University. A transfer may be approved if the applicant completed his PYP and has achieved a minimum GPA set by the College Board. The accepted applicant may transfer his previous achieved courses to the equivalent courses at the college of engineering in Qassim University.

Attendance
Regular engineering courses require full time attendance for academic success. The college requires that students should attend at least 75% of the lectures, practical and laboratorial sessions. A student failing to meet this limit in any of his registered courses will be prohibited from attending the final examination of this course. His grade for this course will be ZERO.
Status of Discontinuity

(1) A student is considered to be in a Status of Discontinuity in one semester if:
(2) He did not, or failed to, register in one semester.
(3) Or he withdrew from this semester.
The validity of the causes is not an issue for discussion. It is permissible for a student to be in a discontinuity status for a maximum of two successive semesters, or a total of three non-successive semesters during his enrollment at QEC. Exceeding these limits ends up by terminating the student’s enrollment at QEC.

(4) Any student, who looses his QEC- studentship due to any of the discontinuity conditions mention in (1) can appeal to be readmitted to the college based on the following conditions: -
(5) The student discontinuity did not exceed four semesters
(6) He has to satisfy all the admission conditions announced at readmission.
(7) He should keep the same university personal identification number (PIN) as well as his records he had prior to the discontinuity status.
(8) The student’s appeal must be approved by the College Dean.
(9) The Dean, based on a recommendation from the associated department council, may require the student to retake any course that he has passed before.
(10) If the student discontinuity exceeded four semesters, and it was not due misconduct, he can apply for admission as a new student or freshman. In this case all his scientific records will be ignored.

Examinations and Grading System
1. The final grade of a specific course is the summation of the final exam grade and a grade corresponding to the class work during the semester.
2. Each course has a total of 100 points.
3. The grade of the semester work is within 50% to 60% of the total final grade of the course. The rest however is assigned for the final exam.
4. A student must have a total of at least 60% of the total mark of a specific course as a pass mark.
The grading system of QEC may be explained as follows:

<table>
<thead>
<tr>
<th>Grade Letter</th>
<th>Numerical average %</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>more than or equal to 95</td>
<td>5.00</td>
</tr>
<tr>
<td>A</td>
<td>90</td>
<td>4.75</td>
</tr>
<tr>
<td>B+</td>
<td>85</td>
<td>4.50</td>
</tr>
<tr>
<td>B</td>
<td>80</td>
<td>4.00</td>
</tr>
<tr>
<td>C+</td>
<td>75</td>
<td>3.50</td>
</tr>
<tr>
<td>C</td>
<td>70</td>
<td>3.00</td>
</tr>
<tr>
<td>D+</td>
<td>65</td>
<td>2.50</td>
</tr>
<tr>
<td>D</td>
<td>60</td>
<td>2.00</td>
</tr>
<tr>
<td>F</td>
<td>Less than 60</td>
<td>1.00</td>
</tr>
</tbody>
</table>

A student’s semester Grade Point Average (GPA) is calculated by dividing the cumulative point value of all his semester’s courses by the total number of semester credit hours he registered for. The following is an example of a hypothetical student’s report having six hypothetical courses.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credit Hours</th>
<th>Grade Letter</th>
<th>Points</th>
<th>Point product</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>B+</td>
<td>4.50</td>
<td>4.5 x 2 = 9</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>D</td>
<td>2.00</td>
<td>2 x 3 = 6</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>C</td>
<td>3.00</td>
<td>3 x 3 = 9</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>D+</td>
<td>2.50</td>
<td>2.5 x 4 = 10</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>B</td>
<td>4.00</td>
<td>4 x 1 = 4</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>C</td>
<td>3.00</td>
<td>3 x 5 = 15</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td></td>
<td></td>
<td>53</td>
</tr>
</tbody>
</table>

This student’s semester-Grade-Point-Average (GPA) is $\frac{53}{18} = 2.944$

The accumulated GPA of a student is calculated by considering all the achieved courses since he first admitted to the college till the time his-GPA is required to be calculated at. The graduation grade of a student is considered based on his
accumulated GPA according to the following table:

<table>
<thead>
<tr>
<th>Accumulated GPA</th>
<th>Graduation Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>From 4.5 and up</td>
<td>Excellent</td>
</tr>
<tr>
<td>From 3.75 to less than 4.5</td>
<td>Very good</td>
</tr>
<tr>
<td>From 2.75 to less than 3.75</td>
<td>Good</td>
</tr>
<tr>
<td>From 2.00 to less than 2.75</td>
<td>Sufficient</td>
</tr>
</tbody>
</table>

**Academic Evaluation for Student standing**

It is expecting from all QEC-students to be in good academic standing. A student with GPA less than 2 is not eligible for graduation. A student fails to maintain an accumulating GPA less than 2.0 in any semester will be warned. Three warnings put the student in dismissing conditions from the college and the university rules—on this case—will be applied.

**Education Resources:**

- Textbooks
- Lectures
- The World wide web (Internet)
- Seminars
- Conferences
- Training Courses

**Serving the university and the society**

1. The faculty contributes in several different committees in the university.
2. The faculty connects an effective relationship in a number of the university units as in the graduate studies deanery, the scientific research deanery and the academic developing deanery.
3. Introduction of training courses for engineers in the private and governmental sectors through a community service deanery in the university.
4. Contribution in the engineering problem solutions which are raised by the Region Emirate.
5. Introducing engineering consultations for the private and governmental sectors.
6. Preparation of circulars and booklets related to the solution of engineering problems.
7. Holding the conferences and general seminars in different engineering fields.
The Career chances:

1. All engineering administrations in the governmental authorities.
2. The projects operation and maintenance administrations in the governmental authorities.
3. The ministry of water and electricity.
4. The ministry of municipal and village affairs.
5. The Saudi commission for the engineers.
6. The general institution for the waters refinement.
7. The general institution for ports.
8. The Saudi airlines.
9. The military occupations management.
10. The constructions and contracting companies.
11. The electronics and communication companies.
12. The power and electric energy companies.
14. The Ministry of agriculture and water resources.
15. The general institution for the electricity.
16. The water and sewage authority.
17. The Saudi Arabia Aramco company.
18. The Saudi company for the basic industries (SABIC).
19. The unified Saudi company for electricity (SCECO).
20. All factories.

Students’ Activities

The university-student affair deanery supervises most of the students’ activities. That includes cultural, recreational, and social. These activities enhance the students’ learning ability as well as it demonstrate good chance for entertainment and stress relief. Samples of these activities are:

1- Cultural activities: in all fields
2- Social activities like traveling and visiting major industrial cities and large scale engineering projects.
3- Recreational activities as arranging races in football, tennis and billiards.
College Scientific Journal

The college of engineering supervises the publication of the bi-annual journal of Qassim University Journal of Engineering and Computer Sciences. Contributions to this journal are not limited to staff members of the college but are open to contributors from inside and outside the Kingdom of Saudi Arabia. Papers are published after being refereed by national and international specialists. This journal is considered a good journal for publication.
THE ENGINEERING COLLEGE PHYSICAL FACILITIES

In addition to the specialized laboratories in each department - which will be explained in the hereafter - the college contains a number of laboratories, drawing halls, teaching halls and computer laboratories which will serve all the college departments. These physical facilities are:
- Educational workshop
- Computer laboratories
- Drawing halls
- Active learning halls
- Teaching halls

1- Educational workshop:
A recent educational workshop with many equipments and tools is used in conjunction with teaching GE105: Basics of Eng. Technology. The workshop is located in the Department of Mechanical Engineering and has Lathes, Milling machines, Shaper, Drill Press, Band Saws, Grinder, Welding and Hydraulic Cutter. Students of the low levels get trained in the workshop and perform experimental exercises for different industrial programs. Moreover, the students carry out manufacturing of equipment and experimental models for their graduation projects. The workshop is utilized also in research projects performed by the college staff members.

2- Computer laboratories:
The college has two computer laboratories supervised by teaching staff members. The laboratories are well equipped with extensive licensed software libraries and up-to-date printers and scanners. The laboratories are utilized in graduation projects and in teaching computer sciences as well as these engineering courses which require computer application. The computer facilities include the service of electronic mail, internet. The capacity of each laboratory is about 40 students.
3- Drawing hall:
The college has a hall for hand work engineering drawing. This hall is utilized in teaching GE 104: Basics of Engineering Drawing. The hall is equipped with thirty drawing tables equipped with all facilities necessary for drawing.

4- Active learning halls:
Four new active learning halls are constructed and well prepared for engineering design courses (GE 211 & GE 213). Two halls are assigned for each course. The active learning halls are prepared with the necessary equipments required for creating the appropriate active learning environment. In these courses teams of students (usually five students each) meet to discuss the assignments and to perform active learning procedures.

5- Teaching halls:
The college contains a number of teaching halls. The halls are equipped with the most recent educational equipments like whiteboards, overhead projectors, internet connections, electric supplies, air conditioners and more.
THE ENGINEERING COLLEGE ADMINISTRATION

Prof. Dr. Sulaiman Al-Alyahya  
Dean, College of Engineering  
Tel: (+966) 6-3803373  
Fax: (+966) 6 – 3801152  
Ext: (+966) 6 - 3800050-5000

Email: syhya@qec.edu.sa

Dr. Ibrahim Alsalamaah  
Vice Dean for Administration Affairs  
Tel: (+966) 6-3803373  
Fax: (+966) 6 – 3801152  
Ext: (+966) 6 - 3800050-5001

Email: alsalamah@qec.edu.sa

Dr. Abdulrahman F. Almarshoud  
Vice Dean for Academic Affairs  
Tel: (+966) 6-3802992  
Fax: (+966) 6 – 3802992  
Ext: (+966) 6 - 3800050-5100

Email: dr_almarshoud@qec.edu.sa
DEGREE REQUIREMENTS:
COLLEGE COURSES’ DESCRIPTION

The following are the requirements for the degree of Bachelor of Science in Engineering for different programs offered by QEC. A hypothetical course is given next as an example of how to read coeds and terminologies.

The following set of symbols —arranged in alphabetic order— is used in this bulletin:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARB</td>
<td>Arab</td>
</tr>
<tr>
<td>CE</td>
<td>Civil Engineering</td>
</tr>
<tr>
<td>Chem</td>
<td>Chemistry</td>
</tr>
<tr>
<td>CSC</td>
<td>Computer Science</td>
</tr>
<tr>
<td>EE</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>GE</td>
<td>General Engineering</td>
</tr>
<tr>
<td>IS</td>
<td>Islamic</td>
</tr>
<tr>
<td>Math</td>
<td>Mathematics</td>
</tr>
<tr>
<td>ME</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>Phys</td>
<td>Physics</td>
</tr>
<tr>
<td>Stat</td>
<td>Statistics</td>
</tr>
</tbody>
</table>
**List of the university-course requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARB 101</td>
<td>Linguistic skills</td>
<td>2</td>
</tr>
<tr>
<td>ARB 103</td>
<td>Arabic Writing</td>
<td>2</td>
</tr>
<tr>
<td>IS 101</td>
<td>Introduction to Islamic culture</td>
<td>2</td>
</tr>
<tr>
<td>IS 102</td>
<td>Islam and Community Building</td>
<td>2</td>
</tr>
<tr>
<td>IS 103</td>
<td>Economic System in Islam</td>
<td>2</td>
</tr>
<tr>
<td>IS 104</td>
<td>Political System in Islam</td>
<td>2</td>
</tr>
</tbody>
</table>

**Total credit-hours 12**

**List of the college-course requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phys 104</td>
<td>General Physics</td>
<td>4</td>
</tr>
<tr>
<td>Chem 111</td>
<td>General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>Math 105</td>
<td>Differential Calculus</td>
<td>3</td>
</tr>
<tr>
<td>Math 106</td>
<td>Integral Calculus</td>
<td>3</td>
</tr>
<tr>
<td>Math 107</td>
<td>Linear Algebra &amp; Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td>Math 203</td>
<td>Differential and Integral Calculus</td>
<td>3</td>
</tr>
<tr>
<td>Math 208</td>
<td>Differential equations</td>
<td>3</td>
</tr>
<tr>
<td>Math xx1</td>
<td>Math Elective 1</td>
<td>3</td>
</tr>
<tr>
<td>Math xx2</td>
<td>Math Elective 2</td>
<td>3</td>
</tr>
<tr>
<td>GE 104</td>
<td>Basics of Engineering Drawing</td>
<td>3</td>
</tr>
<tr>
<td>GE 105</td>
<td>Basics of Engineering Technology</td>
<td>2</td>
</tr>
<tr>
<td>CSC 209</td>
<td>Computer Programming</td>
<td>3</td>
</tr>
<tr>
<td>GE 211</td>
<td>Introduction to Engineering Design-I</td>
<td>3</td>
</tr>
<tr>
<td>GE 213</td>
<td>Introduction to Engineering Design-II</td>
<td>2</td>
</tr>
</tbody>
</table>

**Total credit-hours 12**
<table>
<thead>
<tr>
<th></th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Elective Credits</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>GE 401</td>
<td>Engineering Economy</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>GE 405</td>
<td>Cooperative Training</td>
<td>9</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Total credit-hours 54**

The two math elective courses may be selected from the following courses:

<table>
<thead>
<tr>
<th></th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Elective Credits</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STAT 324</td>
<td>Probability and statistics</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Math 244</td>
<td>Linear algebra</td>
<td>3</td>
<td>3</td>
<td>Math 107</td>
</tr>
<tr>
<td>3</td>
<td>Math 254</td>
<td>Numerical Methods</td>
<td>3</td>
<td>3</td>
<td>Math 106 &amp; 107</td>
</tr>
<tr>
<td>4</td>
<td>Math 322</td>
<td>Partial differential equations</td>
<td>3</td>
<td>3</td>
<td>Math 203 &amp; 208</td>
</tr>
<tr>
<td>5</td>
<td>Math 328</td>
<td>Applied operational researches</td>
<td>3</td>
<td>3</td>
<td>Math 107</td>
</tr>
</tbody>
</table>

The descriptions of the courses required for the degree of Bachelor of Science in Engineering for different programs offered by QEC are given next.

**Phys 104 - General Physics**

- **Electromagnetism:** Coulomb's law in the electric fields, Gauss law, Electric potential, Energy stored, Capacitance and dielectrics, Current and resistance, Electric energy and power, Direct current circuits, Kirchhoff "s Rules, Magnetic fields, Motion of a charged particle in a magnetic field, Sources of the Magnetic fields, Ampere’s law, Faraday ‘s law, in the inductance, Mutual inductance,
Alternative current circuits, RMS values, Impedance, Resonance, Power in RLC circuits.

- **Nuclear Physics:** Photoelectric effect, Atomic spectrum, Bohr model, Nuclear structure, Radioactivity Decay, Half life, Radioactive Decay.

**CHEM 111 - General Chemistry**

4 (3, 1, 0)

**Stoichiometry:** SI Units, chemical formulas, the mole, methods of expressing concentration, Calculations based on chemical equations.

**Gases:** laws, kinetic theory, deviation and van der Waals equation.

**Thermochemistry:** Types of enthalpy changes, Hess Law and its applications, first law of thermodynamics.

**Solutions:** Type of solutions and laws related, colligative properties.

**Chemical kinetics:** Law of reaction rate, reaction order, factors affecting the rates.

**Chemical Equilibrium:** Relation between Ke & Kp, Le Chatelier's principle and factor affecting equilibrium. Ionic equilibrium: Acid and base concepts, pH calculations of acid, base and buffer solutions.

**Atomic Structure:** emission spectrum, Bohr's theory de Broglire's hypothesis, quantum numbers, electronic configuration of elements, consequences of the periodic table.

**Math 105 - Differential Calculus**

3 (3, 0, 1)

Real numbers, Functions, Limits, Continuity. Derivatives, Differentials, Chain Rule, Implicit Differentiation. Higher Order Derivatives, Local Extrema, Concavity, Horizontal and Vertical Asymptotes, Applications of Extrema, related rates. Rolle’s Theorem, Mean Value Theorem, Inverse Trigonometric Functions

**Math 106 - Integral Calculus**

3 (3, 0, 1)


**Pre-requisite:** Math 105
Math 107 - Linear Algebra & Analytic Geometry  

Math 203 - Differential and Integral Calculus  
Infinite series, convergence and divergence of infinite series, integral test, ratio test, root test and comparison test. Conditional convergence and absolute convergence, alternating series test. Power series. Taylor and Maclaurin series. Functions in two or three variables, their limits, continuity and differentiability, The chain rule, Directional derivatives; gradient, Tangent planes, Maxima and Minima for function in two or three variables, Lagrange multipliers, Double integral and its applications to area, volume, moments and center of mass. Double integrals in polar coordinates. Triple integral in rectangular, cylindrical and spherical coordinates and applications to volume, moment and center of mass. Vector fields, line integrals, surface integrals, Green’s theorem, the divergence theorem. Stoke’s theorem.
Pre-requisite: Math 106

Math 208 - Differential equations  
Different types of first order differential equations and its applications. Linear differential equations of higher order. Linear differential equations with constant coefficients. Reduction of the order. Series solution of ordinary differential equations. Frobenius’s method. Fourier series of odd and even functions. Integration of Fourier series
Pre-requisite: Math 203

GE 104 - Basics of Engineering Drawing  
Geometrical construction and basics of lettering, Sketching, Orthographic projection, Sectional and auxiliary views, Dimensioning, Introduction to computer graphics.
GE 105 - Basics of Engineering Technology  
2 (1, 2, 0)
Introduction; Function and planning of workshop; Properties of materials and their applications; Non-ferrous Metals - Ferrous Alloys Production of Iron and Steel, Plain Carbon and Alloy Steels - Tool Steels and the Iron-Carbon Diagram - Heat Treatments of Steels: Heating, Quenching, Tempering, Annealing, Aging, and Surface Hardening, Destructive and Nondestructive Testing of Metals. Workshop metrology; Basic bench work operations; Machining operations; Tools, equipment and machinery used in basic workshop processes: turning, milling, grinding, forging, sheet metal-work; Welding processes: gas welding, arc welding, spot welding. Casting processes: sand casting, die casting; Industrial safety

CSC 209 – Computer Programming  
3 (2, 2, 0)
Introduction to computers and computing fundamentals in JAVA, Data Types, Variables, Operators, Control Structures, Simple input/output statement, Classes & Objects, Methods, Relational and logical expressions, IF-ELSE control structure, The WHILE statement, The FOR statement and looping structure, Introduction to Swing & graphical user interfaces, Arrays Matrix Methods, Vectors, String, Engineering Applications.

