

*Modern Future Organization for Science and Technology
Higher Institute for Engineering and Technology
In New Damietta*

Internal Regulations

for

*Higher Institute for Engineering and
Technology in New Damietta*



9. PROGRAMS SPECIFICATIONS



A. Chemical Engineering



Chemical Engineering

Introduction

Chemical Engineering deals with the technology of using chemical and physical processes to convert naturally-occurring raw materials into final physical products. By combining the art of industrial technology with modern concepts of science and Engineering, it is possible to bring about the realization of processes developed in the laboratory for the production of industrial products and consumer goods.

The program is designed to educate the student in the basic fundamentals of Chemical Engineering and train him in research and development. The curriculum contains a number of elective and specialized topics such as petroleum refining, petrochemicals, desalination, natural gas engineering, corrosion and polymerization.

The program is supported by seven well-equipped laboratories in the areas of process measurement and control, heat transfer, fluid mechanics, organic chemistry, physical chemistry, analytical chemistry, process simulation. These laboratories are designed to familiarize students with aspects of theoretical and practical fundamentals and introduce them to the atmosphere of industrial operations.

The department offers the chemical engineering student a traditional program as well as concentrations in **material engineering and petroleum engineering**. The required courses for each concentration are listed under its curriculum.

Vision and Mission

Vision: The Chemical Engineering Program strives for regional and international recognition in teaching, research and community service. It enriches the standard of engineering education, continually enhances the quality and competence of graduated students, and stimulates outstanding research activities that contribute to the advancement of the chemical engineering profession and the development of local and regional industry.

Mission: The Chemical Engineering Program produces chemical engineers capable of meeting the technological and societal needs of Damietta government, Egypt and the Arab region. This mission is fulfilled by providing a broad curriculum in the basic sciences, process systems and design, unit operations, and in modern experimental and computing techniques. The program strives for



academic excellence through continual assessment of the outcomes. The focus is on petroleum and petrochemical technology, environmental engineering, and water technology, material (foams, ceramics, rubber, plastics, painting and paper) technologies and industries.

Programme Specification

A- Basic Information

1- Programme title: **Chemical Engineering**

2- Programme type: **Single** Double Multiple

3- Department (s): Chemical Engineering Dept

4- Coordinator:

5- External evaluator(s)

6- Last date of programme specifications approval:

B- Professional Information

1- Program aims

For the Society:

- Fulfill the needs of the public and private sectors for chemical engineers, who are capable in their field and professionally qualified, by a thorough instruction in engineering sciences and design.
- Provide a broad education necessary for responsible citizenship, including an understanding of ethical and professional responsibility, and the impact of engineering solutions on the society and the environment.

To provide an attractive avenue for students interested in Chemical engineering which:

- Provides a sound education in Chemical Engineering fundamentals and related topics.
- Trains students such as they can design, analyze, and operate manufacturing processes involving physical and chemical changes.



- Trains students such as they can design and operate chemical processes satisfying social, environmental, and economical constraints.
- Prepares students for careers in the Chemical and related Industry within the Damietta region and beyond.
- Prepares students for practical engineering applications, as well as providing the depth of knowledge required for graduate studies.
- Motivates graduates' participation in life-long learning and professional development activities

2- Intended Learning Outcomes (ILOs)

Engineering Programs must demonstrate that their graduates have acquired certain skills and have proficiency in a number of technical areas. According to ABET Engineering Criteria 2000, Engineering Program must demonstrate that their graduates have the attributes collectively referred to as the **Attributes of an Engineer**.

Consequently, the Chemical Engineering Program aims to graduate Chemical Engineers with a knowledge/understanding of:

1. Application of Mathematics, Science & Engineering Principles.
2. Experimental Design and Experimental Data Collection and Analysis
3. Engineering Design (Chemical Systems, Units & Processes)
4. Multidisciplinary Team Work
5. Identification, Formulation & Solution of Engineering Problems
6. Professional and Ethical Responsibilities, including Safety and Environmental aspects related to Chemical Systems, Units and Processes.
7. Effective Communication Skills
8. Contemporary Issue & Global/Social Impact of Engineering Solutions.
9. Need and Ability to engage on Lifelong Learning
10. Modern Engineering Practice



11. Principles and Working Knowledge of subject areas as defined by the Program Criteria of the American Institute of Chemical Engineers

3- Academic standards

3a External references for standards (Benchmarks)

- ABET Engineering Criteria 2000
 - Cleveland State University, Dept of Chemical Engineering
 - University of Michigan, Chemical Engineering Dept.

3b Comparison of provision to external references

- **Program Outcomes** are according to those listed under Criterion 3 of ABET EC2000
 - The courses and credits are matched with these in the different Chemical Engineering Departments of the listed universities

4- Curriculum Structure and Contents

- a. Program duration: 5 levels, ten semesters
 - b. Program structure
 - i- No. of contact hours per week: 30
 - Lectures: 17,
 - Lab: 6
 - Exercise: 7
 - ii- No. of credit hours: 180
 - Compulsory: 162
 - Electives: 18
 - iii- No. of credit hours of basic sciences courses:
 - No. 35 % 19.5
 - iv- No. of credit hours of courses of social sciences and humanities:
 - No. 13 % 7.5
 - v- No. of credit hours of specialized courses:
 - No. 88 % 49



vi- No. of credit hours of other courses:

N0. 44 % 24

vii- Practical/Field Training:

2 times (each time at least 4 weeks, 30h/week) during 3 summers.

viii- Program Levels (in credit-hours system):

Level 1: 36

Level 2: 36

Level 3: 36

Level 4: 36

Level 5: 36

5- Program courses

a. Compulsory: (162 CR)

1. Basic science Courses: (35 CR)

| Code | Course name | No of units | Hours per week | | | ILOs Covered | Prerequisite |
|---------|--|-------------|----------------|-----|------|--------------|--------------|
| | | | Lect | Lab | Exer | | |
| MTH 101 | Mathematics 1 | 3 | 2 | - | 2 | 1 | - |
| MTH 102 | Mathematics 2 | 3 | 2 | - | 2 | 1 | - |
| MTH 201 | Mathematics 3 | 3 | 2 | - | 2 | 1 | MTH 101 |
| MTH 202 | Mathematics 4 | 3 | 2 | - | 2 | 1 | MTH 101 |
| MTH 302 | Numerical Methods in Engineering | 3 | 2 | - | 2 | 1, 5 | - |
| MTH 301 | Engineering Probability and Statistics | 3 | 2 | - | 2 | 1,5 | - |
| ENG 101 | Mechanics 1 | 3 | 2 | - | 2 | 1,5 | - |
| ENG 102 | Mechanics 2 | 3 | 2 | - | 2 | 1,5 | - |
| PHY 101 | Physics 1 | 4 | 2 | 2 | 2 | 1,2 | - |
| PHY 102 | Physics 2 | 4 | 2 | 2 | 2 | 1,2 | - |
| CHE 101 | General Chemistry | 3 | 2 | 2 | - | 1,2 | - |
| Total | | 35 | 22 | 6 | 20 | | |



2. Engineering Courses: (78 CR)

| Code | Course name | No of units | Hours per week | | | ILOs Covered | Pre-requisite |
|---------|-------------------------------------|-------------|----------------|-----|------|----------------|----------------|
| | | | Lect | Lab | Exer | | |
| ENG 103 | Engineering drawing and projection | 3 | 1 | 4 | - | 1,5,11 | - |
| ENG 104 | Int. to computer systems | 2 | 2 | 2 | - | 1,5,10,11 | - |
| ENG 106 | Int. to Eng. and environment | 2 | 2 | - | - | 6,7,8 | - |
| ENG 201 | Computer programming | 3 | 3 | 2 | - | 6,7,8 | - |
| ENG 202 | Engineering Thermodynamics | 3 | 2 | - | 2 | 1,5,11 | ENG 102 |
| ENG 204 | Electrical Engineering Fundamentals | 4 | 3 | - | 2 | 1,5,11 | - |
| ENG 205 | Strength of materials | 3 | 3 | | 2 | 1,5,11 | - |
| CHE 201 | Chemical Engineering Principles I | 3 | 2 | - | 2 | 1,3,5,6,11 | CHE 101 |
| CHE 202 | Organic chemistry | 4 | 3 | 2 | - | 1,5,11 | CHE 101 |
| CHE 203 | Inorganic chemistry | 3 | 3 | 2 | - | 1,5,11 | CHE 101 |
| ENG 301 | Fluid Mechanics | 3 | 2 | 1 | 1 | 1,3,5 | ENG 102 |
| ENG 302 | Principles of Engineering Design | 3 | 2 | - | 2 | 1,5,11 | Comp. of 72 CR |
| CHE 301 | Physical Chemistry | 3 | 3 | 2 | - | 1 | CHE 101 |
| CHE 302 | Material science and metallurgy | 3 | 3 | - | 2 | 1,5 | ENG 205 |
| CHE 303 | Chemical Engineering Principles II | 3 | 3 | - | 2 | 1,3,5,6,11 | CHE 201 |
| CHE 304 | Chemical Engineering Thermodynamics | 3 | 3 | 2 | - | 1,5,11 | - |
| CHE 305 | Analytical Chemistry | 3 | 3 | 2 | - | 1 | CHE 101 |
| CHE 306 | Process Dynamics and Control | 3 | 2 | 2 | - | 1,2,3,5,6,7,11 | - |
| CHE 401 | Reactor Design | 4 | 3 | - | 2 | 1,2,3,5,11 | CHE 304 |
| CHE 402 | Heat transfer | 3 | 3 | 2 | - | 1,5,11 | ENG 202 |
| CHE 403 | Mass Transfer | 3 | 3 | - | 2 | 1,5,11 | ENG 202 |
| CHE 404 | Corrosion Engineering | 2 | 2 | - | 2 | 1,5,11 | CHE 303 |
| CHE 405 | Mass Transfer Operations | 3 | 3 | - | 2 | 1,3,5,11 | CHE 403 |
| CHE 501 | Computer Applications | 3 | 3 | 2 | - | 1,3,5,11 | - |
| CHE 502 | Petrochemical Engineering | 3 | 3 | - | 2 | 1,5,11 | CHE 101 |
| CHE 504 | Plant Design | 3 | 3 | - | 2 | 1,3,5,6 | CHE 401 |
| Total | | 78 | 68 | 25 | 27 | | |



3. Technological Courses (36 CR)

| Code | Course name | No of units | Hours per week | | | ILOs Covered | Prerequisite |
|---------|--|-------------|----------------|-----|------|--------------------|-------------------|
| | | | Lect | Lab | Exer | | |
| ENG 105 | Production engineering | 4 | 3 | 2 | - | 1,5,7,11 | - |
| ENG 206 | Int. to Information Technology | 3 | 2 | - | 2 | 1,5,7,11 | - |
| ENG 207 | Technical report writing | 2 | 2 | 2 | - | 7,10 | - |
| ENG 308 | Operations Research | 3 | 2 | - | 2 | 1,2,3,5,7, 11 | MTH 302 |
| CHE 406 | Bio organic chemistry | 3 | 3 | - | 2 | 1,3,5,7,1 0,11 | CHE 203 |
| CHE 407 | Mechanical unit operation | 3 | 3 | - | 2 | 1, 5, 11 | CHE 304 |
| CHE 408 | Process Modeling and Simulation | 3 | 3 | 2 | - | 1,5,11 | MTH 302 |
| CHE 503 | Industrial Technology in Chem. Engineering | 3 | 3 | - | 2 | 1,2,3,5,7, 11 | - |
| CHE 505 | Petroleum Refining Engineering | 3 | 3 | - | 2 | 1,2,3,5,7, 11 | - |
| ENG 415 | Quality Assurance and Engineering Reliability | 3 | 2 | - | 2 | 1,2,3,5,7, 11 | - |
| CHE 509 | Project 1* | 3 | 2 | 2 | - | 1,2,3,5,6, 7,11 | Comp. of 144CR |
| CHE 510 | Project 2* | 3 | 2 | 4 | - | 1,2,3,5,6, 7,11 | CHE 509 |
| Total | | 36 | 30 | 12 | 14 | | |

4. Humanities and Languages: (13 CR)

| Code | Course name | No of units | Hours per week | | | ILOs Covered | Prerequisite |
|---------|--------------------------------|-------------|----------------|-----|------|--------------|--------------|
| | | | Lect | Lab | Exer | | |
| LNG 101 | Technical English Language 1 | 2 | 2 | 2 | - | 6,7,8,9 | - |
| LNG 201 | Technical English Language 2 | 2 | 2 | 2 | - | 6,7,8,9 | LNG 101 |
| ENG 303 | Engineering Economy | 3 | 2 | - | 2 | 1,8,11 | - |
| ENG 401 | Environmental management | 3 | 3 | - | - | 1,8,10 | - |
| ENG 408 | Project Management and Control | 3 | 2 | - | 2 | 1,8,11 | - |
| Total | | 13 | 11 | 4 | 4 | | |



b. Chemical engineering technical electives (18 CR)

The department offers the chemical engineering student a **Major traditional program** as well as concentrations in minor programs as:

- **Material engineering**
- **Petroleum and petrochemical engineering**

The required courses for each concentration are listed under its curriculum. Recommended technical electives for the options and concentrations are listed below.

1. Major (Traditional) chemical engineering: (18 CR)

The Student chooses 6 courses form the following list

| Code | Course name | No of units | Hours per week | | | ILOs Covered | Prerequisite |
|---------|--|-------------|----------------|-----|------|-------------------|-------------------|
| | | | Lect | Lab | Exer | | |
| CHE 411 | Liquefied Natural Gas | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | CHE 304 |
| CHE 412 | Air Pollution | 3 | 2 | - | 2 | 1,6, 8,10 | Comp of 100 CH |
| CHE 414 | Polymer Engineering | 3 | 2 | - | 2 | 1,5,11 | CHE 101 |
| CHE 416 | Water Desalination | 3 | 2 | - | 2 | 1,2,3,5, 7,11 | CHM 402 |
| CHE 417 | Polymer Processing | 3 | 2 | - | 2 | 1,2,3,5, 7,11 | CHE 305 |
| CHE 516 | Wastewater Treatment | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 520 | Industrial Safety | 3 | 2 | - | 2 | 1,6, 8,10 | Comp of 140 CH |
| CHE 521 | Plasticizers | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 524 | Food Processing Technology | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 526 | Special Topics in Chemical Engineering | 3 | 2 | - | 2 | | Comp of 140 CH |

2. Material engineering Concentration

The engineered materials concentration allows the student to develop a specialization in a particular area. The concentration begins with the survey course

CHE 302 Material Science and metallurgy,



which is required for all Chemical Engineering juniors, and is followed by 6 additional courses (18 Cr) which concentrates on the material technology and industry. The six courses for the concentration satisfy the technical and Chemical Engineering elective requirements in the curriculum.

| Code | Course name | No of units | Hours per week | | | ILOs Covered | Prerequisite |
|---------|--|-------------|----------------|-----|------|-------------------|-------------------|
| | | | Lect | Lab | Exer | | |
| CHE 414 | Polymer Engineering | 3 | 2 | - | 2 | 1,5,11 | CHE 101 |
| CHE 415 | Engineering Material Selection | 3 | 2 | - | 2 | 1,5,11 | CHE 302 |
| CHE 511 | Electroplating | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 512 | Ceramics | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 513 | Refractories | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 514 | Printing | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 515 | Paints technology | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 517 | Synthetic fibers | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 519 | Paper Technology | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 521 | Plasticizers | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 522 | Foams | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 523 | Rubber | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 526 | Special Topics in Chemical Engineering | 3 | 2 | - | 2 | | Comp of 140 CH |

3. Petroleum and petrochemical engineering Concentration

The petroleum engineering concentration allows the student to develop a specialization in a particular area. As well as the courses

CHE 502 Petrochemical Engineering and

CHE 505 Petroleum Refining Engineering,

which are required for all Chemical Engineering graduates, the concentration contains 6 additional courses (18 Cr) which concentrate on the petroleum engineering and petrochemical industry. The 6 courses for the concentration satisfy the technical and Chemical Engineering elective requirements in the curriculum.



| Code | Course name | No of units | Hours per week | | | ILOs Covered | Prerequisite |
|---------|--|-------------|----------------|-----|------|-------------------|---------------------|
| | | | Lect | Lab | Exer | | |
| CHE 411 | Liquefied Natural Gas | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | CHE 304 |
| CHE 413 | Gas Engineering | 3 | 2 | - | 2 | 1,5,11 | CHE 304, CHE 403 |
| CHE 518 | Gas Sweetening | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | CHE 201, CHE 403 |
| CHE 521 | Plasticizers | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 522 | Foams | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 523 | Rubber | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 525 | Introduction to Combustion Phenomena | 3 | 2 | - | 2 | 1,3,5,7, 10,11 | Comp of 140 CH |
| CHE 526 | Special Topics in Chemical Engineering | 3 | 2 | - | 2 | | Comp of 140 CH |



Suggested Course Distribution of Majoring in Chemical Engineering

Level 1, Semester 1

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|------------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| MTH 101 | Mathematics 1 | 3 | 2 | - | 2 |
| ENG 101 | Mechanics 1 | 3 | 2 | - | 2 |
| PHY 101 | Physics 1 | 4 | 2 | 2 | 2 |
| CHE 101 | General Chemistry | 3 | 2 | 2 | - |
| ENG 103 | Engineering drawing and projection | 3 | 1 | 4 | - |
| ENG 104 | Int. to computer systems | 2 | 2 | 2 | - |
| Total | | 18 | 11 | 10 | 6 |

Chemical Engineering

Level 1, Semester 2

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| MTH 102 | Mathematics 2 | 3 | 2 | - | 2 |
| ENG 102 | Mechanics 2 | 3 | 2 | - | 2 |
| PHY 102 | Physics 2 | 4 | 2 | 2 | 2 |
| ENG 105 | Production engineering | 4 | 3 | 2 | - |
| ENG 106 | Introduction to Engineering | 2 | 2 | - | - |
| LNG 101 | Technical English Language 1 | 2 | 2 | 2 | - |
| Total | | 18 | 13 | 6 | 6 |



Chemical Engineering

Level 2, Semester 1

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|-------------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| MTH 201 | Mathematics 3 | 3 | 2 | - | 2 |
| CHE 201 | Chemical Engineering Principles I | 3 | 2 | - | 2 |
| ENG 201 | Computer programming | 3 | 2 | 2 | - |
| ENG 202 | Engineering Thermodynamics | 3 | 2 | - | 2 |
| ENG 204 | Electrical Engineering Fundamentals | 4 | 3 | - | 2 |
| LNG 201 | Technical English Language 2 | 2 | 2 | 2 | - |
| Total | | 18 | 13 | 4 | 8 |

Chemical Engineering

Level 2, Semester 2

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|--------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| MTH 202 | Mathematics 4 | 3 | 2 | - | 2 |
| CHE 202 | Organic Chemistry | 4 | 3 | 2 | - |
| CHE 203 | Inorganic Chemistry | 3 | 3 | 2 | - |
| ENG 205 | Strength of materials | 3 | 3 | - | 2 |
| ENG 206 | Int. to Information Technology | 3 | 2 | - | 2 |
| ENG 207 | Technical report writing | 2 | 2 | 2 | - |
| Total | | 18 | 12 | 6 | 6 |



Chemical Engineering

Level 3, Semester 1

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|--|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| MTH 301 | Engineering Probability and Statistics | 3 | 2 | - | 2 |
| CHE 301 | Physical Chemistry | 3 | 3 | 2 | - |
| CHE 302 | Material science and metallurgy | 3 | 3 | - | 2 |
| ENG 301 | Fluid Mechanics | 3 | 2 | 1 | 1 |
| ENG 302 | Principles of Engineering Design | 3 | 2 | - | 2 |
| ENG 303 | Engineering Economy | 3 | 2 | - | 2 |
| Total | | 18 | 14 | 3 | 9 |

Chemical Engineering

Level 3, Semester 2

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|-------------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| MTH 302 | Numerical Methods in Engineering | 3 | 2 | - | 2 |
| CHE 303 | Chemical Engineering Principles II | 3 | 3 | - | 2 |
| CHE 304 | Chemical Engineering Thermodynamics | 3 | 3 | 2 | - |
| CHE 305 | Analytical Chemistry | 3 | 3 | 2 | - |
| CHE 306 | Process Dynamics and Control | 3 | 2 | - | 2 |
| ENG 308 | Operations Research | 3 | 2 | - | 2 |
| Total | | 18 | 15 | 4 | 8 |



Chemical Engineering

Level 4, Semester 1

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|--------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| CHE 401 | Reactor Design | 4 | 3 | - | 2 |
| CHE 402 | Heat transfer | 3 | 3 | 2 | - |
| CHE 403 | Mass Transfer | 3 | 3 | - | 2 |
| CHE 404 | Corrosion engineering | 2 | 2 | - | 2 |
| ENG 408 | Project Management and Control | 3 | 2 | - | 2 |
| Total | | 15 | 13 | 2 | 8 |

b. Elective

The student selects one course from the electives list (3 Credit hours)

Chemical Engineering

Level 4, Semester 2

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|---------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| CHE 405 | Mass Transfer Operations | 3 | 3 | - | 2 |
| CHE 406 | Bio organic chemistry | 3 | 3 | - | 2 |
| CHE 407 | Mechanical unit operations | 3 | 3 | - | 2 |
| CHE 408 | Process Modeling and Simulation | 3 | 3 | 2 | - |
| ENG 401 | Environmental management | 3 | 3 | - | - |
| Total | | 15 | 15 | 2 | 6 |

b. Electives

The student selects ONE course from the electives list (3 Credit hours)



Chemical Engineering

Level 5, Semester 1

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|-------------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| CHE 501 | Computer Applications | 3 | 3 | 2 | - |
| CHE 502 | Petrochemical Engineering | 3 | 3 | - | 2 |
| CHE 503 | Industrial Technology in Chem. Eng. | 3 | 3 | 2 | - |
| CHE 509 | Project 1* | 3 | 2 | 2 | - |
| Total | | 12 | 11 | 6 | 2 |

b. Electives

The student selects 2 courses from the electives list (6 Credit hours)

Chemical Engineering

Level 5, Semester 2

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|---|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| CHE 504 | Plant Design | 3 | 3 | - | 2 |
| CHE 505 | Petroleum Refining Engineering | 3 | 3 | - | 2 |
| ENG 415 | Quality Assurance and Engineering Reliability | 3 | 2 | - | 2 |
| CHE 510 | Project 2* | 3 | 2 | 4 | - |
| Total | | 12 | 10 | 4 | 6 |

* Continuous Course; one oral examination for both CHE 509 and CHE 510 at the end of the second term

b. Electives

The student selects 2 courses from the electives list (6 Credit hours)





B. Communications and Electronics Engineering





Communications and Electronics Engineering

Introduction

The Communication and Electronics Engineering Department is now very essential to take place in Damietta area due to the following:

1. The spread development of the different industries in Damietta area, and knowing that the electronics field takes a huge place in any type of industry now.
2. The huge development in the Communications around the world in general and in Egypt in special.

These make it necessary to produce leader engineers in the fields of communications and electronics who can address the challenges of the new century and excel at an international level.

Electronic engineering is a professional discipline that deals with the behavior and effects of electrons (as in electron tubes and transistors) and with electronic devices, systems, or equipment. The term now also covers a large part of electrical engineering degree courses as studied at most European universities. Its practitioners are called **electronics engineers** in Europe. In the Americas and some other parts of the world, the term electrical engineer is used to describe a person doing the same work. In many areas, electronic engineering is considered to be at the same level as electrical engineering, requiring that more general programmes be called **electrical and electronic engineering** (many UK universities have departments of **Electronic and Electrical Engineering**). Both define a broad field that encompasses many subfields including those that deal with power, instrumentation engineering, telecommunications, and semiconductor circuit design amongst many others.

The Bachelor of Science Program in Communication and Electronics Engineering has the following vision and mission. To satisfy these Mission and Vision and to meet the needs of its constituents, eight Educational Objectives have been adopted after studying ABET models of leading educational institutions. In addition, a set of Program Outcomes are developed.



Vision

Electrical and Electronics Engineering Department will provide a program of the highest quality to produce leader engineers who can address the challenges of the new century and excel at an international level.

Mission

With this vision, the mission of the Communication and Electronics Engineering Department is to provide its graduates with the knowledge and skills needed for high quality engineering work as well as advanced engineering research and to equip its graduates with a broad intellectual spectrum in order to prepare them for diverse and competitive career paths.

Programme Specification

A- Basic Information

- 1- Programme title: **Communications and Electronic Engineering**
- 2- Programme type: **Single** Double Multiple
- 3- Department (s): **Communications and Electronic Engineering Dept**
- 4- Coordinator:
- 5- External evaluator(s)
- 6- Last date of programme specifications approval:

B- Professional Information

1- Program aims

For the Society:

- Fulfill the needs of the public and private sectors for Communications and Electronics engineering, who are capable in their field and professionally qualified, by a thorough instruction in engineering sciences and design.
- Provide a broad education necessary for responsible citizenship, including an understanding of ethical and professional responsibility, and the impact of engineering solutions on the society and the environment.



To provide an attractive avenue for students interested in Communication and Electronics engineering major which:

- Provides a sound education in communication and electronics engineering fundamentals and related topics.
- Trains students such as they can design, analyze, and operate manufacturing processes.
- Trains students such as they can design and operate the communication and electronics processes satisfying social, environmental, and economical constraints.
- Prepares students for careers in the communication and electronics and related Industry within the Damietta region and beyond.
- Prepares students for practical engineering applications, as well as providing the depth of knowledge required for graduate studies.
- Motivates graduates' participation in life-long learning and professional development activities

2- Intended learning outcomes (ILOs)

Achievement of the following **Program Outcomes** would indicate that the graduates are equipped with the necessary knowledge and skills to achieve the Educational Objectives.

The first eleven **Program Outcomes** are similar to those listed under Criterion 3 of ABET EC2000.

1. Ability to apply knowledge of mathematics, science and engineering to model and solve communication and electronics engineering problems.
2. Ability to design and conduct experiments related to deterministic or stochastic systems, as well as to analyze and interpret data.
3. Ability to design processes and integrated systems that achieve system design objectives which typically include considerations of ergonomics, productivity, quality, and profitability.



4. Ability to work in multidisciplinary teams providing electronical engineering input, as well as leading and/or coordinating the team's project.
5. Ability to identify, formulate and solve communication and electronics engineering problems.
6. Ability to understand and appreciate professional conduct and ethical responsibility.
7. Ability to communicate effectively.
8. Ability to understand the impact of engineering solutions in a global and social context.
9. Ability to engage in life-long learning and appreciate the need for continual self-development.
10. Knowledge of contemporary issues.
11. Ability to use the techniques, skills, and the modern engineering tools necessary for communication and electronics engineering.
12. A competency to apply communication and electronics engineering techniques and tools in diverse types of organizations with focus on quality engineering and management, productivity and logistics, ergonomics and safety, and engineering economical decisions.

3- Academic standards

3a. External references for standards (Benchmarks)

1. ABET Engineering Criteria 2000
2. University of Nebraska-Lincoln, Dept of Electronics Engineering
3. Bilkent University, Dept of Electrical and Electronics Engineering

3b. Comparison of provision to external references

- **Program Outcomes** are according to those listed under Criterion 3 of ABET EC2000
 - The courses and credits are matched with these in the different Communications and Electronics Engineering Departments of the listed universities

4- Curriculum Structure and Contents

- a. Programme duration 5 levels, ten semesters
- b. Programme structure



- i- No. of hours per week: 30
 Lectures: 17 Lab: 6 Exercise: 7
- ii- No. of credit hours: 180
 Compulsory: 162 Elective: 18
- iii- No. of credit hours of basic sciences courses:
 No. 35 % 19
- iv- No. of credit hours of courses of social sciences and humanities
 No. 13 % 7
- v- No. of credit hours of specialized courses:
 No. 91 % 51
- vi- No. of credit hours of other courses:
 NO. 41 % 23
- vii- Practical/Field Training:
 3 times (4 weeks, 30h/week) during 3 summers.
- viii- Program Levels (in credit-hours system):

| | | |
|-------------|-------------|-------------|
| Level 1: 36 | Level 2: 36 | Level 3: 36 |
| Level 4: 36 | Level 5: 36 | |

5- Program courses

b. Compulsory: (162 CR)

1. Basic science Courses: (35 CR)

| Code | Course name | No of units | Hours per week | | | ILOs Covered | Prerequisite |
|---------|--|-------------|----------------|-----|------|--------------|--------------|
| | | | Lect | Lab | Exer | | |
| MTH 101 | Mathematics 1 | 3 | 2 | - | 2 | 1 | - |
| MTH 102 | Mathematics 2 | 3 | 2 | - | 2 | 1 | - |
| MTH 201 | Mathematics 3 | 3 | 2 | - | 2 | 1 | MTH 101 |
| MTH 202 | Mathematics 4 | 3 | 2 | - | 2 | 1 | MTH 101 |
| MTH 302 | Numerical Methods in Engineering | 3 | 2 | - | 2 | 1,5 | - |
| MTH 301 | Engineering Probability and Statistics | 3 | 2 | - | 2 | 1,5 | - |
| ENG 101 | Mechanics 1 | 3 | 2 | - | 2 | 1,5 | - |
| ENG 102 | Mechanics 2 | 3 | 2 | - | 2 | 1,5 | - |
| PHY 101 | Physics 1 | 4 | 2 | 2 | 2 | 1,2 | - |



| | | | | | | | |
|---------|-------------------|----|----|---|----|-----|---|
| PHY 102 | Physics 2 | 4 | 2 | 2 | 2 | 1,2 | - |
| CHE 101 | General Chemistry | 3 | 2 | 2 | - | 1,2 | - |
| | Total | 35 | 22 | 6 | 20 | | |

2. Engineering Courses: (78 CR)

| Code | Course name | No of units | Hours per week | | | ILOs Covered | Prerequisite |
|---------|---|-------------|----------------|-----|------|----------------|--------------|
| | | | Lect | Lab | Exer | | |
| ENG 103 | Engineering drawing and projection | 3 | 1 | 4 | - | 1,5,11 | - |
| ENG 104 | Int. to computer systems | 2 | 2 | 2 | - | 1,5,10,11 | - |
| ENG 106 | Int. to Engineering & Environment | 2 | 2 | - | - | 6,7,8 | - |
| ENG 201 | Computer programming | 3 | 3 | 2 | - | 6,7,8 | - |
| ENG 202 | Engineering Thermodynamics | 3 | 3 | - | 2 | 1,5,11 | ENG 102 |
| ENG 204 | Electrical Engineering Fundamentals | 4 | 3 | - | 2 | 1,5,11 | - |
| CEE 201 | Electronics 1 | 3 | 3 | - | 2 | 1,5,11 | - |
| CEE 202 | Electronics and electrical measurements | 4 | 3 | - | 2 | 1,5,11 | - |
| CEE 203 | Electronic tests 1 | 2 | 1 | 3 | - | 1,2,5, 11 | CEE 201 |
| CEE 204 | Electronics 2 | 4 | 4 | - | 2 | 1,5,11 | CEE 201 |
| CEE 301 | Fundamentals of Electromagnetism | 3 | 3 | - | 2 | 1,5,11 | - |
| CEE 305 | Electronic circuits 1 | 3 | 3 | - | 2 | 1,2,5, 11 | CEE 201 |
| CEE 306 | Electronic tests 2 | 3 | 1 | 3 | - | 1,2,5, 11 | CEE 203 |
| ENG 301 | Fluid Mechanics | 3 | 2 | 1 | 1 | 1,3,5 | ENG 102 |
| ENG 304 | Advanced Computer programming | 3 | 2 | 2 | - | 1,5,11 | ENG 201 |
| ENG 305 | Automatic control | 3 | 2 | - | 2 | 1,5,11 | - |
| ENG 307 | Engineering Management | 3 | 2 | - | 2 | 1,3,5,8, 11 | - |
| CEE 401 | Signal analysis | 3 | 3 | - | 2 | 1,5,11 | - |
| CEE 402 | Electronic circuits 2 | 3 | 3 | - | 2 | 1,2,5, 11 | CEE 305 |
| CEE 403 | Integrated circuits | 3 | 3 | - | 2 | 1,2,5, 11 | CEE 305 |
| CEE 404 | Electronic tests 3 | 3 | 1 | 3 | - | 1,2,5, 11 | CEE 306 |
| CEE 405 | Optical semiconductors | 3 | 3 | - | 2 | 1,5,11 | CEE 202 |
| CEE 406 | Microprocessor systems | 3 | 3 | - | 2 | 1,5,11 | CEE 202 |
| CEE 407 | Electromagnetic waves | 3 | 3 | - | 2 | 1,5,11 | CEE 301 |



| | | | | | | | |
|---------|--------------------|----|----|----|----|-----------|---------|
| CEE 408 | Electronic tests 4 | 3 | 1 | 3 | - | 1,2,5, 11 | CEE 402 |
| CEE 506 | Electronic tests 5 | 3 | 1 | 3 | - | 1,2,5, 11 | CEE 403 |
| | Total | 78 | 61 | 26 | 31 | | |

3. Technological Courses: (36 CR)

| Code | Course name | No of units | Hours per week | | | ILOs Covered | Prerequisite |
|---------|--------------------------------|-------------|----------------|-----|------|------------------------|-------------------|
| | | | Lect | Lab | Exer | | |
| ENG 105 | Production engineering | 4 | 3 | 2 | - | 1,5,7,11 | - |
| ENG 206 | Int. to Information Technology | 3 | 2 | - | 2 | 1,5,7,11 | - |
| ENG 207 | Technical report writing | 2 | 2 | 2 | - | 7,10 | - |
| CEE 302 | Logical and digital circuits | 3 | 3 | - | 2 | 1,5,11 | CEE 204 |
| ENG 306 | Computer organization | 3 | 3 | - | 2 | 1,5,7,11 | - |
| CEE 501 | Signal processing | 3 | 3 | - | 2 | 1,5,11 | CEE 401 |
| CEE 502 | Communication systems | 3 | 3 | - | 2 | 1,5,11 | CEE 402 |
| CEE 503 | Communications networks | 3 | 3 | - | 2 | 1,5,11 | CEE 402 |
| CEE 504 | Digital Communications | 3 | 3 | - | 2 | 1,5,11 | CEE 402 |
| CEE 505 | Luminous Communications | 3 | 3 | - | 2 | 1,5,11 | CEE 402 |
| CEE 509 | Project 1* | 3 | 2 | 2 | - | 1,2,3,4,5, 6,...,14 | Comp. of 144CR |
| CEE 510 | Project 2 * | 3 | 2 | 4 | - | 1,2,3,4,5, 6,...,14 | CEE 509 |
| | Total | 36 | 33 | 10 | 16 | | |

4. Humanities and Languages: (13 CR)

| Code | Course name | No of units | Hours per week | | | ILOs Covered | Prerequisite |
|---------|--------------------------------|-------------|----------------|-----|------|--------------|--------------|
| | | | Lect | Lab | Exer | | |
| LNG 101 | Technical English Language 1 | 2 | 2 | 2 | - | 6,7,8,9 | - |
| LNG 201 | Technical English Language 2 | 2 | 2 | 2 | - | 6,7,8,9 | LNG 101 |
| ENG 303 | Engineering Economy | 3 | 2 | - | 2 | 1,8,11 | - |
| ENG 401 | Environmental management | 3 | 3 | - | - | 1,8,10 | - |
| ENG 408 | Project Management and Control | 3 | 2 | - | 2 | 1,8,11 | - |
| | Total | 13 | 11 | 4 | 4 | | |



c. Elective

1. Technological courses: (18 CR)

| Code | Course name | No of units | Hours per week | | | ILOs Covered | Prerequisite |
|---------|---|-------------|----------------|-----|------|--------------|--------------|
| | | | Lect | Lab | Exer | | |
| CEE 411 | Microwave electronics | 3 | 2 | - | 2 | 1,5,11 | CEE 402 |
| CEE 412 | Advanced electronic measurements | 3 | 2 | - | 2 | 1,5,11 | CEE 202 |
| CEE 413 | Electronic design with aids of computer | 3 | 2 | - | 2 | 1,5,11 | CEE 204 |
| CEE 414 | Fundamentals of Biomedical Engineering | 3 | 2 | - | 2 | 1,5,11 | ENG 305 |
| CEE 415 | Information systems | 3 | 2 | - | 2 | 1,5,11 | ENG 205 |
| CEE 416 | Telecommunications | 3 | 2 | - | 2 | 1,5,11 | CEE 401 |
| CEE 417 | Computer Circuits Design | 3 | 2 | - | 2 | 1,5,11 | CEE 402 |
| CEE 418 | Artificial Intelligence | 3 | 2 | - | 2 | 1,5,11 | ENG 305 |
| CEE 511 | Robotics engineering | 3 | 2 | - | 2 | 1,5,11 | MTH 202 |
| CEE 512 | Computer Engineering | 3 | 2 | - | 2 | 1,5,11 | ENG 104 |
| CEE 513 | Radar Systems | 3 | 2 | - | 2 | 1,5,11 | CEE 416 |
| CEE 514 | Neural networks | 3 | 2 | - | 2 | 1,5,11 | ENG 305 |
| CEE 515 | Printed circuits design and fabrications | 3 | 2 | - | 2 | 1,5,11 | CEE 406 |
| CEE 516 | Industrial Electronics | 3 | 2 | - | 2 | 1,5,11 | CEE 204 |
| CEE 517 | Introduction to VLSI Design | 3 | 2 | - | 2 | 1,5,11 | CEE 402 |
| CEE 518 | Satellite systems | 3 | 2 | - | 2 | 1,5,11 | CEE 416 |
| CEE 519 | Mobile communications systems | 3 | 2 | - | 2 | 1,5,11 | CEE 416 |
| CEE 520 | Antenna and wave propagation | 3 | 2 | - | 2 | 1,5,11 | CEE 407 |
| CEE 521 | Advanced electronic systems | 3 | 2 | - | 2 | 1,5,11 | |
| CEE 522 | Wireless Communications | 3 | 2 | - | 2 | 1,5,11 | CEE 416 |
| CEE 523 | Special Topics in communication Engineering | 3 | 2 | - | 2 | 1,5,11 | DEPT |



Suggested Course Distribution of Majoring in Communication and Electronics Engineering

Level 1, Semester 1

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|------------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| MTH 101 | Mathematics 1 | 3 | 2 | - | 2 |
| ENG 101 | Mechanics 1 | 3 | 2 | - | 2 |
| PHY 101 | Physics 1 | 4 | 2 | 2 | 2 |
| CHE 101 | General Chemistry | 3 | 2 | 2 | - |
| ENG 103 | Engineering drawing and projection | 3 | 1 | 4 | - |
| ENG 104 | Int. to computer systems | 2 | 2 | 2 | - |
| Total | | 18 | 11 | 10 | 6 |

Communication and Electronics Engineering

Level 1, Semester 2

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|-------------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| MTH 102 | Mathematics 2 | 3 | 2 | - | 2 |
| ENG 102 | Mechanics 2 | 3 | 2 | - | 2 |
| PHY 102 | Physics 2 | 4 | 2 | 2 | 2 |
| ENG 105 | Production engineering | 4 | 3 | 2 | - |
| ENG 106 | Int. to Engineering and environment | 2 | 2 | - | - |
| LNG 101 | Technical English Language 1 | 2 | 2 | 2 | - |
| Total | | 18 | 13 | 6 | 6 |



Communication and Electronics Engineering

Level 2, Semester 1

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|-------------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| MTH 201 | Mathematics 3 | 3 | 2 | - | 2 |
| CEE 201 | Electronics 1 | 3 | 3 | - | 2 |
| ENG 201 | Computer programming | 3 | 2 | 2 | - |
| ENG 202 | Engineering Thermodynamics | 3 | 3 | - | 2 |
| ENG 204 | Electrical Engineering Fundamentals | 4 | 3 | - | 2 |
| LNG 201 | Technical English Language 2 | 2 | 2 | 2 | - |
| Total | | 18 | 15 | 4 | 8 |

Communication and Electronics Engineering

Level 2, Semester 2

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|---|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| MTH 202 | Mathematics 4 | 3 | 2 | - | 2 |
| CEE 202 | Electronics and electrical measurements | 4 | 3 | - | 2 |
| CEE 203 | Electronic tests 1 | 2 | 1 | 3 | - |
| CEE 204 | Electronics 2 | 4 | 4 | - | 2 |
| ENG 206 | Int. to Information Technology | 3 | 2 | - | 2 |
| ENG 207 | Technical report writing | 2 | 2 | 2 | - |
| Total | | 18 | 14 | 5 | 8 |



Communication and Electronics Engineering

Level 3, Semester 1

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|--|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| MTH 301 | Engineering Probability and Statistics | 3 | 2 | - | 2 |
| CEE 301 | fundamentals of Electromagnetism | 3 | 3 | - | 2 |
| CEE 302 | Logical and digital circuits | 3 | 3 | - | 2 |
| ENG 301 | Fluid Mechanics | 3 | 2 | 1 | 1 |
| ENG 303 | Engineering Economy | 3 | 2 | - | 2 |
| ENG 304 | Advanced Computer programming | 3 | 2 | 2 | - |
| Total | | 18 | 14 | 3 | 9 |

Communication and Electronics Engineering

Level 3, Semester 2

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|----------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| MTH 302 | Numerical Methods in Engineering | 3 | 2 | - | 2 |
| CEE 305 | Electronics circuits 1 | 3 | 3 | - | 2 |
| CEE 306 | Electronic tests 2 | 3 | 1 | 3 | - |
| ENG 305 | Automatic control | 3 | 3 | - | 2 |
| ENG 306 | Computer organization | 3 | 3 | - | 2 |
| ENG 307 | Engineering Management | 3 | 2 | - | 2 |
| Total | | 18 | 14 | 3 | 10 |



Communication and Electronics Engineering

Level 4, Semester 1

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|--------------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| CEE 401 | Signal analysis | 3 | 3 | - | 2 |
| CEE 402 | Electronic circuits 2 | 3 | 3 | - | 2 |
| CEE 403 | Integrated circuits | 3 | 3 | - | 2 |
| CEE 404 | Electronic tests 3 | 3 | 1 | 3 | - |
| ENG 408 | Project Management and Control | 3 | 2 | - | 2 |
| Total | | 15 | 12 | 3 | 8 |

b. Elective

The student selects one course from the elective courses list (3 Credit hours)

Communication and Electronics Engineering

Level 4 Semester 2

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|--------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| CEE 405 | Optical semiconductors | 3 | 3 | - | 2 |
| CEE 406 | Microprocessor systems | 3 | 3 | - | 2 |
| CEE 407 | Electromagnetic waves | 3 | 3 | - | 2 |
| CEE 408 | Electronic tests 4 | 3 | 1 | 3 | - |
| ENG 401 | Environmental management | 3 | 3 | - | - |
| Total | | 15 | 13 | 3 | 6 |

b. Elective

The student selects one course from the elective courses list (3 Credit hours)



Communication and Electronics Engineering

Level 5, Semester 1

a. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|---------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| CEE 501 | Digital signal processing | 3 | 3 | - | 2 |
| CEE 502 | Communication systems | 3 | 3 | - | 2 |
| CEE 503 | Communications networks | 3 | 3 | - | 2 |
| CEE 509 | Project 1* | 3 | 2 | 2 | - |
| Total | | 12 | 11 | 2 | 6 |

B. Elective

The student selects TWO courses from the elective courses list (6 Credit hours)

Communication and Electronics Engineering

Level 5, Semester 2

A. Compulsory

| Code | Course name | No of units | Hours per week | | |
|---------|-------------------------|-------------|----------------|-----|------|
| | | | Lect | Lab | Exer |
| CEE 504 | Digital Communications | 3 | 3 | - | 2 |
| CEE 505 | Luminous Communications | 3 | 3 | - | 2 |
| CEE 506 | Electronic tests 5 | 3 | 1 | 3 | - |
| CEE 510 | Project 2 * | 3 | 2 | 4 | - |
| Total | | 12 | 9 | 7 | 4 |

* Continuous Course; one oral examination for both CEE509 and CEE510 at the end of the second term

B. Elective

The student selects two courses from the elective courses list (6 Credit hours)





10. COURSES SPECIFICATIONS





A. Basic Code Courses





MTH101 Mathematics 1

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 1, Semester: 1 | |

A- Basic Information:

| | | | |
|----------------------|---------------|-------------|----------|
| Title: Mathematics 1 | Code: MTH 101 | | |
| Prerequisites: - | | | |
| Credit hours: 3 | | | |
| Lecture: 2 | Lab: - | Exercise: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5

2- Contents

Algebra: vectors algebra - partial fractions – equations theory – vectors – mathematical deduction – numerical solutions methods (simple repetitive method – Newton and modified Newton's method – intersection method – False position method – arrays – linear equations systems – Gauss Jordan method for deletion).

Derivation : function (definition – theories) – basic trigonometric functions and its inverse – exponential and logarithmic functions – hyperbolic functions and its inverse – connection (definition – theories)- limits (definition – theories) - derivatives (definition – theories – higher order types) – curves drawing – mathematical and engineering derivative applications - undefined formulas - Taylor expansion – MacLorean expansion – approximation – introduction in partial derivation

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



MTH201 Mathematics 3

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 2, Semester: 1 | |

A- Basic Information:

| | |
|---|---------------|
| Title: Mathematics 3 | Code: MTH 201 |
| Prerequisites: MTH 101 | |
| Credit hours: 3 | |
| Lecture: 2 Lab: - Exercise: 2 | Total: 4 |

B - Professional Information:

1- 2- Intended Learning Outcomes of Course related to program outcomes: 1, 5

2- Contents

Partial differentiation applications: maximum and minimum values in more than one variable – directional analysis - the directional differential effects - the multi integrations and its applications (the curved and the orthogonal axis) – Gauss-Stokes theory - the endless series and function expansion – basic concepts for the convergence and divergence.

Ordinary differential equations: The first order (the equations which can be separated, homogeneous, exact and linear) - the ordinary differential equations from the second order and higher orders (with constant and variable coefficients), systems from the ordinary differential equations– Laplace transfer and its applications in the solution of differential equations.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



MTH202 Mathematics 4

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 2, Semester: 2 | |

A- Basic Information:

| | |
|---|---------------|
| Title: Mathematics 4 | Code: MTH 202 |
| Prerequisites: MTH 101 | |
| Credit hours: 3 | |
| Lecture: 2 Lab: - Exercise: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5

2- Contents

Special functions – Fourier series - periodic functions and Euler's laws – Fourier's integrations – solutions of the differential equations by series - solving the partial differential equations using variables separation. Functions with complex variables – complex quantities algebra – multiple values functions - the analytical functions and Koshi's theorem - the complex series – Taylor and Lorant series - the zeros, unique points and the rest - the infinite series.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



MTH 301 Engineering Probability and Statistics

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 3, Semester: 1 | |

A- