# ENGINEERING

SU ARISH
SINAI UNIVERSITY

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## Message from The Dean

Welcome to the Faculty of Engineering at Sinai University. We are pleased to have you visit our site where you will find helpful information for students, faculty and staff members, alumni and industry partners. Under the guidance of university board, the faculty provides an environment of learning through the applied coursework. Our major goal is to provide a high-caliber technical work force for the future. Our programs offer a balance of practical skills, solid theory, and the use of computer technology, which will allow you to obtain new knowledge and skills when pursuing your career. It is an important goal of our programs to help you become independent learners. By the time you take your graduation project in the fifth year, you will be expected to manage your time and use all the knowledge you acquired in previous years. In addition to our departments, we have several social and sport extracurricular activities. Our students receive advising support from the faculty members and through the Academic Advising Programs supported by the university administration and guided by the unifying principles of learning, discovery, and community needs. .If you are interested in receiving general information about the Faculty, email the Dean's office and we will send you a brochure. We hope you will enjoy your cyber visit to the Faculty of ENGINEERING. We appreciate your comments on our website.

 **Professor Dr. Mohammed Abd Elsalam**

**Dean. Faculty of Engineering**

**Sinai University**

## INTRODUCTION

Engineering is a profession directed towards the skilled application of a distinctive body of knowledge based on mathematics, science and technology, integrated with business and management, which is acquired through education and professional formation in a particular engineering discipline. Engineering is directed to developing, providing and maintaining infrastructures, goods and services for industry and the community.

Being among labor force; engineers carry out a wide range of roles. Some would find a place on the design and development of remarkable –field related- products, using the latest up to date technologies.

Engineers would come across employment in the field of sales, where communication skills play a big role to succeed, in the manufacturing industries, where hands-on skills are valuable; engineers are among those required-valuable- skills. In some cases they would find a void in research activities, discovering new knowledge, and they would be employed to work for consulting firms that perform work on a contract basis, such as in the construction of a bridge or the design of a factory or an airport. Engineers also would hit upon job chances in the teaching profession, usually in an engineering program or a technology program, still lots of them –in accordance to their positions after graduation- would make the transition to a management position, performing a business role rather than a design role task. Sales engineers do more than selling engineering products; they serve as a link between the customer and the design engineer.

## Mission:

The faculty of ENGINEERING looks for its mission as a heaven reward to the land of Sinai and its inhabitants based on three main alliances:

## Teaching and learning

Leadership in saving unique diversity that lifts up the institutional values seeking to prepare the students as leaders on the near future by:

1. Caring, developing and considering the innovative students

2. Preserving a mental development plan for students through openness, creative and true concepts taking place throughout the engineering field.

## Academic Research

Active and powerful research that integrates the academic knowledge with the practical and artistic skills needed for sustainable development in Sinai, Egypt and consequently the rest of the world.

Community Services

To lift up Sinai Society through enhancing the life quality of its inhabitants by saving and promoting its specialists services to Sinai people, societies and its exertion business organizations.

## Vision:

To be the leading educational faculty in ENGINEERING and its applications and the glitter in altering Sinai economic, social and political situation; pioneering in presenting the highest quality in teaching, learning and academic research that has a true influence in Sinai community service.

## Goals and Objectives

The distinctiveness of the engineering science programs are seen through an appreciation of the uniqueness of the program design and in conveying its unique features to students, teaching staff, managerial staff and community. Thus several types of objectives are considered in multiple levels.

## Student-based Objectives:

We share the institutional values of Sinai University; therefore we place students at the core of our educational objectives; so save all of our efforts to.

1. Enhance students' capacity to engage in extended project plans, in both of an independent basis and in collaboration with their peers, by this means we prepare our students for further academic study and employment.

2. Explore the central features of the discipline(s) that the engineering field covers;

3. Attract students who will benefit from studying in a research-enriched environment;

4. Open access to study a range of unique areas within the discipline;

5. Focus on the challenging nature of knowledge within the discipline.

## Department and Subject based Objectives:

1. To provide a seed-bed for ideas that can be exploited in research programs within multiple departments;

2. To provide the different community organizations with new members;

3. To constitute an example of "best practice" to other peer faculties as being "state of the art".

## Employer-based Objectives:

1. To meet the requirements of potential employers in a specific sector

## Society-based Objectives:

1. To positively have impact on the social fabric of the local community (i.e. Sinai);

2. To widen participation within the body of students studying the discipline;

3. To contribute to society through developing the student's sense of engineering responsibility to their communities.

## THE ATTRIBUTES OF THE ENGINEER

The graduates of the engineering programs should be able to:

a) Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.

b) Design a system; component and process to meet the required needs within realistic constraints.

c) Design and conduct experiments as well as analyze and interpret data.

d) Identify, formulate and solve fundamental engineering problems.

e) Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.

f) Work effectively within multi-disciplinary teams.

g) Communicate effectively.

h) Consider the impacts of engineering solutions on society & environment.

i) Demonstrate knowledge of contemporary engineering issues.

j) Display professional and ethical responsibilities; and contextual understanding

k) Engage in self- and life- long learning.

# Bulletin Articles

## Article (1): Admission Requirements

For admission to the faculty of engineering science at Sinai University a student must have a secondary school certificate (Mathematic branch) or equivalent with grades defined by the university council and according to the rules of the council of private universities. The faculty accepts transfer students from equivalent educational institutions according to the rules of university council .

## Article (2): Faculty Departments

- Department of Architectural Engineering
- Department of Civil Engineering
- Department of Electrical and Computer Engineering
- Department of Mechanical Engineering
- Department of Bio-Medical Engineering

The Faculty may establish other specialties in the future, in accordance with the provisions of the law of private universities.

## Article (3): Faculty Degrees

Faculty of ENGINEERING offers the folowing Bachelor Degrees:

### Bachelor of Science in Architectural Engineering

o With Branches in:

- Architectural and Interior Design
- Urban and City Planning

### Bachelor of Science in Civil Engineering

o With Emphases on Structural Engineering, Transportation Engineering and Environmental Engineering

### Bachelor of Science in Electrical and Computer Engineering

o With Branches in

- Electronics and Communication Engineering
- Computer and Control Engineering
- Electrical Power and Machines Engineering
- Communication and Information Engineering

### Bachelor of Science in Mechanical Engineering

o With Branches in:

- Design and production Engineering
- Mechanical Power Engineering
- Mechatronics Engineering

### Bachelor of Science in Bio-Medical Engineering

## Article (4): Study System

- The faculty of Engineering follows the credit hours system where one lecture credit hour is taught one hour per week during one semester and one practical or tutorial credit hour is taught from (one to four hours) per week for 15 weeks.

- The B. Sc program consists of ten semesters (165 credit hours). Each semester ends with an examination. The academic year is divided into three semesters: Fall Semester (15 weeks), Spring semester (15 weeks) and Summer Semester (7 weeks). Enrollment in the program is at the beginning of each semester.

- The program is planned to include a group of compulsory courses and a group of elective courses which cover requirements of University, Faculty, Main Specialization and specific Branch of such specialization.

- When the student Earned 25 Credit hours he/She is allowed to select one of the faculty scientific department according to the rules approved by the University Council.

### Graduation Project

When the student Earned 130 Credit hours he/ She is allowed required register the graduation project. The period of project is two complete semesters (not include the summer semester) with the oral examination at the end of the second. The date and time of the oral exam is determined by the faculty council and announced to the student.

## Graduation Requirements

To earn B. Sc in Engineering from Sinai University it is required to pass:

- The total credit hours assigned for the department study plan with a CGPA not less than 2 points out of 4.

- In addition, the student has to pass The graduation project.

- In addition, the student has to pass a minimum of six practical summer training weeks under the supervision of the university and he should submit a technical report approved by his department about his training.

- Regular students can earn B. Sc in 9 semesters at least.

The student may be expelled after 10 years if he/she does not finished the graduation requirements

## Article (5): Language of Instruction

English language is the language of teaching and learning for all faculty programs.

## Article (6): Academic Advising and Academic Regulations

- The Faculty assigns a number of its faculty members as academic advisors for its students. The academic advisor guides and helps the student to choose and register for the suitable courses throughout the period of his school time study. The Faculty Board assigns the enrolled students at the Faculty to the advisor based on the recommendation of the Committee on Education and Student Affairs. The academic advisor's opinion is only for orientation, and the student is fully responsible for his course's selections.

- All registered students in the program are subject to the provisions of the following University Academic Regulations.

- Any student whose seasonal fees have not

been paid in full will not be allowed to proceed to the next year of the course and will be required to withdraw from the faculty. In case of unpaid fees or charges at the time of graduation; the graduation certificate will be postponed until all required debts are being paid.

- Undergraduates must inform their advisors if they are absent from faculty for more than one week during term. If the absence is due to illness a medical certificate must be presented and submitted. If an examination is missed on account of illness a medical certificate should be submitted immediately.

- Students must notify the faculty about any change in their home address.

## Article (7): Registration, Deletion and Addition

Upon making tuition and fees payments, a student has to consult his academic advisor in selecting his/her courses for each semester according to the academic calendar deadlines. Actual enrolment cannot begin until registration is complete. Registration updates, whether by adding or dropping courses, must occur during the designated period according to the academic calendar and on the designated form (the add or drop form).

- Registration: A student must register personally at the prescribed time according to the university calendar, in the courses which he wishes to pursue in the following semester, after consulting his academic supervisor. Registration must be fully completed before a student attends any class.

- Late Registration: A student will be allowed to register a week after the registration deadline with the permission of the Vice President of Students' Affairs and the faculty Dean. An acceptable reason is needed for the approval of the registration.

- Freshmen students must register and successfully pass the English language courses ENG 101 & ENG 102 during the first two years. Withdrawal from any of these courses is not allowed unless approved by the Dean of the faculty.

- Academic Load: Undergraduate students can take an academic load ranging from a minimum of (12) credit hours (for students with a CGPA less than 2.0) and a maximum of (18) hours for other students. The Maximum load may be increased by -up to- three credit hours for students with a CGPA not less than

3.0 (subject to approval of the academic advisor and the Dean of the faculty) . A student pays the fees in full if he/she has a 12 hours registration or more in a semester. Accordingly, a student who withdraws from any course will not be refunded for the fees he\she paid. In the summer session, students may take up to seven credit hours. Permission to exceed this maximum to nine credit hours is given for students expected to graduate in the same summer session.

- A course cannot be registered until its prerequisite is successfully passed.

- Registration for conflicting courses (according to academic schedules) is not allowed.

- Add and drop courses: During the first two weeks of the semester, and after consulting and getting permission from the academic advisor, a student is allowed to add and drop any course considering the maximum and minimum allowed credit hours.

## Article (8): Attendance and Absence

- The student should achieve attendance not less than 75% of lectures tutorials and labs in each course in order to enter the final exam.

- If the absence of the student - without an acceptable excuse - exceeded 25% in any course; the Faculty Council has the right to deny student's entry for the final exam "provided that the student has been warned". He is then given a grade of "zero" in the degree of the final test of the course.

- A student who is absent from the final exam without an acceptable excuse is given the degree of "zero" on that exam and will be included in the quarterly business degrees obtained.

- If the student's progress excuse for failure to attend the final exam accepted by the Faculty Board within two days before the examination, the subject is calculated by a rating of "incomplete" in this decision, provided that the student hold at least 60% of the degrees of business quarterly, and has not been denial of entry of final exams. In this case, he is given opportunity to perform the final exam in the next semester, or in the time specified by the Faculty Board. The final grade for the student is calculated on the basis of the degree obtained by the final exam in addition to the degree obtained in the previous quarterly business

## Article (9): Withdrawal from a Course or Semester

- Withdrawal from a course: Students are allowed to withdraw from a course if they found themselves unable to complete. This must take place in specific time as per the academic calendar. In this case, the student will be granted a "W" in his result sheet which refers to his withdrawal. This will not affect the student's GPA; and the student will not be refunded for the fees he\she paid for this course. In any withdrawal case the number of hours registered by the student should not be less than 12 credit hours.

- If the student withdrew from a course or more after the set period without an accepted excuse by the Faculty Board, each of the withdrawn courses will be recorded as a "failure" grade.

- Withdrawal from a semester: Students are allowed to withdraw from a semester (with a maximum of three semesters) provided that they have to fill a withdrawal form before the end of withdrawal period ,being set by the academic calendar, explaining the reasons for this, in addition to getting the Faculty Dean's authorization. Withdrawal grade "W" will be recorded for each course when the student receives permission to withdraw. This will not affect the student's GPA. Withdrawn students have no right to be refunded for their tuition fees.

## Article (10): Dropout

1- The student will be cut off from the study if not registered in a class or withdrew from all courses of the semester without an acceptable excuse.

2- If a student does not register in one semester or more without permission, he would be considered having made interruption in his study without excuse. He may re-register after having an approval from the university council and according to SU rules and regulations. Students who are unable to register for a semester because of illness or other excuses, approved by the university council, may be given permission to postpone their study. In such a case, to re-register a student must acquire a form from the admission office and return the completed form after obtaining the required signatures indicated on the form.

## Article (11): Academic follow-up (Probation/Warning)

The student is academically monitored and closely

followed-up.  In case a student's CGPA drops below 2.0  he/she is warned and placed on probation until he/she improves his/her CGPA . In case the student fails to improve his/ her CGPA to become 2.0 or more and this poor performance persists for four consecutive semesters or six non-consecutive semesters, he/she may be expelled.

## Article (12): Repeating Courses

### a. Repeating a course with grade of "F":

When a course in which the student previously earned a grade of "F" is repeated, the original grad of "F" is disregarded and the new earned grade will be used in calculating the grade point average. Both grades will appear in the student's transcript.

If the student repeats a failed course for the second time or more, the new grade of the student in the repeated course is limited to grade "D" irrespective of the score achieved by student in the last trial. However all course trials grades will appear in the student's transcript.

### b. Repeating a course with grade of "D" or above:

All students pursuing an undergraduate degree may repeat a course one time for the purpose of improving a grade. This policy is limited to a maximum of three courses during the entire undergraduate career of a student, and to courses taken at SU within the previous two years. All courses repeat must be done at SU. The course being retaken must be the same course first taken.

Students are advised that repeating a course does not result in the removal of the original record or grade from their transcripts. The second grade is recorded and computed in the grade point average and the earlier grade is disregarded in calculation of the grade point average unless the student gets a second grade which is less than the first one, in this case the new grade is disregarded in calculation of the grade point average and does not appear in the student's transcript. A repeat course form must be submitted to administration office after being approved by academic advisor and faculty Dean.

Repeating a course in any semester is subject to the availability of spaces in the course.

## Article (13): Transfer and Readmission

Applicants who have attempted other undergraduate studies must submit official academic transcripts, mark sheets, and/or certificates from the faculty attended regardless of whether they have earned credit or seek transfer credit. All academic records not in English or Arabic must be accompanied by certified English translations.

When the student transfers to a faculty from a similar faculty, a course evaluation process will be carried out by the academic department to decide on which courses to be accepted, and added to his "GPA" calculations.

Students who withdraw from the University in good standing and subsequently wish to return after an absence of one or more semesters may apply for readmission. Readmission is offered on a space-available basis and is not guaranteed.

## Article (14): Administrative Regulations

1. Each department prepares a complete description of the contents of courses to be taught, and presents the content to the Committee on Education and Student Affairs. After approval by the Faculty Board, the approved course contents become binding on the faculty members who teach these courses.

2. The Faculty Board on the proposal of the District Councils concerned may change or modify the registration requirements and the contents of any course.

3. The Committee on Education and Student Affairs conducts periodical academic checkups in coordination with the academic advisor. The student of low academic achievement will be given a report of his/her academic status. The Council will adopt a follow up policy to the academic status of the student.

4. The Faculty Board may organize training courses or refresher studies in the subjects that fall within the specialization of the various departments.

5. The Faculty Board may approve the holding of intensive summer classes in some courses on the proposal of Departments, and as permitted by the conditions of the Faculty.

## Article (15): Grading System

Student work in each course is evaluated throughout the semester. Examinations, quizzes, reports, discussions or other means of evaluation help students know how they stand in a course.

Final examinations review the entire semester's

work. Each examination lasts no longer than three hours and counts for no more than 50% of the final course grade. Except in senior high level courses where extensive writing assignments and projects pertain, no other element in the final course grade will count for more than one-half. Final examinations are held during the official examination period, which is listed in the academic calendar of the Faculty of Engineering. At the close of the semester students receive a final grade in each course. The grade is the professor's official estimate of the student's achievement as reflected in examinations, assignments, and class participation. The final grades are recorded on the student's permanent record at the Office of the Registrar. The grade may not be changed on the student record.

## Evaluation System:

A grade is reported for each course in which a student has enrolled to indicate the quality of performance in that course. The grading system used at Sinai University is as follows:

| Grade | Definition | Marks | Points |
|-------|-----------|-------|--------|
| A+ | Excellent | 95 - 100 % | 4 |
| A | | 90 - < 95 % | 4 |
| A- | | 85 - < 90 % | 3.7 |
| B+ | Very Good | 80 - < 85 % | 3.3 |
| B | | 75 - < 80 % | 3 |
| C+ | Good | 70 - < 75 % | 2.7 |
| C | | 65 - < 70 % | 2.4 |
| D | Pass | 60 - < 65 % | 2 |
| F | Fail | Less 60 % | 0 |

Remarks:
- Minimum required percentage to pass any course is 60%.
- If a student grades less than 30% in the final written exam, no marks will be registered for him/her, and will be given "F" in the course.
- Student's grades are announced to them. Upon his/her request, a student may check his/her own answer sheet to make sure of the degrees he/she has got.

## Grade point Average (GPA) and

## cumulative Grade point Average (CGPA)

The grade point average is computed each semester to show the student academic standing in that semester. The grade points value of each registered course is multiplied by the number of credit hours the course represents to get the quality points of that course. The total quality points are then divided by the total credit hours, excluding the credit hours for the "F" courses, to obtain the grade point average of the student at the semester (GPA).

## An example for calculating the GPA:

| Course Code | Credit Hrs | Grade | Point | Quali ty Point |
|-------------|-----------|-------|-------|----------------|
| ENB 1101 | 4 | A | 4 | 16 |
| ENB 1202 | 3 | B | 3 | 9 |
| ENM 1101 | 2 | C | 2.4 | 4.8 |
| ITC  1110 | 2 | D | 2 | 4 |
| ENB 1102 | 4 | F | 0 | 0 |
| Total | 15 | | | 33.8 |

## GPA=33.8/15=2.25

Decimals beyond 2 places are truncated, not rounded up, in computing the grade point average.

## Cumulative Grade Point Average

(CGPA):- is a calculation of the average of all of a student's grades for all semesters and courses completed up to a given academic term where GPA may only refer to one term

## CGPA= Total Points / Net Ch

Net Ch: Total number of registered credit hours after excluding repeated courses

Total Points: Total quality points of student's registered courses

## Article (16): Honor Degree

Honors: As the rules of, SU honors is awarded to students who do superior work. Student who earns a Grade Point Average (GPA) of 3.0 or above with no incomplete (I) grades or fail (F) for the previous semester is placed on

the dean's honors list. Graduation honors is awarded to students who have maintained a (GPA) and a (CGPA) of 3.0 or more throughout their study career.

## Article (17): Grade Rules

### 1- Grades not included in the Grade Point Average:

| Grade | Description |
|-------|-------------|
| I | Incomplete |
| W | Authorized Withdrawal |
| Z | Unauthorized Withdrawal |
| AU | Audit |
| IPG | In Progress |
| NP | No Pass |
| NG | No Grade |

### 2- Incomplete (I):

If the student does not attend the final exam of any course due to a compelling excuse approved by the faculty council, the course is reckoned as Incomplete (I). In such a case, the student should take the final exam of this course at the time to be fixed by the faculty on condition that the deadline for it would be before the end of the next semester, taking into consideration that the student's written and lab marks in the semester are registered as it is. If the student fails to set for the exam in his course in the period specified above, he will have a failure grade "F".

### 3- No Grade (NG)

No grade was issued by the instructor. This is a temporary grade which will be replaced by the actual grade when it is reported.

### 4- Withdraw (W)

A student may withdraw from an academic semester or from course/courses within the withdrawal period announced in the academic calendar for that semester. Under no circumstances can an instructor assign a (W) in a course.

## Article (18): General

The provisions of the law regulating the private universities and its implementing regulations will be applied for any articles not contained in the text in this bulletin.



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| Architectural Engineering | ENA | Architectural and Interior Design | A |
|---|---|---|---|
| | | Urban and City Planning | U |
| Civil Engineering | ENC | | |
| Electrical Engineering | ENE | Electrical Power and Machine Engineering | P |
| | | Computer and control Engineering | C |
| | | Electronic and Communication Engineering | E |
| | | Communication and Information Engineering | CIE |
| Mechanical Engineering | ENM | Design and Production Engineering | D |
| | | Mechanical Power Engineering | P |
| | | Mechatronics Engineering | M |
| Bio- Medical Engineering | ENI | | |

## 2- Codes of Humanities and Social Sciences and Basic Sciences

ENH             Humanities and Social Science

ENB             Basic Science

## 3- Level codes:

Code             Level

1 Preparatory year   (Level 1)

2 First year         (Level 2)

3 Second year        (Level 3)

4 Third year         (Level 4)

5 Fourth year        (Level 5)

## 4- Course Code:

| Department Code | Level | Semester | Course no. |
|---|---|---|---|
| ENA, ENC, ENE, ENM, ENI, ENH, ENB | (1 – 5) | (1 – 2) | (1 – 99) |

The code of electives courses are shown as follows:

| Department Code | Elective | Department's branches | Course no. |
|---|---|---|---|

| ENA, ENC, ENE, ENM, ENI, ENH, ENB | (E) | (X) | (1 – 99) |
|---|---|---|---|
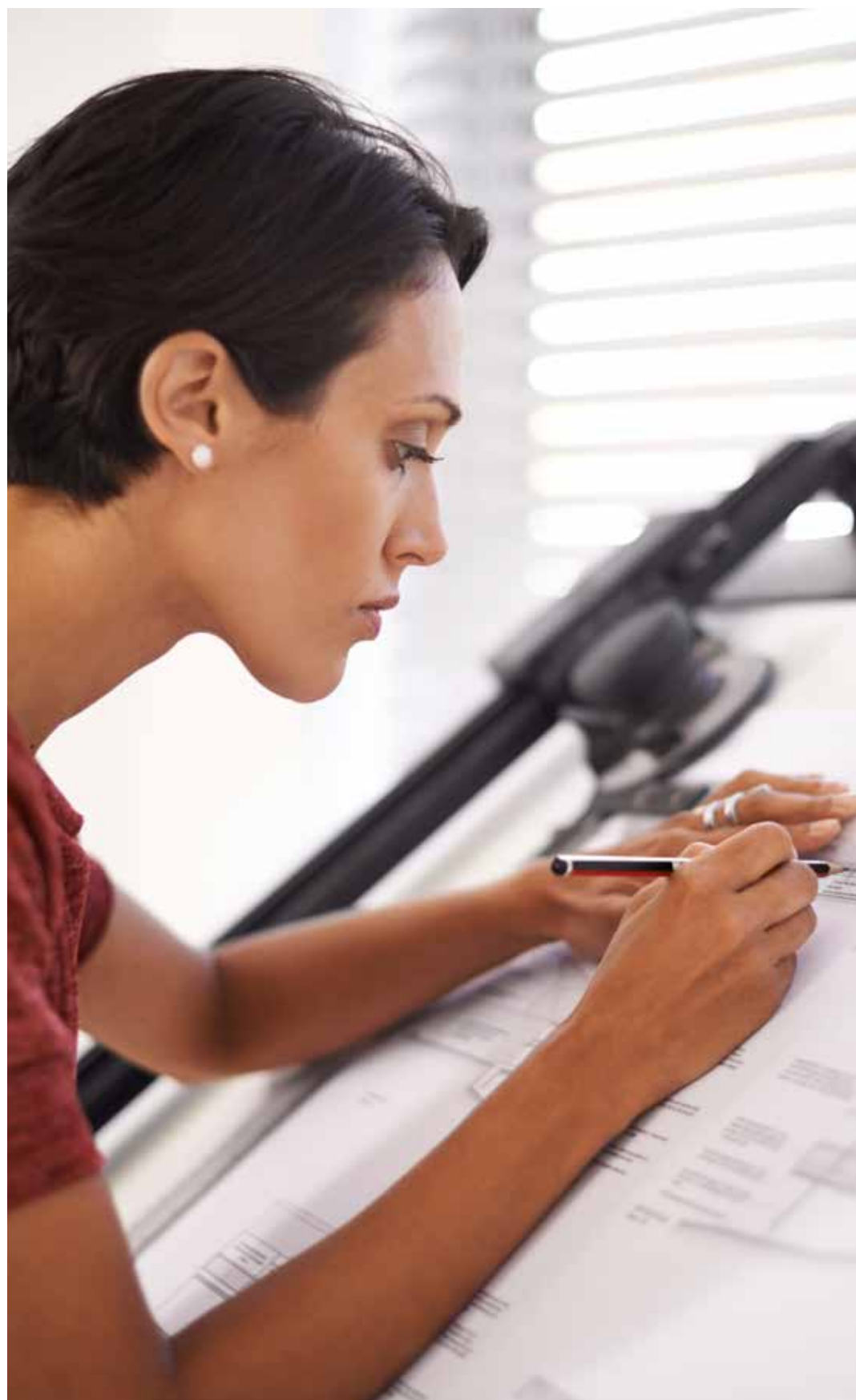
## Examples:

* Course Code: (e.g. ENC 1101)

1. The first and second Letters represent the faculty offering the course (EN= Engineering).

2. The third Letter: represents the department offering the course (C= Civil).

3. The first digit represents the level of study (from 1 – 5).

4. The second digit represents the semester number (from 1 – 2)

5. The third and fourth digits represent the course number.


* Course Code: (e.g. ENM EP01)

1. The first and second Letters represent the faculty offering the course (EN= Engineering).

2. The third Letter: represents the department offering the course (M= Mechanical).

3. The first digit represents the level of study E represents elective course.

4. The second digit represents the branch (P Mechanical power Engineering)

5. The third and fourth digits represent the course number.


## Article (20): University Requirements Courses

**University Requirements**

| Course code | Course Title | Hours | | | |
|---|---|---|---|---|---|
| | | L | T | P | Ch |
| ITC 1101 | Introduction to Computer Science | 1 | - | 2 | 2 |
| SSG xx01 | Sinai History | 2 | - | - | 2 |
| SSG xx02 | Human Rights | 1 | - | - | 1 |
| SSG xx03 | Scientific Thinking | 1 | - | - | 1 |
| SSE 1101 | English Language(1) | 1 | - | 2 | 2 |
| SSE 2102 | English Language(2) | 1 | - | 2 | 2 |
| SSG xxxx | General Elective – A1 | 2 | - | - | 2 |
| SSG xxxx | General Elective –A2 | 2 | - | - | 2 |
| Total | | 11 | - | 6 | 14 |

## Article (21): General Elective Courses

## General Elective -A Courses      (4Ch)

| Course code | Course Title | Hours | | | | Prerequisite |
|---|---|---|---|---|---|---|
| | | L | T | P | Ch | |
| SSG xx04 | Introduction to Sociology | 2 | - | - | 2 | |
| SSG xx05 | Introduction to Psychology | 2 | - | - | 2 | |
| SSG xx06 | Introduction to Political Sciences | 2 | | | 2 | |
| SSG xx07 | Introduction to the History of Civilization | 2 | - | - | 2 | |
| SSG xx08 | Recent Egyptian History | 2 | - | - | 2 | |
| SSG xx09 | Arab & Islamic Civilization | 2 | - | - | 2 | |
| SSG xx10 | Industrial Social Sciences | 2 | - | - | 2 | |

## General Elective -B Courses      (2Ch)

| Course code | Course Title | Hours | | | | Prerequisite |
|---|---|---|---|---|---|---|
| | | L | T | P | Ch | |
| BAB xx01 | Introduction to Business Administration | 2 | | | 2 | |
| BAB xx02 | Introduction to Economics | 2 | | | 2 | |
| BAB 41xx | Introduction to Accounting | 2 | - | - | 2 | |

## Article (22): Faculty Requirements Courses

## Faculty Requirements

| Course code | Course Title | Hours | | | |
|---|---|---|---|---|---|
| | | L | T | P | Ch |
| ENB 1101 | Calculus and Analytic Geometry (1) | 3 | 2 | - | 4 |
| ENB 1102 | Physics (1) | 3 | 1 | 2 | 4 |
| ENB 1103 | Mechanics (1) | 2 | 2 | - | 3 |
| ENB 1204 | Chemistry (1) | 3 | - | 2 | 4 |
| ENB 1205 | Mechanics (2) | 2 | 2 | - | 3 |
| ENB 1206 | Calculus and Analytic Geometry (2) | 3 | 2 | - | 4 |
| ENH 1201 | Engineering History | 1 | - | - | 1 |
| ENH 2202 | Communication and Presentation Skills | 1 | 2 | - | 2 |
| ENH 3105 | Technical Report Writing | 2 | - | - | 2 |
| BAH 4202 | Management & Marketing | 2 | - | - | 2 |
| ENH 2203 | Principles of Negotiation | 2 | | - | 2 |
| ENH 3104 | Professional Ethics | 2 | - | - | 2 |
| ENM 1101 | Engineering Drawing | 1 | - | 3 | 2 |
| ENM 1202 | Production Technology | 2 | - | 3 | 3 |
| ENM 3212 | Engineering Economics | 2 | - | - | 2 |
| ENM 5122 | Project Management | 2 | - | - | 2 |
| BAB 4101 | General Elective - B | 2 | - | | 2 |
| | Total | 35 | 11 | 10 | 44 |

# Department of

# of
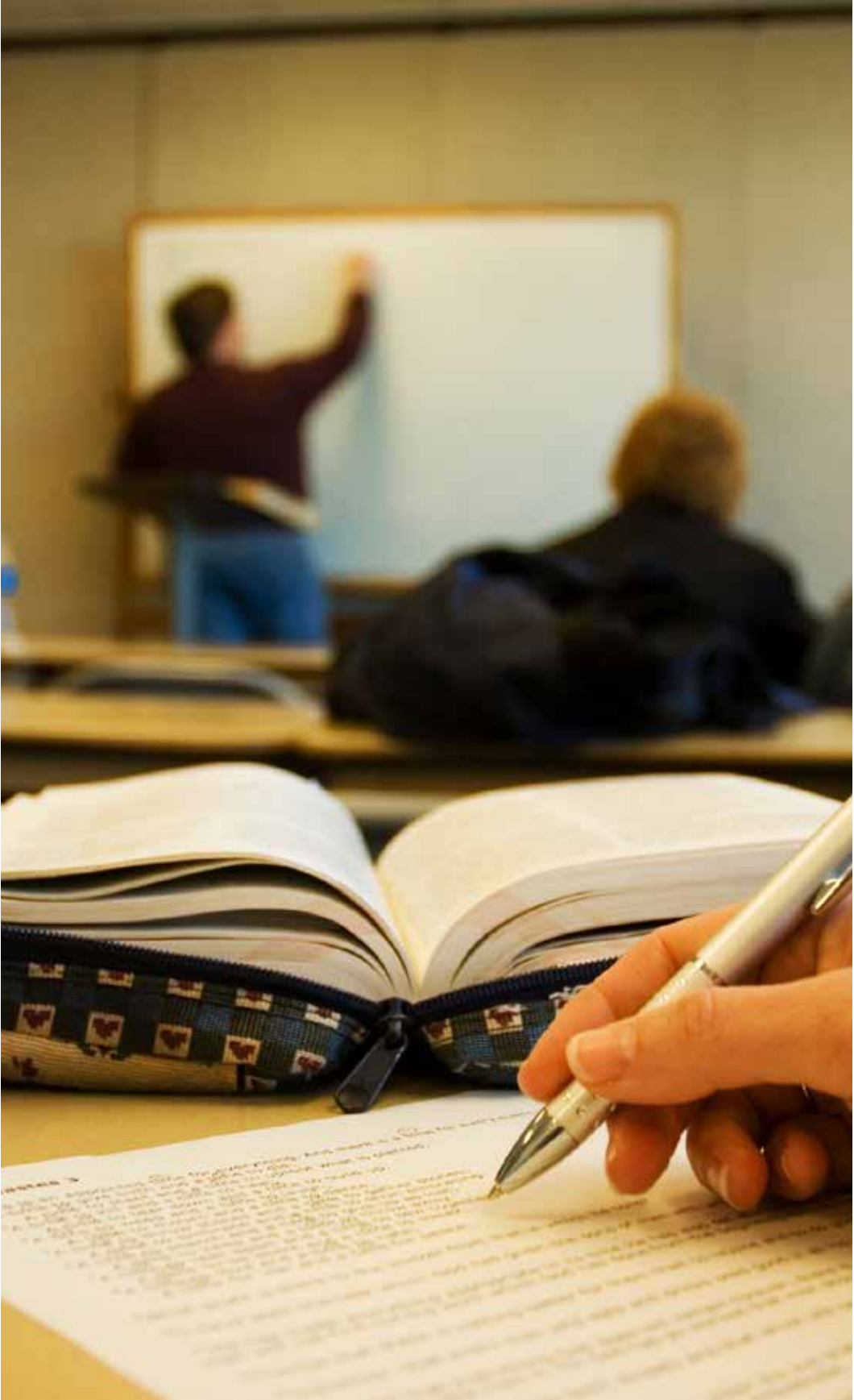
# Architectural Engineering

# Architectural Engineering

Bachelor of Science in Architectural Engineering in one of the following branches:

1) Architectural and Interior Design.

2) Urban and City Planning.

- A grade of -at least-'C' in Engineering Drawing Course ENM1101 is required for this department.

- Students who do not fulfill this requirement might be asked to pass a qualifying course/exam in order to join the department.

- The student should complete at least four weeks training, under supervision of a department member, in an Architectural engineering project.

## 1- Introduction

Architecture is a fascinating subject involving wide-ranging academic, practical and vocational activities. It requires creativity, imagination and technical knowledge and skills, and involves study of the arts, history, technology and cultural context. Architecture is normally studied with a view to becoming a professional architect, but it is also an excellent vehicle for further academic study at postgraduate level and other forms of career development.

Architects plan, design, and supervise construction of many essential facilities and structures for residential commercial, industrial and institutional buildings. These building systems include electrical, communications and control, lighting, heating, ventilating, air conditioning, fire protection, plumbing, and structural systems. Architects should be able to solve problems as well as apply the latest in high-tech equipment and sophisticated procedures to address challenges concerning our environment and infra-structure.

Architecture is a broad field. Because of this breadth, courses are required in each of the above areas. Although an architect, may specialize within a given area, by the very nature of the profession it is required to interact with specialists in the other areas. Architects also must be effective in communicating with the public and be expected to work with property owners, city officials, attorneys, and even medical doctors for concerns related to public health measures.

## 2- Mission

Our mission is to build the character and develop a multidimensional personality of future architects through structured education, to educate students for future architectural design practice through rigorous curricula, and to advance knowledge of the discipline to benefit the society locally, regionally, and internationally through scholarly research.

The Architectural Engineering Program will provide students with the tools necessary to solve Architectural problems critical to our society's well-being. This will be accomplished through a comprehensive, forward- looking and broad-based Architectural engineering curriculum emphasizing fundamentals, practical applications, oral and written communication skills, computer applications skills, and professional practice issues and ethics. The Program will prepare graduates for entry into the Architecture profession, for life-long learning, and to take their role as Architects in a global society.

## 3- Vision

The Department will be an internationally acclaimed learning community engaging in exemplary architectural and urban planning education, rigorous research and scholarship, and strengthening links to the professional and university communities, and the broader community.

The Department of Architecture will:

- · Educate its students to become effective practitioner in the profession of architecture and urban planning.

- · Enrich the understanding of architecture as a broad humanistic and scientific discipline through sound training and multidisciplinary education.

- · Create community figures that are able to meet the demands of a changing profession with technical skills that are complemented by personal vision, ethical persuasiveness, and entrepreneurial drive.

- · Advance scholarly knowledge through research and active collaboration with professional and academic communities.

- · Support the local community through mutual collaboration and addressing areas of communal interest.

## 4- Program Objectives

Consistent with the mission of the Architecture Engineering Program, graduates of the Architecture Engineering Program will have:

1) A strong fundamental scientific and technical knowledge base which they will be able to apply to experimental design as well as analysis and interpretation of data in conducting experiments.

2) Ability to apply engineering skills and work in multi-disciplinary teams to identify and formulate solutions for architectural problems, and to analyze and design Architectural projects.

3) Competence in the use of the latest tools and techniques in Architectural practice and the ability to effectively communicate resulting technical and professional information in written, oral, and visual formats.

4) An awareness and understanding of the ethical, legal and professional obligations needed to function as part of a professional enterprise and to protect human health and welfare, and to preserve the environment in a global society.

## Programs Credit Hours

The Bachelor degree of architectural Engineering is granted to students who successfully complete a minimum of 165 credit hours 5 levels, 10 semesters divided as follows:

| Year | Architecture and Interior Design | | | | Urban and City Planning | | | |
|---|---|---|---|---|---|---|---|---|
| | L | T | P | Ch | L | T | P | Ch |
| Level 1 | 25 | 9 | 14 | 35 | 25 | 9 | 14 | 35 |
| Level 2 | 26 | 27 | 4 | 37 | 26 | 27 | 4 | 37 |
| Level 3 | 26 | 22 | 4 | 34 | 26 | 22 | 4 | 34 |
| Level 4 | 19 | 29 | 0 | 29 | 17 | 30 | 4 | 29 |
| Level 5 | 20 | 26 | 0 | 30 | 20 | 27 | 0 | 30 |
| Total | 116 | 113 | 22 | 165 | 114 | 115 | 26 | 165 |

L= lecture hours, T = tutorial hours, P = practical hours, Ch= credit hours

# 7-STUDY PLAN

## Department Requirements

| Course code | Course Title | Hours | | | |
|---|---|---|---|---|---|
| | | L | T | p | Ch |
| ENA 2101 | Architectural Design (1) | 2 | 6 | - | 4 |
| ENA 2102 | Theory of Architecture (1) | 3 | - | - | 3 |
| ENA 2103 | Building Constructions  (1) | 1 | 2 | 2 | 2 |
| ENA 2104 | **Visual Studies (1)** | 2 | 2 | - | 3 |
| ENA 2205 | Architectural Design (2) | 2 | 6 | - | 4 |
| ENA 2206 | Applications of Computer in Arch. (1) | 2 | 6 | - | 4 |
| ENA 2207 | History Of Architecture (1) | 2 | - | - | 2 |
| ENA 2208 | **Visual Studies (2)** | 2 | 2 | - | 3 |
| ENA 3109 | Architectural Design (3) | 2 | 6 | - | 4 |
| ENA 3110 | **Theory of Architecture (2)** | 3 | - | - | 3 |
| ENA 3111 | Building Construction (2) | 1 | 2 | 2 | 2 |
| ENA 3212 | Architectural Design (4) | 2 | 6 | - | 4 |
| ENA 3213 | History Of Architecture (2) | 2 | - | - | 2 |
| ENE EA01 | Fundamentals of Electrical and Electronic Eng. | 1 | 2 | 2 | 2 |
| ENA 3215 | Urban Design (1) | 2 | 2 | - | 3 |
| ENA 4117 | **Working Drawings (1)** | 1 | 6 | - | 3 |
| ENA 4119 | **Evolution of the Built Environment** | 2 | 2 | - | 3 |
| ENA 4222 | **Working Drawings (2)** | 1 | 6 | - | 3 |
| ENA 5227 | Applications of Computer in Arch. (2) | 2 | 6 | - | 4 |
| ENA 5231 | **Environmental studies** | 2 | 1 | - | 2 |
| ENC 3130 | Structural Analysis (1) | 2 | 1 | - | 2 |
| ENC 2129 | Architectural Materials | 2 | 1 | - | 2 |
| ENC3131 | Surveying | 2 | 1 | - | 2 |
| ENC3232 | Reinforced Concrete and Metals in Design | 2 | 2 | - | 3 |
| ENC4233 | **Soil Mechanics and Foundations** | 2 | 1 | - | 2 |
| Total | | 47 | 69 | 6 | 71 |

## Specialization Requirements

### Architecture and Interior Design

| Course code | Course Title | Hours | | | |
|---|---|---|---|---|---|
| | | L | T | p | Ch |
| ENA 4116 | Architectural Design (5) | 2 | 6 | - | 4 |
| ENA 4118 | Theory of Architecture (3) | 3 | - | - | 3 |
| ENA 4220 | Landscape Architecture | 2 | 2 | - | 3 |
| ENA 4221 | Architectural Design (6) | 2 | 6 | - | 4 |
| ENA 5124 | Environmental Control Systems | 2 | 1 | - | 3 |
| ENA 5125 | Interior Design (1) | 2 | 2 | - | 3 |
| ENA 5229 | Interior Design (2) | 2 | 2 | - | 3 |
| ENA 5230 | Photography in Architecture | 2 | 2 | - | 3 |
| ENA EAxx | Elective (1) | 1 | 2 | - | 2 |
| ENA EAxx | Elective (2) | 1 | 2 | - | 2 |
| ENA 5123 | Graduation project (1) | 2 | 4 | - | 3 |
| ENA 5228 | Graduation project (2) | 2 | 4 | - | 3 |
| Total | | 23 | 33 | 0 | 36 |

### Urban and City Planning

| Course code | Course Title | Hours | | | |
|---|---|---|---|---|---|
| | | L | T | p | Ch |
| ENA 4132 | Urban Design (2) | 2 | 4 | 2 | 4 |
| ENA 4133 | Urban Planning | 2 | 4 | - | 3 |
| ENA 4234 | Urban Design (3) | 2 | 4 | 2 | 4 |
| ENA 4235 | Urban Landscape | 2 | 2 | - | 3 |
| ENA 5137 | Environmental Urbanism | 2 | 2 | - | 3 |
| ENA 5138 | Urban Infrastructure and Road Engineering | 2 | 2 | - | 3 |
| ENA 5235 | GIS (Geographic Information System) | 2 | 2 | - | 3 |
| ENA 5240 | Regional Planning | 2 | 2 | - | 3 |
| ENA EUxx | Elective (1) | 1 | 2 | - | 2 |
| ENA EUxx | Elective (2) | 1 | 2 | - | 2 |
| ENA 5136 | Graduation project (1) | 2 | 4 | - | 3 |
| ENA 5239 | Graduation project (2) | 2 | 4 | - | 3 |
| Total | | 22 | 34 | 4 | 36 |

# PROGRAMME CURRICULUM (Architecture and Urban Design)

## Level 1

1st Term Semester (1)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENB 1101 | Calculus and Analytic Geometry (1) | 3 | 2 | - | 4 | No Prerequisite | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1102 | Physics (1) | 3 | 1 | 2 | 4 | No Prerequisite | 20 | 20 | 10 | 50 | 100 | 3 |
| ITC 1101 | Introduction to Computer Science | 1 | - | 2 | 2 | No Prerequisite | 20 | 20 | 10 | 50 | 100 | 3 |
| SSE 1101 | English Language (1) | 1 | - | 2 | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 2 |
| ENM 1101 | Engineering Drawing | 1 | - | 3 | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1103 | Mechanics (1) | 2 | 2 | - | 3 | No Prerequisite | 20 | 30 | - | 50 | 100 | 3 |
| SSG xx02 | Human Rights | 1 | - | - | 1 | No Prerequisite | 20 | 20 | 30 | - | 50 | 2 |
| Total | | 12 | 5 | 9 | 18 | | | | | | | |

L= lecture, T = tutorial, P = practical, CW= Course work, T.Es= Term exams; summation of best three exams during the semester,

F.E. =Final exam

2nd Term Semester (2)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch. | | CW | T.Es | O/P | F.E | | |
| ENH 1201 | Engineering History | 1 | - | - | 1 | No Prerequisite | 20 | 30 | - | 50 | 100 | 2 |
| ENB 1204 | Chemistry (1) | 3 | - | 2 | 4 | No Prerequisite | 20 | 20 | 10 | 50 | 100 | 3 |
| ENB 1205 | Mechanics (2) | 2 | 2 | - | 3 | No Prerequisite | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1206 | Calculus and Analytic Geometry (2) | 3 | 2 | - | 4 | ENB 1101 Calculus and Analytic Geometry (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENM 1202 | Production Technology | 2 | - | 3 | 3 | No Prerequisite | 20 | 20 | 10 | 50 | 100 | 3 |
| SSG xx01 | Sinai History | 2 | - | - | 2 | No Prerequisite | 50 | - | - | 50 | 100 | 1 |
| Total | | 13 | 4 | 5 | 17 | | | | | | | |

# (Architecture and Urban Design)

## Level 2

1st Term  Semester  (3)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENA 2101 | Architectural Design (1) | 2 | 6 | - | 4 | No Prerequisite | 20 | | 40 | 40 | 100 | 8 |
| ENA 2102 | Theory of Architecture (1) | 3 | - | - | 3 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 3 |
| ENA 2103 | Building Constructions (1) | 1 | 2 | 2 | 2 | No Prerequisite | 40 | 20 | -- | 40 | 100 | 4 |
| ENA 2104 | Visual Studies (1) | 2 | 2 | - | 3 | No Prerequisite | 40 | 20 | | 40 | 100 | 3 |
| ENC 2129 | **Architectural Materials** | 2 | 1 | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| SSE 2102 | English Language (2) | 1 | - | 2 | 2 | SSE 1101 English Lang. (1) | 30 | 20 | -- | 50 | 100 | 2 |
| SSG xxxx | General Elective - A1 | 2 | - | - | 2 | No Prerequisite | 50 | - | 50 | - | 100 | 1 |
| Total | | 13 | 11 | 4 | 18 | | | | | | | |

2nd Term Semester  (4)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENA 2205 | Architectural Design (2) | 2 | 6 | - | 4 | ENA 2101 Architectural Design (1) | 20 | -- | 40 | 40 | 100 | 8 |
| ENA 2206 | Applications of Computer in Arch. (1) | 2 | 6 | - | 4 | ITC 1101Introduction to Computer Science | 30 | 20 | -- | 50 | 100 | 3 |
| ENA 2207 | History Of Architecture (1) | 2 | - | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 3 |
| ENA 2208 | Visual Studies (2) | 2 | 2 | - | 3 | ENA 2104 Visual Studies (1) | 40 | 20 | | 40 | 100 | 3 |
| ENH 2203 | Principles of Negotiation | 2 | | - | 2 | - | 20 | 30 | 50 | - | 100 | 2 |
| ENH  2202 | Communication & presentation skills | 1 | 2 | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| SSG xxxx | General Elective - A2 | 2 | - | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| Total | | 13 | 16 | 0 | 19 | | | | | | | |

# (Architecture and Urban Design)

## Level 3

1st Term  Semester  (5)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENA 3109 | Architectural Design (3) | 2 | 6 | - | 4 | ENA 2205Arch. Design (2) | 20 | -- | 40 | 40 | 100 | 8 |
| ENA 3110 | **Theory of Architecture (2)** | 3 | - | - | 3 | ENA 2102 Theory Of Arch. (1) | 30 | 20 | -- | 50 | 100 | 3 |
| ENA 3111 | **Building Construction (2)** | 1 | 2 | 2 | 2 | ENA 2103 Building Const. (1) | 40 | 20 | -- | 40 | 100 | 4 |
| ENC 3130 | Structural Analysis | 2 | 1 | - | 2 | No Prerequisite | 30 | 20 | | 50 | 100 | 3 |
| ENH 3104 | Professional Ethics | 2 | 0 | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| ENH 3105 | Technical Report Writing | 2 | - | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| ENC 3131 | Surveying | 2 | 1 | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| Total | | 14 | 10 | 2 | 17 | | | | | | | |

2nd Term Semester  (6)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENA 3212 | **Architectural Design (4)** | 2 | 6 | - | 4 | ENA 3109Arch. Design (3) | 20 | -- | 40 | 40 | 100 | 8 |
| ENA 3213 | History Of Architecture (2) | 2 | - | - | 2 | ENA 2207 History of Arch. (1) | 30 | 20 | -- | 50 | 100 | 2 |
| ENE EA01 | Fundamentals of Electrical & Electronic Eng. | 1 | 2 | 2 | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 3 |
| ENA 3215 | Urban Design (1) | 2 | 2 | - | 3 | No Prerequisite | 20 | -- | 40 | 40 | 100 | 4 |
| ENM 3212 | Engineering Economics | 2 | - | - | 2 | No Prerequisite | 30 | 20 | | 50 | 100 | 2 |
| SSG xx03 | Scientific Thinking | 1 | - | - | 1 | No Prerequisite | 30 | 20 | | 50 | 100 | 2 |
| ENC 3232 | Reinforced Concrete & Metals in Design | 2 | 2 | - | 3 | ENC 3130 Structural Analysis | 20 | 30 | | 50 | 100 | 3 |
| Total | | 12 | 12 | 2 | 17 | | | | | | | |

# (Architecture and Interior Design)

## Level 4

1st Term Semester (7)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENA 4116 | Architectural Design (5) | 2 | 6 | - | 4 | ENA 3212 Arch. Design (4) | 20 | -- | 40 | 40 | 100 | 8 |
| ENA 4117 | Working Drawings (1) | 1 | 6 | - | 3 | ENA 3111 Blg. Constructions (2) | 20 | -- | 40 | 40 | 100 | 8 |
| ENA 4118 | Theory of Architecture (3) | 3 | - | - | 3 | ENA 3110 Theory Of Arch. (2) | 30 | 20 | - | 50 | 100 | 3 |
| ENA 4119 | Evolution of the Built Environment | 2 | 2 | - | 3 | ENA 3213History of Arch. (2) | 30 | 20 | | 50 | 100 | 3 |
| BAB 4101 | General Elective B | 2 | - | - | 2 | No Prerequisite | 30 | 20 | | 50 | 100 | 2 |
| Total | | 10 | 14 | - | 15 | | | | -- | | | |

2nd Term Semester (8)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENA 4220 | Landscape Architecture | 2 | 2 | - | 3 | No Prerequisite | 20 | -- | 40 | 40 | 100 | 3 |
| ENA 4221 | Architectural Design (6) | 2 | 6 | - | 4 | ENA 4116 Arch. Design (5) | 20 | -- | 40 | 40 | 100 | 8 |
| ENA 4222 | Working Drawings (2) | 1 | 6 | - | 3 | ENA 4117 Working Drawings (1) | 20 | -- | 40 | 40 | 100 | 8 |
| BAH 4202 | Management and Marketing | 2 | - | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| ENC 4233 | Soil Mechanics and Foundations | 2 | 1 | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| Total | | 9 | 15 | - | 14 | | | | -- | | | |

# (Architecture and Interior Design)

## Level 5

1ˢᵗ Term Semester (9)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | P/O | F.E | | |
| ENA 5123 | **Graduation Project (1)** | 2 | 4 | - | 3 | ENA 4221 Arch. Design (6) | 50 | -- | 50 | -- | 100 | -- |
| ENA 5124 | **Environmental Control Systems** | 2 | 1 | - | 3 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 3 |
| ENA 5125 | **Interior Design (1)** | 2 | 2 | - | 3 | ENA 2208 Visual Studies(2) | 30 | 20 | -- | 50 | 100 | 6 |
| ENA 5126 | **Project Management** | 2 | - | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| ENA EAxx | **Elective (1)** | 1 | 2 | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| ENA EAxx | Elective (2) | 1 | 2 | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| Total | | 10 | 11 | - | 15 | | | | | | | |

2ⁿᵈ Term Semester (10)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | P/O | F.E | | |
| ENA 5227 | Applications of Computer in Arch. (2) | 2 | 6 | - | 4 | Applications of Computer in Arch. (1) ENA 2206 | 30 | 20 | -- | 50 | 100 | 3 |
| ENA 5228 | **Graduation Project (2)** | 2 | 4 | - | 3 | ENA 5123 **Graduation Des. Project (1)** | 50 | -- | 50 | -- | 100 | -- |
| ENA 5229 | **Interior Design (2)** | 2 | 2 | - | 3 | ENA 5125 **Interior Design (1)** | 20 | | 40 | 40 | 100 | 6 |
| ENA 5230 | Photography **in Architecture** | 2 | 2 | - | 3 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| ENA 5231 | Environmental Studies | 2 | 1 | - | 2 | No Prerequisite | 30 | 20 | | 50 | 100 | 2 |
| Total | | 10 | 15 | - | 15 | | | | -- | | | |

# Urban and City Planning

## Level 4

1st Term  Semester  (7)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | CH | | CW | T.Es | O/P | F.E | | |
| ENA 4132 | Urban Design (2) | 2 | 4 | 2 | 4 | ENA 3215 Urban Design (1) ENA 3212Arch. Design (4) | 20 | -- | 40 | 40 | 100 | 8 |
| ENA 4133 | Urban  Planning | 2 | 4 | - | 3 | No Prerequisite | 20 | -- | 40 | 40 | 100 | 8 |
| ENA 4117 | Working Drawings (1) | 1 | 6 | - | 3 | ENA 3111 Blg. Construc-tions(2) | 20 | -- | 40 | 40 | 100 | 8 |
| ENA 4119 | Evolution of the Built Environment | 2 | 2 | - | 3 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 3 |
| BAH 4101 | General Elective B | 2 | - | - | 2 | No Prerequisite | 50 | - | 50 | - | 100 | 2 |
| Total | | 9 | 16 | 2 | 15 | | | | -- | | | |

2nd Term  Semester  (8)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENA 4234 | Urban Design (3) | 2 | 4 | 2 | 4 | ENA 4132 Urban Design (2) | 20 | | 40 | 40 | 100 | 8 |
| ENA 4235 | Urban Landscape | 2 | 2 | - | 3 | No Prerequisite | 20 | -- | 40 | 40 | 100 | 6 |
| ENA 4222 | Working Drawings (2) | 1 | 6 | - | 3 | ENA 4117 Working Draw-ings (1) | 20 | -- | 40 | 40 | 100 | 8 |
| BAH 4202 | Management and Marketing | 2 | - | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| ENC 4233 | Soil Mechanics and Foundations | 1 | 2 | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| Total | | 8 | 14 | 2 | 14 | | | | | | | |

# Urban and City Planning

## Level 5

### 1st Term Semester (9)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENA 5136 | **Graduation Project (1)** | 2 | 4 | - | 3 | ENA 4234 Urban Design (3) | 50 | -- | 50 | -- | 100 | -- |
| ENA 5137 | **Environmental Urbanism** | 2 | 2 | - | 3 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 3 |
| ENA 5138 | **Urban Infrastructure and Road Engineering** | 2 | 2 | - | 3 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| ENA 5126 | **Project Management** | 2 | - | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| ENA EUxx | **Elective (1)** | 1 | 2 | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| ENA EUxx | Elective (2) | 1 | 2 | - | 2 | No Prerequisite | 30 | 20 | -- | 50 | 100 | 2 |
| Total | | 10 | 12 | - | 15 | | | | | | | |

### 2nd Term Semester (10)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENA 5227 | Applications of Computer in Arch. (2) | 2 | 6 | - | 4 | Applications of Computer in Arch. (1) ENA 2206 | 30 | 20 | -- | 50 | 100 | 3 |
| ENA 5239 | **Graduation Project (2)** | 2 | 4 | - | 3 | **ENA 5136 Graduation project (1)** | 50 | | 50 | -- | 100 | -- |
| ENA 5235 | **GIS (Geographic Information System)** | 2 | 2 | - | 3 | No Prerequisite | 20 | | 30 | 50 | 100 | 3 |
| ENA 5240 | **Regional Planning** | 2 | 2 | - | 3 | No Prerequisite | 20 | | 30 | 50 | 100 | 3 |
| ENA 5231 | Environmental Studies | 2 | 1 | - | 2 | No Prerequisite | 20 | | 30 | 50 | 100 | 3 |
| Total | | 10 | 15 | - | 15 | | | | | | | |

# Department of

# of

# Civil

# Engineering

# Civil Engineering

 Bachelor of Science in Civil Engineering

With Emphases on Structural Engineering(S), Transportation Engineering(T) and Environmental Engineering(E)

## 1.Introduction:

Civil engineers plan, design, and supervise construction of many essential facilities and structures such as bridges, dams, interstate highways, and buildings. Service to the community, its development and improvement are fundamental aspects of a civil engineering career. Civil engineers are problem solvers and they apply the latest in high-tech equipment and sophisticated procedures to address challenges concerning our environment and infrastructure. Included in the study of civil engineering are courses in environmental engineering that are directly related to the solution of hazardous waste and pollution problems, to providing potable and economical water supply systems, and to maintaining a safe environment. Water resources engineering is related to hydraulic and hydrologic engineering, flood control, rainfall, and runoff prediction and the transport in flows. Studies in geotechnical engineering address the bearing capacities of soils, settlement of foundations, and the design of both deep and shallow foundations. Courses in structural analysis and design are directed toward providing reliable and economical structures such as bridges, buildings, port facilities, and dam facilities.

Transportation engineering involves the movement of people and car-go from place to place, the design of airports and highways, and traffic studies to maintain efficient flows. Courses in construction engineering include studies in construction techniques; cost estimating, quality control/ quality assurance, and contract administration. Materials engineering involves the production, quality control, use, and property analysis of construction materials such as asphalt, concrete, aggregate, wood, masonry, and steel.

Civil engineering is a broad field. Because of this breadth, courses are required in each of the above areas. Although you, as a civil engineer, may specialize within a given area, by the very nature of the profession you have to interact with specialists in the other areas. You also may find that you will work with engineers in other disciplines such as mechanical, electrical, or geological engineering in the planning, design, and construction of complex facilities. Civil engineers also must be effective in

communicating with the public.

## 2.Mission

The Civil Engineering Program will prepare students for professional performance in the global society and for life-long learning and continued professional development in the civil engineering profession through a comprehensive, forward-looking and broad-based curriculum in civil engineering emphasizing fundamentals and practical applications, oral and written communication skills, computer applications skills, and professional practice issues and ethics.

## 3- VISION

The Department will be an internationally learning community in civil engineering education, and strengthening links to the professional and university communities, and the broader community.

 The Department will:

 · Enrich the understanding of department of civil engineering   as a scientific discipline through sound training and multidisciplinary education.

· Create community figures that are able to meet the demands of a changing profession with technical skills that are complemented by personal vision, ethical persuasiveness, and entrepreneurial drive.

· Advance scholarly knowledge through research and active collaboration with professional and

academic communities

## 4 .Program Objectives

The civil engineer should be able to:

a) Act professionally in design and supervision of civil engineering disciplines.

b) Use the codes of practice of all civil engineering disciplines effectively and professionally.

c) Design, construct and protect all types of excavations and tunneling systems for different purposes.

d) Manage construction sites.

e) Select appropriate building materials from the perspective of strength, durability, suitability for location, temperature, weather conditions and impacts of seawater and environment.

f) Select and design adequate water control

structures, irrigation and water networks, sewerage systems and pumping stations.

g) Define and preserve properties (lands, real estates) of individuals, communities and institutions, through different surveying and GIS tools.

h) Design and construct structures for protection against dangers of unexpected natural events such as floods and storms.

i) Lead and supervise a group of designers and site or lab technicians.

## 6. Program Credit Hours

The Bachelor degree of Civil Engineering is granted to students who successfully complete a minimum of 165 credit hours  5 levels , 10 semesters divided as follows:

| Year | L | T | P | Ch |
|---|---|---|---|---|
| Level  1 Preparatory year | 25 | 9 | 14 | 35 |
| Level  2  First year | 25 | 13 | 15 | 36 |
| Level  3  Second year | 26 | 15 | 5 | 34 |
| Level  4  Third year | 22 | 15 | 7 | 31 |
| Level  5  Fourth year | 21 | 16 | 3 | 29 |
| Total | 119 | 68 | 44 | 165 |

L= lecture hours, T = tutorial hours, P = practical hours, Ch= credit hours

# 7- STUDY PLAN

## Department Requirements

| Course code | Course Title | Hours | | | |
|---|---|---|---|---|---|
| | | L | T | P | Ch |
| ENA 3234 | Building Construction | 1 | 1 | - | 1 |
| ENB 2107 | Engineering Mathematics (1) | 2 | 2 | - | 3 |
| ENB 2108 | Physics (2) | 3 | 1 | 2 | 4 |
| ENB 2209 | Engineering Mathematics (2) | 2 | 2 | - | 3 |
| ENB 3211 | Probability and Statistics | 2 | 2 | - | 3 |
| ENC 2101 | Construction Materials (1) | 2 | 1 | 2 | 3 |
| ENC 2102 | Civil Drawing | 1 | - | 3 | 2 |
| ENC 2203 | Structural Analysis (1) | 2 | 2 | - | 3 |
| ENC 2204 | Surveying | 2 | 1 | 2 | 3 |
| ENC 3105 | Irrigation and Drainage Engineering | 2 | 2 | - | 3 |
| ENC 3106 | Structural Analysis (2) | 2 | 2 | - | 3 |
| ENC 3107 | Hydraulic Engineering | 2 | 2 | - | 3 |
| ENC 3208 | Reinforced Concrete Design (1) | 2 | 2 | - | 3 |
| ENC 3209 | Construction Materials (2) | 2 | 1 | 2 | 3 |
| ENC 3210 | Soil Mechanics | 2 | 2 | 1 | 3 |
| ENC 4111 | Reinforced Concrete Design (2) | 2 | 2 | - | 3 |
| ENC 4112 | Transportation and Traffic Engineering | 2 | 2 | - | 3 |
| ENC 4113 | Structural Analysis (3) | 2 | 2 | - | 3 |
| ENC 4114 | Sanitary Engineering | 2 | 2 | 1 | 3 |
| ENC 4215 | Construction Projects Management (1) | 2 | 1 | 2 | 3 |
| ENC 4216 | Steel Structures Design (1) | 2 | 2 | - | 3 |
| ENC 4217 | Highways and Airports Engineering | 2 | 2 | 1 | 3 |
| ENC 4218 | Foundation Engineering | 2 | 2 | 1 | 3 |
| ENC 4219 | Structural Analysis using Computer | 2 | - | 2 | 3 |
| ENC 5120 | Steel Structures Design (2) | 2 | 2 | - | 3 |
| ENC 5121 | Reinforced Concrete Design (3) | 2 | 2 | - | 3 |
| ENC 5122 | Design of Irrigation Works | 2 | 2 | - | 3 |
| ENC 5123 | Graduation Project (1) | 2 | 3 | - | 3 |
| ENC 5224 | Construction Contract Specifications | 1 | - | - | 1 |
| ENC 5225 | Environmental Studies | 2 | 1 | - | 2 |
| ENC5226 | Graduation Project (2) | 2 | - | 3 | 3 |
| ENEC 3124 | Computer Programming Applications | 2 | - | 2 | 3 |
| ENM 2103 | Engineering Drawing and Graphics | 1 | - | 3 | 2 |
| ENM 2243 | Fluid Mechanics | 2 | 2 | 1 | 3 |
| ENE 3182 | Electrical and Mechanical Engineering | 2 | 1 | - | 2 |
| Total | | 67 | 51 | 28 | 98 |

# ELECTIVE COURSES (Specialization Requirements)

- Student has to select three courses ( 9 credit hours) in level five.

- Prerequisites for any elective course are all compulsory courses up to its level.

1- Structural Engineering courses

| Course Code | Course Title | Prerequisite | Hours | | | |
|---|---|---|---|---|---|---|
| | | | L | T | P | Ch |
| ENC ES01 | Repair & Strengthening of Structures | ENC 3209 Construction Materials(2) | 2 | 2 | - | 3 |
| ENC ES02 | Soil Improvement | ENC 3210 Soil Mechanics | 2 | 2 | - | 3 |
| ENC ES03 | Foundation Engineering (2) | ENC 4218 Foundation Engineering (1) | 2 | 2 | - | 3 |
| ENC ES04 | Construction Methods | ENC 3209 Construction Materials(2) | 2 | 2 | - | 3 |
| ENC ES05 | Construction Projects Management (2) | ENC 4215 Construction Projects Management (1) | 2 | 2 | - | 3 |
| ENC ES06 | High-Rise Building Analysis and Design | ENC 4111 Reinforced Concrete Design (2) ENC 4113 Structural Analysis (3) | 2 | 2 | - | 3 |
| ENC ES07 | Pre-stressed Concrete Design | ENC 4111 Reinforced Concrete Design (2) | 2 | 2 | - | 3 |
| ENC ES08 | Matrix anaylsis of Structural | ENC 4113 Structural anaylsis (3) | 2 | 2 | - | 3 |

2- Environmental Engineering courses

| Course Code | Course Title | Prerequisite | Hours | | | |
|---|---|---|---|---|---|---|
| | | | L | T | P | CR |
| ENC EE01 | Smart Materials and Sensors | ENC 2101 Construction Materials(1) | 2 | 2 | - | 3 |
| ENC EE02 | Solid Waste Management | ENC 4114 Sanitary Engineering | 2 | 2 | - | 3 |
| ENC EE03 | Introductions to Air Pollution | ENC 2101 Construction Materials(1) | 2 | 2 | - | 3 |
| ENC EE04 | Environmental Hydrology | ENC 3210 Soil Mechanics | 2 | 2 | - | 3 |
| ENC EE05 | Water Quality Management and Waste Water Treatment | ENC 4114 Sanitary Engineering | 2 | 2 | - | 3 |
| ENC EE06 | Water Infrastructure Engineering | ENC 4114 Sanitary Engineering | 2 | 2 | - | 3 |
| ENC EE07 | Water Purification | ENC 4114 Sanitary Engineering | 2 | 2 | - | 3 |

## 3- Transportation engineering courses

| Course Code | Course Title | Prerequisite | Hours | | | |
|---|---|---|---|---|---|---|
| | | | L | T | P | Ch |
| ENC ET01 | Geodetic Survey | ENC 2204 Surveying | 2 | 2 | - | 3 |
| ENC ET02 | Geographic Information System (GIS) | ENC 2204 Surveying | 2 | 2 | - | 3 |
| ENC ET03 | Photogrammetric Surveying | ENC 2204 Surveying | 2 | 2 | - | 3 |
| ENC ET04 | Highways Construction Technology | ENC 4217 Highways and Airports Engineering | 2 | 2 | - | 3 |
| ENC ET05 | Railway Engineering | ENC 2204 Surveying | 2 | 2 | - | 3 |
| ENC ET06 | Traffic Management Systems | ENC 4112 Transportation Planning and Traffic Engineering | 2 | 2 | - | 3 |
| ENC ET07 | Harbour, Navigation and Shore Engineering | ENC 5122 Design of Irrigation Works | 2 | 2 | - | 3 |

# 9. PROGRAM CURRICULUM

## Level 1

1st Term Semester (1)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch. | | CW | T.Es | O/P | F.E | | |
| ENB 1101 | Calculus and Analytic Geometry (1) | 3 | 2 | - | 4 | No Prerequisite | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1102 | Physics (1) | 3 | 1 | 2 | 4 | No Prerequisite | 20 | 20 | 10 | 50 | 100 | 3 |
| ITC 1101 | Introduction to Computer Science | 1 | - | 2 | 2 | No Prerequisite | 20 | 20 | 10 | 50 | 100 | 3 |
| SSE 1101 | English Language(1) | 1 | - | 2 | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 2 |
| ENM 1101 | Engineering Drawing | 1 | - | 3 | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1103 | Mechanics (1) | 2 | 2 | - | 3 | No Prerequisite | 20 | 30 | - | 50 | 100 | 3 |
| SSG xx02 | Human Rights | 1 | - | - | 1 | No Prerequisite | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 12 | 5 | 9 | 18 | | | | | | | |

L= lecture, P/T= practical/tutorial, CW= Course work, T.E =Term exams (summation of best three exams during the semester),  F.E =Final exam

2nd Term  Semester (2)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch. | | CW | T.Es | O/P | F.E | | |
| ENH 1201 | Engineering History | 1 | - | - | 1 | No Prerequisite | 20 | 30 | - | 50 | 100 | 2 |
| ENB 1204 | Chemistry (1) | 3 | - | 2 | 4 | No Prerequisite | 20 | 20 | 10 | 50 | 100 | 3 |
| ENB 1205 | Mechanics (2) | 2 | 2 | - | 3 | No Prerequisite | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1206 | Calculus and Analytic Geometry (2) | 3 | 2 | - | 4 | ENB 1101 Calculus and Analytic Geometry (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENM 1202 | Production Technology | 2 | - | 3 | 3 | No Prerequisite | 20 | 20 | 10 | 50 | 100 | 3 |
| SSG xx01 | Sinai History | 2 | - | - | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 1 |
| Total | | 13 | 4 | 5 | 17 | | | | | | | |

# Level 2

1st Term  Semester (3)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch. | | CW | T.Es | O/P | F.E | | |
| ENB 2107 | Engineering Mathematics (1) | 2 | 2 | - | 3 | No Prerequisite | 20 | 30 | - | 50 | 100 | 3 |
| ENB 2108 | Physics (2) | 3 | 1 | 2 | 4 | ENB 1102 Physics (2) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 2103 | Engineering Drawing and Graphics | 1 | - | 3 | 2 | ENM 1101 Engineering Drawing | 20 | 30 | - | 50 | 100 | 3 |
| SSE 2102 | English Language(2) | 1 | - | 2 | 2 | SSE 1101 English Language (1) | 20 | 30 | - | 50 | 100 | 2 |
| ENC 2101 | Construction Materials (1) | 2 | 1 | 2 | 3 | No Prerequisite | 20 | 20 | 10 | 50 | 100 | 3 |
| ENC 2102 | Civil Drawing | 1 | - | 3 | 2 | ENM 1101 Engineering Drawing | 20 | 30 | - | 50 | 100 | 3 |
| SSG xxxx | General Elective – A1 | 2 | - | - | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 1 |
| Total | | 12 | 4 | 12 | 18 | | | | | | | |

2nd Term  Semester (4)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch. | | CW | T.Es | O/P | F.E | | |
| ENB 2209 | Engineering Mathematics (2) | 2 | 2 | - | 3 | ENB 2107 Engineering Mathematics (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENH  2202 | Communication and Presentation Skills | 1 | 2 | - | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 1 |
| ENC 2203 | Structural Analysis (1) | 2 | 2 | - | 3 | ENB 1103 Mechanics (1) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENC 2204 | Surveying | 2 | 1 | 2 | 3 | No Prerequisite | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 2243 | Fluid Mechanics | 2 | 2 | 1 | 3 | No Prerequisite | 20 | 30 | - | 50 | 100 | 3 |
| ENH 2203 | Principles of Negotiation | 2 | - | - | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 2 |
| SSG xxxx | General Elective – A2 | 2 | - | - | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 1 |
| Total | | 13 | 9 | 3 | 18 | | | | | | | |

# Level 3

1st Term  Semester (5)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch. | | CW | T.Es | O/P | F.E | | |
| ENC 3105 | Irrigation and Drainage Engineering | 2 | 2 | - | 3 | No Prerequisite | 20 | 30 | - | 50 | 100 | 3 |
| ENC 3106 | Structural Analysis (2) | 2 | 2 | - | 3 | ENC 2203 Structural Analysis(1) | 20 | 30 | - | 50 | 100 | 3 |
| ENC 3107 | Hydraulic Engineering | 2 | 2 | - | 3 | ENM 2243 Fluid Mechanics | 20 | 30 | - | 50 | 100 | 3 |
| ENE 3182 | Electrical and Mechanical Engineering | 2 | 1 | - | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 3 |
| ENEC 3124 | Computer Programming Applications | 2 | - | 2 | 3 | ITC E01 Introduction to Computer | 20 | 20 | 10 | 50 | 100 | 3 |
| ENH 3104 | Professional Ethics | 2 | - | - | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 2 |
| ENH 3105 | Technical Report Writing | 2 | - | - | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 14 | 7 | 2 | 18 | | | | | | | |

2nd Term  Semester (6)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch. | | CW | T.Es | O/P | F.E | | |
| ENC 3208 | Reinforced Concrete Design (1) | 2 | 2 | - | 3 | ENC 3106 Structural Analysis(2) | 20 | 30 | - | 50 | 100 | 3 |
| ENC 3209 | Construction Materials (2) | 2 | 1 | 2 | 3 | ENC 2101 Construction Materials (1) | 20 | 20 | 10 | 50 | 100 | 2 |
| ENC 3210 | Soil Mechanics | 2 | 2 | 1 | 3 | No Prerequisite | 20 | 20 | 10 | 50 | 100 | 3 |
| ENB 3211 | Probability and Statistics | 2 | 2 | - | 3 | No Prerequisite | 20 | 30 | | 50 | 100 | 3 |
| ENM 3212 | Engineering Economics | 2 | - | - | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 2 |
| ENA 3234 | Building Construction | 1 | 1 | - | 1 | ENM 1101 Engineering Drawing | 20 | 30 | - | 50 | 100 | 2 |
| SSG xx03 | Scientific Thinking | 1 | - | - | 1 | No Prerequisite | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 12 | 8 | 3 | 16 | | | | | | | |

# Level 4

## 1st Term Semester (7)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch. | | CW | T.Es | O/P | F.E | | |
| ENC 4111 | Reinforced Concrete Design (2) | 2 | 2 | - | 3 | ENC 3208 Reinforced Concrete Design (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENC 4112 | Transportation and Traffic Engineering | 2 | 2 | - | 3 | ENC 2204 Surveying | 20 | 30 | - | 50 | 100 | 3 |
| ENC 4113 | Structural Analysis (3) | 2 | 2 | - | 3 | ENC 3106 Structural Analysis(2) | 20 | 30 | - | 50 | 100 | 3 |
| ENC 4114 | Sanitary Engineering | 2 | 2 | 1 | 3 | ENM 2243 Fluid Mechanics | 20 | 30 | - | 50 | 100 | 3 |
| BAB 4101 | General Elective -B | 2 | - | - | 2 | No Prerequisite | 50 | - | - | 50 | 100 | 1 |
| Total | | 10 | 8 | 1 | 14 | | | | | | | |

## 2nd Term  Semester (8)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch. | | CW | T.Es | O/P | F.E | | |
| ENC 4215 | Construction Projects Management (1) | 2 | 1 | 2 | 3 | ENC 3209 Construction Materials (2) | 20 | 30 | - | 50 | 100 | 3 |
| ENC 4216 | Steel Structures Design (1) | 2 | 2 | - | 3 | ENC 3106 Structural Analysis(2) | 20 | 30 | - | 50 | 100 | 3 |
| ENC 4217 | Highways and Airports Engineering | 2 | 2 | 1 | 3 | ENC 4112 Transportation and Traffic Engineering | 20 | 30 | - | 50 | 100 | 3 |
| ENC 4218 | Foundation Engineering | 2 | 2 | 1 | 3 | ENC 3210 Soil Mechanics | 20 | 20 | 10 | 50 | 100 | 3 |
| ENC 4219 | Structural Analysis using Computer | 2 | - | 2 | 3 | ENC 4113 Structural Analysis(3) | 20 | 20 | 10 | 50 | 100 | 3 |
| BAH 4202 | Management & Marketing | 2 | - | - | 2 | No Prerequisite | 50 | - | - | 50 | 100 | 2 |
| Total | | 12 | 7 | 6 | 17 | | | | | | | |

# Level 5

1st Term Semester (9)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch. | | CW | T.Es | O/P | F.E | | |
| ENC 5120 | Steel Structures Design (2) | 2 | 2 | - | 3 | ENC 4216 Steel Structures Design (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENC 5121 | Reinforced Concrete Design (3) | 2 | 2 | - | 3 | ENC 4111 Reinforced Concrete Design (2) | 20 | 30 | - | 50 | 100 | 3 |
| ENC 5122 | Design of Irrigation Works | 2 | 2 | - | 3 | ENC 3107 Hydraulic Engineering | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5122 | Project Management | 2 | - | - | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 2 |
| ENC 5123 | Graduation Project (1) | 2 | 3 | - | 3 | Departmental requirements | 50 | - | 50 | - | 100 | - |
| Total | | 10 | 9 | 0 | 14 | | | | | | | |

2nd Term Semester (10)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch. | | CW | T.Es | O/P | F.E | | |
| ENC 5224 | Construction Contract Specifications | 1 | - | - | 1 | ENC 4215 Construction Projects Management (1) | 50 | - | - | 50 | 100 | 3 |
| ENC Exxx | Electives | 2 | 2 | - | 3 | According to the course | 20 | 30 | - | 50 | 100 | 3 |
| ENC Exxx | Electives | 2 | 2 | - | 3 | According to the course | 20 | 30 | - | 50 | 100 | 3 |
| ENC Exxx | Electives | 2 | 2 | - | 3 | According to the course | 20 | 30 | - | 50 | 100 | 3 |
| ENC 5225 | Environmental Studies | 2 | 1 | - | 2 | No Prerequisite | 20 | 30 | - | 50 | 100 | 2 |
| ENC 5226 | Graduation Project (2) | 2 | - | 3 | 3 | ENC 5123 Graduation Project (1) | 50 | - | 50 | - | 100 | - |
| Total | | 11 | 7 | 3 | 15 | | | | | | | |
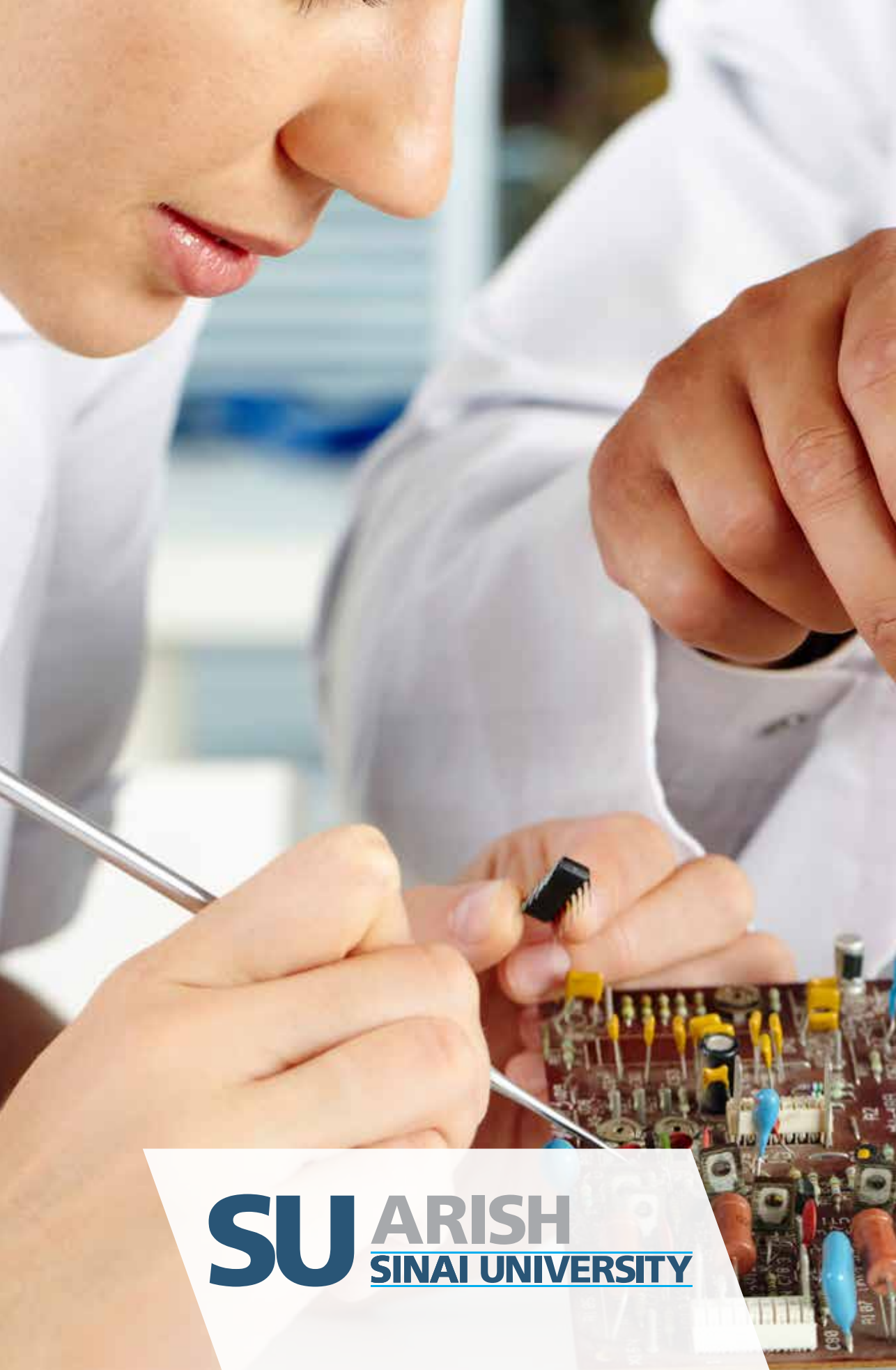
# Department of

# Electrical and Computer Engineering

# Electrical
## and Computer Engineering

Bachelor of Science in one of the following branches:

(I)   Electronics and Communication Engineering.

(II)  Computer and Controls Engineering.

(III) Electrical Power and Machines Engineering.

(V) Communication and Information Engineering.

## 1- INTRODUCTION

Electrical and computer engineers are involved in channeling, control, and processing natural resources into uses for man such as heating, lightning, home appliances, transportation, data processing, and communications.

They are primarily concerned with the generation, transmission, processing, transformation, control, and utilization of energy or information. In electrical engineering education, you may choose to emphasize an area which especially interests you or you may study a broader spectrum of course work. In the basic courses you will study physical electronics, application of basic electrical elements, energy sources, discrete electrical and electronic components as they are found interconnected in operational electrical networks.

The electronics and communications area will go further to the integrated circuits and VLSI technology. This area includes also such studies as the makeup of information bearing signals, microwave systems, modulation and detection techniques as well as the detailed analysis of the modern communications systems such as the cellular mobile, satellite, and global positioning systems.

The computer and control engineering provides course work in the design and applications of microprocessor systems, digital logic devices, digital design and automation, large computer systems, robot vision systems, artificial intelligence, and distributed processing.

The electrical power and machine engineering will emphasize on the design and applications of circuits and systems to automatically monitor and regulate devices, machines, and electrical systems for optimal performance in a variety of operation conditions. It deals  also with the design and application of motors, generators, transformers, distribution systems, high voltage, and economical transmission of energy.

The communication and information engineering have a well prepared program as a combination of computer science and computer engineering.

## 2- Mission :

The Electrical and computer Engineering Program will provide students with the tools necessary to solve electrical engineering problems critical to our society's. This will be accomplished through a comprehensive, forward- looking and broad-based Electrical engineering curriculum emphasizing fundamentals, practical applications, oral and written communication skills, computer applications skills, and professional practice issues and ethics.

## 3- Vision:

The Department will be an internationally learning community engaging in exemplary Electrical engineering education, rigorous research and scholarship, and strengthening links to the professional and university communities, and the broader community.

 The Department will educate its students to become effective practitioner in the profession of the fields of electrical engineering. Also creates community figures that are able to meet the demands of a changing profession with technical skills that are complemented by personal vision, ethical persuasiveness, and entrepreneurial drive.

# (I)- Electronic and Communication Engineering branch.

## INTRODUCTION

Electronics and communication branch becomes more and more influential on the human society. The reason for this is that almost all electronic and communication products are produced in huge quantities so interfering with every one's life. In addition, electronic subsystems become part of almost any industrial product nowadays. Beside the basic laws of physical sciences, mathematics, and basic ENGINEERING, electronics engineering programs combine electronic engineering principles and traditional computer science with good practice in design and project management applied to technically demanding problems. Graduates will be well qualified to play a disciplined and innovative part in research and development across the IT and Electronics sector.

An electronics and communication engineer should have strong background in basic science and basic mathematics and be able to use these tools in his own engineering field. He should employ necessary techniques, hardware, and communication tools for modern engineering applications. He also should be able to work in a multi- disciplinary environment, and follow and contribute to the developments in their own field recognizing the significance of lifelong learning.

Electronics and communication engineering is a broad discipline that covers the fields of integrated electronic circuits, electronic data storage, high-speed computing, communications, signal processing, microwave, wave propagation and antenna, optoelectronics, automation, automatic control and monitoring systems, circuit analysis, network analysis, digital signal processing, microprocessors, and modern communication disciplines.

Programs of electronics and communication engineering are designed to strike a balance between theoretical and laboratory experience and to impart fundamental and practical understanding of the principles required for a successful career in electronics engineering. This requires a solid core of foundation courses in physics, mathematics, computer science, and general engineering, which is also essential for lifelong learning.

## THE ATTRIBUTES OF AN ELECTRONICS ENGINEER

In addition to the general attributes of engineer, the electronics engineer should be able to:

a) Participate in and lead quality improvement projects.

b) Manipulate with the electronic circuits, all the way from the discrete components level, circuits' analysis and design, to the troubleshooting with emphasis on electronic power devices.

c) Apply control theory and measurement principals for industrial variables, signal conversion, conditioning and processing.

d) Deal with the computers hardware, software, operating systems and interfacing.

e) Design, operate and maintain digital and analog communication, mobile communication, coding, and decoding systems.

# (II)- Computer and Control Engineering

## INTRODUCTION

Computer engineering (CE) is a discipline that embodies the science and technology of design, construction, implementation, and maintenance of software and hardware components of modern computing systems and computer-controlled equipment. Computer engineering has traditionally been viewed as a combination of both computer science (CS) and electrical engineering (EE). Computer engineering is a field that experiences          effects from rapid technological development in different real life applications. Computer engineering programs use basic sciences, mathematics, engineering and electronics, physical and human sciences to provide new computer technologies and systems that make human applications easier, more productive, faster and also enjoyable to use.

A computer engineer is a person trained to be proficient in the design and implementation of computer systems, both hardware and software. He should essentially be able to design digital control circuitry and program it to function correctly. To perform these tasks, the computer engineer must be knowledgeable in related mathematics, physics sciences, electronics, communications, computer hardware and software, networking and other engineering concepts and systems. A proper level of expertise must be possessed through practicing the discipline concepts in solving problems of real applications. This level of expertise should be permanently upraised by engaging in life-long learning processes.

## THE ATTRIBUTES OF A COMPUTER ENGINEER

Computer engineering is a field that requires many skills. In addition to the general attributes of an engineer, the computer engineer should be able to:

a) Demonstrate inductive reasoning abilities, figuring general rules and conclusions about seemingly unrelated events

b)  Use current advanced techniques, skills, and tools necessary for computing practices to specify, design, and implement computer-based systems.

c)  Recognize the information requirements of various business activities on both operational and decision making levels.

d)  Tackling business problems using system analysis tools and techniques.

e) Managing projects related to computer systems in diverse fields of applications.

f) Implementing phases of the  computer system  development  life  cycle, procurement and installation of hardware, software design, data manipulation and system operations.

# (III)- Electrical Power And Machines Engineering

## INTRODUCTION

Electrical power and machines engineering discipline is that main branch of electrical engineering which concerns with generation, transmission, distribution, utilization, and control of electric energy. The vast electrical power systems which expand over each nation in the world and interconnection networks among neighboring countries are considered the largest and most complex man-made systems. Proper planning, design, implementation, operation and control of these large-scale electrical power systems require advanced engineering knowledge and techniques. Electrical generators are used in power stations to convert thermal or hydraulic energy into electrical energy. Electric motors are the essential parts for driving all kinds of machines in industrial plants and are also used for driving electric transport systems. Electrical transformers can change voltage levels, thus facilitate electrical power transmission over long distances. Modern power electronics and automatic control techniques are extensively employed in electrical power and machines systems for improving performance, operation and control.

The electrical power and machines engineering program consists of two main fields, namely electrical power engineering subjects and electrical machines engineering subjects. These are essentially supported by two main topics: automatic control engineering and power electronics subjects. Other essential subjects in the program include electrical circuits, electronic circuits and devices, electromagnetism, energy conversion, measurement andcomputer programming. Basic subjects in the program include mathematics, physics, materials engineering, workshop technology, laboratories, management and environmental issues. The electrical power and machines engineering program should  provide students with:

•A wide and comprehensive introduction to basic sciences and mathematics with a through understanding of the fundamental knowledge necessary for engineering studies.

•Basic engineering skills of drawings, workshop technologies, laboratories and practical field training.

•The required depth in electrical power and machines engineering subjects necessary for

performing engineering jobs.

•Essential knowledge of highly interest for future postgraduate studies and research in the field of electrical engineering.

•Principals of engineering design skills including creative ideas, project innovation, practical synthesis and management.

•A necessary environment to work both individually and within groups, thus developing their communications skills.

## THE ATTRIBUTES OF ELECTRICAL ENGINEERS

In addition to the general attributes of engineer, the electrical engineer should be able to:

a) Design and supervise the construction of systems to generate, transmit, control and use electrical energy.

b) Design and develop heavy equipment, such as generators, motors, transmission lines and distributing systems.

c) Plan and manage engineering activity during the diverse phases of electric power generation, transmission and control

d) Prepare and reviews simple sketches, specifications and data sheets for electric power generation, control and distribution systems

e) Perform design reviews and checks for electric power generation and distribution systems

f) Perform review of supplier documentation for compliance with specifications g)  Develops load lists

h)  Develops low voltage power systems

# (V) - Communication and Information Engineering branch

## INTRODUCTION

Communication and Information engineering (CI) is a discipline that embodies the science and technology of design, construction, implementation, and maintenance of software and hardware components of communication and information systems and computer-controlled equipment. The program of communication and information engineering has traditionally been viewed as a combination of both computer science (CS) and communication engineering (CE).

The communication and information branch uses basic sciences, mathematics, engineering and electronics, physical and human sciences to make human applications easier, more productive, faster and also enjoyable to use.

## THE ATTRIBUTES OF A COMMUNI- CATION AND INFORMATION  ENGINEER.

Communication and Information engineering is a field that requires many skills in the fields of communication , computer and information engineering. In addition to the general attributes of an engineer, At the end of this branch, engineers should be able to:

 a)  Use current advanced techniques, skills, and tools necessary for practices to specify, design, and implement computer and communication based systems.

b) Deal with the computers hardware, software, operating systems and

   interfacing

c) Recognize the information requirements of various engineering activities on both operational and decision making levels.

d) Apply control theory and measurement principals for industrial variables, signal conversion, conditioning and processing.

e)         Implementing  phases  of  the computer  system  development  life  cycle, procurement
and        installation        of
hardware, software        design,  data manipulation and system operations.

f) Design, operate and maintain digital and analog communication, mobile communication, coding, and decoding systems.

## 6- PROGRAM CREDIT HOURS

| Year | Electronic and Communication Engineering | | | | | Computer and Control Engineering | | | | | Electrical power Engineering | | | | | Communication and Information Engineering | | | | |
|------|----|----|----|-----|----|----|----|----|-----|----|----|----|----|-----|----|----|----|----|-----|----|
| | L | T | P | ICT | Ch | L | T | P | ICT | Ch | L | T | P | ICT | Ch | L | T | P | ICT | Ch |
| Level 1 | 25 | 9 | 14 | - | 35 | 25 | 9 | 14 | - | 35 | 25 | 9 | 14 | - | 35 | 25 | 9 | 14 | - | 35 |
| Level 2 | 27 | 11 | 5 | 6 | 35 | 27 | 11 | 5 | 6 | 35 | 27 | 11 | 5 | 6 | 35 | 27 | 11 | 5 | 6 | 35 |
| Level 3 | 28 | 18 | 4 | 4 | 36 | 28 | 18 | 4 | 4 | 36 | 28 | 18 | 4 | 4 | 36 | 28 | 18 | 4 | 4 | 36 |
| Level 4 | 24 | 10 | 4 | 9 | 32 | 24 | 14 | 3 | 10 | 33 | 25 | 15 | 4 | 8 | 31 | 24 | 14 | 2 | 9 | 33 |
| Level 5 | 20 | 14 | 4 | 2 | 27 | 20 | 14 | 4 | 2 | 26 | 22 | 14 | 4 | 3 | 28 | 20 | 12 | 5 | 2 | 26 |
| Total | 124 | 62 | 31 | 21 | 165 | 124 | 66 | 30 | 22 | 165 | 127 | 67 | 31 | 21 | 165 | 124 | 64 | 30 | 21 | 165 |

L= lecture hours, T = tutorial hours, P = practical hours, Ch= credit hours

# 7- Department Requirements

| Course code | Course Title | Hours | | | | |
|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch |
| ENB 2107 | Engineering Mathematics (1) | 2 | 2 | - | - | 3 |
| ENB 2108 | Physics (2) | 3 | 1 | 2 | - | 4 |
| ENB 2209 | Engineering Mathematics (2) | 2 | 2 | - | - | 3 |
| ENB 3110 | Engineering Mathematics (3) | 2 | 2 | - | - | 3 |
| ENB 3211 | Probability and Statistics | 2 | 2 | - | - | 3 |
| ENE 5250 | Environmental Studies | 2 | 1 | | - | 2 |
| ENM 2103 | Engineering Drawing and Graphics | 1 | - | - | 3 | 2 |
| ENM 3142 | Mechanical Engineering | 2 | 1 | - | - | 2 |
| ENE 2101 | Electric circuits (1) | 2 | 1 | - | - | 2 |
| ENE 2102 | Computer Programming | 2 | - | 2 | - | 3 |
| ENE 2203 | Electric Circuits (2) | 2 | 1 | 1 | 1 | 3 |
| ENE 2204 | Electronics (1) | 3 | 1 | - | - | 3 |
| ENE 2205 | Electrical Material | 2 | 1 | - | - | 2 |
| ENE 3106 | Electronics (2) | 2 | 2 | 1 | 1 | 3 |
| ENE 3107 | Digital Design | 3 | 2 | 1 | 1 | 4 |
| ENE 3108 | Principals of Electrical Machines | 2 | 1 | --- | - | 2 |
| ENE 3209 | Measurements and Instrumentation | 2 | 2 | 1 | - | 3 |
| ENE 3210 | Control Systems | 2 | 2 | 1 | 1 | 3 |
| ENE 3211 | Signal Analysis and Systems | 2 | 2 | - | 1 | 3 |
| ENE 3212 | Electromagnetic fields | 2 | 2 | - | - | 3 |
| ENE 4113 | Microprocessor Architecture & Applications | 2 | 2 | - | 2 | 3 |
| ENE 5198 | Graduation Project-1 | 2 | 3 | - | - | 3 |
| ENE 5299 | Graduation Project-2 | 2 | - | 3 | - | 3 |
| Total | | 48 | 33 | 12 | 10 | 65 |
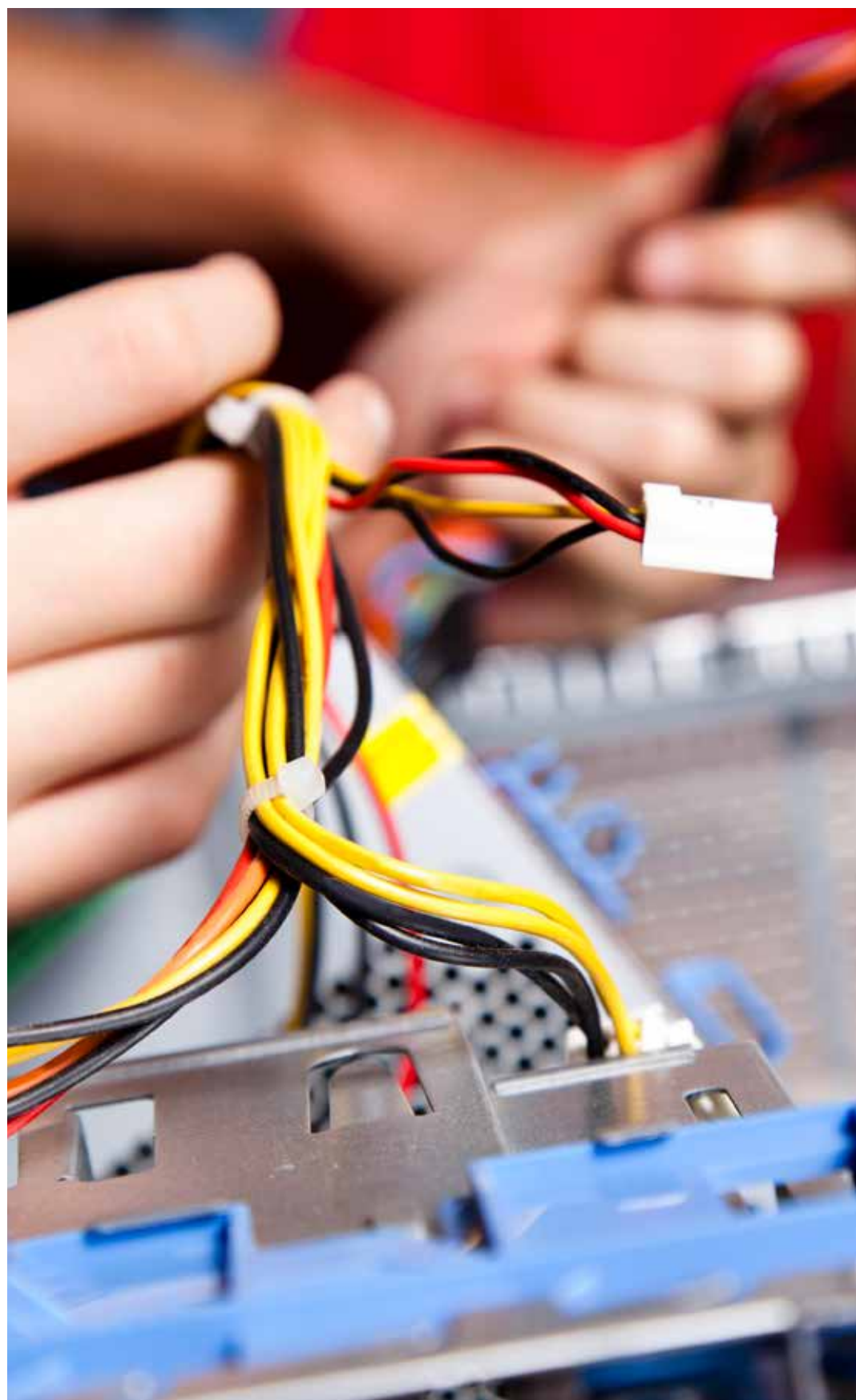
# (I) - Specialization Requirements For Electronics and Communication Engineering Branch

| Course code | Course Title | Hours | | | | |
|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch |
| ENE 4131 | Communication Theory (1) | 2 | 1 | 1 | - | 3 |
| ENE 4132 | Digital Signal Processing | 2 | 2 | - | 1 | 3 |
| ENE 4133 | Electromagnetic Waves | 2 | 1 | - | - | 2 |
| ENE 4234 | Communication Theory (2) | 2 | 1 | 2 | - | 3 |
| ENE 4235 | Introduction to VLSI Design | 2 | - | - | 1 | 2 |
| ENE 4236 | Microwave engineering | 2 | 1 | 1 | 1 | 3 |
| ENE 5137 | Antennas & Wave Propagation | 2 | 2 | 1 | 1 | 3 |
| ENE 5138 | Mobile Communications | 2 | 1 | - | - | 2 |
| ENE 5239 | Radio Navigation Systems | 2 | 1 | - | 1 | 3 |
| ENE 5240 | Satellite Communications | 2 | 2 | - | - | 3 |
| ENE EExx | Elective | 2 | - | - | 2 | 3 |
| ENE EExx | Elective | 2 | 2 | - | - | 3 |
| ENE EExx | Elective | 2 | - | - | 2 | 3 |
| ENE EExx | Elective | 2 | 2 | - | - | 3 |
| ENE EExx | Elective | 2 | 2 | - | - | 3 |
| Total | | 30 | 18 | 5 | 9 | 42 |

L=30, P= 4/2= 2, ICT=9/2=4.5, 35/165= 21.2%

# (II) - Specialization Requirements For Computer and Control Engineering Branch

| Course code | Course Title | Hours | | | | |
|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch |
| ENE 4132 | Digital Signal Processing | 2 | 2 | - | 1 | 3 |
| ENE 4151 | Computer networks | 2 | 2 | 1 | - | 3 |
| ENE 4152 | Operating systems (1) | 2 | - | - | 1 | 2 |
| ENE 4253 | Operating systems (2) | 2 | 2 | 1 | - | 3 |
| ENE 4254 | Computer architecture | 2 | 2 | 1 | 1 | 3 |
| ENE 4255 | Algorithms and data structure | 2 | 2 | - | 1 | 3 |
| ENE 5156 | Communication systems | 2 | 1 | - | - | 2 |
| ENE 5157 | Computer interfacing | 2 | 2 | 1 | 1 | 3 |
| ENE 5258 | Artificial intelligence | 2 | 2 | - | 1 | 3 |
| ENE 5259 | Database systems | 2 | 1 | - | - | 2 |
| ENE ECxx | Elective | 2 | - | - | 2 | 3 |
| ENE ECxx | Elective | 2 | 2 | - | - | 3 |
| ENE ECxx | Elective | 2 | - | - | 2 | 3 |
| ENE ECxx | Elective | 2 | 2 | - | - | 3 |
| ENE ECxx | Elective | 2 | 2 | - | - | 3 |
| Total | | 30 | 22 | 4 | 10 | 42 |

L=30, P= 4/2= 2, ICT=10/2=5, 35/165= 21.2%

# (III) - Specialization Requirements For Electrical Power and Machines Engineering Branch

| Course code | Course Title | Hours | | | | |
|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch |
| ENE 4171 | Electrical Power (1) | 2 | 2 | -- | 2 | 3 |
| ENE 4172 | Electrical machines (1) | 2 | 2 | 1 | 1 | 3 |
| ENE 4273 | Power electronics (1) | 2 | 2 | 1 | 1 | 3 |
| ENE 4274 | Electrical power (2) | 2 | 2 | -- | 1 | 3 |
| ENE 4275 | Electrical Machines (2) | 3 | 1 | 2 | 1 | 4 |
| ENE 4276 | Modern control systems | 2 | 1 | --- | -- | 2 |
| ENE 4277 | Utilization of Electrical Energy | 2 | 1 | -- | -- | 2 |
| ENM 42 | Power Plants | 2 | 1 | --- | | 2 |
| ENE 5178 | Electrical Power Systems Analysis | 2 | 2 | -- | 2 | 3 |
| ENE 5179 | Special Electrical Machines | 2 | 2 | - | -- | 3 |
| ENE 5180 | Power system protection | 2 | 1 | 1 | 1 | 3 |
| ENE 5281 | High Voltage Engineering | 2 | 2 | - | -- | 3 |
| ENE EPxx | Elective | 2 | 1 | -- | -- | 2 |
| ENE EPxx | Elective | 2 | 1 | - | -- | 2 |
| ENE EPxx | Elective | 2 | 1 | - | -- | 2 |
| ENE EPxx | Elective | 2 | 1 | - | -- | 2 |
| Total | | 33 | 23 | 5 | 9 | 42 |

L=33, P= 4/2= 2, ICT=9/2=4.5, 35/165= 21.2 %

# (V)- Specialization Requirements For Communication and Information  Engineering Branch

| Course code | Course Title | Hours | | | | |
|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch |
| ENE 4131 | Communication Theory (1) | 2 | 1 | 1 | - | 3 |
| ENE 5259 | Data Base system | 2 | 1 | - | - | 2 |
| ENE 4133 | Electromagnetic Waves | 2 | 1 | - | - | 2 |
| ENE 4152 | Operating System (1) | 2 | 2 | - | 1 | 3 |
| ENE 4254 | Computer Architecture | 2 | 2 | 1 | 1 | 3 |
| ENE 4255 | Algorithm and Data structure | 2 | 2 | - | 1 | 3 |
| ENE 5185 | Software Engineering | 2 | 2 | 1 | 1 | 3 |
| ENE 5186 | Data Communications | 2 | 1 | - | - | 2 |
| ENE 5287 | Object oriented programming | 2 | 2 | | | 3 |
| ENB 4215 | Discrete Mathematics | 2 | 2 | | | 3 |
| ENE EExx | Elective | 2 | - | - | 2 | 3 |
| ENE EExx | Elective | 2 | 2 | - | - | 3 |
| ENE EExx | Elective | 2 | - | - | 2 | 3 |
| ENE EExx | Elective | 2 | 2 | - | - | 3 |
| ENE EExx | Elective | 2 | 2 | - | - | 3 |
| Total | | 30 | 22 | 3 | 8 | 42 |

L=30, P= 4/2= 2, ICT=9/2=4.5, 35/165= 21.2%

# Elective Courses for Electrical Engineering Students

**Prerequisites for any elective course are all compulsory courses up to its level.**

## (I)- Electronic and Communication Branch

| Course code | Course Title | Hours | | | | Prerequisite |
|---|---|---|---|---|---|---|
| | | L | T | P/ICT | CH | |
| ENE EE01 | (VHDL) High level Descriptive language | 2 | - | 2 | 3 | |
| ENE EE02 | Stochastic Processes | 2 | - | 2 | 3 | |
| ENE EE03 | Communications Systems | 2 | - | 2 | 3 | ENE 3211 |
| ENE EE04 | Electronic and Photonic Devices | 2 | 2 | - | 3 | ENE 3106, ENE EE03 |
| ENE EE05 | Information Theory | 2 | 2 | - | 3 | ENB 3211, ENE EE02 |
| ENE EE06 | Computer Networks | 2 | - | 2 | 3 | ENE2102, ENE EE01 |
| ENE EE07 | Introductions to Neural Networks& Applications | 2 | - | 2 | 3 | ENE2102, ENE EE02 |
| ENE EE08 | Computer-Aided Network Design | 2 | 2 | - | 3 | ENE2102 |
| ENE EE09 | Remote sensing | 2 | 2 | - | 3 | ENE 4132 |
| ENE EE10 | Optical Communication Systems | 2 | 2 | - | 3 | ENE 4234, ENE EE09 |
| ENE EE11 | Telecommunication Networks | 2 | 2 | - | 3 | ENE 4234, ENE EE09 |
| ENE EE12 | Selected topics in communications | 2 | 2 | - | 3 | ENE EE10 |

## (II)-Computer and Control Engineering Branch

| Course code | Course Title | Hours | | | | Prerequisite |
|---|---|---|---|---|---|---|
| | | L | T | P/ICT | CH | |
| ENE EC01 | Classical Optics | 2 | - | 2 | 3 | ENB 2108 |
| ENE EC02 | Optical Computing | 2 | - | 2 | 3 | ENB 2108 |
| ENE EC03 | Fuzzy Logic Control | 2 | 2 | - | 3 | ENE 3209, ENE EC01 |
| ENE EC04 | Data Mining | 2 | 2 | - | 3 | ENE EC02 |
| ENE EC05 | Computer Graphics | 2 | - | 2 | 3 | ENE 2102, ENE EC02 |
| ENE EC06 | Modeling and Simulation | 2 | - | 2 | 3 | ENE EC02 |
| ENE EC07 | Semantic web | 2 | - | 2 | 3 | ENE EC01 |
| ENE EC08 | Advanced PLC | 2 | 2 | - | 3 | |
| ENE EC09 | Experts Systems | 2 | 2 | - | 3 | |
| ENE EC10 | Neural Networks For Control | 2 | 2 | - | 3 | ENE EC09 |
| ENE EC11 | Digital Image Processing | 2 | 2 | - | 3 | ENE 4132, ENE EC09 |
| ENE EC12 | Wireless Computer Networks | 2 | 2 | - | 3 | ENE 4151, ENE EC08. |

# (III)- Electrical Power and Machines Engineering Branch

| Course code | Course Title | Hours | | | | Prerequisite |
|---|---|---|---|---|---|---|
| | | L | T | P/ICT | CH | |
| ENE EP01 | Standard Specifications | 2 | 1 | - | 2 | ENE 4121 |
| ENE EP02 | Electric Power Quality | 2 | 1 | - | 2 | ENE 5178 |
| ENE EP03 | Electric Hazards and Safety | 2 | 1 | - | 2 | ENE 4121 |
| ENE EP04 | Power System Reliability | 2 | 1 | - | 2 | ENE 5178 |
| ENE EP05 | Power system Planning | 2 | 1 | - | 2 | ENE 5178 |
| ENE EP06 | Control of Electrical Power Systems | 2 | 1 | - | 2 | ENE 5178, ENE EP04 |
| ENE EP07 | Electric Drive Systems | 2 | 1 | - | 2 | ENE 4172, ENE 4275, ENE EP05 |
| ENE EP08 | Dynamics of Electric Machines | 2 | 1 | - | 2 | ENE 4172, ENE 4275, ENE EP04 |
| ENE EP09 | Electrical Machines Design | 2 | 1 | - | 2 | ENE 4172, ENE 4275, ENE EP04 |
| ENE EP10 | Modeling of Electrical Machines | 2 | 1 | - | 2 | ENE 4172, ENE 4275, ENE EP05 |
| ENE EP11 | Electric Power Distribution Systems | 2 | 1 | - | 2 | ENE 5178, ENE EP06 |
| ENE EP12 | Static VAR Compensators and HVDC Systems | 2 | 1 | - | 2 | ENE 5178, ENE EP04. |
| ENE EP13 | Introduction to FACTS | 2 | 1 | - | 2 | : ENE 5178, ENE EP06 |

# (V) - Communication and information Branch

| Course code | Course Title | Hours | | | | Prerequisite |
|---|---|---|---|---|---|---|
| | | L | T | P/ICT | CH | |
| ENE EE01 | (VHDL) High level Descriptive language | 2 | - | 2 | 3 | |
| ENE EE03 | Communications Systems | 2 | - | 2 | 3 | ENE 3211 |
| ENE EE06 | Information Theory | 2 | 2 | - | 3 | ENB 3211, ENE EE02 |
| ENE EE07 | Computer Networks | 2 | - | 2 | 3 | ENE2102, ENE EE01 |
| ENE EE08 | Introductions to Neural Networks& Applications | 2 | - | 2 | 3 | ENE2102, ENE EE02 |
| ENE EE09 | Computer-Aided Network Design | 2 | 2 | - | 3 | ENE2102 |
| ENE EE10 | Remote sensing | 2 | 2 | - | 3 | ENE 4132 |
| ENE EE11 | Optical Communication Systems | 2 | 2 | - | 3 | ENE 4234, ENE EE09 |
| ENE EE12 | Telecommunication Networks | 2 | 2 | - | 3 | ENE 4234, ENE EE09 |
| ENE EE13 | Selected topics in communications | 2 | 2 | - | 3 | ENE EE10 |
| ENE EC02 | Optical Computing | 2 | - | 2 | 3 | ENB 2108 |
| ENE EC04 | Data Mining | 2 | 2 | - | 3 | ENE EC02 |
| ENE EC05 | Computer Graphics | 2 | - | 2 | 3 | ENE 2102, ENE EC02 |
| ENE EC06 | Modeling and Simulation | 2 | - | 2 | 3 | ENE EC02 |
| ENE EC10 | Neural Networks For Control | 2 | 2 | - | 3 | ENE 3210 |

# 9- PROGRAM CURRICULUM

## Level 1

1st Term Semester (1)

| Course code | Course Title | Hours | | | | | Prerequisite | Examination Marks* | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENB 1101 | Calculus and Analytic Geometry (1) | 3 | 2 | - | - | 4 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1102 | Physics (1) | 3 | 1 | 2 | - | 4 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ITC 1101 | Introduction to Computer Science | 1 | - | 2 | - | 2 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| SSE 1101 | English Language(1) | 1 | - | 2 | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENM 1101 | Engineering Drawing | 1 | - | 3 | - | 2 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB1103 | Mechanics (1) | 2 | 2 | - | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| SSG xx02 | Human Rights | 1 | - | - | - | 1 | - | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 12 | 5 | 9 | - | 18 | | | | | | | |

L= lecture, T = tutorial, P = practical, CW= Course work, T.Es= Term exams; summation of best three exams during the semester, F.E. =Final exam

2nd Term  Semester (2)

| Course code | Course Title | Hours | | | | | Prerequisite | Examination Marks* | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENH 1201 | Engineering History | 1 | - | - | - | 1 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENB1204 | Chemistry (1) | 3 | - | 2 | - | 4 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ENB1205 | Mechanics (2) | 2 | 2 | - | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB1206 | Calculus and Analytic Geometry (2) | 3 | 2 | - | - | 4 | ENB 1101 Calculus and Analytic Geometry (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENM 1202 | Production Technology | 2 | - | 3 | - | 3 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| SSG xx01 | Sinai History | 2 | - | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 1 |
| Total | | 13 | 4 | 5 | - | 17 | | | | | | | |

# Level 2

## 1st Term  Semester (3)

| Course code | Course Title | Hours | | | | | Prerequisite | Examination Marks* | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENB 2107 | Engineering Mathematics (1) | 2 | 2 | - | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB 2108 | Physics (2) | 3 | 1 | 2 | - | 4 | ENB 1102 Physics (2) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 2103 | Engineering Drawing & Graphics | 1 | - | 3 | - | 2 | ENM 1101 Engineering Drawing | 20 | 30 | - | 50 | 100 | 3 |
| SSE 2102 | English Language(2) | 1 | - | 2 | - | 2 | SSE 1101 English Language (1) | 20 | 30 | - | 50 | 100 | 2 |
| ENE 2101 | Electric circuits (1) | 2 | 1 | - | - | 2 | - | 20 | 30 | -- | 50 | 100 | 3 |
| ENE 2102 | Computer Programming | 2 | - | 2 | - | 3 | - | 20 | 30 | -- | 50 | 100 | 3 |
| SSG xxxx | General Elective – A1 | 2 | - | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 1 |
| Total | | 13 | 4 | 9 | - | 18 | | | | | | | |

## 2nd Term Semester (4)

| Course code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENB 2209 | Engineering Mathematics (2) | 2 | 2 | - | - | 3 | ENB 2107 Engineering Mathematics (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENH 2202 | Communication & Presentation Skills | 1 | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 1 |
| ENE 2203 | Electric Circuits (2) | 2 | 1 | 1 | 1 | 3 | ENE 2101 Electric circuits (1) | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 2204 | Electronics (1) | 3 | 1 | - | - | 3 | ENE 2101 Electric circuits (1) | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 2205 | Electrical Material | 2 | 1 | - | - | 2 | - | 20 | 30 | -- | 50 | 100 | 3 |
| ENH 2203 | Principles of Negotiation | 2 | - | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| SSG xxx | General Elective – A2 | 2 | - | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 1 |
| Total | | 14 | 7 | 1 | 1 | 17 | | | | | | | |

# Level 3

## 1st Term Semester (5)

| Course code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 3106 | Electronics (2) | 2 | 2 | 1 | 1 | 3 | ENE 2204 Electronics (1) | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 3107 | Digital Design | 3 | 2 | 1 | 1 | 4 | ENE 2203 Electric circuits (2) | 20 | 30 | -- | 50 | 100 | 3 |
| ENE 3108 | Principals of Electrical Machines | 2 | 1 | - | - | 2 | ENE 2203 Electric Circuits (2) | 20 | 30 | - | 50 | 100 | 1 |
| ENM 3142 | Mechanical Engineering | 2 | 1 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB 3110 | Engineering Mathematics (3) | 2 | 2 | - | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENH 3104 | Professional Ethics | 2 | - | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENH 3105 | Technical Report Writing | 2 | - | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 15 | 8 | 2 | 2 | 18 | | | | | | | |

## 2nd Term Semester (6)

| Course code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total. Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 3209 | Measurements and Instrumentation | 2 | 2 | 1 | - | 3 | ENE 2101 Electric circuits (1), ENE3108 Principals of Electrical Machines | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 3210 | Control Systems | 2 | 2 | 1 | 1 | 3 | ENE 2203 Electric Circuits (2), ENB3110 Engineering Mathematics (3) | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 3211 | Signal Analysis and Systems | 2 | 2 | - | 1 | 3 | ENE 2203 Electric circuits (2) | 20 | 30 | ---- | 50 | 100 | 3 |
| ENE 3212 | Electromagnetic Fields | 2 | 2 | - | - | 3 | ENE 2203 Electric circuits (2) | 20 | 30 | ---- | 50 | 100 | 3 |
| ENB 3211 | Probability and Statistics | 2 | 2 | - | - | 3 | - | 20 | 30 | | 50 | 100 | 3 |
| ENM 3212 | Engineering Economics | 2 | - | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| SSG xx03 | Scientific Thinking | 1 | - | - | - | 1 | - | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 13 | 10 | 2 | 2 | 18 | | | | | | | |

# (I) Electronic and Communication Branch

## Level 4

### 1st Term  Semester (7)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 4113 | Microprocessor Architecture & Applications | 2 | 2 | - | 2 | 3 | ENE 3107 Digital Design | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4131 | Communication Theory (1) | 2 | 1 | 1 | - | 3 | ENE 3211 Signal Analysis and Systems | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4132 | Digital Signal Processing | 2 | 2 | - | 1 | 3 | ENE 3211 Signal Analysis and Systems | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4133 | Electromagnetic Waves | 2 | 1 | - | - | 2 | ENE 3212 Electromagnetic Fields | 20 | 30 | - | 50 | 100 | 3 |
| ENE EExx | Elective | 2 | - | - | 2 | 3 | ENE 3107 Digital Design | 10 | 30 | 10 | 50 | 100 | 3 |
| BAH 4101 | General Elective –B | 2 | - | - | - | 2 | | 50 | - | - | 50 | 100 | 1 |
| Total | | 12 | 6 | 1 | 5 | 16 | | | | | | | |

### 2nd Term  Semester (8)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 4234 | Communication Theory (2) | 2 | 1 | 2 | - | 3 | ENE 4131 Communication Theory (1) | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4235 | Introduction to VLSI Design | 2 | - | - | 1 | 2 | ENE 3106 Electronics (2) & ENE 3107 Digital Design | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4236 | Microwave engineering | 2 | 1 | 1 | 1 | 3 | ENE 4133 Electromagnetic Waves | 10 | 30 | 10 | 50 | 100 | 3 |
| BAH 4202 | Management & Marketing | 2 | - | - | - | 2 | - | 20 | 30 | 0 | 50 | 100 | 2 |
| ENE EExx | Elective | 2 | 2 | - | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENE EExx | Elective | 2 | - | - | 2 | 3 | - | 10 | 30 | 10 | 50 | 100 | 3 |
| Total | | 12 | 4 | 3 | 4 | 16 | | | | | | | |

# Level 5

1st Term  Semester (9)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 5137 | Antennas & Wave Propagation | 2 | 2 | 1 | 1 | 3 | ENE 4236 Microwave engineering | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 5138 | Mobile Communications | 2 | 1 | - | - | 2 | ENE 4234 Communication Theory (2) | 20 | 30 | - | 50 | 100 | 3 |
| ENE EExx | Elective | 2 | 2 | - | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5122 | Project Management | 2 | - | | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENE 5198 | Graduation Project-1 | 2 | 3 | - | - | 3 | Departmental requirements | 25 | - | - | - | - | - |
| Total | | 10 | 8 | 1 | 1 | 13 | | | | | | | |

2nd Term  Semester (10)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | | | CW | T.Es | O/P | F.E | | |
| ENE 5239 | Radio Navigation Systems | 2 | 1 | - | 1 | 3 | ENE 4234 Communication Theory (2) | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 5240 | Satellite communications | 2 | 2 | - | - | 3 | ENE 4234 Communication Theory (2) | 20 | 30 | - | 50 | 100 | 3 |
| ENE EExx | Elective | 2 | 2 | - | - | 3 | | 20 | 30 | - | 50 | 100 | 3 |
| ENE 5250 | Environmental Studies | 2 | 1 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENE 5299 | Graduation Project (2) | 2 | - | 3 | - | 3 | Departmental requirements | 25 | - | 50 | - | 100 | - |
| Total | | 10 | 6 | 3 | 1 | 14 | | | | | | | |

# (II)- Computer and Control Engineering Branch

## Level 4

1st Term Semester (7)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 4113 | Microprocessor Architecture & Applications | 2 | 2 | - | 2 | 3 | ENE 3107 Digital Design | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4132 | Digital Signal Processing | 2 | 2 | - | 1 | 3 | ENE 3211 Signal Analysis and Systems | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4151 | Computer networks | 2 | 2 | 1 | - | 3 | - | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4152 | Operating systems (1) | 2 | - | - | 1 | 2 | ENE 2102 Computer programming- | 20 | 30 | - | 50 | 100 | 3 |
| ENE ECxx | Elective | 2 | - | - | 2 | 3 | - | 10 | 30 | 10 | 50 | 100 | 3 |
| BAH 4101 | General Elective –B | 2 | - | - | - | 2 | - | 50 | - | - | 50 | 100 | 1 |
| Total | | 12 | 6 | 1 | 6 | 16 | | | | | | | |

2nd Term Semester (8)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 4253 | Operating systems (2) | 2 | 2 | 1 | - | 3 | ENE 4152 Operating systems (1) | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4254 | Computer architecture | 2 | 2 | 1 | 1 | 3 | ENE 4113 Microprocessor Architecture & Applications | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4255 | Algorithms and data structure | 2 | 2 | - | 1 | 3 | ENE 2102 Computer Programming | 10 | 30 | 10 | 50 | 100 | 3 |
| BAH 4202 | Management & Marketing | 2 | - | - | - | 2 | - | 20 | 30 | 0 | 50 | 100 | 2 |
| ENE ECxx | Elective | 2 | 2 | - | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENE ECxx | Elective | 2 | - | - | 2 | 3 | - | 10 | 30 | 10 | 50 | 100 | 3 |
| Total | | 12 | 8 | 2 | 4 | 17 | | | | | | | |

# Level 5

## 1st Term Semester (9)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 5156 | Communication systems | 2 | 1 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENE 5157 | Computer interfacing | 2 | 2 | 1 | 1 | 3 | ENE 4152 Operating systems (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENE ECxx | Elective | 2 | 2 | - | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5122 | Project Management | 2 | - | | | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENE 5198 | Graduation Project-1 | 2 | 3 | - | | 3 | Departmental requirements | 25 | - | - | - | - | - |
| Total | | 10 | 8 | 1 | 1 | 13 | | | | | | | |

## 2nd Term Semester (10)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 5258 | Artificial intelligence | 2 | 2 | - | 1 | 3 | - | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 5259 | Database systems | 2 | 1 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENEECxx | Elective | 2 | 2 | - | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENE 5250 | Environmental Studies | 2 | 1 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENE 5299 | Graduation Project-2 | 2 | - | 3 | - | 3 | Departmental requirements | 25 | - | 50 | - | 100 | - |
| Total | | 10 | 6 | 3 | 1 | 13 | | | | | | | |

# (III)- Electrical Power and Machines Engineering Branch

## Level 4

1st Term  Semester (7)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 4171 | Electrical Power (1) | 2 | 2 | -- | 2 | 3 | ENE 2203 Electric Circuits (2) | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4172 | Electrical Machines (1) | 2 | 2 | 1 | 1 | 3 | ENE 3108 Principals of Electrical Machines | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4173 | Power electronics | 2 | 2 | 1 | 1 | 3 | ENE 2203 Electronics (2) | 20 | 30 | - | 50 | 100 | 3 |
| ENE 4113 | Microprocessor Architecture & Applications | 2 | 2 | --- | 2 | 3 | | 10 | 30 | 10 | 50 | 100 | 3 |
| ENM 4144 | Power Plants | 2 | 1 | -- | -- | 2 | EME Mechanical Engineering | 20 | 30 | ---- | 50 | 100 | 3 |
| BAH 4101 | General Elective –B | 2 | - | - | -- | 2 | | 50 | - | - | 50 | 100 | 1 |
| Total | | 12 | 9 | 2 | 6 | 16 | | | | | | | |

Semester (8)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 4274 | Electrical  Power (2) | 2 | 2 | -- | 1 | 3 | ENE 4171 Electrical Power (1) | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4275 | Electrical Machines (2) | 3 | 1 | 2 | 1 | 4 | ENE 4172 Electrical Machines (1) | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 5276 | Modern Control Systems | 2 | 1 | -- | -- | 2 | ENE 2203 Electric Circuits (2) | 20 | 30 | ---- | 50 | 100 | 3 |
| ENE 4277 | Utilization of Electrical Energy | 2 | 1 | -- | -- | 2 | ENE 4172 Electrical Machines (1) | 20 | 30 | ---- | 50 | 100 | 3 |
| BAH 4202 | Management & Marketing | 2 | - | - | - | 2 | | 20 | 30 | ---- | 50 | 100 | 3 |
| ENE EPxx | Elective | 2 | 1 | - | | 2 | - | 10 | 30 | 10 | 50 | 100 | 3 |
| Total | | 13 | 6 | 2 | 2 | 15 | | | | | | | |

# Level 5

1st Term  Semester (9)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 5178 | Electrical Power Systems Analysis | 2 | 2 | -- | 2 | 3 | ENE 4274 Electrical  Power (2) | 20 | 30 | --- | 50 | 100 | 3 |
| ENE 5179 | Special Electrical Machines | 2 | 2 | - | -- | 3 | ENE 4172 Electrical Machines (1),  ENE 4275 Electrical Machines (2) | 20 | 30 | --- | 50 | 100 | 3 |
| ENE 5180 | Power Systems Protection | 2 | 1 | 1 | 1 | 3 | ENE 5178 Electrical Power Systems Analysis | 20 | 30 | --- | 50 | 100 | 3 |
| ENE EP1xx | Elective | 2 | 1 | --- | --- | 2 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENM5122 | Project Management | 2 | - | --- | --- | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENE 5198 | Graduation Project-1 | 2 | 3 | - | --- | 3 | Departmental requirements | 25 | - | - | - | - | - |
| Total | | 12 | 9 | 1 | 3 | 16 | | | | | | | |

2nd Term  Semester (10)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 5281 | High voltage engineering | 2 | 2 | -- | -- | 3 | ENE 5178 Electrical Power Systems Analysis | 20 | 30 | --- | 50 | 100 | 3 |
| ENE EPxx | Elective | 2 | 1 | -- | -- | 2 | - | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE EPxx | Elective | 2 | 1 | - | -- | 2 | | 20 | 30 | --- | 50 | 100 | 3 |
| ENE 5250 | Environmental Studies | 2 | 1 | - | -- | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENE 5299 | Graduation Project-2 | 2 | - | 3 | -- | 3 | Departmental requirements | 25 | - | 50 | - | 100 | - |
| Total | | 10 | 5 | 3 | -- | 12 | | | | | | | |

# (V)- Communication and information Engineering Branch

## Level 4

### 1st Term Semester (7)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 4113 | Microprocessor Architecture & Applications | 2 | 2 | - | 2 | 3 | ENE 3107 Digital Design | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4131 | Communication Theory (1) | 2 | 1 | 1 | - | 3 | ENE 3211 Signal Analysis and Systems | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4152 | Operating System 1 | 2 | 2 | - | 1 | 3 | ENE 2102 Computer Programming | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4133 | Electromagnetic Waves | 2 | 1 | - | - | 2 | ENE 3212 Electromagnetic Fields | 20 | 30 | - | 50 | 100 | 3 |
| ENE EExx | Elective | 2 | - | - | 2 | 3 | ENE 3107 Digital Design | 10 | 30 | 10 | 50 | 100 | 3 |
| BAH 4101 | General Elective –B | 2 | - | - | - | 2 | | 50 | - | - | 50 | 100 | 1 |
| Total | | 12 | 6 | 1 | 5 | 16 | | | | | | | |

### 2nd Term Semester (8)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 4254 | Computer Architecture | 2 | 2 | 1 | 1 | 3 | ENE 4113 Microprocessor Architecture & Applications | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 4255 | Algorithm and Data structure | 2 | 2 | - | 1 | 3 | ENE 2102 Computer Programming | 10 | 30 | 10 | 50 | 100 | 3 |
| ENB 4215 | Discrete Mathematics | 2 | 2 | - | - | 3 | | | | | | | |
| BAH 4202 | Management & Marketing | 2 | - | - | - | 2 | - | 20 | 30 | 0 | 50 | 100 | 2 |
| ENE EExx | Elective | 2 | 2 | - | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENE EExx | Elective | 2 | - | - | 2 | 3 | - | 10 | 30 | 10 | 50 | 100 | 3 |
| Total | | 12 | 8 | 1 | 4 | 17 | | | | | | | |

# Level 5

1st Term Semester (9)

| Course Code | Course Title | Hours | | | | | Prerequisite | Examination Marks | | | | Total Mark | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 5185 | Software Engineering | 2 | 2 | 1 | 1 | 3 | ENE 2102 Computer programming | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 5186 | Data Communications | 2 | 1 | - | - | 2 | ENE3211 Signal Analysis and Systems | 20 | 30 | - | 50 | 100 | 3 |
| ENE ECxx | Elective | 2 | 2 | - | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5122 | Project Management | 2 | - | | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENE 5198 | Graduation Project-1 | 2 | 3 | - | - | 3 | Departmental requirements | 25 | - | - | - | - | - |
| Total | | 10 | 8 | 1 | 1 | 13 | | | | | | | |

2nd Term Semester (10)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | ICT | | CW | T.Es | O/P | F.E | | |
| ENE 5259 | Data Base system | 2 | 1 | - | - | 2 | ENE4255 Algorithm and Data Structure | 10 | 30 | 10 | 50 | 100 | 3 |
| ENE 5287 | Object oriented programming | 2 | - | 1 | 1 | 3 | ENE5185 Software Engineering | 20 | 30 | - | 50 | 100 | 3 |
| ENE ECxx | Elective | 2 | 2 | - | - | 3 | | 20 | 30 | - | 50 | 100 | 3 |
| ENE 5250 | Environmental Studies | 2 | 1 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENE 5299 | Graduation Project (2) | 2 | - | 3 | - | 3 | Departmental requirements | 25 | - | 50 | - | 100 | - |
| Total | | 10 | 4 | 4 | 1 | 13 | | | | | | | |

SU ARISH
SINAI UNIVERSITY

# Department of

## Mechanical Engineering

# INTRODUCTION

Bachelor of Science in Mechanical Engineering

With Branches In:

(I) Design and production Engineering

(II) Mechanical Power Engineering

(III) Mechatronic Engineering

Mechanical engineers should be curious about how things are made and work. They have a desire to solve problems and a talent for understanding the operation of mechanical devices. Mechanical engineers conceive, plan, design and direct the production, distribution and operation of a wide variety of devices, machines and systems, environmental control and materials processing, transportation and handling. Mechanical engineers analyze their design using the principles of motion, energy, and momentum to insure that the product functions safely, efficiently, reliably, and manufactured at a competitive cost with minimized environmental hazards.

Mechanical engineering is a broad discipline which covers the fields of solid and fluid mechanics, thermodynamics, engineering design, production technology, economics and management. Basic studies are devoted to mechanical properties of materials, machine design, dynamics and control, instrumentation, fundamentals of fluid flow, energy and power systems.

Mechanical Engineering covers the design, analysis, testing and manufacturing of products that are used in every facet of modern society. Undergraduate educational programs in mechanical engineering are, therefore, specifically designed to provide a wide variety of topics. These include power systems, fluid and thermal sciences related to discipline, automatic control, reliability, quality assurance and control, mechanical design and manufacturing.

A B.Sc. degree mechanical engineering is designed for students who seek careers as engineers in industry, army, consulting firms and private and governmental agencies. This degree is also appropriate for students who plan to be researchers or who intend to pursue an advanced degree in engineering. A typical program curriculum incorporates analytical tools, creative thought and diversity of skills as well as the state of art of the profession.

This program is divided into three main branches that starts from the third year (level 4) in the department of Mechanical Engineering they are:

1-  Design and Production  Engineering

2-  Mechanical  Power Engineering

3-  Mechatronic Engineering

## 2-Mission

As part of Sinai University, the mission of the Mechanical Engineering Department is to provide its students with a high quality engineering education. The quest of excellence is central to the department's mission, in addition to preserving high standards of academic achievement, professional behavior, and ethical conduct.

## 3-Vision

The crucial vision of the program is to provide its students with a strong technical foundation and to expose them to the latest technologies and developments in this wide-ranging and challenging field.

## 4. PROGRAM  OBJECTIVES

The following Education Objectives represent the broad objectives of this department as they relate to the students.

1) Provide students with a solid foundation in the fundamental principles of science and engineering.

2) To examine current and relevant technical problems in engineering as examples of the applications of such principles.

3) Provide comprehensive course work in both the thermal and mechanical systems areas, including cross-linkage between the two areas.

4) Provide students with meaningful design experiences.

5) Provide students with opportunities to develop teamwork, communication, and computer skills.

# 6- PROGRAM CREDIT HOURS.

The Bachelor degree of Mechanical Engineering according to its branched is granted to students who successfully complete a minimum of 165 credit hours  5 levels , 10 semesters divided as follows:

| Year | (I) Design and Production Engineering | | | | (II) Mechanical Power Engineering | | | | (III) Mechatronic Engineering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | T | P | Ch | L | T | P | Ch | L | T | P | Ch |
| Level 1 | 25 | 9 | 14 | 35 | 25 | 9 | 14 | 35 | 25 | 9 | 14 | 35 |
| Level 2 | 25 | 14 | 14 | 36 | 25 | 14 | 14 | 36 | 25 | 14 | 14 | 36 |
| Level 3 | 24 | 13 | 6 | 32 | 24 | 13 | 6 | 32 | 24 | 13 | 6 | 32 |
| Level 4 | 25 | 15 | 8 | 34 | 24 | 18 | 7 | 34 | 24 | 12 | 10 | 34 |
| Level 5 | 20 | 14 | 7 | 28 | 20 | 16 | 6 | 28 | 20 | 14 | 7 | 28 |
| Total | 119 | 65 | 49 | 165 | 118 | 70 | 47 | 165 | 118 | 62 | 51 | 165 |

L= lecture hours, T = tutorial hours, P = practical hours, Ch= credit hours
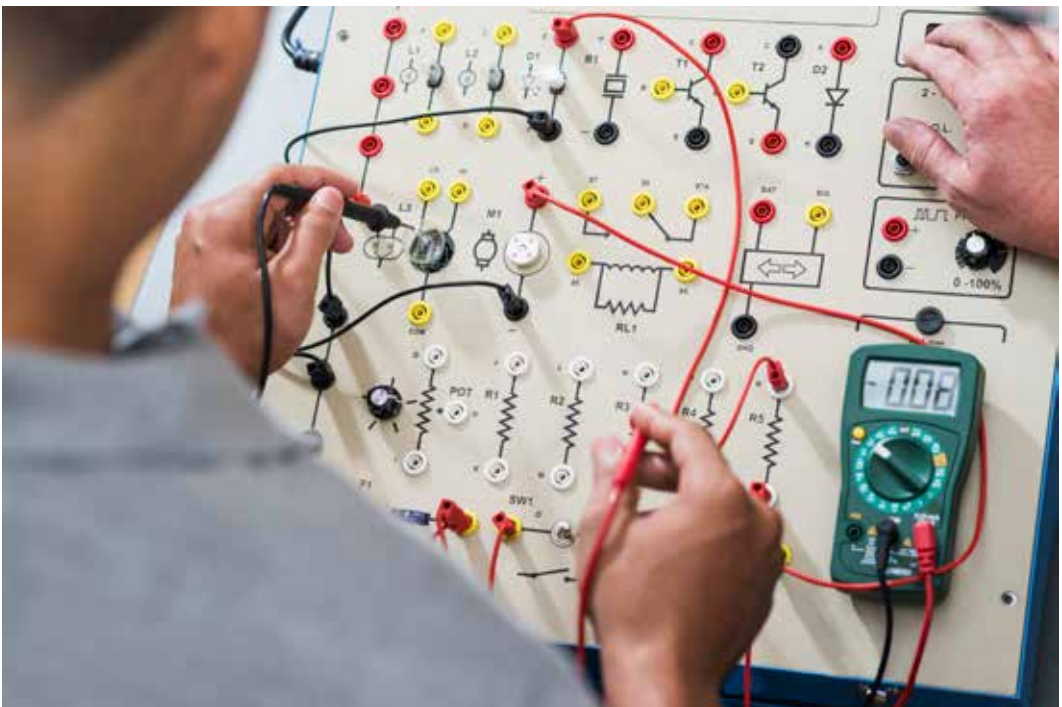
# 7. STUDY PLAN

## Department Requirements

| Course code | Course Title | Hours | | | |
|---|---|---|---|---|---|
| | | L | T | P | Ch |
| ENB 2107 | Engineering Mathematics (1) | 2 | 2 | - | 3 |
| ENB 2108 | Physics (2) | 3 | 1 | 2 | 4 |
| ENB 2209 | Engineering Mathematics (2) | 2 | 2 | - | 3 |
| ENB 3110 | Engineering Mathematics (3) | 2 | 2 | - | 3 |
| ENB 3211 | Probability and Statistics | 2 | 2 | - | 3 |
| ENE 2241 | Fundamental of Electrical Engineering | 2 | 2 | | 3 |
| ENE 3243 | Electrical Machines | 2 | 1 | 2 | 3 |
| ENE 3142 | Computer Programming Applications | 2 | - | 2 | 3 |
| ENM 2103 | Engineering Drawing and Graphics | 1 | - | 3 | 2 |
| ENM 2104 | Thermodynamics (1) | 2 | 2 | 1 | 3 |
| ENM 2105 | Engineering Materials and Testing | 2 | 1 | 2 | 3 |
| ENM 2206 | Fluid Dynamics | 2 | 2 | 1 | 3 |
| ENM 2207 | Stress Analysis | 1 | - | 3 | 2 |
| ENM 3108 | Mechanical Design (1) | 2 | 2 | - | 3 |
| ENM 3109 | Thermodynamics (2) | 2 | 2 | 1 | 3 |
| ENM 3210 | Industrial Technology | 3 | 2 | 1 | 4 |
| ENM 3211 | Theory of machines | 2 | 2 | - | 3 |
| ENM 5123 | Graduation Project (1) | 2 | 3 | - | 3 |
| ENM 5227 | Environmental Studies | 2 | 1 | | 2 |
| ENM 5228 | Graduation Project (2) | 2 | - | 3 | 3 |
| Total | | 40 | 29 | 21 | 59 |

# (I)Specialization Requirements Design and Production Engineering Branch

| Course code | Course Title | Hours | | | |
|---|---|---|---|---|---|
| | | L | T | P | Ch |
| ENM 4113 | Mechanical Measurements | 2 | - | 2 | 3 |
| ENM 4114 | Vibrations | 2 | 2 | 1 | 3 |
| ENM 4115 | Theory of Metal Cutting and Forming | 3 | 1 | 2 | 4 |
| ENM EDxx | Elective (1) | 2 | 2 | 1 | 3 |
| ENM 4116 | Work study | 2 | - | 1 | 2 |
| ENM 4217 | Automatic Control | 2 | 2 | - | 3 |
| ENM 4218 | Machines Tool Design | 2 | 2 | - | 3 |
| ENM EDxx | Elective (2) | 2 | 2 | 1 | 3 |
| ENM 4219 | Quality Control | 2 | 2 | - | 3 |
| ENM 5120 | Dynamic System Analysis and Modeling | 2 | 2 | - | 3 |
| ENM 5121 | Numerical Control Machines | 2 | 2 | 1 | 3 |
| ENM 5224 | Tool Design | 2 | 2 | - | 3 |
| ENM EDxx | Elective (3) | 2 | 2 | 1 | 3 |
| ENM 5225 | Advanced Mechanical Design | 2 | 2 | - | 3 |
| ENM 5226 | Metrology | 2 | - | 2 | 3 |
| ENE 4244 | Electrical Power Engineering | 2 | 2 | | 3 |
| Total | | 33 | 25 | 12 | 48 |

## (II) Specialization Requirements Mechanical Power Engineering branch

| Course code | Course Title | Hours | | | |
|---|---|---|---|---|---|
| | | L | T | P | Ch |
| ENM 4113 | Mechanical Measurements | 2 | - | 2 | 3 |
| ENM 4114 | Vibrations | 2 | 2 | 1 | 3 |
| ENM 4129 | Turbomachinery (1) | 2 | 2 | 1 | 3 |
| ENM 4130 | Heat and Mass Transfer | 2 | 2 | 1 | 3 |
| ENM EPxx | Elective (1) | 2 | 2 | - | 3 |
| ENM 4231 | Thermal Power Stations | 2 | 2 | 1 | 3 |
| ENM 4217 | Automatic Control | 2 | 2 | - | 3 |
| ENM 4232 | Internal Combustion Engines (1) | 2 | 2 | 1 | 3 |
| ENM EPxx | Elective (2) | 2 | 2 | - | 3 |
| ENM 5120 | Dynamic System Analysis and Modeling | 2 | 2 | - | 3 |
| ENM 5133 | Refrigeration & Air Conditioning | 2 | 2 | 1 | 3 |
| ENM 5236 | Renewable Energy Systems | 2 | 2 | - | 3 |
| ENM 5235 | Simulation of Thermal Systems | 2 | 2 | 1 | 3 |
| ENM 5134 | Turbomachinery (2) | 2 | 2 | 1 | 3 |
| ENM EPxx | Elective (3) | 2 | 2 | - | 3 |
| ENE 4244 | Electrical Power Engineering | 2 | 2 | - | 3 |
| Total | | 32 | 30 | 10 | 48 |

## (III) - Specialization Requirements Mechatronic Engineering Branch

| Course code | Course Title | Hours | | | |
|---|---|---|---|---|---|
| | | L | T | P | Ch |
| ENE 4145 | electronics | 2 | - | 2 | 3 |
| ENE 4146 | Logic design | 2 | - | 2 | 3 |
| ENE 42xx | Computer organization | 2 | - | 2 | 3 |
| ENE 52xx | Microprocessor and Digital Systems | 2 | 2 | 1 | 3 |
| ENE 5148 | Power Electronics | 2 | 2 | - | 3 |
| ENM 4114 | Vibrations | 2 | 2 | - | 3 |
| ENM 4137 | System Modeling & simulation | 2 | 2 | - | 3 |
| ENM EMxx | Elective (1) | 2 | 2 | - | 3 |
| ENM 4217 | Automatic Control | 2 | 2 | - | 3 |
| ENM 4238 | Mechatronics (1) | 2 | 2 | 1 | 3 |
| ENM 4239 | Design of Applied Measuring Systems | 2 | - | 2 | 3 |
| ENM EMxx | Elective (2) | 2 | 2 | - | 3 |
| ENM EMxx | Elective (3) | 2 | 2 | - | 3 |
| ENM 5121 | Numerical Control Machines | 2 | 2 | - | 3 |
| ENM 5140 | Mechatronics (2) | 2 | 2 | 1 | 3 |
| ENM 5241 | Robotics | 2 | 2 | 1 | 3 |
| Total | | 32 | 24 | 12 | 48 |

**Elective Courses for Mechanical Engineering Students:**

- Student has to select two courses of level four and one courses in level five.

-  Prerequisites for any elective course are all compulsory courses up to its level.

## (I) Design and Production Engineering    (9 Ch)

| Course code | Course Title | Hours | | | | Prerequisite |
| --- | --- | --- | --- | --- | --- | --- |
| | | L | T/P | P | Ch | |
| ENM ED01 | Concurrent Engineering | 2 | 2 | - | 3 | |
| ENM ED02 | Product Dissections | 2 | 2 | - | 3 | ENM 3210 Industrial technology |
| ENM ED03 | Measuring Instruments | 2 | 2 | - | 3 | ENM4113 Mechanical Measurements |
| ENM ED04 | Experimental Stress Analyses | 2 | 2 | - | 3 | ENM2207 Stress analysis |
| ENM ED05 | Sustainability and Design for Environment | 2 | 2 | - | 3 | ENM3108 Mechanical Design 1 |
| ENM ED06 | Operations Research | 2 | 2 | - | 3 | ENB 3211 Probability and Statistics |
| ENM ED07 | Materials & Process Selection | 2 | 2 | - | 3 | ENM3108 Mechanical Design 1 |

## (II) Mechanical Power Engineering    (9 Ch)

| Course code | Course Title | Hours | | | | Prerequisite |
| --- | --- | --- | --- | --- | --- | --- |
| | | L | T | P | Ch | |
| ENM EP01 | Hydraulic and Pneumatic Systems | 2 | 2 | - | 3 | ENM 2206 Fluid Dynamics |
| ENM EP02 | Power Plant Design and Engineering | 2 | 2 | - | 3 | ENM 4231 Thermal Power Plant |
| ENM EP03 | HVAC Engineering | 2 | 2 | - | 3 | ENM 5133 Refrigeration and Air conditioning |
| ENM EP04 | Internal Combustion Engines (2) | 2 | 2 | - | 3 | ENM 4232 Internal Combustion Engines (1) |
| ENM  EP05 | Pipelines Networks | 2 | 2 | - | 3 | ENM 2206 Fluid Dynamics |
| ENM EP06 | Gas Dynamics | 2 | 2 | - | 3 | ENM 3109 Thermodynamic(2) |
| ENM EP07 | Advanced Energy Conversion Systems | 2 | 2 | - | 3 | |

## (III) Mechatronic Engineering Courses    (9 Ch)

| Course code | Course Title | Hours | | | | Prerequisite |
|---|---|---|---|---|---|---|
| | | L | T | P | Ch | |
| ENM EM01 | Mechatronic Automation | 2 | 2 | - | 3 | ENE 4146 Logic Design |
| ENM EM02 | Manufacturing for Mechatronics | 2 | 2 | - | 3 | ENM 3216 Industrial Technology |
| ENM EM03 | Electro mechanical systems | 2 | 2 | - | 3 | ENM5140 Mechatronics(2) |
| ENM EM04 | Computational Mechanics | 2 | 2 | - | 3 | ENB 3110 Engineering Mathematics (3) |
| ENM EM05 | Control of Hydraulic Systems | 2 | 2 | - | 3 | ENM 2206 Fluid Dynamics |
| ENM EM06 | Real-Time Systems | 2 | 2 | - | 3 | ENM EM04 Computational Mechanics |
| ENE EM07 | Fuzzy Logic Control | 2 | 2 | - | 3 | ENE 4146 Logic Design |
| ENE EM08 | Computer Networks | 2 | 2 | - | 3 | ENM EM01 Mechatronic Automation |
| ENE EM09 | Expert Systems | 2 | 2 | - | 3 | ENE EM03 Fuzzy Logic Control |

# 9. PROGRAM CURRICULUM FOR MECHANICAL ENGINEERING

## Level 1

### 1st Term Semester (1)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENB 1101 | Calculus and Analytic Geometry (1) | 3 | 2 | - | 4 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1102 | Physics (1) | 3 | 1 | 2 | 4 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ITC 1101 | Introduction to Computer Science | 1 | - | 2 | 2 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| SSE 1101 | English Language(1) | 1 | - | 2 | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENM 1101 | Engineering Drawing | 1 | - | 3 | 2 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1103 | Mechanics (1) | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| SSG xx02 | Human Rights | 1 | - | - | 1 | - | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 12 | 5 | 9 | 18 | | | | | | | |

L= lecture, T = tutorial, P = practical, CW= Course work, T.Es= Term exams; summation of best three exams during the semester, F.E. =Final exam

### 2nd Term Semester (2)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENH 1201 | Engineering History | 1 | - | - | 1 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENB 1204 | Chemistry | 3 | - | 2 | 4 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ENB 1205 | Mechanics (2) | 2 | 2 | - | 3 | ENB 1103 Mechanics (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1206 | Calculus and Analytic Geometry (2) | 3 | 2 | - | 4 | ENB 1101 Calculus and Analytic Geometry (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENM 1202 | Production Technology | 2 | - | 3 | 3 | | 20 | 20 | 10 | 50 | 100 | 3 |
| SSG xx01 | Sinai History | 2 | - | - | 2 | | 20 | 30 | - | 50 | 100 | 1 |
| Total | | 13 | 4 | 5 | 17 | | | | | | | |

# Level 2

### 1st Term  Semester (3)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENB 2107 | Engineering Mathematics (1) | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB 2108 | Physics (2) | 3 | 1 | 2 | 4 | ENB 1102 Physics (1) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 2103 | Engineering Drawing and Graphics | 1 | - | 3 | 2 | ENM 1101 Engineering Drawing | 20 | 30 | - | 50 | 100 | 3 |
| SSE 2102 | English Language(2) | 1 | - | 2 | 2 | SSE 1101 English Language (1) | 20 | 30 | - | 50 | 100 | 2 |
| ENM 2104 | Thermodynamics (1) | 2 | 2 | 1 | 3 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 2105 | Engineering Materials and Testing | 2 | 1 | 2 | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| SSG xxx | General Elective – A1 | 2 | - | - | 2 | | 20 | 30 | - | 50 | 100 | 1 |
| Total | | 13 | 6 | 10 | 19 | | | | | | | |

### 2nd Term  Semester (4)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENB 2209 | Engineering Mathematics (2) | 2 | 2 | - | 3 | ENB 2107 Engineering Mathematics (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENH  2202 | Communication and Presentation Skills | 1 | 2 | - | 2 | - | 20 | 30 | - | 50 | 100 | 1 |
| ENM 2206 | Fluid Dynamics | 2 | 2 | 1 | 3 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 2207 | Stress Analysis | 1 | - | 3 | 2 | ENM 2105Engineering Materials and Testing | 20 | 30 | - | 50 | 100 | 3 |
| ENE 2241 | Fundamentals of Electrical  Engineering | 2 | 2 | - | 3 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ENH 2203 | Principles of Negotiation | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| SSG xxx | General Elective – A2 | 2 | - | | 2 | - | 20 | 30 | - | 50 | 100 | 1 |
| Total | | 12 | 8 | 4 | 17 | | | | | | | |

# Level 3

## 1st Term Semester (5)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENM 3108 | Mechanical Design (1) | 2 | 2 | - | 3 | ENM 2207 Stress analysis | 20 | 30 | - | 50 | 100 | 3 |
| ENM 3109 | Thermodynamics (2) | 2 | 2 | 1 | 3 | ENM 2104 Thermodynamics (1) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENB 3110 | Engineering Mathematics (3) | 2 | 2 | - | 3 | ENB 2209 Engineering Mathematics (2) | 20 | 30 | - | 50 | 100 | 3 |
| ENE 3142 | Computer Programming Applications | 2 | - | 2 | 3 | ITC 1101 Introduction to Computer | 20 | 20 | 10 | 50 | 100 | 3 |
| ENH 3104 | Professional Ethics | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENH 3105 | Technical Report Writing | 2 | - | | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 12 | 6 | 3 | 16 | | | | | | | |

## 2nd Term Semester (6)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENM 3210 | Industrial Technology | 3 | 2 | 1 | 4 | ENM 1202 Production Technology | 20 | 30 | 10 | 50 | 100 | 3 |
| ENE 3243 | Electrical Machines | 2 | 1 | 2 | 3 | ENE 2241 Fundamentals of Electrical Engineering | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 3211 | Theory of machines | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB 3211 | Probability and Statistics | 2 | 2 | - | 3 | - | 20 | 30 | | 50 | 100 | 3 |
| ENM 3212 | Engineering Economics | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| SSG xx03 | Scientific Thinking | 1 | - | - | 1 | - | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 12 | 7 | 3 | 16 | | | | | | | |

# (I) - Design and Production Engineering Branch

## Level 4

### 1st Term Semester (7)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENM 4113 | Mechanical Measurements | 2 | - | 2 | 3 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 4114 | Vibrations | 2 | 2 | 1 | 3 | ENM 3211 Theory of Machines | 20 | 30 | - | 50 | 100 | 3 |
| ENM 4115 | Theory of Metal Cutting and Forming | 3 | 1 | 2 | 4 | ENM 3210 Industrial Technology | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM EDxx | Elective (1) | 2 | 2 | 1 | 3 | - | 20 | 30 | 0 | 50 | 100 | 3 |
| ENM 4116 | Work study | 2 | - | 1 | 2 | - | 20 | 30 | 0 | 50 | 100 | 3 |
| BAB 4101 | General Elective -B | 2 | - | - | 2 | - | 50 | - | - | 50 | 100 | 1 |
| Total | | 13 | 5 | 7 | 17 | | | | | | | |

### 2nd Term Semester (8)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENM 4217 | Automatic Control | 2 | 2 | - | 3 | ENB 3110 Engineering Mathematic (3) | 20 | 30 | 0 | 50 | 100 | 3 |
| ENE 4244 | Electrical Power Engineering | 2 | 2 | | 3 | ENEP 3212 Electrical Machines | 20 | 30 | 0 | 50 | 100 | 3 |
| ENM 4218 | Machines Tool Design | 2 | 2 | - | 3 | ENM 4115 Theory of Metal Cutting and Forming | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM EDxx | Elective (2) | 2 | 2 | 1 | 3 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| BAH 4202 | Management & Marketing | 2 | - | - | 2 | - | 20 | 30 | 0 | 50 | 100 | 2 |
| ENM 4219 | Quality Control | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| Total | | 12 | 10 | 1 | 17 | | | | | | | |
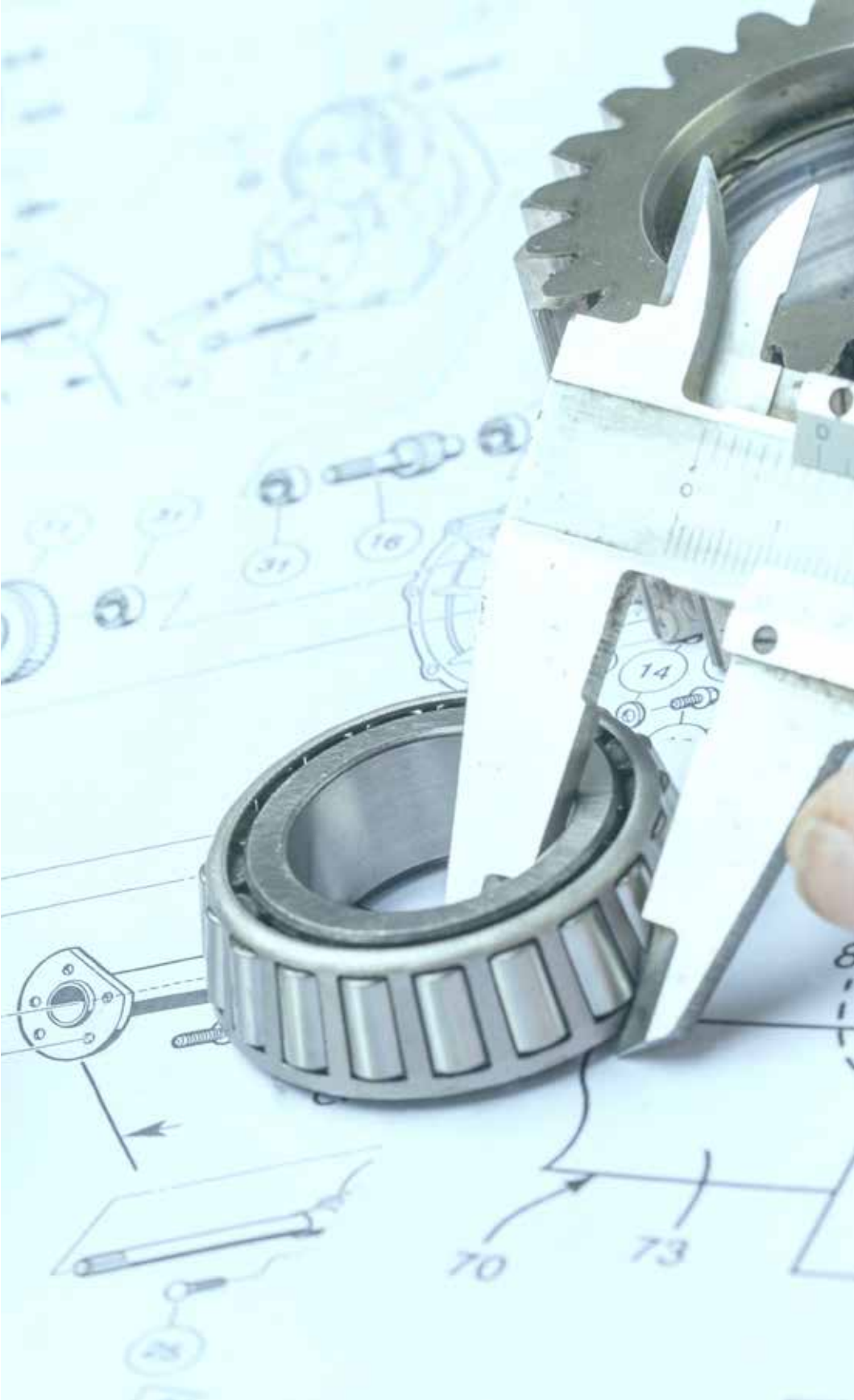
# Level 5

1<sup>st</sup> Term  Semester (9)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENM 5120 | Dynamic System Analysis and Modeling | 2 | 2 | - | 3 | ENM 4217 Automatic control | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5121 | Numerical Control Machines | 2 | 2 | 1 | 3 | ENM 4115 Theory of Metal Cutting and Forming | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM EDxx | Elective (3) | 2 | 2 | 1 | 3 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 5122 | Project Management | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENM 5123 | Graduation Project (1) | 2 | 3 | - | 3 | Departmental requirements | 25 | - | - | - | - | - |
| Total | | 10 | 9 | 2 | 14 | | | | | | | |

2<sup>nd</sup> Term  Semester (10)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENM 5224 | Tool Design | 2 | 2 | - | 3 | ENM 4115 Theory of Metal Cutting and Forming | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5225 | Advanced Mechanical Design | 2 | 2 | - | 3 | ENM 3108 Mechanical Design (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5226 | Metrology | 2 | - | 2 | 3 | ENM 4113 Mechanical Measurements | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 5227 | Environmental Studies | 2 | 1 | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENM 5228 | Graduation Project (2) | 2 | - | 3 | 3 | Departmental requirements | 25 | - | 50 | - | 100 | - |
| Total | | 10 | 5 | 5 | 14 | | | | | | | |

# (II) - Mechanical Power Engineering Branch

## Level 4

1st Term  Semester (7)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENM 4113 | Mechanical Measurements | 2 | - | 2 | 3 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 4114 | Vibrations | 2 | 2 | 1 | 3 | ENM 3211 Theory of Machines | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 4129 | Turbomachinery (1) | 2 | 2 | 1 | 3 | ENM 2206 Fluid Dynamics | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 4130 | Heat and Mass Transfer | 2 | 2 | 1 | 3 | ENM 3109 Thermodynamics (2) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM EPxx | Elective (1) | 2 | 2 | - | 3 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| BAB 4101 | General Elective -B | 2 | - | - | 2 | - | 50 | - | - | 50 | 100 | 1 |
| Total | | 12 | 8 | 5 | 17 | | | | | | | |

2nd Term  Semester (8)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENM 4231 | Thermal Power Stations | 2 | 2 | 1 | 3 | ENM 4130 Heat and Mass Transfer | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 4217 | Automatic Control | 2 | 2 | - | 3 | ENB 3110 Engineering Mathematic (3) | 20 | 30 | - | 50 | 100 | 3 |
| ENE 4244 | Electrical Power Engineering | 2 | 2 | | 3 | ENE 2241 Fundamentals of Electrical Engineering | 20 | 30 | - | 50 | 100 | 3 |
| ENM 4232 | Internal Combustion Engines (1) | 2 | 2 | 1 | 3 | ENM 3109 Thermodynamics (2) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM EPxx | Elective (2) | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| BAH 4202 | Management & Marketing | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 12 | 10 | 2 | 17 | | | | | | | |

## Level 5

1st Term Semester (9)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENM 5133 | Refrigeration & Air Conditioning | 2 | 2 | 1 | 3 | ENM 4130 Heat and Mass Transfer | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 5120 | Dynamic System Analysis and Modeling | 2 | 2 | - | 3 | ENM 4114 Viberation | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5134 | Turbomachinery (2) | 2 | 2 | 1 | 3 | ENM 4129 Turbomachinery (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5122 | Project Management | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENM 5123 | Graduation Project (1) | 2 | 3 | | 3 | Departmental Requirements | 25 | - | - | - | - | - |
| Total | | 10 | 9 | 2 | 14 | | | | | | | |

2nd Term Semester (10)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENM 5235 | Simulation of Thermal Systems | 2 | 2 | 1 | 3 | ENM 4130 Heat and Mass Transfer | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM EPxx | Elective (3) | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5236 | Renewable Energy Systems | 2 | 2 | - | 3 | ENM 4130 Heat and Mass Transfer | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5227 | Environmental Studies | 2 | 1 | - | 2 | - | 20 | 30 | - | - | 100 | 2 |
| ENM 5228 | Graduation Project (2) | 2 | - | 3 | 3 | Departmental Requirements | 25 | - | 50 | - | 100 | - |
| Total | | 10 | 7 | 4 | 14 | | | | | | | |
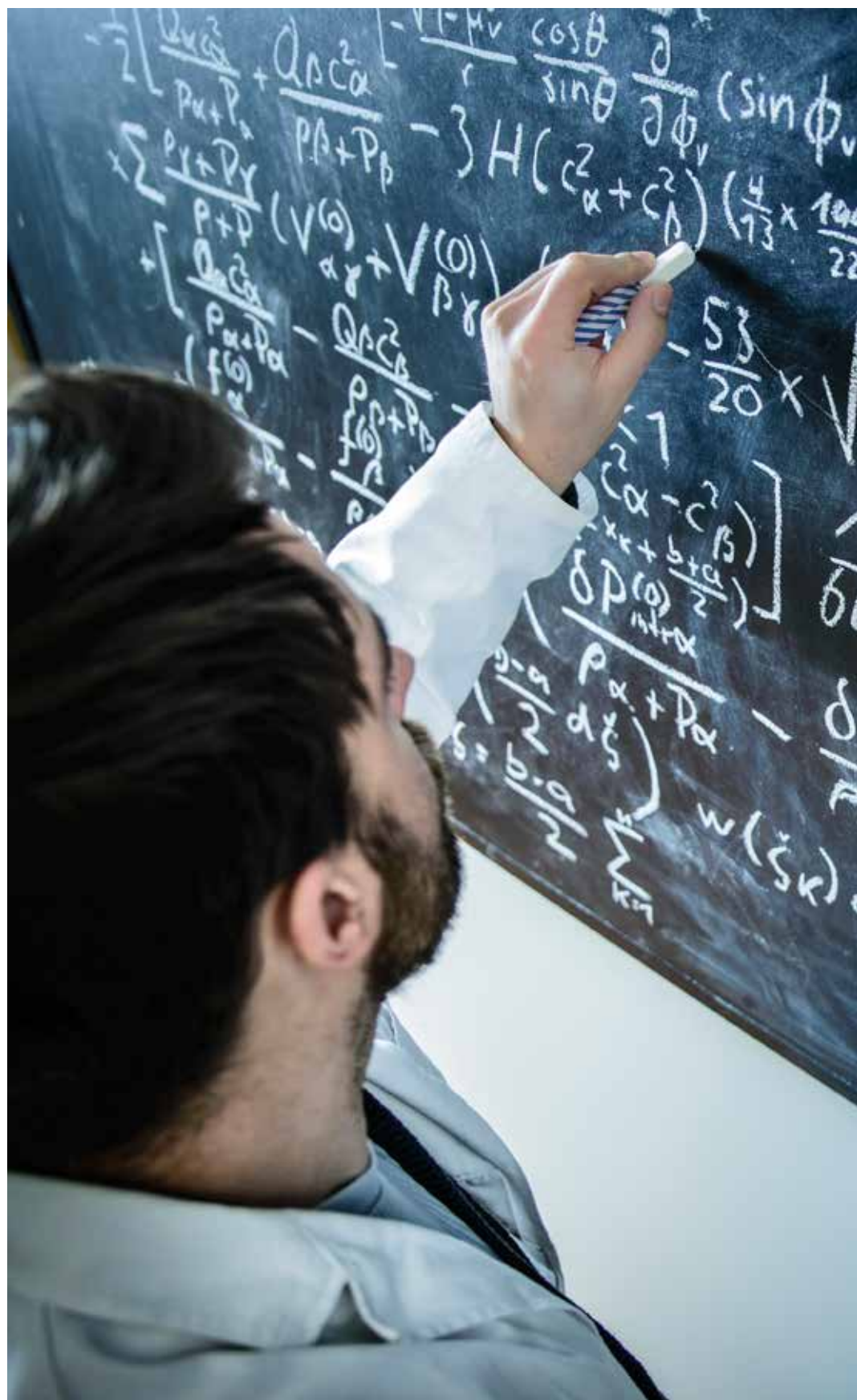
# (III) - Mechatronic Engineering Branch

## Level 4

1st Term  Semester (7)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 4145 | Electronics | 2 | - | 2 | 3 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM  4114 | Vibrations | 2 | 2 | 1 | 3 | ENM 3211 Theory of Machines | 20 | 20 | 10 | 50 | 100 | 3 |
| ENE 4146 | Logic Design | 2 | - | 2 | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENM 4137 | System Modeling & Simulation | 2 | 2 | - | 3 | - | 20 | 30 | -- | 50 | 100 | 3 |
| ENM EMxx | Elective (1) | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| BAB 4101 | General Elective -B | 2 | - | - | 2 | - | 50 | - | - | 50 | 100 | 1 |
| Total | | 12 | 6 | 5 | 17 | | | | | | | |

2nd Term Semester (8)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENM 4238 | Mechatronics (1) | 2 | 2 | 1 | 3 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 4239 | Design of Applied Measuring Systems | 2 | - | 2 | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENM  4217 | Automatic Control | 2 | 2 | - | 3 | ENB 3110 Engineering Mathematic (3) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENE  4247 | Computer Organization | 2 | - | 2 | 3 | | 20 | 30 | - | 50 | 100 | 3 |
| BAH  4202 | Management & Marketing | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENM EMxx | Elective (2) | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| Total | | 12 | 6 | 5 | 17 | | | | | | | |

# Level 5

1st Term Semester (9)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | C.W | T.Es | O/P | F.E | | |
| ENM 5121 | Numerical Control Machines | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5140 | Mechatronics (2) | 2 | - | 2 | 3 | ENM 4238 Mechatronics (1) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENE 5148 | Power Electronics | 2 | 2 | - | 3 | | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5122 | Project Management | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENM 5123 | Graduation Project (1) | 2 | 3 | - | 3 | Departmental requirements | 25 | - | - | - | - | - |
| Total | | 10 | 7 | 2 | 14 | | | | | | | |

2nd Term  Semester (10)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | C.W | T.Es | O/P | F.E | | |
| ENM EMxx | Elective (3) | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENM 5241 | Robotics | 2 | 2 | 1 | 3 | ENM 5140 Mechatron-ics(2) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENE 5249 | Microprocessor and Digital Systems | 2 | 2 | 1 | 3 | ENE 4146 Logic Design | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 5227 | Environmental Studies | 2 | 1 | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENM 5228 | Graduation Project (2) | 2 | - | 3 | 3 | Departmental requirements | 25 | - | - | 50 | 100 | - |
| Total | | 10 | 7 | 5 | 14 | | | | | | | |

# Department of

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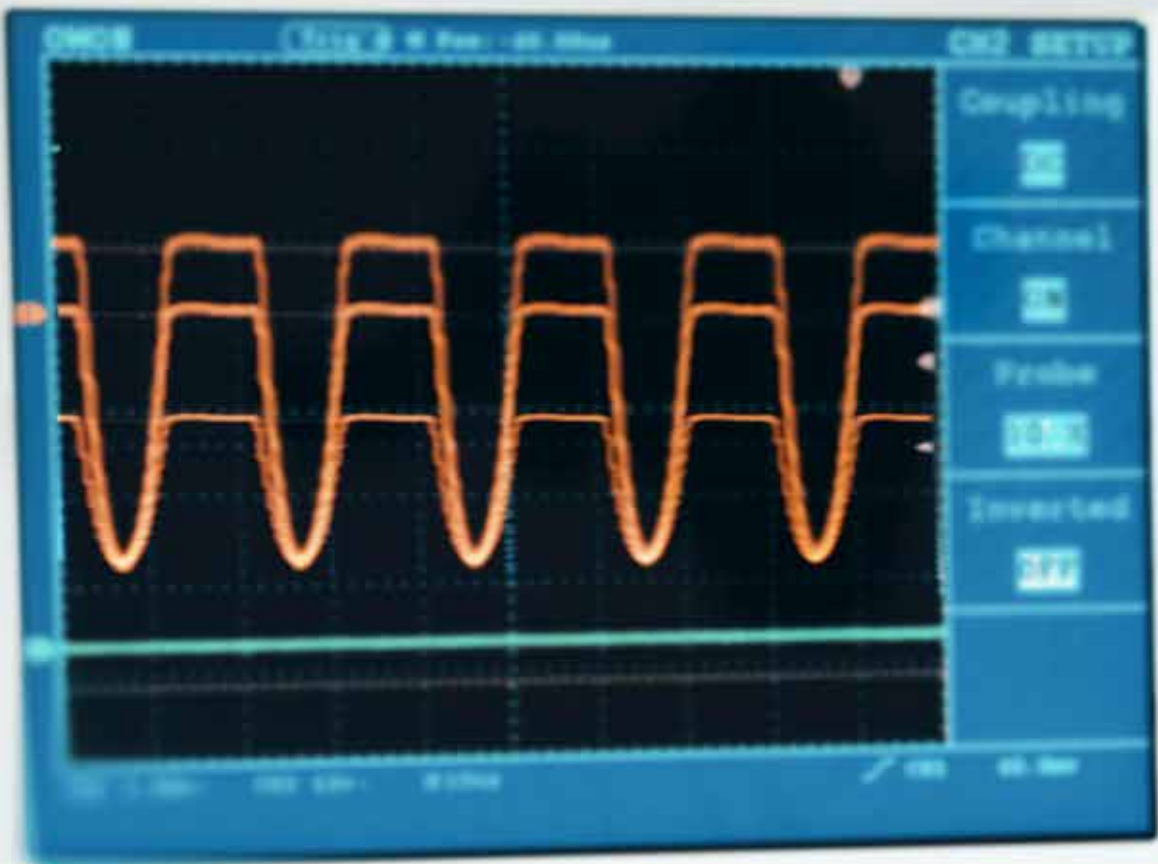
# Bio-Medical Engineering

## Bio-Medical Engineering

## Bachelor of Science in Bio-Medical Engineering

## INTRODUCTION:

A Bio-Medical engineer uses traditional engineering expertise to analyze and solve problems in biology and medicine, providing an overall enhancement of health care. It turns out that lots of people have a common interest of trying to improve human life, which exploits the many specialty areas inside of the field of Bio-Medical Engineering.

The Bio-Medical engineering program is interdisciplinary in scope. The participating faculty are from the Colleges of Engineering, Medicine, and Education. Bio-Medical engineers are concerned with the application of engineering concepts and analytical techniques to biological and medical problems. They are interested in developing new concepts, instrumentation, and materials for use with living systems. In addition, they seek to understand those phenomena of living systems which have functional capabilities desirable in the design of physical systems. Graduates of the program are able to understand scientific literature, formulate hypotheses, complete independent research or design projects and report their results. They engage in research or design careers in the various fields of Bio-Medical engineering.

The future of Bio-Medical engineering holds great promise for future generations. One of the rapidly expanding fields is the field of nuclear medicine. Nuclear medicine has gone from an imaging and cancer treatment tool to a tool that can be used to treat such deadly diseases such as heart disease, which is one of the leading causes of death in the United States today. New imaging technology has allowed nuclear medicine to see body chemistry while it is at work.

The future of Bio-Medical engineering will certainly include artificial tissue growth. Currently, the only application of artificial tissue growth is artificial skin for burn victims. Right now, this artificial skin is grown, grafted on, and left as sort of a bio mechanical tarp until the burn victim's own skin grows in. According to discovery news, researchers are currently looking for a permanent skin replacement and are hoping to one day grow actual organs.

## MISSION

The Department of Biomedical Engineering serves the University, the community, and the biomedical engineering profession through education, research, and design activities. Graduates of our programs are highly skilled biomedical engineers who understand the ethical, social, and economic implications of their work. We open doors for students

## VISION

To be recognized nationally as a high-quality, research-driven biomedical engineering department with excellence in both undergraduate and graduate education.

## PROGRAM OBJECTIVES

Our program objectives consisting of a general list of desired graduate knowledge and skills. The resulting overarching objectives highlight five broad areas of student achievement and knowledge that will satisfy our constituent's needs, both now and in the future, and fulfill the Sinai University Program's mission.

The following program objectives have been established for the Bio-Medical Engineering Program:

1) Analytical and technical skills

Graduates possess the ability to formulate, analyze and solve problems, both analytically and experimentally, in engineering, Bio-Medical engineering, and the basic sciences.

2) Life sciences

Graduates possess the ability to understand the interconnection between engineering, Bio-Medical engineering, and the life sciences including biology and physiology, both analytically and experimentally.

3) Communications

Graduates can articulate their ideas and communicate in a clear and effective manner appropriate to their audience. Written and oral communications are logical, utilize proper grammar and technical vocabulary, and use modern presentation techniques.

4) Creativity

Graduates can evaluate traditional methodologies in the Bio-Medical sciences, and the intersection between engineering and medicine in order to devise new approaches to technical and clinical problems.

5) Interdisciplinary approach and career development

Graduates can work effectively in teams to accomplish Bio-Medical engineering and Bio-Medical science tasks and understand the importance of each team member's ability to contribute in his/her area of expertise. Of particular relevance is the interconnection of engineering and clinical personnel and/or engineering/Bio-Medical scientist towards the solution of problems of compelling clinical and Bio-Medical interest and need.

| Year | Bio-Medical Engineering | | | |
|---|---|---|---|---|
| | L | T | P | Ch |
| Level 1 | 25 | 9 | 14 | 35 |
| Level 2 | 27 | 13 | 13 | 36 |
| Level 3 | 25 | 15 | 8 | 34 |
| Level 4 | 22 | 15 | 10 | 29 |
| Level 5 | 22 | 18 | 7 | 31 |
| Total | 121 | 70 | 52 | 165 |

## Study Plan

### Department Requirements

| Course code | Course Title | Hours | | | |
|---|---|---|---|---|---|
| | | L | T | P | Ch |
| ENB 2107 | Engineering Mathematics (1) | 2 | 2 | - | 3 |
| ENB 2108 | Physics (2) | 3 | 1 | 2 | 4 |
| ENB 2209 | Engineering Mathematics (2) | 2 | 2 | - | 3 |
| ENB 3110 | Engineering Mathematics (3) | 2 | 2 | - | 3 |
| ENB 3211 | Probability and statistics | 2 | 2 | | 3 |
| ENI 2101 | Biology | 2 | 1 | 2 | 3 |
| ENE 2114 | Electrical Circuits | 2 | - | 1 | 2 |
| ENM 2103 | Engineering Drawing and Graphics | 2 | 2 | 1 | 3 |
| ENI 2202 | Biophysics | 2 | 1 | 2 | 3 |
| ENE 2215 | Logic Circuits | 2 | 2 | 2 | 3 |
| ENE 3116 | Signal and Systems Analysis | 2 | 2 | - | 3 |
| ENE 3218 | Electronic Devices and Circuits | 2 | 2 | 1 | 3 |
| ENM 3245 | Introduction to Thermodynamics & Fluid Mechanics | 2 | 2 | - | 3 |
| ENI 3205 | Bio-Medical Measurements | 2 | 1 | 2 | 3 |
| ENE 4121 | Advanced Electronics | 2 | 2 | 2 | 3 |
| ENE 4276 | Modern Control Systems | 2 | 2 | 2 | 3 |
| ENI 5111 | Graduation Project | 2 | 3 | - | 3 |
| ENI 5215 | Graduation Project (2) | 2 | - | 3 | 3 |
| ENE 3117 | Computer Programming | 2 | - | 2 | 3 |
| ENI 5214 | Environmental Studies | 2 | 1 | - | 2 |
| Total | | 41 | 30 | 22 | 59 |

## Specialization Requirements

| Course code | Course Title | Hours | | | |
|---|---|---|---|---|---|
| | | L | T | P | Ch |
| ENI 2203 | Chemistry(2) | 2 | - | 1 | 2 |
| ENI 3104 | Anatomy and Physiology | 2 | 2 | 1 | 3 |
| ENE 4122 | Computer Architecture | 2 | 2 | - | 3 |
| ENI 4106 | Clinical Engineering | 2 | 2 | 2 | 3 |
| ENE 4223 | Microprocessors and Microcontroller | 2 | 2 | 1 | 3 |
| ENE 4120 | Fields and Wave Propagation | 2 | 2 | - | 3 |
| ENI 4207 | Bio-Medical Signal Processing | 2 | 1 | - | 2 |
| ENI 4208 | Medical Instrumentations | 2 | - | 1 | 2 |
| ENI 5109 | Bio-Medical Image Processing | 2 | 2 | 1 | 3 |
| ENI 5110 | Bio-Medical Ultrasound | 2 | 2 | - | 3 |
| ENI E51xx | Elective(1) | 2 | 2 | - | 3 |
| ENI 5212 | Medical Imaging | 2 | 2 | 1 | 3 |
| ENI 5213 | Bio-Medical Modeling and Simulation | 2 | 2 | 1 | 3 |
| ENI E52xx | Elective(2) | 2 | 2 | - | 3 |
| ENE 3219 | Data Structure and Algorithms | 3 | 2 | 2 | 3 |
| ENE 4224 | Database in Bio-Medical Engineering | 2 | 2 | 2 | 3 |
| ENE 5126 | Artificial Neural Networks | 2 | 2 | 1 | 3 |
| Total | | 35 | 29 | 14 | 48 |

Elective Courses for Bio-Medical Engineering Students:

- Student has to select two courses of level five.

-  Prerequisites for any elective course are all compulsory courses up to its level.

## Bio-Medical Engineering     (6 Ch)

| Course code | Course Title | Hours | | | | Prerequisite |
|---|---|---|---|---|---|---|
| | | L | T | P | Ch | |
| ENI EI01 | Applied Artificial Intelligence | 2 | 2 | 0 | 3 | |
| ENI EI02 | Biomechanics and Rehabilitation | 2 | 2 | 0 | 3 | |
| ENI EI03 | Visualization Techniques | 2 | 2 | 0 | 3 | |
| ENI EI04 | Medical Expert Systems | 2 | 2 | 0 | 3 | |
| ENI EI05 | Pattern Recognition | 2 | 2 | 0 | 3 | |

# 9. PROGRAM CURRICULUM

## Level 1

1st Term Semester (1)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENB 1101 | Calculus and Analytic Geometry (1) | 3 | 2 | - | 4 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1102 | Physics (1) | 3 | 1 | 2 | 4 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ITC 1101 | Introduction to Computer Science | 1 | - | 2 | 2 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| SSE 1101 | English Language(1) | 1 | - | 2 | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENM 1101 | Engineering Drawing | 1 | - | 3 | 2 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1103 | Mechanics (1) | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| SSG xx02 | Human Rights | 1 | - | - | 1 | - | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 12 | 5 | 9 | 18 | | | | | | | |

L= lecture, T = tutorial, P = practical, CW= Course work, T.Es= Term exams; summation of best three exams during the semester,

F.E. =Final exam

2nd Term  Semester (2)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENH 1201 | Engineering History | 1 | - | - | 1 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENB 1204 | Chemistry (1) | 3 | - | 2 | 4 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ENB 1205 | Mechanics (2) | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB 1206 | Calculus and Analytic Geometry (2) | 3 | 2 | - | 4 | ENB 1101 Calculus and Analytic Geometry (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENM 1202 | Production Technology | 2 | - | 3 | 3 | | 20 | 20 | 10 | 50 | 100 | 3 |
| SSG xx01 | Sinai History | 2 | - | - | 2 | | 50 | - | - | 50 | 100 | 1 |
| Total | | 13 | 4 | 5 | 17 | | | | | | | |

# Level 2

## 1st Term Semester (3)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks* | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENB 2107 | Engineering Mathematics (1) | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB 2108 | Physics (2) | 3 | 1 | 2 | 4 | ENB 1102 Physics (1) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 2103 | Engineering Drawing and Graphics | 2 | 2 | 1 | 3 | ENM 1101 Engineering Drawing | 20 | 20 | 10 | 50 | 100 | 3 |
| SSE 2102 | English Language(2) | 1 | - | 2 | 2 | SSE E44 Technical English (1) | 20 | 30 | - | 50 | 100 | 2 |
| ENI 2101 | Biology | 2 | 1 | 2 | 3 | | 20 | 20 | 10 | 50 | 100 | 3 |
| ENE 2114 | Electrical Circuits | 2 | - | 1 | 2 | | 20 | 30 | - | 50 | 100 | 3 |
| SSG xxx | General Elective – A1 | 2 | - | - | 2 | - | 50 | - | - | 50 | 100 | 1 |
| Total | | 14 | 6 | 8 | 19 | | | | | | | |

## 2nd Term  Semester (4)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENB 2209 | Engineering Mathematics (2) | 2 | 2 | - | 3 | ENB 2107 Engineering Mathematics (1) | 20 | 30 | - | 50 | 100 | 3 |
| ENH 2202 | Communication and Presentation Skills | 1 | 2 | - | 2 | | 20 | 30 | - | 50 | 100 | 1 |
| ENI 2202 | Biophysics | 2 | 1 | 2 | 3 | ENB 1102 Physics (1) | 20 | 30 | 10 | 50 | 100 | 3 |
| ENI 2203 | Chemistry (2) | 2 | - | 1 | 2 | ENB 1204Chemistry(1) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENE 2215 | Logic Circuits | 2 | 2 | 2 | 3 | - | 20 | 30 | 10 | 50 | 100 | 3 |
| ENH 2203 | Principles of Negotiation | 2 | | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| SSG xxxx | General Elective –A2 | 2 | - | - | 2 | - | 50 | - | - | 50 | 100 | 1 |
| Total | | 13 | 7 | 5 | 17 | | | | | | | |

# Level 3

## 1st Term Semester (5)

| Course code | Course Title | Credit hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENB 3110 | Engineering Mathematics (3) | 2 | 2 | - | 3 | ENB 2107 Engineering Mathematics (2) | 20 | 30 | - | 50 | 100 | 3 |
| ENE 3116 | Signal and Systems Analysis | 2 | 2 | | 3 | ENE 2114 Electrical Circuits | 20 | 30 | - | 50 | 100 | 3 |
| ENI 3104 | Anatomy and Physiology | 2 | 2 | 1 | 3 | ENI 2101 Biology | 20 | 20 | 10 | 50 | 100 | 3 |
| ENE 3117 | Computer Programming | 2 | - | 2 | 3 | ITC 1101 Introduction to Computer | 20 | 20 | 10 | 50 | 100 | 3 |
| ENH 3104 | Professional Ethics | 2 | - | - | 2 | | 50 | - | - | 50 | 100 | 1 |
| ENH 3105 | Technical Report Writing | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 12 | 6 | 3 | 16 | | | | | | | |

## 2nd Term Semester (6)

| Course code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total. Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENI 3205 | Biomedical Measurements | 2 | 1 | 2 | 3 | ENI 2202 Bio-Physics | 20 | 20 | 10 | 50 | 100 | 3 |
| ENE 3218 | Electronic Devices and Circuits | 2 | 2 | 1 | 3 | ENE 2114 Electrical Circuits | 20 | 20 | 10 | 50 | 100 | 3 |
| ENE 3219 | Data Structure and Algorithms | 2 | 2 | 2 | 3 | ENE 3117 Computer Programming | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 3245 | Introduction to Thermodynamics & Fluid Mechanics | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 3 |
| ENB 3211 | Probability and statistics | 2 | 2 | - | 3 | ENB 1206 Calculus 2 | 20 | 30 | - | 50 | 100 | 3 |
| ENM 3212 | Engineering Economics | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| SSG xx03 | Scientific Thinking | 1 | - | - | 1 | - | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 13 | 9 | 5 | 18 | | | | | | | |

## Level 4

1st Term  Semester (7)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENE 4120 | Fields and Wave Propagation | 2 | 2 | - | 3 | ENB 1102 Physics 1 | 20 | 30 | - | 50 | 100 | 3 |
| ENE 4121 | Advanced Electronics | 2 | 2 | 2 | 3 | ENE 3218 Electronic Devices and Circuits | 20 | 20 | 10 | 50 | 100 | 3 |
| ENI  4106 | Clinical Engineering | 2 | 2 | 2 | 3 | - | 20 | 20 | 10 | 50 | 100 | 3 |
| ENE 4122 | Computer Architecture | 2 | 2 | | 3 | ENE2215 Logic Circuits | 20 | 30 | - | 50 | 100 | 3 |
| BAH 4101 | General Elective -B | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 1 |
| Total | | 10 | 8 | 4 | 14 | | | | | | | |

2nd Term Semester (8)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENI  4207 | Biomedical Signal Processing | 2 | 1 | - | 2 | ENB 3211 Probability and statistics | 20 | 30 | - | 50 | 100 | 3 |
| ENE  4223 | Microprocessors and Microcontroller | 2 | 2 | 1 | 3 | ENE2215 Logic Circuits | 20 | 20 | 10 | 50 | 100 | 3 |
| ENE  4224 | Database in Biomedical Engineering | 2 | 2 | 2 | 3 | ELE 3117 Computer Programming | 20 | 20 | 10 | 50 | 100 | 3 |
| ENI  4208 | Medical Instrumentations | 2 | - | 1 | 2 | ENI 3205 Biomedical Measurements,  ENI 2203 Chemistry (2) | 20 | 20 | 10 | 50 | 100 | 3 |
| ENE 4276 | Modern Control Systems | 2 | 2 | 2 | 3 | ENB 3110 Engineering mathematic 3,  ENE 3116 Signal and system analysis | 20 | 20 | 10 | 50 | 100 | 3 |
| BAH  4202 | Management & Marketing | 2 | - | - | 2 | | 20 | 30 | - | 50 | 100 | 2 |
| Total | | 12 | 7 | 6 | 15 | | | | | | | |

# Level 5

1st Term  Semester (9)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENI  5109 | Biomedical Image Processing | 2 | 2 | 1 | 3 | ENI 4207 Biomedical Signal Processing | 20 | 20 | 10 | 50 | 100 | 3 |
| ENI  5110 | Biomedical Ultrasound | 2 | 2 | - | 3 | ENB 1102 Physics (1), ENI 2203 Chemistry (2) | 20 | 30 | - | 50 | 100 | 2 |
| ENI  Elxx | Elective(1) | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENE 5126 | Artificial Neural Networks | 2 | 2 | 1 | 3 | ENB 2209Engineering Mathematics 2 | 20 | 20 | 10 | 50 | 100 | 3 |
| ENM 5122 | Project Management | 2 | - | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENI 5111 | Graduation Project (1) | 2 | 3 | - | 3 | Departmental requirements | 25 | - | - | - | - | - |
| Total | | 12 | 11 | 2 | 17 | | | | | | | |

2nd Term  Semester  (10)

| Course Code | Course Title | Hours | | | | Prerequisite | Examination Marks | | | | Total Marks | Exam Time (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Ch | | CW | T.Es | O/P | F.E | | |
| ENI  5212 | Medical Imaging | 2 | 2 | 1 | 3 | ENI 5109 Biomedical Image Processing | 20 | 20 | 10 | 50 | 100 | 3 |
| ENI  5213 | Biomedical Modeling and Simulation | 2 | 2 | 1 | 3 | ENI 4207 Biomedical Signal Processing | 20 | 20 | 10 | 50 | 100 | 3 |
| ENI  Elxx | Elective (2) | 2 | 2 | - | 3 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENI 5214 | Environmental Studies | 2 | 1 | - | 2 | - | 20 | 30 | - | 50 | 100 | 2 |
| ENI 5215 | Graduation Project (2) | 2 | - | 3 | 3 | Departmental requirements | 25 | - | 50 | - | 100 | - |
| Total | | 10 | 7 | 5 | 14 | | | | | | | |

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