GE 211 - Introduction to Engineering Design-I  
3 (2, 4, 0)
Engineering design or how engineers approach and solve problems; process and product design; quality principles; working in teams; presentation, organization and assessment of technical work, preparation of brief reports on assigned work, self regulation or the behaviors associated with taking personal responsibility for time management, learning new material, setting goals, etc

GE 213 - Introduction to Engineering Design-2  
2 (2, 2, 0)
Computer or mathematical modeling of process and product, continuation of quality principles, working in teams, presentation, organization and assessment of technical work, preparation of brief reports on assigned work, self-regulation or the behaviors associated with taking personal responsibility for time management, learning new material, setting goals, etc
Pre-requisite: GE 211

GE 401 - Engineering Economy  
3 (3, 0, 1)
GE 405 - Cooperative Training

The student starts the Cooperation Training during the summer that precedes his final year of study and continues to the end of the next semester in either the Governmental or Private sectors. At the end of training, student must prepare a detailed report which will be orally examined by a special committee of faculty professors.

The elective courses

Stat 324 - Probabilities and statistics

Some discrete probability distributions (Uniform, binomial, multinomial, hyper-geometric, negative binomial, geometric and Poisson distributions, Mean and variance for these distributions, relationship between Poisson and hyper-geometric with binomial distributions) Some continuous probability distributions (Uniform, standard Normal, Normal, Area under the normal curve, Application of the normal distribution, mean and variance, Normal approximation to the binomial) Fundamental sampling distributions and data descriptions (Random sampling, some important statistics, Sampling distribution (central limit theorem), Sampling distribution of mean and difference between two means for large samples (and for small samples taken from normal distribution), t-distribution (its applications) One-and Two-sample estimation Problems (Statistical Inferences, Classical method of
estimation, Estimating the mean, Standard error of a point estimate, Prediction Interval, Estimating the difference between two means (for known and unknown (equal) variances), Estimating a Proportion, determination of the sample size at a specified error) One-and two-sample tests of hypotheses (Null and Alternative hypotheses, type I error, type II error, one and two tailed tests, P value, tests concerning a single mean, tests on two means (for variance known and unknown), test on a single proportion) Simple Linear Regression (Least squares and the fitted model, Properties of the least square estimators, Inferences concerning the regression coefficients, prediction)

Math 244 – Linear algebra

General review of vectors in space and its engineering applications, Euclidean n-space, linear transformation from n-space to m-space and its properties. General vector in space, subspaces, linear independence, row space, column space, and nullspace. Inner products in space, angle and orthogonality in inner product spaces, best approximation: least squares, orthogonal matrices. Eigenvalues and eigenvectors.
Pre-requisite: Math 107

Math 254 - Numerical Methods

Numerical Solution of non-linear equations and associated errors, convergence rate, solution of system of equations by direct and repeated methods and associated errors, Interpolation and polynomial approximation and associated errors, Numerical differentiation and integration and associated errors, Introduction to numerical solutions for ordinary differential equations
Pre-requisite: Math 106 & 107

Math 322 – Partial Differential Equations

Classification the partial differential equations according the order and linearity, Gamma and Beta functions, The Boundary value problem and orthogonal system, Expansion the functions in Bessel and Legendre functions, Solution of the heat equation by separation of the variable, The governing equation of string., Solution of the wave equation by D'almber method, Solution of Laplace equation in different regions.
Pre-requisite: Math 203, 208
Math 328 – Applied operational researches 3 (3, 0, 1)
Introduction to operation research methodology and applications, Building of mathematical models, Linear programming models, The simplex algorithm, Duality and sensitivity analysis, Transportation and assignment models, Network models, Integer programming, Using Optimization Software

Pre-requisite: Math 107
THE DEPARTMENT
OF
ELECTRICAL ENGINEERING

Contact Information:

The Dept. Head: Dr. Abdulrahman F. Almarshoud

Tel: (+966)(6)3800050 – 5100
Fax: (+966)(6)3802992
Secretary: (+966)(6)3800050 – 5101
Email: qec@qec.edu.sa
P.O.B 6677 - Buraydah 51452 - Saudi Arabia
About the Dept.:

Electrical engineers are essential to almost every industry. It is in fact difficult to imagine a modern industry without the services of Electrical engineers. Electrical engineering has been and continues to be a cornerstone in every new technical development.

The job of Electrical engineers usually involves design, feasibility studies, cost analysis studies, installation, operation, and maintenance of plants, processes, or equipment. The focusing of the Electrical engineering department is on teaching, community service, and research. The department faculties recognize the need to provide the graduating engineer with the appropriate background in order to meet the challenges and large demands of a fast growing country such as the Kingdom. The department of Electrical engineering mission is to provide education of quality, research, and community services that cover a broad spectrum of Electrical engineering areas. These areas include evaluation, design, operation, and maintenance of integrated governmental, industrial, and service systems.

Mission of the electrical engineering department

The electrical engineering department seeks to meet the needs of the Saudi society and the region with outstanding electrical engineering programs in education, research, and community service.

Vision of the electrical engineering department

The electrical engineering department aims to be recognized locally, regionally and internationally as a leading department providing high quality programs and services in electrical engineering fields.

Program Educational Objectives

The educational objectives of the electrical engineering department are the attributes (knowledge, skills, and behavior) that the department graduates will be able to successfully demonstrate during a short time. In order to accomplish its mission, the department in cooperation with its constituencies has identified the following list of Program Educational Objectives.
The graduate students should:

Possess the skills and knowledge required for the design, operation and inspection of electrical systems, and be able to solve modern problems in electrical engineering. Be able to fit in various working environments through effective communication skills and ability to function on team. Be able to integrate academic learning with field practice in order to develop engineering profession based on social and professional ethics. Be able to continuously develop their knowledge and skills, and engage in life-long learning.

Studying System

According to the educational plans; a student may complete any of the departmental programs in 8 semesters (4 years) after the Preparatory year Program (PYP). A successful student may complete the full requirements of the selected program if he completed (after the PYP) a total of 139 credit-hours. In details the 139 credit-hours include:

- University requirements (12 credit-hours),
- College requirements (54 credit-hours) and
- Program and/or Departmental requirements (68 credit-hours) for each of the two tracks offered by the department. The two tracks are the Power Engineering track and the Electronics & communication Engineering Program. The student has to select one of these two tracks. The 68 credit hours for each tracks may be divided to:

  a) Fundamental Courses (36 credit hours)
  b) Obligatory courses (26 credit hours)
  c) Elective course (6 credit hours)

- The Free Courses: 5 credit hours have to be selected among the set of courses available in the university.

In addition; a student has to complete cooperation training in a summer term and the post- or pre-term at one of the private or governmental sectors. It may be necessary to mention here that this training is supervised and evaluated by the college faculties
Program Outcomes:

The outcomes of EE Program are listed below. At the time of graduation, our students will have:

a) An ability to apply knowledge of mathematics, science, and electrical engineering sciences.
b) An ability to design and conduct experiments, as well as to analyze and interpret data.
c) An ability to design a system, component, or process to meet desired needs within realistic constraints.
d) An ability to function on teams.
e) An ability to identify, formulate, and solve electrical engineering problems.
f) An understanding of professional and ethical responsibility.
g) An ability to communicate effectively.
h) The broad education necessary to understand the impact of electrical engineering solutions in a global, economic, environmental, and societal context.
i) A recognition of the need for, and an ability to engage in, life-long learning.
j) Knowledge of contemporary issues.
k) An ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.

The EE curriculum and the actions taken to effectively implement this curriculum are the main vehicles that ensure that the Program Outcomes, and the ultimate Program Educational Objectives, are met. The curriculum includes basic science/math requirements taken during the low-level semesters.
### THE FUNDAMENTAL COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EE 201 Fundamentals of Electric Circuits</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>EE 202 Electric Circuit Analysis</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>EE 203 Electromagnetism</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>EE 205 Electric Circuits Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>EE 208 Logic Design</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>EE 210 Logic Design Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>GE 210 Engineering Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>EE 300 Instruments &amp; Electrical Measurements</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>EE 301 Signals and systems Analysis</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>EE 312 Electronics - 1</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>EE 313 Electronics Laboratory - 1</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>EE 351 Principles of Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>13</td>
<td>EE 354 Microprocessors and Interface Circuits</td>
<td>3</td>
</tr>
<tr>
<td>14</td>
<td>EE 400 Graduation Project</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>
# THE OBLIGATORY COURSES

The Power Engineering Track

<table>
<thead>
<tr>
<th>Credit hours</th>
<th>Course Title</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Mechanical power engineering</td>
<td>ME 322</td>
</tr>
<tr>
<td>3</td>
<td>Electric Machines - 1</td>
<td>EE 330</td>
</tr>
<tr>
<td>3</td>
<td>Fundamentals of Power Systems</td>
<td>EE 340</td>
</tr>
<tr>
<td>3</td>
<td>Electric Machines - 2</td>
<td>EE 331</td>
</tr>
<tr>
<td>1</td>
<td>Electric Machines Laboratory</td>
<td>EE 332</td>
</tr>
<tr>
<td>3</td>
<td>Power Systems Analysis</td>
<td>EE 343</td>
</tr>
<tr>
<td>1</td>
<td>Power Systems Laboratory</td>
<td>EE 344</td>
</tr>
<tr>
<td>3</td>
<td>Power Electronics</td>
<td>EE 432</td>
</tr>
<tr>
<td>3</td>
<td>High Voltage Engineering</td>
<td>EE 446</td>
</tr>
<tr>
<td>3</td>
<td>Power System Protection</td>
<td>EE 449</td>
</tr>
</tbody>
</table>

Total: 26 credit hours
## The Electronics & communication Engineering Track

<table>
<thead>
<tr>
<th>Credit hours</th>
<th>Course Title</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Electronics - 2</td>
<td>EE 317</td>
</tr>
<tr>
<td>1</td>
<td>Electronics Laboratory 2</td>
<td>EE 319</td>
</tr>
<tr>
<td>3</td>
<td>Communications Principles</td>
<td>EE 320</td>
</tr>
<tr>
<td>2</td>
<td>Principles of Networks Engineering</td>
<td>EE 355</td>
</tr>
<tr>
<td>3</td>
<td>Digital Communications</td>
<td>EE 322</td>
</tr>
<tr>
<td>1</td>
<td>Communications Laboratory</td>
<td>EE 326</td>
</tr>
<tr>
<td>3</td>
<td>ICs Technology and Applications</td>
<td>EE 405</td>
</tr>
<tr>
<td>1</td>
<td>Integrated Circuits Laboratory</td>
<td>EE 406</td>
</tr>
<tr>
<td>3</td>
<td>Wave Propagation and Antennas</td>
<td>EE 423</td>
</tr>
<tr>
<td>3</td>
<td>Information Theory and Coding</td>
<td>EE 420</td>
</tr>
<tr>
<td>3</td>
<td>Mobile Communications</td>
<td>EE 463</td>
</tr>
</tbody>
</table>

**Total: 26 credit hours**
**THE ELECTIVE COURSES**

The Elective Courses of the Power Engineering Track

In the eighth semester a student must select at least 6 credit hours out of the following courses

<table>
<thead>
<tr>
<th>Credit hours</th>
<th>Course Title</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Electrical Standard Specifications</td>
<td>EE 401</td>
</tr>
<tr>
<td>3</td>
<td>Programmable Logic Controllers</td>
<td>EE 411</td>
</tr>
<tr>
<td>3</td>
<td>Electric Energy Utilization</td>
<td>EE 441</td>
</tr>
<tr>
<td>3</td>
<td>Control and Operation of Power Systems</td>
<td>EE 443</td>
</tr>
<tr>
<td>3</td>
<td>Planning and Design of Power Systems</td>
<td>EE 444</td>
</tr>
<tr>
<td>3</td>
<td>Industrial Power Systems Design</td>
<td>EE 445</td>
</tr>
<tr>
<td>3</td>
<td>Computer Applications in Power Systems</td>
<td>EE 447</td>
</tr>
<tr>
<td>3</td>
<td>Selected Topics in Power Systems</td>
<td>EE 448</td>
</tr>
<tr>
<td>3</td>
<td>Special Electrical Machines</td>
<td>EE 433</td>
</tr>
<tr>
<td>3</td>
<td>Selection and Installation of Motors</td>
<td>EE 434</td>
</tr>
<tr>
<td>3</td>
<td>Electric Drive Systems</td>
<td>EE 435</td>
</tr>
<tr>
<td>3</td>
<td>Advanced Topics in Power Electronics</td>
<td>EE 436</td>
</tr>
<tr>
<td>3</td>
<td>Selected Topics in Electrical Machines</td>
<td>EE 438</td>
</tr>
<tr>
<td>3</td>
<td>Applied Control</td>
<td>EE 455</td>
</tr>
<tr>
<td>3</td>
<td>Digital Control Systems</td>
<td>EE 456</td>
</tr>
</tbody>
</table>
The Elective Courses of the Electronics & communication Engineering Track

In the eighth semester a student must select at least 6 credit hours out of the following courses

<table>
<thead>
<tr>
<th>Credit hours</th>
<th>Course Title</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Industrial Electronics</td>
<td>EE 412</td>
</tr>
<tr>
<td>3</td>
<td>Power Electronics</td>
<td>EE 413</td>
</tr>
<tr>
<td>3</td>
<td>Programmable Logic Controllers</td>
<td>EE 411</td>
</tr>
<tr>
<td>3</td>
<td>Communication Electronics</td>
<td>EE 417</td>
</tr>
<tr>
<td>3</td>
<td>Analog and Digital Filters Design</td>
<td>EE 418</td>
</tr>
<tr>
<td>3</td>
<td>Selected Topics in Electronics</td>
<td>EE 419</td>
</tr>
<tr>
<td>3</td>
<td>Telephone Systems and Traffic Analysis</td>
<td>EE 421</td>
</tr>
<tr>
<td>3</td>
<td>Communication Theory</td>
<td>EE 462</td>
</tr>
<tr>
<td>3</td>
<td>Optical Communication Networks</td>
<td>EE 424</td>
</tr>
<tr>
<td>3</td>
<td>Computer Network Security</td>
<td>EE 425</td>
</tr>
<tr>
<td>3</td>
<td>Microwave Systems Design</td>
<td>EE 427</td>
</tr>
<tr>
<td>3</td>
<td>Satellite Communications</td>
<td>EE 428</td>
</tr>
<tr>
<td>3</td>
<td>Selected Topics in Communications</td>
<td>EE 429</td>
</tr>
<tr>
<td>3</td>
<td>Industrial Instrumentation</td>
<td>EE 450</td>
</tr>
<tr>
<td>3</td>
<td>Digital Control Systems</td>
<td>EE 456</td>
</tr>
<tr>
<td>3</td>
<td>Network Architecture and Protocols</td>
<td>EE 465</td>
</tr>
</tbody>
</table>
Admission to the department:
The admission to the department depends on:
- The student desire
- The Student GPA
- The capacity of the department

Serving the university and the society
1. Presentation of training courses for the engineers in the private and governmental sectors through a community service deanery in the university.
2. Contribution in the engineering problems solution which are raised by the Region Emirate
3. Engineering consultations for the private and governmental sectors.
4. Preparation of circulars and booklets which help in the solution of engineering problems
5. Holding the conferences and general seminars in the engineering fields

The Career chances
1. All engineering administrations in the governmental authorities.
2. The projects operation and maintenance administrations in the governmental authorities.
3. The ministry of water and electricity.
4. The ministry of municipal and village affairs.
5. The Saudi commission for the engineers.
6. The general institution for the waters refinement.
7. The general institution for ports.
8. The Saudi airlines.
9. The military occupations management.
10. The constructions and contracting companies.
11. The electronics and communication companies.
12. The power and electric energy companies.
14. The Ministry of agriculture and water recourses.
15. The general institution for the electricity.
16. The water and sewage authority.
17. The Saudi Arabian American Oil (Aramco) company.
18. The Saudi company for the basic industries (SABIC)
19. The unified Saudi company for electricity (SCECO).
20. All factories
THE ELECTRICAL ENGINEERING DEPARTMENT MEMBERS

Department Head, Assistant Prof. Dr. Abdulrahman F. Almarshoud

Electrical Engineering

Research Interests: 1-Electric machines 2-Power electronics 3-Wind energy
Tel: +966(6) 3800050-5100
E-mail: dr_almarshoud@qec.edu.sa

Professors:

Prof. Dr. Mohammed Abdel-samie Abdel-halim

Electrical Machines and Power Electronics

Tel: +966(6) 3800050-5104
E-mail: masamie@qec.edu.sa

Prof. Dr. Elsayed Abd-Elaliem Mohamed

Power System Analysis

Research Interests: Application of AI on power systems: control, dynamics, protection & planning.
Tel: +966(6) 3800050-5108
E-mail: elsayedamohamed@qec.edu.sa

Prof. Dr. Roshdy Abo Alazaem ElSayed

Electronics and Communications

Research Interests: Electronic Devices and Circuits, Photovoltaics, Integrated Circuits.
Tel: +966(6) 3800050-5109
E-mail: roshdy@qec.edu.sa
Prof. Dr. Mohamed Adel Abdallah
High Voltage Engineering - Power Engineering
Research Interests: Surge Over Voltage
Protection - Lightning Protection Systems- Earthing
Systems- Electrical Insulators and High voltage Testing
Tel: +966(6) 3800050-
E-mail: abdallahma@qec.edu.sa

Associate Professors:

Assoc. Prof. Dr. Ahmed Adel Abdelwahab
Digital Communication systems
Research Interests: 1. Information Theory and
Data Compression 2. Cryptography and Computer
Network Security
Tel: +966(6) 3800050-5112
E-mail: abdelwahab@qec.edu.sa

Assoc. Prof. Dr. Ramadan Ali Tasaltitin
Electronics and Communication
Research Interests: Signal Processing, Image
Recognition, Intelligent Measurement System,
Neural Network, Fuzzy Logic
Tel: +966(6) 3800050-5111
E-mail: rtasaltin@qec.edu.sa

Assoc. Prof. Dr. Ragaey Abdel-Fattah Saleh
Power system control
Research Interests:
Tel: +966(6) 3800050-5106
E-mail: ragaeys@qec.edu.sa

Assoc. Prof. Dr. Ahmed Elkheir Bensenouci
Electric Power System
Research Interests: Control of Power Systems
Application of modern techniques Control of
Electric machines
Tel: +966(6) 3800050-5101
E-mail: bensenouci@qec.edu.sa
Assoc. Prof. Dr. Tahar Tafticht
Electric Power System

**Research Interests:** Control of Power Systems
Application of modern techniques Control of Electric machines
Tel: +966(6) 3800050-5356
E-mail: ttahar@qec.edu.sa

**Assistant Professors:**
Assistant Prof. Dr. Elsaid Elaraby
Power System Planning
**Research Interests:** Ancillary Services Pricing in the Deregulated Electricity Markets. Reactive power management, planning and pricing. Application of Artificial Intelligence to power system planning and operation.
Tel: +966(6) 3800050-5107
E-mail: elaraby@qec.edu.sa

**Lecturers:**
Lec. Mohammad Munawwar Shees
Power System & Electrical Drives
**Research Interests:** Induction Motor Drives
Tel: +966(6) 3800050-EXT-5129
E-mail: munawwarshees@qec.edu.sa

Lec. Mr. Madjid TOUBAL
Electronics
**Research Interests:**
Tel: +966(6) 3800050-5118
E-mail: amtoubal@qec.edu.sa

**Engineers**
Eng. Ibrahim Ahmed Abdelkader
Web Developing And Computer maintenance
**Research Interests:**
Tel: +966(6) 3800050-5303
E-mail: engibrahim4u@qec.edu.sa
Electrical Engineering Department Laboratories:

1. **Circuit and Electrical Measurement lab.**
   - EE 202: Electric circuit analysis
   - EE 205: Electric Circuits Laboratory
   - EE 300: Instruments & Electrical Measurements

   Equipment available includes: Cathode Ray Oscilloscope, Function Generator, Variable DC supply, Digital Multimeter, Analog Multimeter, LCR meter, Resistor Box, Capacitor Box, 3 phase extra low voltage transformer

   This lab is the first the student is faced to at the beginning of his study in the Department of Electrical Engineering. In this lab the student is requested to make some simple circuits and asked to test them and make some measurements. The student is also trained to use basic instrumentations as Galvanometer, Ammeter and Voltmeter and the measure of capacity.

2. **Logic circuit Design lab.**
   - EE208: Logic Design
   - EE210: Logic Design Laboratory

   Equipment available includes: Digital Board XLA5, Logic Probe, Logic Pulser, IC trainer Kit (WUEKRO-w5101-3D), Field service toolbox, TTL IC Tester, Computers, ICs

   In this lab students learn how to install and test simple logical circuits, after that pass to more complicated ones. He also learn how to design logical circuits by using the computer assistance and Xilinx software. Then apply them in the practice using the programmable integrated circuits FPAG

3. **Electronics lab.**
   - EE 312 Electronics - 1
   - EE313 Electronics Laboratory - 1
   - EE317 Electronics - 2
   - EE319 Electronics Laboratory - 2
   - EE405 ICs Technology and Applications
   - EE406 Integrated Circuits Laboratory
Equipment available includes: Oscilloscope 2ch 50 Hz, Oscilloscope 2ch 100 Hz, Oscilloscope 4ch 50 Hz, Oscilloscope 2ch 200 Hz, Function Generator Max Freq 15Mhz, Function Generator Max Freq 30Mhz, Dual DC Power Supply, Digital Multimeter, LCR Meter, Decade resistance box, Decade inductor box, Decade capacitance box, Bread Board.

This lab is equipped with all the necessary electronic devices and tools where the student can install and test electronic circuits associated with the theoretical electronics course. The students can work on many devices that would enable them to perform experiments. Laboratory also used to assist students in completing parts of laboratory projects graduation.

4. Electric power system lab.
   EE340 Fundamentals of Power Systems
   EE343 Power Systems Analysis
   EE344 Power Systems Laboratory
   EE449 Power System Protection


Laboratory simulation systems is also available in the college, it allows the simulation of generating stations and transmission lines and prevention systems. The generation, transfer and distribution of electrical energy can be studied in this lab, as well as to study how to operate, control and protect the power systems.
5. **Electric machines lab.**
   EE330 Electric Machines - 1
   EE332 Electric Machines Laboratory
   EE433 Special Electrical Machines


   This laboratory includes many different electric machines as generators and engines operating on DC and others operating on AC as well as electrical transformers and various instrumentations. These devices are used in teaching laboratory courses for Electrical Engineering Department students and is also used in various research for graduate students, such as masters and doctorate.

6. **Automatic control lab.**
   EE351 Principles of Control Systems
   EE455 Applied Control
   EE456 Digital Control Systems

   Equipment available includes: Universal control unit COM3 Lab, Continuous and discontinuous control Multimeter, Oscilloscope, Power supply, Principal control card CONTROL 1, Advanced control card CONTROL 2.

   We offer in this lab the application of undergraduate courses in Basic and Advanced Automatic Control, Nonlinear Control, Hybrid and Embedded Systems, Modeling, Introduction to MATLAB and Project Course in Control.

7. **Microprocessor and logic controllers lab.**
   EE354, Microprocessors and Interface Circuits
   EE411 Programmable Logic Controllers

   Equipment available includes: Microprocessor Training System, Operating Program (Assembler), Microcontroller Training System, Switch and Lamp unit. Application board for FLT 32, 4 mm I/O module, BTEC level course.
This lab gives students the practical exposure to Assembly language programming of microprocessors, computer architecture of 8088/8086 microprocessor family, assembly program development using debugger software, use of flow charts and other aids in software development, memory and I/O interfacing circuitry for microprocessors, interrupts, serial and parallel data communications. The lab also hosts hardware projects in more advanced areas.

8. Drives and Power electronics lab.
EE432, Power Electronics
EE435 Electric Drive Systems

Equipment available includes: Static converters valves, Line commutated static valves, converters and choppers, switched mode, power supply, Inverters circuits, Converter fed DC machine, AC drive.


9. Communication lab.
EE 320 Communications Principles
EE322 Digital Communications
EE326 Communications Laboritory

Equipment available includes: Analog Communications: Frequency Synchronizer, CF transmitter 20 kHz, CF Receiver 20 kHz, TF transmitter 16 kHz, TF Receiver 16 kHz, FM/PM Modulator, FM/PM Demodulator, Frequency Multiplier, DC Power supply ±15 V. Digital Oscilloscope, Analog Multimeter, Set of 10 Bridging plugs. Digital Communications: PAM Modulator, PAM Demodulator, PCM Modulator, PCM Demodulator, PTM Modulator, PTM Demodulator, Delta Modulator, Delta Demodulator ASK/FSK/PSK Modulator, ASK/FSK Demodulator, FSK Demodulator. Fiber Optic Communications: Noise source, Fiber Optic Transmitter, Fiber Optic Receiver, Fiber optic microscope.
In this Laboratory the students identify the modern communication systems used in working life and proceed on practical tests. The lab contains also special devices measuring the properties of microwave antennas and the use of instruments to measure their properties. Functional blocks of analog communication systems. Design of mixers, converters, RF and IF amplifiers, AM detectors, and FM discriminators. Functional blocks of monochrome TV receivers.


10. Wireless Communications lab.
    EE424 Optical Communication Networks
    EE427 Microwave Engineering
    EE463 Mobile Communications

Equipment available includes: Antenna Measuring station, Rotating antenna platform, Gunn power supply with SWR Meter, Gunn oscillator, Isolator, PIN Modulator, Large horn antenna, Support for waveguide components, Stand base MF, Set of microwave absorbers, Dipole antenna, kit Yagi-Uda antennas, kit Physics microwave accessories, waveguide propagation accessories, Telephone switching module, Telephone set analog, RJ12, USB PCI Interface card.

Characteristic s of HF transmission lines. Lossless and lossy transmission lines. Microstrip transmission lines. Smith chart. Impedance matching techniques. Theory of waveguides (rectangular and circular). Microwave components and cavity resonators. Introduction to radio wave propagation.

11. Computer labs
    GE104.: Basics of Engineering Drawing
    GE 208.: Programming in C Language

Equipment available includes: Network transformer (24output), set Cables cat 6, Printer with network card, PC for students P4, PC for Instructor P4, PC distributing files P4.

In this lab the students apply simulations methods of many theoretical ideas faced in the courses. Also it permits them to try theoretical circuits and enhance their knowledge in programming.
### THE ELECTRICAL ENGINEERING PROGRAMS

#### 1- Electrical Power engineering Track

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 101</td>
<td>Introduction to Islamic culture</td>
<td>2</td>
</tr>
<tr>
<td>ARB 101</td>
<td>Linguistic skills</td>
<td>2</td>
</tr>
<tr>
<td>Phys 104</td>
<td>General Physics</td>
<td>4</td>
</tr>
<tr>
<td>GE 104</td>
<td>Basics of Engineering Drawing</td>
<td>3</td>
</tr>
<tr>
<td>Math 105</td>
<td>Differential Calculus</td>
<td>3</td>
</tr>
<tr>
<td>Chem 111</td>
<td>General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Total credit-hours</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 102</td>
<td>Islam and Community Building</td>
<td>2</td>
</tr>
<tr>
<td>GE 105</td>
<td>Basics of Engineering Technology</td>
<td>2</td>
</tr>
<tr>
<td>Math 106</td>
<td>Integral Calculus</td>
<td>3</td>
</tr>
<tr>
<td>EE 201</td>
<td>Fundamentals of Electric Circuits</td>
<td>3</td>
</tr>
<tr>
<td>CSC 209</td>
<td>Computer Programming</td>
<td>3</td>
</tr>
<tr>
<td>GE 210</td>
<td>Engineering Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>Math 107</td>
<td>Linear Algebra &amp; Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total credit-hours</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 103</td>
<td>Economic System in Islam</td>
<td>2</td>
</tr>
<tr>
<td>EE 202</td>
<td>Electric Circuit Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EE 203</td>
<td>Electromagnetism</td>
<td>3</td>
</tr>
<tr>
<td>Math 203</td>
<td>Differential and Integral Calculus</td>
<td>3</td>
</tr>
<tr>
<td>EE 205</td>
<td>Electric Circuits Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>EE 208</td>
<td>Logic Design</td>
<td>3</td>
</tr>
<tr>
<td>EE 210</td>
<td>Logic Design Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>GE 211</td>
<td>Introduction to Engineering Design-I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total credit-hours</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>
### The 4th semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Type</th>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 208</td>
<td>Differential equations</td>
<td>3</td>
<td></td>
<td>Math 203</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE 213</td>
<td>Introduction to Engineering Design-2</td>
<td>2</td>
<td></td>
<td>GE 211</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math xx1</td>
<td>Math Elective I</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 300</td>
<td>Instruments &amp; Electrical Measurements</td>
<td>3</td>
<td></td>
<td>EE 205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 301</td>
<td>Signals and systems Analysis</td>
<td>3</td>
<td></td>
<td>EE 202</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 312</td>
<td>Electronics – 1</td>
<td>3</td>
<td></td>
<td>EE 202</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 313</td>
<td>Electronics Laboratory – 1</td>
<td>1</td>
<td></td>
<td></td>
<td>EE 312</td>
<td></td>
</tr>
</tbody>
</table>

Total credit-hours 18

### The 5th semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Type</th>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARB 103</td>
<td>Arabic Writing</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME 322</td>
<td>Mechanical power engineering</td>
<td>3</td>
<td></td>
<td>Phys 104</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 330</td>
<td>Electric Machines - 1</td>
<td>3</td>
<td></td>
<td>EE 202,203</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 340</td>
<td>Fundamentals of Power Systems</td>
<td>3</td>
<td></td>
<td>EE 202,203</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math +++</td>
<td>Elective Mathematics - 2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 354</td>
<td>Microprocessors and Interface Circuits</td>
<td>3</td>
<td></td>
<td>EE 208</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+++</td>
<td>Free Course</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total credit-hours 19

### The 6th semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Type</th>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 104</td>
<td>Political System in Islam</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 331</td>
<td>Electric Machines – 2</td>
<td>3</td>
<td></td>
<td>EE 330</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 332</td>
<td>Electric Machines Laboratory</td>
<td>1</td>
<td></td>
<td>EE 331</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 343</td>
<td>Power Systems Analysis</td>
<td>3</td>
<td></td>
<td>EE 340</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 344</td>
<td>Power Systems Laboratory</td>
<td>1</td>
<td></td>
<td>EE 343</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE 401</td>
<td>Engineering Economy</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 432</td>
<td>Power Electronics</td>
<td>3</td>
<td></td>
<td>EE 312</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE 351</td>
<td>Principles of Control Systems</td>
<td>3</td>
<td></td>
<td>EE 301</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total credit-hours 19
### The 7th semester

| Course Code | Course Title                  | Credits
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GE 405</td>
<td>Cooperative Training</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td><strong>Total credit-hours</strong></td>
<td>9</td>
</tr>
</tbody>
</table>

### The 8th semester

| Course Code | Course Title                              | Credits
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 446</td>
<td>High Voltage Engineering</td>
<td>3 3 - 1</td>
</tr>
<tr>
<td>EE 482</td>
<td>Design of electrical Protection System</td>
<td>3 3 - 1</td>
</tr>
<tr>
<td>EE 4xx</td>
<td>Elective Course – 1</td>
<td>3 - - -</td>
</tr>
<tr>
<td>EE 4xx</td>
<td>Elective Course – 2</td>
<td>3 - - -</td>
</tr>
<tr>
<td>+++</td>
<td>Free Course</td>
<td>3 - - -</td>
</tr>
<tr>
<td>EE 400</td>
<td>Senior Design Project</td>
<td>3 - - -</td>
</tr>
<tr>
<td></td>
<td><strong>Total credit-hours</strong></td>
<td>18</td>
</tr>
</tbody>
</table>

### The Elective Courses of the Power Engineering Track

In the eighth semester a student must select at least 6 credit hours out of the following courses:

<table>
<thead>
<tr>
<th>Co-Req</th>
<th>Pre-Req</th>
<th>TU</th>
<th>LB</th>
<th>LT</th>
<th>Credits</th>
<th>Course Title</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>EE 343, 331</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Electrical Standard Specifications</td>
<td>EE 401</td>
</tr>
<tr>
<td>-</td>
<td>EE 354</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Programmable Logic Controllers</td>
<td>EE 411</td>
</tr>
<tr>
<td>-</td>
<td>EE 340</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Electric Energy Utilization</td>
<td>EE 441</td>
</tr>
<tr>
<td>-</td>
<td>EE 343</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Control and Operation of Power Systems</td>
<td>EE 443</td>
</tr>
<tr>
<td>-</td>
<td>EE 343</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Planning and Design of Power Systems</td>
<td>EE 444</td>
</tr>
<tr>
<td>-</td>
<td>EE 340</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Industrial Power Systems Design</td>
<td>EE 445</td>
</tr>
<tr>
<td>-</td>
<td>EE 343</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Computer Applications in Power Systems</td>
<td>EE 447</td>
</tr>
<tr>
<td>-</td>
<td>EE 343</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Selected Topics in Power Systems</td>
<td>EE 448</td>
</tr>
<tr>
<td>-</td>
<td>EE 331</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Special Electrical</td>
<td>EE 433</td>
</tr>
</tbody>
</table>
## College of Engineering

### Machines

<table>
<thead>
<tr>
<th></th>
<th>EE 331</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Selection and Installation of Motors</td>
<td>EE 434</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE 432, 331</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>Electric Drive Systems</td>
<td>EE 435</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE 432</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>Advanced Topics in Power Electronics</td>
<td>EE 436</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE 331</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>Selected Topics in Electrical Machines</td>
<td>EE 438</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE 351</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>Applied Control</td>
<td>EE 455</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE 351</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>Digital Control Systems</td>
<td>EE 456</td>
<td></td>
</tr>
</tbody>
</table>

### 2- Electronics and Communication Track

#### The 1st semester

<table>
<thead>
<tr>
<th></th>
<th>IS 101 Introduction to Islamic culture</th>
<th>2</th>
<th>2</th>
<th>-</th>
<th>-</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ARB 101 Linguistic skills</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Phys 104 General Physics</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>GE 104 Basics of Engineering Drawing</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Math 105 Differential Calculus</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Chem 111 General Chemistry</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>Total credit-hours</strong></td>
<td><strong>18</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### The 2nd semester

<table>
<thead>
<tr>
<th></th>
<th>IS 102 Islam and Community Building</th>
<th>2</th>
<th>2</th>
<th>-</th>
<th>-</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GE 105 Basics of Engineering Technology</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>GE 104</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Math 106 Integral Calculus</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>Math 105</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>EE 201 Fundamentals of Electric Circuits</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>Phys 104</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>CSC 209 Computer Programming</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>GE 210 Engineering Mechanics</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>Math 106</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Math 107 Linear Algebra &amp; Analytic Geometry</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>Total credit-hours</strong></td>
<td><strong>19</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### The 3rd semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 103</td>
<td>Economic System in Islam</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>EE 202</td>
<td>Electric Circuit Analysis</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 203</td>
<td>Electromagnetism</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Math 203</td>
<td>Differential and Integral Calculus</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 205</td>
<td>Electric Circuits Laboratory</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>EE 208</td>
<td>Logic Design</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 210</td>
<td>Logic Design Laboratory</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>GE 211</td>
<td>Introduction to Engineering Design-I</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Total credit-hours 19

### The 4th semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 208</td>
<td>Differential equations</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE 213</td>
<td>Introduction to Engineering Design-II</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Math xx1</td>
<td>Math Elective 1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 300</td>
<td>Instruments &amp; Electrical Measurements</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 301</td>
<td>Signals and systems Analysis</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 312</td>
<td>Electronics – 1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 313</td>
<td>Electronics Laboratory – 1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Total credit-hours 18

### The 5th semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARB 103</td>
<td>Arabic Writing</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>EE 317</td>
<td>Electronics – 2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 319</td>
<td>Electronics Laboratory – 2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>EE 320</td>
<td>Communications Principles</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CEN 355</td>
<td>Principles of Networks Engineering</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Math xx2</td>
<td>Math Elective 2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 354</td>
<td>Microprocessors and Interface Circuits</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>++++</td>
<td>Free Course</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Total credit-hours 19
## The 6th semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Hours</th>
<th>Elective</th>
<th>Lab</th>
<th>Total Credit-Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 104</td>
<td>Political System in Islam</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE 401</td>
<td>Engineering Economy</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>EE 322</td>
<td>Digital Communications</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>EE 320</td>
</tr>
<tr>
<td>EE 326</td>
<td>Communications Laboratory</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td>EE 320 EE 322</td>
</tr>
<tr>
<td>EE 351</td>
<td>Principles of Control Systems</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>EE 301</td>
</tr>
<tr>
<td>EE 405</td>
<td>ICs Technology and Applications</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>EE 317</td>
</tr>
<tr>
<td>EE 406</td>
<td>Integrated Circuits Laboratory</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td>EE 405</td>
</tr>
<tr>
<td>EE 423</td>
<td>Wave Propagation and Antennas</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>EE 203</td>
</tr>
</tbody>
</table>

Total credit-hours 19

## The 7th semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
<th>Total Credit-Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE 405</td>
<td>Cooperative Training</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

Total credit-hours 9

## The 8th semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Hours</th>
<th>Elective</th>
<th>Lab</th>
<th>Total Credit-Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 420</td>
<td>Information Theory and Coding</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>EE 320</td>
</tr>
<tr>
<td>EE 463</td>
<td>Mobile Communications</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>EE 320</td>
</tr>
<tr>
<td>EE 4xx</td>
<td>Elective Course – 1</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>EE 4xx</td>
<td>Elective Course – 2</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>+++</td>
<td>Free Course</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>EE 400</td>
<td>Senior Design project</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td></td>
<td>GE 405</td>
</tr>
</tbody>
</table>

Total credit-hours 18
The Elective Courses of the Electronics and Communication Track
In the eighth semester a student must select at least 6 credit hours out of the following courses

<table>
<thead>
<tr>
<th>Co-Req</th>
<th>Pre-Req</th>
<th>TU</th>
<th>LB</th>
<th>LT</th>
<th>Credit hours</th>
<th>Course Title</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EE 317</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Industrial Electronics</td>
<td>EE 412</td>
</tr>
<tr>
<td></td>
<td>EE 312</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Power Electronics</td>
<td>EE 413</td>
</tr>
<tr>
<td></td>
<td>EE 353</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Programmable Logic Controllers</td>
<td>EE 411</td>
</tr>
<tr>
<td>EE 322</td>
<td>EE 317, 320</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Communication Electronics</td>
<td>EE 417</td>
</tr>
<tr>
<td></td>
<td>EE 317</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Analog and Digital Filters Design</td>
<td>EE 418</td>
</tr>
<tr>
<td></td>
<td>EE 317</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Selected Topics in Electronics</td>
<td>EE 419</td>
</tr>
<tr>
<td>EE 322</td>
<td>EE 320</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Telephone Systems and Traffic Analysis</td>
<td>EE 421</td>
</tr>
<tr>
<td>EE 322</td>
<td>EE 320</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Communication Theory</td>
<td>EE 462</td>
</tr>
<tr>
<td></td>
<td>EE 317, 320</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Optical Communication Networks</td>
<td>EE 424</td>
</tr>
<tr>
<td></td>
<td>EE 355,320</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Computer Network Security</td>
<td>EE 425</td>
</tr>
<tr>
<td>EE 322</td>
<td>EE 320</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Microwave System design</td>
<td>EE 427</td>
</tr>
<tr>
<td>EE 322</td>
<td>EE 320</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Satellite Communications</td>
<td>EE 428</td>
</tr>
<tr>
<td></td>
<td>EE 320</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Selected Topics in Communications</td>
<td>EE 429</td>
</tr>
<tr>
<td></td>
<td>EE 208,317,351</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Industrial Instrumentation</td>
<td>EE 450</td>
</tr>
<tr>
<td></td>
<td>EE 351</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Digital Control Systems</td>
<td>EE 456</td>
</tr>
<tr>
<td></td>
<td>EE 355, 320</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>Network Architecture and Protocols</td>
<td>EE 465</td>
</tr>
</tbody>
</table>
THE ELECTRICAL ENGINEERING COURSES

THE FUNDAMENTAL COURSES

GE210: Engineering Mechanics 3 (3, 1, 0)
Force and moment for planer systems; Basic equilibrium conditions Centroids; friction, area and mass moments of inertia. Kinematics of a particle: rectilinear and curvilinear motion. Kinetics of particles: Newton's law, work and energy; kinematics of rigid body in plane motion. Relative velocity and acceleration; Kinetics of a rigid body in plane motion: translation, fixed axis rotation, general motion, work and energy.

Co-requisite: Math 106

EE 201 - Fundamentals of Electric Circuits: 3 (3, 0, 1)
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 DC circuit analysis: Nodal and mesh analysis; Sinusoidal sources and the concept of phasor in circuit analysis Techniques of AC circuit analysis: Nodal and mesh analysis

Pre-requisite: Phys 104

EE 202 - Electric Circuit Analysis 3 (3, 0, 1)
Introduction to concept of active, reactive, complex power and power factor. Three phase circuits; Introduction to Op-Amp: ideal characteristics with simple applications; Frequency response of RLC and resonance; Natural and step response of first and second order circuits; Laplace transform in circuit analysis; Introduction to frequency selective circuits: passive filters, Bode plots; Two-Port networks; Mutual inductance and transformers

Pre-requisite: EE 201

EE 203 - Electromagnetism 3 (3, 0, 1)
Review to vector calculus; Electrostatic fields; Gauss's law and divergence; Electric potential; Dielectrics and capacitance; Poisson's and Laplace's equations; Charge images; Current density and conductors; Magnetostatic fields; Biot–Savart and Ampere's laws; Curl and Stoke's theorem; Magnetic materials and circuits; Self and mutual inductances; Energy in static Fields, Introduction to electromagnetic waves.

Pre-requisite: Phys 104
EE 205 - Electric Circuits Laboratory 1 (0,2,0)
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; Resonance in series and parallel circuit; Maximum power transfer theorem and power factor improvement in AC circuits; Transients in DC circuits; Magnetically-coupled circuits; Three phase circuits

Co-requisite: EE 202

EE 208 - Logic Design 3 (3, 0, 1)
Introduction to Numbering Systems, including: Binary system, hexadecimal system, Binary codes (Gray and ASCII codes), Logic gates and logic functions, Boolean Algebra, De-Morgan laws, Representation of negative and fractional numbers in binary systems. Combinational Logic Circuits, including: Canonical forms, Simplification using logic algebra and Karnaugh maps (K-maps), Arithmetic logic Units, Half and full Adders, Subtractors, and multipliers. Multiplexers and Demultiplexers, Encoders and decoders, Comparators and Parity generators. Programmable Logic Devices (PLD’s) and VHDL, including PAL’ PLA’s, GAL’s, CPLD’s and FPGA’s, Fundamentals of VHDL. Sequential Logic Devices, including: State machines, Methods of representation, state transition diagrams and tables. Flip-flops (S-R, D, J-K, T, Master-Slave), Gated and clocked flip flops, edge-triggered flip flops. Registers, their types, their operation and applications. Counters, their types, their operation and applications. Introduction to Memory Devices, SRAM and DRAM cells, their operation and organization. Flash memory and its architecture and operation.

EE 210- Logic Design Laboratory 1 (0,2,0)
Familiarization with logic circuits laboratory; Introduction to logic gates; Implementation of Boolean functions using AND and OR gates; NAND and NOR implementation; XOR and address; Design of combinational circuits; Flip-flops; Design of sequential circuits; Sequential PLA’s.

Co-requisite: EE 208

EE 300 - Instruments & Electrical Measurements 3 (2, 2, 0)
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 fiber sensors; Digital measurements: Data conversion principles; Digital voltmeter.

Pre-requisite: EE 205

EE 301 - Signals and systems Analysis 3 (3, 0, 1)

Pre-requisite: EE 202

EE 312 - Electronics - 1 3 (3, 0, 1)
Introduction to Semiconductors, including: Crystal lattice, bonds and energy bands in solids. P-N Junction including: Junction formation, I-V characteristics, forward and reverse bias, breakdown voltage. Applications of P-N Junction including Rectification, Zener diode, solar cells and light emitting diode (LED). Bipolar Junction Transistor (BJT), including: BJT types and operation, and its currents and current amplification factor. BJT modes of operation and biasing configurations. BJT current equations and Ebers Moll model. Operating point and bias stability. BJT small signal models and BJT operation as an amplifier. Metal-Oxide-Semiconductor Field Effect Transistor (MOSFET), including: MOSFET types and theory of operation. Channel formation in Enhancement-mode MOSFET and its I-V characteristics in linear and saturation modes. MOSFET biasing configurations. MOSFET small signal models and MOSFET operation as an amplifier.

Pre-requisite: EE 202

EE 313 - Electronics Laboratory - 1 1 (0, 2, 0)

Co-requisite: EE 312
EE 351 - Principles of Control Systems 3 (3, 0, 1)
Review of mathematical background (complex variables, Laplace, Diff. Equations);
System representation (block diagram, transfer functions, signal flow graph)
Modeling of electric and mechanical systems; State variable analysis; Stability; Time
domain analysis; Root locus; Frequency domain analysis; Introduction to PID control
Pre-requisite: EE 301

EE 354 - Microprocessors and Interface Circuits 3 (2, 2, 0)
Introduction to Microprocessor Systems, including: microcomputer architecture,
data, address and control busses, memory access and interrupts. Architecture of 80x86
Microprocessors, including 16-bit, 32 bit microprocessors, Pentium and Core2
microprocessors. Memory Organization & Segmentation, including memory
segmentation and address generation (20-bit and 32-bit addresses). Instruction Set of
80x86 Microprocessors, including addressing modes, data-transfer instructions, logic
and mathematic instructions, flow control, subroutines and interrupts, program
control instructions, instruction decoding. Assembly Language and Programming of
Intel microprocessors, including, DEBUG and Macro-assembler, Procedures and
subroutines. Memory Interface Circuits. Interface Circuits for Input/Output Devices,
programmable I/O (8255 PIO), examples, handshaking and microprocessor
communications
Pre-requisite: EE 208

EE 400 – Senior design Project 3(3, 0, 0)
The student is assigned, among a team of students and one or more faculty
professors, 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 graduation project shall continue 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.
Pre-requisite: GE 405
Electrical Power Engineering Track Courses

EE 330 - Electric Machines - 1  
3 (3, 0, 1)
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 alternators, synchronous motors, steady-state operation, motor starting), synchronous machine dynamics: the swing equation, steady state and transient stability
Pre-requisite: EE 202 & 203

EE 331 - Electric Machines - 2  
3 (3, 0, 1)
Three-phase induction machines (construction, operation, equivalent circuit, performance characteristics, starting of induction motors, speed control), single-phase induction motors, fundamentals of d.c machines, DC machines (components, classification, performance, motor characteristics, starting of d.c motors, speed control of d.c motors).
Pre-requisite: EE 330

EE 332 - Electric Machines Laboratory  
1 (0, 2, 0)
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; Equivalent circuit of synchronous machine: Performance of synchronous motors; Terminal characteristics of dc machines

co-requisite: EE 331

EE 340 - Fundamentals of Power Systems  
3 (3, 0, 1)
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.
Pre-requisite: EE 202 & 203
EE 343 - Power Systems Analysis 3 (3, 0, 1)
Pre-requisite: EE 340

EE 344 - Power Systems Laboratory 1 (0, 2, 0)
Transmission line characteristics; Reactive power compensation; Symmetrical and unsymmetrical fault analysis; Load-flow simulation; Transient stability simulation; Active and reactive power generator control; Characteristics of isolated and interconnected systems; Characteristics and coordination of protective relays
co-requisite: EE 343

EE 432 - Power Electronics 3 (3, 1, 1)
Power semiconductor devices: terminal characteristics; Power converters: ac-ac converters, rectifiers, inverters, dc-dc converters and resonant converters;
Applications in power systems
Pre-requisite: EE312

EE 446 - High Voltage Engineering 3 (3, 0, 1)
Pre-requisite: EE340

EE 452 – Design of Electrical Protection Systems 3 (3, 0, 1)
Protection system components: Objectives, system components, requirements, protection zones, main and backup protection; Protection Instrument transformers (CT, VT & CVT): Types, construction, equivalent circuit, ratio error, burden, accuracy classes; Protective relays: Types (electromechanical, solid state, digital, numerical), function classifications, merits & demerits, IED; Circuit Breakers: Introduction, types (air, vacuum, oil, SF6), principle of operation, applications,
merits and demerits, during fault behavior, rapture capacity; **Transmission Line Protection and Design:** Overcurrent protection schemes, distance protection schemes, power line carrier protection (PLC), case study (design of a TL protection scheme); **Generator Protection and Design:** Stator protection schemes, rotor protection schemes, case study (design of a generator protection scheme); **Transformer Protection and Design:** Overcurrent protection, restricted earth fault, differential, Buchholz, case study (design of a transformer protection scheme).

**Pre-requisite:** EE340

### Electrical Power Engineering Track Elective Courses

**EE 401 - Electrical Standard Specifications**  
3 (3, 0, 1)  
Introduction; harmonized standards; CE marking and conformity assessment of electric products; underwriter laboratories (UL) mark: mission of UL, types of UL marks; IEC standard marking (nameplate data & terminal marking) of electric products, motor marking, contactor marking, fuse marking, circuit breaker marking; safety of low voltage equipment (LVD), safety classification, IP code, electrical hazards; IEC standard sites and electric operating conditions for motors, HVF, imbalance factor, motor derating, standard motor testing, electromagnetic compatibility (EMC): emission; immunity, harmonic currents, third harmonic emission limits, flicker; standard classification of hazardous areas; types and standard marking of motors and electric equipment suitable for use in potentially explosive atmospheres.

**Pre-requisite:** EE 343, 331

**EE 411 - Programmable Logic Controllers**  
3 (3, 0, 1)  
Introduction (What’s PLC?), PLC Architecture; including PLC building blocks (I/O ports, internal relays, timers, counters, serial ports, high-speed counters), PLC operation, scan cycle, PLC response time, case study: Siemens S7 PLC’s, PLC’s Memory Organization; including: input memory, output memory, S-memory, variable memory, config memory, external EEPROM, PLC Programming; including: PLC programming Languages (LAD, functional and STL), LAD and STL basic instructions, programming devices and compilers (STEP-7), program editing, designing and editing a PLC project, compiling, downloading, testing (simulation) and running, PLC Wiring; including: DC inputs, AC inputs, transistor and relay outputs, analog and digital Inputs, analog and digital outputs, PLC Communications; including: PLC communication busses, Fieldbus, Profibus, industrial Ethernet, Examples; including miscellaneous industrial applications.

**Pre-requisite:** EE354
EE 433 - Special Electrical Machines 3 (3, 0, 1)
reluctance motor, stepper motor, eddy current motors, hysteresis motors, ac commutator motors, universal motor, two phase servo motor, linear induction motor, linear d.c motor.
Pre-requisite: EE331

EE 434 - Selection and Installation of Motors 3 (3, 0, 1)
Pre-requisite: EE331

EE 435 - Electric Drive Systems 3 (3, 0, 1)
Pre-requisite: EE331 & 432

EE 436 - Advanced Topics in Power Electronics 3 (3, 0, 1)
Advanced rectifier converters (star-double star with inter-phase reactor, 12 pulse rectifiers), rectifier converter operation (overlap, regulation, and power factor), frequency converters, analysis of three-phase ac voltage controllers, thyristor triggering circuits, thyristor commutation techniques, applications of power electronics.
Pre-requisite: EE432

EE 438 - Selected Topics in Electrical Machines 3 (3, 0, 1)
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
Pre-requisite: EE331
EE 441 - Electric Energy Utilization 3 (3, 0, 1)
Pre-requisite: EE340

EE 443 - Control and Operation of Power Systems 3 (3, 0, 1)
Concepts of power system operation; Network topology and incidence matrices; Formation of bus impedance matrix; Unit commitment; Optimal power flow; Automatic generation control (AGC); Energy management systems (EMS) and control centers operation; State estimation (SE); Dynamic security assessment (DSA).
Pre-requisite: EE343

EE 444 - Planning and Design of Power Systems 3 (3, 0, 1)
Introduction to Power System Planning: Definitions, objectives, procedures, requirements; Load Characteristics: Definitions, types, load curves; Load Forecasting: Definitions, objectives, types, methodologies (time series); Introduction to Power System Reliability: Introduction, terms and definitions, reliability indices, reliability evaluation, service interruption, failure mode, outages; System Cost Assessment: Present worth value, investment and fixed costs, operating costs, case study (generation cost assessment); Transmission Line Planning and Design: Introduction, Kelvins law, Tollgem Theory, case study (design of a TL planning); Distribution System Planning and Design: Introduction, distribution system components, distribution substation site location, substation rating, substation service area with many primary feeders, percentage voltage drop, design of primary system, design of secondary system, case study (design of distribution system).
Pre-requisite: EE343
EE 445 - Industrial Power Systems Design 3 (3, 0, 1)
Construction of site plans, site plan interpreting, unit substation, feeders and bus systems, Panel boards, using wire tables for determining conductor sizes, motor installation calculations, system protection and include: circuit breakers, fuses, over current protection devices, short circuit protection devices and their time- current characteristic charts.), lighting protection, installation in hazardous locations
Pre-requisite: EE340

EE 447 - Computer Applications in Power Systems 3 (3, 0, 1)
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.
Pre-requisite: EE343

EE 448 - Selected Topics in Power Systems 3 (3, 0, 1)
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
Pre-requisite: EE343

EE 455 - Applied Control 3 (3, 0, 1)
Pre-requisite: EE 351

EE 456 - Digital Control Systems 3 (3, 0, 1)
Pre-requisite: EE 351
Course Offered by Mechanical Engineering Department

**ME 322 - Mechanical power engineering**  \(3 \ (3, \ 0, \ 1)\)

**Pre-requisite: Phys 104**

**Electronics and Communication Engineering Track Courses**

**EE 317 - Electronics - 2**  \(3 \ (3, \ 0, \ 1)\)

**Pre-requisite: EE 312**

**EE 319 - Electronics Laboratory - 2**  \(1 \ (0, \ 2, \ 0)\)

**co-requisite: EE 317**

**EE 320 - Communications Principles**  \(3 \ (3, \ 0, \ 1)\)
Basic Elements of a Communication System, including: types of communication systems and their building blocks, receiver, transmitter and channel. Wireless communication systems, Superheterodyne transceivers (TRX). Basic Modulation Techniques, including: Amplitude modulation (AM), Frequency modulation (FM), and phase modulation (PM). Pulse modulation Techniques, including: PAM, PWM and PPM, Pulse Code Modulation (PCM), Differential PCM (DPCM), Delta Modulation (DM). Signal Multiplexing, including: time division multiplexing (TDM), and frequency-division multiplexing (FDM). Introduction to Digital Modulation (Shift Keying), including amplitude-shift keying (ASK), frequency-shift keying (FSK) and phase-shift keying (PSK).

**Pre-requisite: EE 301**
EE 322 - Digital Communications  3 (3, 0, 1)
Introduction to Digital Communications, including: random variables and probability distributions, signal-to-noise (S/N) ratio, probability of error. Coherent Digital Modulation Techniques, including amplitude-shift keying (ASK), frequency-shift keying (FSK) and phase-shift keying (PSK), Minimum-shift keying (MSK), Gaussian MSK (GMSK). Orthogonal Digital Modulation Techniques. Orthogonal FDM (OFDM). Comparison between Digital Modulation Techniques, including bandwidth, power spectrum and probability of error. Introduction to Information Theory, including: Channel Capacity, source coding, channel coding, inter-symbol interference, error correcting coding techniques.
Pre-requisite: EE 320

EE 326 - Communications Laboratory  1 (0, 2, 0)
Basic Modulation & modulation Techniques, including: Amplitude modulation (AM), Frequency modulation (FM). Signal Multiplexing, including: time division multiplexing (TDM), and frequency-division multiplexing (FDM). Superheterodyne radio receiver (RX), measurement of sensitivity, selectivity and fidelity, Pulse modulation Techniques, including: PAM, PWM and PPM, Pulse Code Modulation (PCM), Differential PCM (DPCM), Delta Modulation (DM). Digital Modulation (Shift Keying), including amplitude-shift keying (ASK), frequency-shift keying (FSK) and phase-shift keying (PSK: BPSK, QPSK, M-ary PSK, GMSK). Coding, including: Source Coding, Channel Coding and Error Correcting Codes.
Pre-requisite: EE 320  Co-requisite: EE 322

CEN 355 - Principles of Networks Engineering  2 (2, 0, 1)

EE 405 - ICs Technology and Applications  3 (3, 0, 1)
Introduction to IC Technology, including: crystalline silicon preparation, oxidation, impurity diffusion, ion implantation, die separation, pad contacts, Heat sinking, BJT and CMOS technology. Linear IC’s and their Applications, including: operational amplifiers (OpAmps), the 741 IC, and operational trans-conductance amplifiers (OTA). Digital IC’s and their Applications, including: Combinational logic MSI circuits, sequential logic IC’s, VLSI circuits and memory IC’s. Mixed IC’s and their Applications, including: analog-to-digital converters (ADC) and digital-to-analog converters (DAC), Timers and multi-vibrator IC’s (555/556/557) and their applications in communications. Switched-mode power supplies (SMPS) IC’s, PWM and DC-DC converter IC’s.
Pre-requisite: EE 317
EE 406 - Integrated Circuits Laboratory 1 (0, 2, 0)
Co-requisite: EE 405

EE 420- Information Theory and Coding 3 (3, 0, 1)
Pre-requisite: EE 320

EE 423 - Wave Propagation and Antennas 3 (3, 0, 1)
Introduction to antennas and propagation; Basic propagation models 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, VHF and UHF systems; antenna a linear and planar arrays
Pre-requisite: EE 203

EE 463 - Mobile Communications 3 (3, 0, 1)
Practical and theoretical aspects of mobile 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.
Pre-requisite: EE 320
Electronics and Communication Engineering Track Elective Courses

EE 413 - Power Electronics 3 (3, 0, 1)
Power semiconductor devices: terminal characteristics; Power converters: ac-ac converters, rectifiers, inverters, dc-dc converters and resonant converters; Applications in power systems
Pre-requisite: EE 312

EE 411 - Programmable Logic Controllers 3 (3, 0, 1)
Introduction (What’s PLC?), PLC Architecture; including PLC building blocks (I/O ports, internal relays, timers, counters, serial ports, high-speed counters), PLC operation, scan cycle, PLC response time, case study: Siemens S7 PLC’s, PLC’s Memory Organization; including: input memory, output memory, S-memory, variable memory, config memory, external EEPROM, PLC Programming; including: PLC programming Languages (LAD, functional and STL), LAD and STL basic instructions, programming devices and compilers (STEP-7), program editing, designing and editing a PLC project, compiling, downloading, testing (simulation) and running, PLC Wiring; including: DC inputs, AC inputs, transistor and relay outputs, analog and digital Inputs, analog and digital outputs, PLC Communications; including: PLC communication busses, Fieldbus, Proffibus, industrial Ethernet, Examples; including miscellaneous industrial applications.
Pre-requisite: EE 354

EE 412 - Industrial Electronics 3 (3, 0, 1)
Power Devices, including: Power diodes, power BJT, thyristors, phase control, thyristor protection circuits. Stabilized Power Supplies, including: DC power supplies, stabilization using zener diodes, series regulators, shunt regulators, IC regulators, switch mode power supplies (SMPS). Energy Conversion, including: static converters, commutation circuits (natural and forced). Inverter Circuits, including: inverter circuits, push-pull and bridge inverters, commutation of inverters, sinewave inverters. Converters Circuits, including: DC-DC converters, Flyback DC converters, push-pull DC converters, bridge converters, DC-up and DC-down converters. Transducers, including: strain gauges, temperature sensors, pressure and force measurements, optoelectronic sensors, proximity sensors. Operational Amplifiers Industrial Applications, including: Instrumentation Amplifiers, Bridge amplifiers. Assembly, Testing & Troubleshooting of Electronic Circuits, including: electronic circuits assembly, automatic test equipment, computer-aided assembly (pick and place) and manufacturing (CAM) systems.
Pre-requisite: EE317
EE 417 - Communication Electronics  
Introduction to Analog and Digital Transceivers, including: Wireless and Cable systems, Heterodyne and Homodyne (Zero-IF) Radio Receivers, all-digital transceivers. Design and Synthesis of analog RF Transceiver, including: Functional block diagram, Design of LNA, Mixers, VCO, Phase-locked loops (PLL), Frequency synthesizers, IF amplifiers, AM detectors, and FM discriminators. Design and Synthesis of Digital/Mixed-signal RF Transceiver, including: QPSK modulator/demodulator (modem), Timing and Clock recovery circuits, FSK circuits, GMSK modems, ASK and QAM circuits. Line Coding and Pulse Modulation Circuits, including: PCM modulators, Δ– modulators and their variants. TV Receivers, including: Functional blocks of Monochrome TV, Video Transmission Standards (PAL, SECAM, NTSC) and Camera systems, Design of video amplifiers, SAW-IF amplifiers, sync separators, horizontal and vertical oscillators and AFC. Functional block diagram of Color TV receivers, Color signal representation and processing, Digital Video Broadcasting (DVB) and High-definition TV (HDTV).  
Pre-requisite: EE317 & 320  
co-requisite: EE322

EE 418 – Design of Analog and Digital Filters  
Introduction to Theory of N-port networks, including: Transfer functions of linear and discrete systems and their representation in the frequency domain and using Z-Transform, Poles and Zeros. Filter Design, including: Types of filters in the frequency domain low-pass, high-pass, band-pass and stop-band filters, Types of Filters according to their Approximate characteristics, like Butterworth, Tchebychev, Elliptic (Cauer) and Gaussian filters. Analog Filter Synthesis (implementation), including: Sallen-Key general structure using Op-Amps, Quad filters, Negative-impedance converters (NIC) and Gyrators, Leapfrog filters, and gm-C filters (using OTA). Applications, including: RF, IF filters in cellular phones and radio transceivers, equalization of telephone cables and CATV. Digital Filters, including: Finite impulse response (FIR) and Infinite impulse response (IIR) filters. Fast Fourier Transform and Digital Signal Processors (DSP). Applications, including: voice and image processing and remote sensing.  
Pre-requisite: EE317

EE 419 - Selected Topics in Electronics  
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.
Pre-requisite: EE317

EE 421 - Telephone Systems and Traffic Analysis 3 (3, 0, 1)
Pre-requisite: EE 320 co-requisite: EE322

EE 424 - Optical Communication Networks 3 (3, 0, 1)
Pre-requisite: EE 317 &320

EE 425 - Computer Network Security 3 (3, 0, 1)
Introduction to cryptography and cryptanalysis; Basic definitions: Security services, attacks and mechanisms; conventional encryption algorithms: DES, IDEA, RC5 and Blowfish, key distribution; introduction to number theory, public key encryption algorithm: RSA ; message authentication code; hash function; digital signature and authentication protocols
Pre-requisite: EE 320 & 355

EE 427 - Microwave System Design 3 (3, 0, 1)
Pre-requisite: EE 320 co-requisite: EE322
EE 428 - Satellite Communications
Overview of satellite systems. Orbits and launching methods. The geostationary orbit. Modulations schemes and satellite multiple access (FDMA, TDMA, and CDMA). Space link analysis: Uplink, downlink and system noises. Satellite antennas: Antenna polarization and radiation pattern. Applications of satellites: Asynchronous transfer mode (ATM) over satellite networks, the internet, Direct broadcast satellite (DBS) television and satellite mobile services.
Pre-requisite: EE 320 co-requisite: EE322

EE 429 - Selected Topics in Communications
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
Pre-requisite: EE 320

EE 450 - Industrial Instrumentation
Pre-requisite: EE 208, 317 & 351

EE 456 - Digital Control Systems
Pre-requisite: EE 351

EE 462 - Communication Theory
Pre-requisite: EE 320 co-requisite:

EE322

EE 465 - Network Architecture and Protocols
Pre-requisite: EE 320 &355
THE DEPARTMENT  
OF  
CIVIL ENGINEERING

Contact Information:

The Dept. Head: Dr Ibrahim S. Alsalamah
Tel: (+966)(6)3800050 – 5200
Fax: (+966)(6)3802992
Secretary: (+966)(6)3800050 – 5201
Email: gec@qec.edu.sa
P.O.B 6677 - Buraydah 51452 - Saudi Arabia
About the department:

The oldest and most elegant branch of engineering profession in engineering colleges all over the world and that is due to the fact that civil engineering is related to almost all aspects of civilization. Many of the important things in our lives that we take for granted are the product of civil engineering. Civil engineer deals with a wide variety of engineering aspects such as designing, construction, and maintenance of different structure (buildings, embankments, storage tanks, dams, roads, water and wastewater networks, irrigation and drainage networks, etc....), solving execution problems, managing engineering and construction projects, and it just does not end there. Civil engineer also has a significant role in planning and managing transportation systems, terrific safety, conservation and development of water resources, treatment and reuse of wastewater, and the list extends.

The civil engineering curriculum in Qassim University is set to serve the broad range activities of the profession. It is designed to fulfill the student's need of sufficient and balanced content of different civil engineering topics. Initially such topics cover most, if not all, of the sub-disciplines of civil engineering. Students then choose to specialize in one or more sub-disciplines towards the end of the degree.

Mission of the civil engineering department
The civil engineering department seeks to meet the needs of the Saudi society and the region with outstanding civil engineering programs in education, research, and community service.

Vision of the civil engineering department
The civil engineering department aims to be recognized locally, regionally and internationally as a leading department providing high quality programs and services in civil engineering fields.

Program Educational Objectives
Civil Engineering Program Educational Objectives are the attributes (knowledge, skills, and behavior) that the program graduates will be able to successfully demonstrate during a short time. In order to accomplish its mission, the department
in cooperation with its constituents has identified the following list of Program Educational Objectives:

1. To produce graduates with comprehensive knowledge in civil engineering fundamentals.
2. To produce graduates who can apply design, management and construction methods in civil engineering projects.
3. To produce graduates who can demonstrate ability with effective communication skills and teamwork in multi-disciplinary projects.
4. To produce graduates who can continue life-long learning and gain skills to promote professional development, creative thinking and career planning based on social and professional ethics.

**Studying System**

According to the educational plans; a student may complete his Civil Engineering program in 8 semesters (4 years) after the Preparatory year Program (PYP). A successful student may complete the full requirements of the selected program if he completed (after the PYP) a total of 139 credit-hours. In details the 139 credit-hours include:

- University requirements (12 credit-hours),
- College requirements (54 credit-hours) and
- Program and/or Departmental requirements (68 credit-hours) – 6 credit hours have to be selected among the set of elective courses.
- The Free Courses: 5 credit hours have to be selected among the set of courses available in the university.

In addition; a student has to complete cooperation training in a summer term and the following term at one of the private or governmental sectors. It may be necessary to mention here that this training is supervised and evaluated by the college faculties.

**Admission to the dept:**

The admission in the department depends on:
- The student desire
- The Student GPA
- The capacity of the department
Program Outcomes:

A student completing the CE Program will achieve the following outcomes which are the same as those of ABET:

a) An ability to apply knowledge of mathematics, science, and engineering principles to solve civil engineering problems in practice.

b) An ability to design and conduct experiments, and to analyze and interpret data in major recognized civil engineering areas.

c) An ability to analyze and design a system, civil engineering structure or component to meet desired goals in civil engineering applications economically viable, sustainable and acceptable socially, politically and ethically.

d) An ability to function on teams.

e) An ability to identify, formulate, and solve civil engineering problems.

f) An ability to understand professional, social and ethical practices and responsibilities.

g) An ability to communicate effectively in oral and written forms.

h) An understanding of the impact of engineering solutions in a global, economical, environmental and societal context.

i) A recognition of the need for, and an ability to engage in, life-long learning.

j) A knowledge of contemporary issues in civil engineering.

k) An ability to use modern tools, techniques and skills necessary for civil engineering practice.

The students in the CE Program will gain proficiency in some of the recognized major Civil Engineering areas. These engineering areas include: (1) Structural Engineering, (2) Water Resources and Hydraulic Engineering, (3) Transportation Engineering and (4) Environmental Engineering. Besides, basic project management techniques are also taken.
Serving the university and the society

1. Presentation of training courses for the engineers in the private and governmental sectors through a community service deanery in the university.
2. Contribution in the engineering problems solution which are raised by the Region Emirate.
3. Engineering consultations for the private and governmental sectors.
4. Preparation of circulars and booklets which help in the solution of engineering problems.
5. Holding the conferences and general seminars in the engineering fields.

The Career chances:

1. All engineering administrations in the governmental authorities.
2. The projects operation and maintenance administrations in the governmental authorities.
3. The ministry of water and electricity.
4. The ministry of municipal and village affairs.
5. The Saudi commission for the engineers.
6. The general institution for the waters refinement.
7. The general institution for ports.
8. The Saudi airlines.
9. The military occupations management.
10. The constructions and contracting companies.
11. The electronics and communication companies.
12. The power and electric energy companies.
14. The Ministry of agriculture and water recourses.
15. The general institution for the electricity.
16. The water and sewage authority.
17. The Saudi Arabia Aramco company.
18. The Saudi company for the basic industries (SABIC).
19. The unified Saudi company for electricity (SCECO).
20. The construction material factories.
THE CIVIL ENGINEERING DEPARTMENT MEMBERS

Department Head, Assoc. Prof. Dr. Ibrahim Saleh Al-Salamah
Hydrology & Water Resources Engineering
Research Interests: Groundwater flow and Remediation, Surface and groundwater hydrology
Tel: +966(6) 3800050-5000
E-mail: alsalamah@qec.edu.sa

Professors:

Prof. Dr. Faisal Khalil Ibrahim
Research Interests: Nonlinear analysis of structures. Soil structure interaction.
Tel: +966(6) 3800050-5212
E-mail: faisal@qec.edu.sa

Prof. Dr. Sayed A. Habib
Highway Engineering
Research Interests:
Tel: +966(6) 3800050-5206
E-mail: sahm53@qec.edu.sa

Prof. Dr. Hesham Ali Zien El Din
Structural Analysis and Steel Structures
Research Interests: Structural Analysis
Tel: +966(6) 3800050-
E-mail: zieneldin@qec.edu.sa

Associate Professors:

Assoc. Prof. Dr. Shereef El-Kholy
Geotechnical/Geoenvironment En
Research Interests:
Tel: +966(6) 3800050-5210
E-mail: selkholy@qec.edu.sa

Assoc. Prof. Dr. Ahmed Ahmed Mohamed El-Sonbaty
Engineering Mathematics
Research Interests: Mathematics-Photogrammetry-Computer Graphics
Tel: +966(6) 3800050-5215
E-mail: asonbaty@qec.edu.sa
Assistant Professors:

Assistant Prof. Dr. Yousef Kebbieh Kebbieh
Surveying and Geodesy
Research Interests: GPS Surveys, Geodetic and Surveying Networks Adjustment, Gyrotheodolite Azimuth Determination.
Tel: +966(6) 3800050-5214
E-mail: yousef11@qec.edu.sa

Assistant Prof. Dr. Hussam
Research Interests: Software Engineering
Intelligent Transportation System Expert System
Tel: +966(6) 3800050-5207
E-mail: halzein@qec.edu.sa

Assistant Prof. Dr. Yousry Ghazaw
hydraulic str
Research Interests:
Tel: +966(6) 3800050-5209
E-mail: ghazaw@qec.edu.sa

Master:
MAS. Alsir Altayeb Mohamed Alamin
Research Interests:
Tel: +966(6) 3800050-2385
E-mail: amin@qec.edu.sa
Laboratories and Equipments:

The Civil Engineering Department has established excellent laboratory facilities for undergraduate courses, graduate courses and research work. The main laboratories of the Department are listed as follows:

- **Hydraulics Laboratory:**
  The laboratory is used for instruction in courses; Fluid Mechanics, CE-230, Fluid Mechanics Laboratory CE-231, Hydrology, CE-331, Hydraulic Engineering, CE-456 and Design of Water Structure, CE-458. The laboratory is equipped with Hydrostatic Pressure Apparatus to determine the hydrostatic force acting on a plane surface, Orifice & Free Jet Flow Apparatus to determine coefficients of velocity, contraction and discharge. There is also, Centrifugal Pump Characteristics to determine the characteristics of centrifugal pump and Laminar Flow Apparatus to show the stream lines.

- **Concrete Laboratory:**
  This laboratory is used for instruction in courses; Structural Materials, CE-203, Properties and Testing of Concrete, CE-304, Concrete Technology, CE-401 and Advanced Reinforced Concrete, CE-403. This laboratory is well equipped for carrying out basic tests on aggregates and cement, and for casting and testing concrete specimens (fresh and hardened). In addition to the undergraduate students this laboratory is also used by the graduate students for experimental and research work.

- **Environmental Engineering Laboratory:**
  This laboratory is used for instruction in courses; Water and Waterwaste Engineering, CE-370 and Design and Operation of Water and Waterwaster Treatment Plants CE-474. The equipment available includes: Incubator for B. O. D. Test, Digital D. O. Meter, TITRATOR for C. O. D. Test, Muffle Furnace for TSS and TS measurements, Spectrophotometer, Desiccators, Magnetic Stirrer, Vacuum Pump, Ph – meter, Turbidity meter, Perialistic pumps, DATA LOGGER for measuring Water Quality Conductivity Dissolved Oxygen Colorimeter, Desalination unit.

- **Soil Mechanics Laboratory:**
  This laboratory is used for instruction in courses; Geotechnical Engineering, CE-353, Geotechnical Engineering Laboratory, CE-354,
Foundation Engineering, CE-363 and Soil Improvement and Earth Structure Design, CE-454 Fluid Mechanics Laboratory CE-231, Hydrology, CE-331, Hydraulic Engineering, CE-456 and Design of Water Structure, CE-458. The laboratory is equipped with Atterberg's Limit Apparatus to determine cohesive soil indices, Sieves Sets to determine cohesionless soil gradation, Consolidation cells to determine cohesive soil compressibility characteristics. There is also, Direct Shear and Triaxial Test Apparatus to determine soil shear strength parameters.

- **Transportation and Surveying Laboratory:**
  This laboratory is used for instruction in courses; Survey Basics, CE-112 and Project Surveying, CE-464. The laboratory is equipped with theodolites, EDM, total stations and level instruments for performing surveying field works such as distance, angle and elevation differences measurements, profiling, traversing, topographic surveying, mapping, and curve layout.

- **Material Engineering Laboratory:**
  This laboratory is used for instruction in the course; Mechanics of Materials, CE-202. The laboratory is reasonably equipped for carrying out simple experiments to familiarize the undergraduate students with basic structural behavior and stress analysis and includes tests for tension, Poisson’s ratio, stress concentration, flexure and torsion.
# THE CIVIL ENGINEERING PROGRAM

## The 1st semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 101</td>
<td>Introduction to Islamic culture</td>
<td>2 2</td>
</tr>
<tr>
<td>ARB 101</td>
<td>Linguistic skills</td>
<td>2 2</td>
</tr>
<tr>
<td>Phys 104</td>
<td>General Physics</td>
<td>4 3 2</td>
</tr>
<tr>
<td>GE 104</td>
<td>Basics of Engineering Drawing</td>
<td>3 1 4</td>
</tr>
<tr>
<td>Math 105</td>
<td>Differential Calculus</td>
<td>3 3 1</td>
</tr>
<tr>
<td>Chem 111</td>
<td>General Chemistry</td>
<td>4</td>
</tr>
</tbody>
</table>

Total credit-hours 18

## The 2nd semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 102</td>
<td>Islam and Community Building</td>
<td>2 2</td>
</tr>
<tr>
<td>GE 105</td>
<td>Basics of Engineering Technology</td>
<td>2 1 2</td>
</tr>
<tr>
<td>Math 106</td>
<td>Integral Calculus</td>
<td>3 3 1</td>
</tr>
<tr>
<td>CE 285</td>
<td>Introduction to Geotechnical Engineering</td>
<td>2 2 1</td>
</tr>
<tr>
<td>GE 201</td>
<td>Statics</td>
<td>3 3 1</td>
</tr>
<tr>
<td>CSC 209</td>
<td>Computer Programming</td>
<td>3 2 2</td>
</tr>
<tr>
<td>Math 107</td>
<td>Linear Algebra &amp; Analytic Geometry</td>
<td>3 3 1</td>
</tr>
</tbody>
</table>

Total credit-hours 18

## The 3rd semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 103</td>
<td>Economic System in Islam</td>
<td>2 2</td>
</tr>
<tr>
<td>ARB 103</td>
<td>Arabic Writing</td>
<td>2 2</td>
</tr>
<tr>
<td>GE 202</td>
<td>Dynamics</td>
<td>3 3 1</td>
</tr>
<tr>
<td>CE 202</td>
<td>Mechanics of Materials</td>
<td>3 3 1</td>
</tr>
<tr>
<td>Math 203</td>
<td>Differential and Integral Calculus</td>
<td>3 3 1</td>
</tr>
<tr>
<td>GE 211</td>
<td>Introduction to Engineering Design-I</td>
<td>3 2 4</td>
</tr>
<tr>
<td>CE 112</td>
<td>Survey Basics</td>
<td>2 1 2</td>
</tr>
</tbody>
</table>

Total credit-hours 18
### The 4th semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Major Credits</th>
<th>Elective Credits</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 203</td>
<td>Structural Materials</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>CE 202</td>
</tr>
<tr>
<td>Math 208</td>
<td>Differential equations</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>Math 203</td>
</tr>
<tr>
<td>GE 213</td>
<td>Introduction to Engineering Design-2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>GE 211</td>
</tr>
<tr>
<td>ME 229</td>
<td>Thermodynamics and Heat transfer</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>Phys 104</td>
</tr>
<tr>
<td>CE 230</td>
<td>Fluid Mechanics</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>Math203, GE202</td>
</tr>
<tr>
<td>CE 231</td>
<td>Fluid Mechanics Laboratory</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>CE 230</td>
</tr>
<tr>
<td>Math xx1</td>
<td>Math Elective 1</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Total credit-hours 18

### The 5th semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Major Credits</th>
<th>Elective Credits</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 104</td>
<td>Political System in Islam</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>CE 304</td>
<td>Properties and Testing of Concrete</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>CE 203</td>
</tr>
<tr>
<td>CE 305</td>
<td>Structural Analysis</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>CE 202</td>
</tr>
<tr>
<td>CE 320</td>
<td>Construction Engineering</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CE 353</td>
<td>Geotechnical Engineering</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>CE 203, CE 285</td>
</tr>
<tr>
<td>CE 354</td>
<td>Geotechnical Engineering Laboratory</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>CE 353</td>
</tr>
<tr>
<td>Math +++</td>
<td>Elective Mathematics - 2</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>+++</td>
<td>Free Course</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Total credit-hours 20

### The 6th semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Major Credits</th>
<th>Elective Credits</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 315</td>
<td>Reinforced Concrete</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>CE 304, 305</td>
</tr>
<tr>
<td>CE 370</td>
<td>Water and Wastewater Engineering</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>CE 230</td>
</tr>
<tr>
<td>CE 331</td>
<td>Hydrology</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>CE 230</td>
</tr>
<tr>
<td>CE 341</td>
<td>Transportation and Traffic Engineering</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>Math 254</td>
</tr>
<tr>
<td>+++</td>
<td>Free course</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>CE 353, CE 315</td>
</tr>
<tr>
<td>CE 375</td>
<td>Steel Structures Design</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>CE 305</td>
</tr>
</tbody>
</table>

Total credit-hours 20

### The 7th semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Major Credits</th>
<th>Elective Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE 405</td>
<td>Cooperative Training</td>
<td>9</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Total credit-hours 9
The 8th semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>TU</th>
<th>LB</th>
<th>LT</th>
<th>CR</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE 401</td>
<td>Engineering Economy</td>
<td>3</td>
<td>3</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>GE 402</td>
<td>Project Management</td>
<td>3</td>
<td>3</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CE 4xx</td>
<td>Elective Course – 1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE 4xx</td>
<td>Elective Course – 2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE 363</td>
<td>Foundation Engineering</td>
<td>3</td>
<td>3</td>
<td></td>
<td>1</td>
<td>CE 353</td>
</tr>
<tr>
<td>CE 400</td>
<td>Senior Design Project</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>GE 405</td>
</tr>
</tbody>
</table>

Total credit-hours 18

The Elective Courses

In the 8th semester the student should select some elective courses not less than 6 hours

<table>
<thead>
<tr>
<th>Co-Req</th>
<th>Pre-Req</th>
<th>TU</th>
<th>LB</th>
<th>LT</th>
<th>CR</th>
<th>Course Title</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 315</td>
<td>CE 353</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>Computer Applications</td>
<td>CE 317</td>
</tr>
<tr>
<td>CE 315</td>
<td>1 0 3</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Advanced Reinforced Concrete</td>
<td>CE 403</td>
</tr>
<tr>
<td>CE 305</td>
<td>1 0 3</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Advanced Structural Analysis</td>
<td>CE 406</td>
</tr>
<tr>
<td>CE 375</td>
<td>1 0 3</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Advanced Steel Design</td>
<td>CE 412</td>
</tr>
<tr>
<td>CE 353</td>
<td>1 0 3</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Advanced Geotechnical Engineering</td>
<td>CE 453</td>
</tr>
<tr>
<td>CE 203</td>
<td>1 0 3</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Concrete Technology</td>
<td>CE 401</td>
</tr>
<tr>
<td>CE 203</td>
<td>1 0 3</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Design of Pavement</td>
<td>CE 443</td>
</tr>
<tr>
<td>CE 112</td>
<td>1 0 3</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Project Surveying</td>
<td>CE 464</td>
</tr>
<tr>
<td>CE 353</td>
<td>1 0 3</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Soil Improvement and Earth Structure</td>
<td>CE 454</td>
</tr>
<tr>
<td>CE 341</td>
<td>1 0 3</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Highway Planning and Design</td>
<td>CE 455</td>
</tr>
<tr>
<td>Course</td>
<td>Credits</td>
<td>Units</td>
<td>Requirement</td>
<td>Course Title</td>
<td>Credits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td>-------</td>
<td>-------------</td>
<td>--------------------------------------------------------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE 230</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>CE 456 Hydraulic Engineering</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE 230</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>CE 458 Design of Water Structures</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE 370</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>CE 474 Design and Operation of Water and Wastewater Treatment Plants</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>CE 475 Environmental Engineering</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>CE 490 Selected Topics in Civil Engineering</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
THE CIVIL ENGINEERING COURSES

CE 112 - Survey Basics 2 (1, 2, 0)
Definitions and concepts in land surveying, divisions and importance of surveying, units of measurements, introduction to theory of measurements and errors, linear measurements, angular measurements, directions, leveling and contouring; computer applications.
Pre-requisite: Math 107

CE 202 - Mechanics of Materials 3 (3, 0, 1)
Pre-requisites: Math 203 & GE 201

CE 203 - Structural Materials 3 (2, 2, 0)
Pre-requisite: GE 202

CE 230 - Fluid Mechanics 3 (3, 0, 1)
Pre-requisites: Math 203 & GE 202

CE 231 - Fluid Mechanics Laboratory 1 (0, 2, 0)
Laboratory experiments covering Fluid measurements, flow through pipes, open channel, centrifugal pump. Measurement of temperature, atmospheric pressure, coefficient of viscosity for liquids, Hydrostatic pressure, Orifice flow, coefficient of
velocity, and coefficient of discharge, Flow over weirs, Reynolds Number, Bernoulli’s theorem, Pizometric tubes, Pitot tube, Fluid friction and coefficient of friction in pipes, Pump characteristics

**Co-requisite: CE 230**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits (3, 0, 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 285</td>
<td>Introduction to Geotechnical Engineering</td>
<td>2 (2, 0, 1)</td>
</tr>
<tr>
<td>CE 304</td>
<td>Properties and Testing of Concrete</td>
<td>3 (2, 2, 0)</td>
</tr>
<tr>
<td>CE 305</td>
<td>Structural Analysis</td>
<td>3 (3, 0, 1)</td>
</tr>
<tr>
<td>CE 315</td>
<td>Reinforced Concrete</td>
<td>3 (3, 0, 1)</td>
</tr>
<tr>
<td>CE 320</td>
<td>Construction Engineering</td>
<td>3 (3, 0, 1)</td>
</tr>
</tbody>
</table>

Types and classification of rocks based on origin and strength. Weathering process. Classification of soil based on formation. Index and engineering classification of soil. Clay minerals and soil structure.

Cement: manufacture, properties, types of cement, tests. Aggregates: types, properties, grading, tests. Mixing water, Concrete: proportions, mixing, handling, placing, fresh and hardened properties, tests, curing.

**Pre-requisite: CE 203**


**Pre-requisite: CE 202**

Fundamentals and design theories based on ultimate 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.

**Pre-requisite: CE 304 & 305**

Overview of the construction industry, earthmoving machinery and properties, excavation and lifting, loading and hauling, compaction and finishing, concrete construction, concrete form design, concrete economics, construction economics, contract construction.
CE 331 - Hydrology  
3 (3, 0, 1)  
Pre-requisite: CE 230

CE 341 - Transportation and Traffic Engineering  
4 (3, 0, 2)  
Pre-requisite: Math 254

CE 353 - Geotechnical Engineering  
3 (3, 0, 1)  
Pre-requisite: CE 203 & 285

CE 354 - Geotechnical Engineering Laboratory  
1 (0, 2, 0)  
Co-requisite: CE 353

CE 363 - Foundation Engineering  
3 (3, 0, 1)  
Pre-requisite: CE 353, CE 315
CE 370 - Water and Wastewater Engineering 4 (3, 0, 2)
Analysis of water distribution and wastewater collection systems, computer modeling of network systems; water treatment including coagulation, flocculation, softening, sedimentation, filtration, desalination and disinfection; water treatment, principles of biological treatment systems including activated sludge, extended aeration, aerated lagoons, and stabilization ponds.
Pre-requisite: CE 230

CE 375 - Steel Structures Design 3 (3, 0, 1)
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.
Pre-requisite: CE 305

CE 400 – Senior Design Project 3 hours
The student is assigned, among a team of students and one or more faculty professors, 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 graduation project shall continue 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.
Pre-requisite: GE 405

GE201: Statics. 3 (3, 1, 0)
GE202: Dynamics. 3 (3, 1, 0)
Prerequisite: GE201.

GE 402: Management of Engineering Projects. 3 (3, 1, 0)
Basic Management Process approach, Defining Project, Project life cycle, Balancing competing demands with triple constraints, Strategies and planning, methods, Project planning and scheduling, integrated project planning, Quality management, Bar-charts and Gantt Chart, critical path methods, PERT method, resource leveling and allocation, time-cost trade off. Construction and organizational approaches, leadership elements, and decision making. Time and cost control, Project Closing, computer applications.

ME229 – Thermodynamics and Heat transfer 3 (3, 0, 1)
First and second law of thermodynamics; Properties of ideal gases and vapors. Air standard cycles. Conduction and convection heat transfer.
Pre-requisite: Phyis-104
The elective courses

CE 317 - Computer Applications
3 (2, 1, 1)
Problem formulation. Preparing problem model. Constitutive modeling of different engineering materials. Using FEM-based software packages in design and solving engineering problems. Results verification and interpretation. The used software packages will vary depending on job market requirements. Examples of packages include, but not limited to, SAP 2000, PLAXIS, Geo-Slope Suit, ANSYS, STAD Pro, Mud Flow, Pipe Net,.....etc.
Pre-requisite: CE 353
Co-requisite: CE 315

CE 401 - Concrete Technology
3 (3, 0, 1)
In-depth study of composition, characteristics and hydration of cements; structure and properties of hardened cement paste; local aggregates; workability, strength, volume changes and permeability of concrete; failure mechanisms of plain concrete; production, handling and quality control of concrete; mix design; special concretes such as fiber reinforced concrete, ferrocement and polymer impregnated; durability problems of concrete in the Gulf environment; preventive measures, specifications and construction techniques for local conditions.
Pre-requisite: CE 203

CE 403 - Advanced Reinforced Concrete
3 (3, 0, 1)
Design of 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.
Pre-requisite: CE 315

CE 406 - Advanced Structural Analysis
3 (3, 0, 1)
Analysis of indeterminate structures; trusses, beams, plane frames and arches. Method of consistent deformation; flexibility matrix formulation; prestrain, temperature change and support movement effects. Slope deflection method. Matrix analysis of beams and plane frame using the stiffness method. Moment distribution; sway consideration.
Pre-requisite: CE 305
CE 412 - Advanced Steel Design  
3 (3, 0, 1)  
Introduction to elastic-plastic material behavior, plastic analysis and design of continuous beams and simple frames using load resistance factor design (LRFD); design of built-up beams and plate girders, optimum proportioning of I-beam, design of composite section analysis and design for torsion, design of semi-rigid and rigid connections, computer application and usage in design of rigid frames and steel buildings  
Pre-requisite: CE 375

CE 443 - Design of Pavement  
3 (3, 0, 1)  
Pavement types and loading, behavior of pavements under dynamic loads, stresses in flexible and rigid pavements, pavement components, pavement design factors, flexible highway and airport pavement design, rigid highway and airport pavement design; overlay design and computer applications; practical pavement design project of a road and airport  
Pre-requisite: CE 203

CE 453 - Advanced Geotechnical Engineering  
3 (3, 0, 1)  
Fundamental relations of elasticity and plasticity in soil masses; unsaturated soils behavior; deformation properties of cohesionless and cohesive soils; advanced strength concepts in soils and stress path; advanced slope stability analysis; introduction to soil dynamics.  
Pre-requisite: CE 353

CE 454 - Soil Improvement and Design of Earth Structures  
3 (3, 0, 1)  
General survey of soil types and their behavior and the available techniques for improvement; modifications by admixtures and grouting; the use of geo-synthetic material in filtration, seepage control, and reinforcement; design and analysis of variance retaining walls, anchored sheet piles and braced excavations.  
Pre-requisite: CE 353

CE 455 - Highway Planning and Design  
3 (3, 0, 1)  
Highway planning in rural and urban areas; highway location studies; engineering and aesthetic considerations; geometric design, structural design, highway materials; drainage, highway construction, highway safety engineering; discussion of AASHTO and Saudi highway design manuals; complete geometric design of a two-lane highway; introduction to computer softwares for geometric design.  
Pre-requisite: CE 341
CE 456 - Hydraulic Engineering  3 (3, 0, 1)
Steady flow in closed conduits and open channels. Pumps. Networks of pipes. Dimensional analysis and similitude. Laboratory experiments covering fluid measurements, flow through pipes, open channel, centrifugal pump.
Pre-requisite: CE 230

CE 458 - Design of Water Structures  3 (3, 0, 1)
Pre-requisite: CE 230

CE 464 - Project Surveying  3 (3, 0, 1)
Laser systems and alignment, electronic distance measurement with high precision, total station, land subdivision and legal aspects; route surveying, hydrographic surveying, mine surveying, construction surveying, ruin surveying, industrial surveying, structure deformation measurement and monitoring, earth crustal deformation measurement
Pre-requisite: CE 112

CE 474 - Design and Operation of Water and Wastewater Treatment Plants  3 (3, 0, 1)
Theory and practice in sanitary engineering including the concepts of processing, design, economic evaluation and computer analysis; using practical considerations in the design and operation of treatment units and the combining of unit processing in water and wastewater treatment plants; field trips will be organized to visit various types of treatment plants in operation.
Pre-requisite: CE 370

CE 475 - Environmental Engineering  3 (3, 0, 1)

CE 490 - Selected Topics in Civil Engineering  3 (3, 0, 1)
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.
THE DEPARTMENT
OF
MECHANICAL ENGINEERING

Contact Information:
The Dept. Head: Prof. Sulayman A. Alyaha
Tel: (+966)(6)3800050 – 5300
Fax: (+966)(6)3802992
Secretary: (+966)(6)3800050 – 5301
Email: gec@qec.edu.sa
P.O.B 6677 - Buraydah 51452 - Saudi Arabia
THE DEPARTMENT OF MECHANICAL ENGINEERING

About the Department:
Mechanical engineers are essential to almost every industry. It is in fact difficult to imagine a modern industry without the services of Mechanical engineers. Mechanical engineering has been and continues to be a cornerstone in every new technical development.

The job of Mechanical engineer usually involves design, feasibility studies, cost analysis studies, installation, operation, and maintenance of plants, processes, or equipment. The focusing of the Mechanical engineering department is on teaching, community service, and research. The department faculty recognizes the need to provide the graduating engineer with the appropriate background in order to meet the challenges and large demands of a fast-growing country such as the Kingdom. The department of Mechanical engineering mission is to provide education of quality, research, and community services that cover a broad spectrum of mechanical engineering areas. These areas include evaluation, design, operation, and maintenance of integrated governmental, industrial, and service systems.

Mission of the mechanical engineering department
The mechanical engineering department seeks to meet the needs of the Saudi society and the region with outstanding mechanical engineering programs in education, research, and community service.

Vision of the mechanical engineering department
The mechanical engineering department aims to be recognized locally, regionally and internationally as a leading department providing high quality programs and services in mechanical engineering fields.

Program Educational Objectives
The educational objectives of the Mechanical Engineering Program (MEP) at the College of Engineering, Qassim University are stated such that the graduate will:
1. possess the skills and knowledge necessary for work environment including design, installation, operation, maintenance and inspection of mechanical and energy systems.
2. utilize information technology; data analysis; and mathematical, computational, and modern-experimental techniques in formulating and solving practical problems.
3. fit in various working environments through effective communication skills and the ability to work in multidisciplinary teams.
4. continue life-long learning and gain skills to promote professional development, creative thinking, and career planning based on social and professional ethics.

**Studying System**

According to the educational plans; a student may complete his Civil Engineering program in 8 semesters (4 years) after the Preparatory year Program (PYP). A successful student may complete the full requirements of the selected program if he completed (after the PYP) a total of 139 credit-hours. In details the 139 credit-hours include:

- University requirements (12 credit-hours),
- College requirements (54 credit-hours) and
- Program and/or Departmental requirements (68 credit-hours) – 6 credit hours have to be selected among the set of elective courses.
- The Free Courses: 5 credit hours have to be selected among the set of courses available in the university.

In addition; a student has to complete cooperation training in a summer term and the following term at one of the private or governmental sectors. It may be necessary to mention here that this training is supervised and evaluated by the college faculties.

**Admission to the dept:**

The admission in the department depends on:
- The student desire
- The Student GPA
- The capacity of the department
Program Outcomes:

The outcomes of the ME Program are as below. At the time of graduation, our students will have:

a) An ability to apply knowledge of mathematics, science, and engineering
b) An ability to design and conduct experiments, as well as to analyze and interpret data
c) An ability to design a system, component, or process to meet desired needs within realistic constraints
d) An ability to function on teams
e) An ability to identify, formulate, and solve engineering problems
f) An understanding of professional and ethical responsibility
g) An ability to communicate effectively.
h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i) A recognition of the need for, and an ability to engage in, life-long learning
j) A knowledge of contemporary issues
k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
l) The ability to work professionally in both thermal and mechanical systems areas including the design and realization of such systems.

The program outcomes from (a) to (k) are in full consistence with the stated ABET outcomes Criterion 3, while program outcome (l) adopts the ME specific criteria.
Serving the university and the society

1- Presentation of training courses for the engineers in the private and governmental sectors through a community service deanery in the university.
2- Contribution in the engineering problems solution which are raised by the Region Emirate.
3- Engineering consultations for the private and governmental sectors.
4- Preparation of circulars and booklets which help in the solution of engineering problems.
5- Holding the conferences and general seminars in the engineering fields.

The Career chances:

1. All engineering administrations in the governmental authorities.
2. The projects operation and maintenance administrations in the governmental authorities.
3. The ministry of water and electricity.
4. The ministry of municipal and village affairs.
5. The Saudi commission for the engineers.
6. The general institution for the waters refinement.
7. The general institution for ports.
8. The Saudi airlines.
9. The military occupations management.
10. The constructions and contracting companies.
11. The electronics and communication companies.
12. The power and electric energy companies.
14. The Ministry of agriculture and water recourses.
15. The general institution for the electricity.
16. The water and sewage authority.
17. The Saudi Arabia Aramco company.
18. The Saudi company for the basic industries (SABIC)
19. The unified Saudi company for electricity (SCECO).
20. All factories.
MECHANICAL ENGINEERING DEPARTMENT
MEMBERS

Dept. Head Dr. Fahad Al-Mufdi
Production, CAD, CAM, FEA
Research Interests: Advanced Materials Processing
Tel: +966(6) 3800050- 5300
E-mail : almufadi@qec.edu.sa

Prof. Dr. Sulaiman Alyahya
Food Engineering & Engineering Management
Research Interests: Processing Engineering & Handling and Storage Engineering
Tel: +966(6) 3800050- 5300
E-mail : syahya@qec.edu.sa

Professors:

Prof. Dr. Ahmed Al-Shoshane
Environement control Engineering

Assist. Prof Dr.: Abduallah S. Al-Suwaiany
Dynamical Systems and Vibrations
Res. Interests : Vibration supression and control
Tel. : + 966 6 3800050 - 5315
E-mail : asuwaiyan@qec.edu.sa

Dr.: Abdualaziz S. Al-Aboodi
Manufacturing, Design, CAD-KAM
Res. Interests :
Design of heatexchanger, FEA, Elasticity, Plasticity
Tel. : + 966 6 3800050 - 5382
E-mail : alaboodi@qec.edu.sa
Pref Dr.: Abdualghani Mohammed El-Towi  
Mechanical & aeroantical eng.  
Res. Interests: Vibration supression and contral  
Tel.: + 966 6 3800050 - 5352  
E-mail: Abdualghaniwohaued@qec.edu.sa

Prof. Dr. Nabil El Minshawy  
Thermo-Fluid Mechanics, Conventional  
and Renewable Energy  
Research Interests: Thermo-Fluid,  
Conventional and Renewable Energy,  
Water Desalination, Air and water pollution  
Control  
Tel: +966(6) 3800050-  
E-mail: profminshawy@qec.edu.sa

Prof. Dr. Bahgat Khamies Morsy  
Math and Economic Engineerinig and  
Thermo-Fluid  
Research Interests: Continous  
Combustion - Forced Ventilation-Heating  
and Cooling- air condition  
Tel: +966(6) 3800050-5019  
E-mail: bahgat@qec.edu.sa

Prof. Dr. Elsayed Elbeheiry  
Controls and Dynamics  
Research Interests: robots, CNC  
machines, Control and dynamics, vibration,  
Tel: +966(6) 3800050-5311  
E-mail: elbeheiry@qec.edu.sa

Prof. Dr. Gamal M. Attia  
Engineering Mathematics  
Research Interests: 1- Numerical  
solution of integral equations 2- Partial  
Differential Equations.  
Tel: +966(6) 3800050-2433  
E-mail: gattia@qec.edu.sa
Associate Professors:

Assoc. Prof. Dr. Mohmoud Kassem
Heat and mass transfer and its applications
Research Interests: Solar energy refrigeration and air conditioning heat exchanger designe
Tel: +966(6) 3800050-5316
E-mail: mah_kassem@qec.edu.sa

Assoc. Prof. Dr. Albadrawy A. Abo El-Nasr
Research Interests:
Tel: +966(6) 3800050-5308
E-mail: albadrawye@qec.edu.sa

Assoc. Prof. Dr. Mahmoud Saber Youssef
Fluid Mechanics and its Applications
Research Interests: Turbulence modelling for hydrodynamic and thermal fields. Large Eddy Simulation (LES)
Tel: +966(6) 3800050-
E-mail: mahmoud@qec.edu.sa

Assoc. Prof. Dr. Elamir Samy
Mechanical Engineering
Research Interests: Application of computer vision in production engineering
Tel: +966(6) 3800050-5314
E-mail: esamy@qec.edu.sa

Assoc. Prof. Dr. A.R. Emad
Dynamics, Control, Structure and Robotics
Research Interests:
Tel: +966(6) 3800050-3010
E-mail: aremad@qec.edu.sa

Assistant Prof. Dr. Falah mustafa Al-Sarairhe
Production engineering
Research Interests: technology of machine building-- processes and machines of by pressure shaping
Tel: +966(6) 3800050-
E-mail: f_sarairhe@qec.edu.sa
Mechanical Engineering Department Laboratories:

1. Dynamics and Control lab.
Equipment available includes: applications of mechanical power controls like temperature, pressure, flow and liquid-level controls. This is in addition to two important units for servo-pneumatic controls and servo-hydraulic controls. Equipments for vibration analysis and controls include rectilinear, torsional, rotor and inverted pendulum pieces of equipments. Another important unit for machinery fault diagnosis by using vibration spectrum analysis exists. General dynamic motion controls include a magnetic levitation, an industrial emulator and a gyroscopic motion. A training unit on how to control DC, AC, and stepper motors exists. The lab also includes a unit for training on multi-motor digital controllers.

2. Measurements lab.
Equipment available includes: Servo control trainer, gyroscope apparatus, Magnetic levitation apparatus, Industrial Emulator, Temperature process station, Pressure process station, Level process station, Pneumatic training system, Electrical control of pneumatic system, Servo proportional control of pneumatic systems, Hydraulic fundamentals training system, Electrical control of hydraulic system, Servo proportional control of hydraulic systems, Flow process station.

3. Mechanical Vibrations lab.
Equipment available includes: Torsion disk, ‘complete turn key’ (3rd disk encoder), Rectilinear Apparatus, ‘complete turn key’ (3rd mass encoder) ECP Inverted Pendulum, Vibration sensor with clamping set, Sensor supply module, PC-aided data recording system, Balance of reciprocating masses, Whirling shaft apparatus, Universal driving unit, Machinery fault trainer.

5. Mechanics of Machinery lab.
Equipment available includes: a motorized Gyroscope, Rotating and Reciprocating Mass balancing, Lathe Gearing Layout, Geared System apparatus along with cutaway-model of different type of gears, clutches and working models of different planar mechanisms.
This laboratory is reasonably equipped for carrying out simple experiments to familiarize the undergraduate students with basic mechanism and working of machinery and include balancing of rotating and reciprocating system and speed and depth of cut in a lathe gear system.

6. Fluid mechanics lab.
This laboratory is reasonably equipped for carrying out simple experiments that related to the fluid mechanics basic concepts, through this laboratory also many of the basic theories, phenomena and laws that related to the fluid mechanics which the students learns in the lectures are demonstrated and confirmed in the lab through available various experimental equipments.

7. Heat transfer lab.
The heat transfer lab is equipped with the tabulated equipments in order to provide students with experience in engineering analysis of experimental data using relevant theory from heat transfer. Moreover, to develop in students the ability to formulate a research problem, design experiments and analysis tools and to complete a research project in a team setting.
8. Thermodynamics lab.
Equipment available include: Dead Weight, Series/Parallel Pumps, Reciprocating compressors characteristics, Temperature and humidity measurements, Internal combustion engine characteristics: Diesel engines two and four strokes, Petrol engines two and four strokes, Petrol engine with variable compression ratio
This laboratory is reasonably equipped for carrying out simple experiments that related to the thermodynamics basic & concepts, through this laboratory also many of the basic theories, phenomena and laws that related to the thermodynamics which the students learns in the lectures are demonstrated and confirmed in the lab through available various experimental equipments. Students will be able also to evaluate the performance of various thermodynamics open and closed systems.

9. Computer labs
GE104.: Basics of Engineering Drawing
GE 208.: Programming in Fortran Language

Equipment available includes: Network transformer (24 output), set Cables cat 6, Printer with network card, PC for students P4, PC for Instructor P4, PC distributing files P4.

In this lab the students apply simulations methods of many theoretical ideas faced in the courses. Also it permits them to try theoretical circuits and enhance their knowledge in programming.
# THE MECHANICAL ENGINEERING PROGRAM

The pre-requisite for acceptance in the program is the completion of the preparatory year program with grade not less than 3.5 from 5.00

### The 1st semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
<th>Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 101</td>
<td>Introduction to Islamic culture</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>ARB 101</td>
<td>Linguistic skills</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Phys 104</td>
<td>General Physics</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>GE 104</td>
<td>Basics of Engineering Drawing</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Math 105</td>
<td>Differential Calculus</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chem 111</td>
<td>General Chemistry</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Total credit-hours 18

### The 2nd semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
<th>Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 102</td>
<td>Islam and Community Building</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>GE 105</td>
<td>Basics of Engineering Technology</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Math 106</td>
<td>Integral Calculus</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>GE 201</td>
<td>Statics</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>CSC 209</td>
<td>Computer Programming</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Math 107</td>
<td>Linear Algebra &amp; Analytic Geometry</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>ME 251</td>
<td>Materials Engineering</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Total credit-hours 19

### The 3rd semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
<th>Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE 202</td>
<td>Dynamics</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Math 203</td>
<td>Differential and Integral Calculus</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>GE 211</td>
<td>Introduction to Engineering Design-I</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>ME 241</td>
<td>Mechanical Drawing</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>ME 351</td>
<td>Mechanics of Materials</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>ME 352</td>
<td>Mechanics of Materials Laboratory</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>+++</td>
<td>Free Course</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Total credit-hours 19
### The 4th semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Hours</th>
<th>Year</th>
<th>Course Code</th>
<th>Credits</th>
<th>Hours</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 208</td>
<td>Differential equations</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Math 203</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>GE 213</td>
<td>Introduction to Engineering Design-2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>GE 211</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>EE 318</td>
<td>Fundamentals of Electric circuits</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Phys 104</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 330</td>
<td>Manufacturing Processes</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>ME241, ME 251, ME 351</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 360</td>
<td>Mechanics of Machinery</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>GE 202, CSC 209</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 363</td>
<td>Mechanics of Machinery Lab.</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>ME 360</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 371</td>
<td>Thermodynamics -1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Phys 104</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Total credit-hours 19

### The 5th semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Hours</th>
<th>Year</th>
<th>Course Code</th>
<th>Credits</th>
<th>Hours</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 103</td>
<td>Economic System in Islam</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Math xx1</td>
<td>Math Elective 1</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>EE 399</td>
<td>Electrical Machines</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>EE 318</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 340</td>
<td>Mechanical Design -1</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>ME 330, ME 360</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 372</td>
<td>Thermodynamics – 2</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>ME 371</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 380</td>
<td>Fluid Mechanics</td>
<td>4</td>
<td>3</td>
<td>-</td>
<td>ME 371, GE 202</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 383</td>
<td>Thermo-fluid Laboratory -1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>ME 380, ME 372</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Total credit-hours 18

### The 6th semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Hours</th>
<th>Year</th>
<th>Course Code</th>
<th>Credits</th>
<th>Hours</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARB 103</td>
<td>Arabic Writing</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>IS 104</td>
<td>Political System in Islam</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Math xx2</td>
<td>Math Elective 2</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 343</td>
<td>Measurements and Instrumentation</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>ME 380</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 374</td>
<td>Heat and Mass Transfer</td>
<td>4</td>
<td>3</td>
<td>-</td>
<td>ME 380</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 384</td>
<td>Thermo-fluid Laboratory -2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>ME 374</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 467</td>
<td>System Dynamics and Automatic Control</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>MTH208, CSC 209</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ME 468</td>
<td>System Dynamics and Automatic Control Laboratory</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>ME 467</td>
<td>-</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Total credit-hours 19
The 7th semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>CR</th>
<th>LT</th>
<th>LB</th>
<th>TU</th>
<th>Pre-Req</th>
<th>Co-Req</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE 405</td>
<td>Cooperative Training</td>
<td>9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Total credit-hours 9

The 8th semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>CR</th>
<th>LT</th>
<th>LB</th>
<th>TU</th>
<th>Pre-Req</th>
<th>Co-Req</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE 401</td>
<td>Engineering Economy</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>GE 402</td>
<td>Project Management</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ME 4xx</td>
<td>Elective Course – 1</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ME 4xx</td>
<td>Elective Course – 2</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>+++++</td>
<td>Free Course</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ME 400</td>
<td>Senior Design Project</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>GE 405</td>
<td>-</td>
</tr>
</tbody>
</table>

Total credit-hours 18

The Elective Courses

In the 8th semester the student should select some elective courses not less than 6 credit hours.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>CR</th>
<th>LT</th>
<th>LB</th>
<th>TU</th>
<th>Pre-Req</th>
<th>Co-Req</th>
</tr>
</thead>
<tbody>
<tr>
<td>423 ME</td>
<td>Renewable Energy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>374'372</td>
</tr>
<tr>
<td>425 ME</td>
<td>Energy Solar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>374</td>
</tr>
<tr>
<td>431 ME</td>
<td>Tool Manufacturing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>374</td>
</tr>
<tr>
<td>441 ME</td>
<td>Mechanical Design -2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>374</td>
</tr>
<tr>
<td>453 ME</td>
<td>Modern Engineering materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>374</td>
</tr>
<tr>
<td>455 ME</td>
<td>Corrosion Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>374</td>
</tr>
<tr>
<td>462 ME</td>
<td>Mechatronics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>374</td>
</tr>
<tr>
<td>463 ME</td>
<td>Mechanical Vibrations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>374</td>
</tr>
<tr>
<td>466 ME</td>
<td>Robotics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>374</td>
</tr>
<tr>
<td>470 ME</td>
<td>Thermal Power Plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>374</td>
</tr>
<tr>
<td>474 ME</td>
<td>Refrigeration Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>374</td>
</tr>
<tr>
<td>475 ME</td>
<td>Air Conditioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>374</td>
</tr>
<tr>
<td>480 ME</td>
<td>Turbo Machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>380'372</td>
</tr>
<tr>
<td>482 ME</td>
<td>Compressible Fluids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>380</td>
</tr>
<tr>
<td>483 ME</td>
<td>Pumping Machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>380</td>
</tr>
<tr>
<td>490 ME</td>
<td>Selected Topics In Mechanical Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ME</td>
<td>380</td>
</tr>
</tbody>
</table>
THE Mechanical Engineering Program Courses

GE201: Statics. 3 (3, 1, 0)

GE202: Dynamics. 3 (3, 1, 0)
Prerequisite: GE201.

GE 402: Management of Engineering Projects. 3 (3, 1, 0)
Basic Management Process approach, Defining Project, Project life cycle, Balancing competing demands with triple constraints, Strategies and planning, methods, Project planning and scheduling, integrated project planning, Quality management, Bar-charts and Gantt Chart, critical path methods, PERT method, resource leveling and allocation, time-cost trade off. Construction and organizational approaches, leadership elements, and decision making. Time and cost control, Project Closing. computer applications

ME 241- Mechanical Drawing
Using Solid Works software: Introduction to 3D modeling, 2D drawings (sketching), reference geometry, 3D drawings (features), drawing and editing mechanical parts, assembly drawings. 2- Standard Mechanical Parts: Screw threads, fasteners and springs. 3- Fits and Tolerances: fundamentals, types, symbols. 4- Detailed Drawings: orthographic views, auxiliary views, sectional views, detailed views and dimensioning. 5- Manufacturing Symbols: Geometrical tolerance, surface finish, and weld symbols.
Pre-requisite: GE 104
ME 251 - Materials Engineering 3 (3, 0, 1)
Introduction to materials engineering; Structure and characteristics of metals; polymers and ceramics; Equilibrium-phase diagrams; Microstructures of alloys; Imperfections; Diffusion; Mechanical properties of metals, polymers, ceramics; Heat treatment of plain-carbon steels, cast irons and precipitation hardening.
Pre-requisite: Phys 104

ME 330 - Manufacturing Processes 4 (2, 2, 1)
Pre-requisite: ME 241,251 & 351

ME 340- Mechanical Design -1 3 (1, 2, 1)
Design process; Origin and identification of engineering design problems; Creativity in engineering design; Technical analysis; Human and legal factors; Problem solving and decision making; Design communication; Failures resulting from static loading; Variable loading and fatigue failure; Material selection for strength and rigidity; Design of mechanical elements: screws, power screws, fasteners and connections, welded, brazed and bonded joints; Rolling contact bearings; Term design project.
Pre-requisite: ME 330 & 360

ME 343 - Measurements and Instrumentation 2 (2, 0, 1)
Measuring concepts; Experimental procedures; Standards and dimensional units of measurement, analyzing, assessing and presenting experimental data, analog measured: time-dependent characteristics, Response of measuring systems, Sensors, Signal conditioning, digital techniques in mechanical measurements, displacement measurements, measurement of motion, measurement of force and torque, measurement of strain and stress, measurement of pressure, measurement of temperature, measurement of flow.
Pre-requisite: ME 380
ME 351 - Mechanics of Materials  
Study of the mechanical behavior of solid bodies (Rods, shafts, beams, etc.) under various types of loading. Mechanical and thermal stresses and strains; Stress-strain relations; Axial deformation; Shear and bending moments in beams; Stresses in beams; Torsion of shafts and thin wall tubes; Combined loadings; Analysis of plane stress and plane strain; Theories of failures; Thick – and thin-wall cylinders; Strain gauges and applications; Deflection of beams; Statically indeterminate problems; Energy methods; Stability of axially loaded beams (columns).
Pre-requisite: GE 201

ME 352 - Mechanics of Materials Laboratory  
Strain gauge applications: tension test, torsion test, cantilever beam, pressurized cylindrical vessel; Deflection of beams; Buckling of columns.
Co-requisite: ME 351

ME 360 - Mechanics of Machinery  
Topological characteristics of planar mechanisms; Degree-of-freedom; Position, velocity and acceleration analysis of linkages: graphical and analytical methods; Static and dynamic force analysis of machinery: graphical and analytical methods; Flywheels; Cam mechanisms; Law of gearing; Simple and planetary gear trains; Term project.
Pre-requisite: GE 202 & CSC 209

ME 363 - Mechanics of Machinery Lab.  
Introduction to the mechanics of machinery, study of various type of mechanisms like slider crank, four – bar, quick return mechanism, Hooke’s coupling and different kinds of gear trains through working models. Drawing the displacement profiles for various combinations of cam and follower. Balancing of rotating and reciprocating masses. Verification of gyroscopic torque equation etc.
Co-requisite: ME 360

ME 371- Thermodynamics -1  
Basics and definitions of thermodynamics; properties of pure substances First law of thermodynamics; Second law of thermodynamics; Entropy; Carnot and reversed Carnot cycles; simple and modified Rankine cycle; Gas power cycles; Refrigeration and heat pump cycles.
Pre-requisite: Phys 104
ME 372- Thermodynamics -2 3 (3, 0, 1)
Thermodynamic relations; Availability; Ideal gas mixtures; Gas-vapor mixtures; Thermodynamics of reciprocating gas compressors; Combustion; Introduction to internal combustion engines.
Pre-requisite: ME 371

ME 374 - Heat and Mass Transfer 4 (3, 0, 2)
Steady and unsteady heat conduction; Free and forced convection for external and internal flows; Heat exchangers; Properties and process of radiation, radiation exchange between surfaces. Mass transfer, Diffusion
Pre-requisite: ME 380

ME 380 - Fluid Mechanics 4 (3, 0, 2)
Dimensions and units; Fundamental concepts in fluids; Fluid statics; Control volume; Conservation of mass and momentum equations and its applications ; Energy equation; Differential form of equations; Stream function; Euler's equations; Bernoulli's equation and its applications; Dimensional analysis and model studies; Introduction to turbomachinery., Dynamics of fluid flow, steady and non steady viscous flow in pipes, Navier-Stokes equations; external flow characteristics, Boundary layer characteristics and equations; Blasius flow; Momentum integral equation; drag and lift. Introduction to one dimensional compressible flows; Types of flows; Isentropic flow in variable-area passages, shock waves.
Pre-requisite: ME 371 & GE 202

ME 383 - Thermo-fluid Laboratory -1 1 (0, 2, 0)
Temperature and humidities various measurements, Dead weight, Impact of a jet, hammer in pipes, Measuring the hydrostatic forces on the submerged surfaces, Performance test for a multi-stage reciprocating air compressor; Measurement of heating value of a gaseous fuel; Exhaust-gas analysis; Performance of spark ignition engine; Performance of compression ignition engine; Demonstration of fluid flow (flow visualization).
Co-requisite: ME 380& 372
ME 384 - Thermo-fluid Laboratory -2 1 (0, 2, 0)
Visualization of potential flow fields; Visualization of real flow around streamlined and bluff bodies; Pipe flow, velocity distribution, pressure drop and friction factor; Flow measurements: orifice, venturi and nozzle calibrations; Calibration of thermocouples; Free convection for a lumped capacitance thermal system; determination of thermal conductivities of a new metals; thermal performance of fins (free and forced convection).
Co-requisite: ME 364

ME 400 – Senior Design Project 3 hours
The student is assigned, among a team of students and one or more faculty professors, 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, viability studies, final design drawings, bill of quantities, and the total operating cost of the project. The graduation project shall continue for one semesters. 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
Pre-requisite: GE 405

ME-467 - System Dynamics and Automatic Control 4 (3, 0, 2)
Laplace transformation methods; Modeling of mechanical, electrical, hydraulic, pneumatic and thermal systems; Analogies; Mixed systems; Representation of control system components; Transfer functions and block diagrams; Time response of feedback control systems; Routh stability criterion, Root locus technique; Frequency response methods; Compensation; Term project.
Pre-requisite: MTH208 - CSC 209

ME-468 - System Dynamics and Automatic Control Laboratory 1 (0, 2, 0)
Experiments in support of control system theory including: servo control of electrical motors, control of linear and torsional vibrations, control of gyroscopic motion, control of pendulum motion, hydro-mechanical liquid level control, pressure control, pneumatic servomechanism, vibration control; digital simulation of linear systems using a software package (MATLAB).
The Elective Courses

ME 423- Renewable Energy 3 (3, 0, 1)
Basic and principles of conventional and non-conventional energy, energy conversion, power plant cycles, The distribution, variability and availability of all categories of renewable energy. Principles of renewable energy systems such as solar, wind, geothermal, and Nuclear energy. Environmental aspects of implementation of renewable energy. Topic also covers some practical applications to utilizing the renewable energy such as sea water desalination and power plants.
Pre-requisite: ME 372 & 374

ME 425 - Energy Φ Solar 3 (3, 0, 1)
Thermal aspects of solar energy conversion. Solar radiation measurement and prediction. Selected topics in heat transfer. Flat plate and focusing collector analysis. Solar energy storage. Solar systems including hot water, space heating and cooling, distillation and thermal power conversion.
Pre-requisite: ME 374

ME 431 - Tool Manufacturing 3 (3, 0, 1)
Principles of cutting tools, jigs, fixtures, fit and tolerances, tool cutting geometry, tool life, cost analysis, economics, and safety in tooling design applications.
Pre-requisite: ME 330

ME 441 - Mechanical Design -2 3 (1, 2, 1)
Design of mechanical elements: springs, lubrication and journal bearings, spur, helical, bevel, and worm gears, clutches and brakes, miscellaneous power transmission components; Term design projects.
Pre-requisite: ME 340

ME 453 - Modern Engineering materials 3 (3, 0, 1)
Pre-requisite: ME 351
ME 455 Corrosion Engineering 3 (3, 0, 1)
Pre-requisite: ME 351

ME-462 – Mechatronics 3 (3, 0, 1)
Mechanical system interfacing and actuation; Operational and power amplifiers; Analog to Digital and digital to analog converters; Digital data acquisition basics; Position/Orientation control; PWM control of DC motors, Sensors and actuators; Microprocessor-, microcontroller- and PC-based control; PLC basics and their programming; C programming (M-code & G-code) of CNC machine tools.
Pre-requisite: ME 467

ME-463 - Mechanical vibrations 3 (3, 0, 1)
Fundamentals of mechanical vibration, including free and forced vibration of single-, multi-and infinite-degree of freedom systems. Modal analysis and matrix formulation of vibration problems. Approximate solution techniques. Vibration and modal analysis of continuous systems: beams, rods, and strings. Approximate analytical as well as numerical solutions using suitable software such as MATLAB. Numerous examples and applications of vibration measurement and analysis, including vibration isolation and dynamic absorbers and rotating machinery. Laboratory experimentation for justifying the above topics.
Pre-requisite: ME 360

ME-466 – Robotics 3 (3, 0, 1)
Introduction to robotics and their applications, spatial descriptions and transformation, manipulator forward kinematics, manipulator inverse kinematics, trajectory generation Jacobians: velocities and static forces, manipulator dynamics, control of manipulators, robot programming, robot sensors and vision.
Pre-requisite: ME 467
Co-requisite: ME 467
ME-470 - Thermal Power Plants  
3 (3, 0, 1)  
Forms of energy, oil, gas and coal. Combustion processes, energy cycles. Steam generators and their component design. Turbines. Load curves. Field trips to power plants and other energy installations.  
Pre-requisite: ME 372 & 374

ME 474 - Refrigeration Engineering  
3 (3, 0, 1)  
Mechanical vapor compression refrigeration cycles (single-stage and multi-stage); refrigerant compressors; refrigerants; absorption refrigeration systems; thermoelectric cooling; flash cooling; gas cycle refrigeration; ultra-low-temperature refrigeration (cryogenics); food refrigeration; transport refrigeration. Laboratory will be utilized to carry out experiments on refrigeration equipment and in problem solving sessions.  
Pre-requisite: ME 372 & 374

ME 475 - Air Conditioning  
3 (3, 0, 1)  
Thermodynamics of moist air; construction of the psychrometric chart; psychrometric processes; psychrometric systems; industrial processes, air conditioning systems; duct design and air distribution methods; cooling towers. Experiments utilizing air conditioning equipment will be conducted for air conditioning systems will be practiced through a practical project in tutorial sessions.  
Pre-requisite: ME 372 & 374

ME-480 - Turbo Machinery  
3 (3, 0, 1)  
Thermo-fluid dynamics aspects of fluid flow, efficiencies of turbomachines. Two dimensional cascades: turbine and compressor cascade correlations and performance. Axial turbines (two-dimensional analysis), axial flow compressors and fans (two-dimensional analysis), centrifugal compressors and fans, radial flow turbines.  
Pre-requisite: ME 372 & 380
ME 482 - Compressible Fluids  
3 (3, 0, 1)  
Fundamentals of compressible fluid flow (gas dynamics) in relation to effects of area change (nozzles and diffusers), friction and heat interaction (Fanno, Rayleigh line and isothermal flow), combustion waves normal and oblique shock waves and their effects on flow properties (extended diffusers and supersonic airfoils). Applications to flow through pipelines, subsonic, sonic and supersonic flights, turbomachinery and combustion.  
Pre-requisite: ME 380

ME 483- Pumping Machinery  
3 (3, 0, 1)  
Terminology and description of typical pump machinery. Momentum and energy transfer between fluid and rotor. Performance characteristics of centrifugal and axial flow fans, compressors, and pumps. Various types of losses. Positive displacement pumps. Cavitation and water hammer problems in pump systems. Special problems in pump design and applications. Laboratory experiments will include performance evaluation of various types of pumps and problem-solving sessions.  
Pre-requisite: ME 380

ME 490 - Selected Topics In Mechanical Engineering  
3(3, 0, 1)  
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  
Pre-requisite - Co-requisite: to be stated
Courses Offered by Other Departments

EE 318 - Fundamentals of Electric circuits 3 (3, 0, 1)
Pre-requisite: Phys 104

EE 339 - Electrical Machines 2 (2, 0, 1)
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.
Pre-requisite: EE 318
For any improvement suggestions or proposals, Please email to:

qec@qec.edu.sa
or
meupdates@qec.edu.sa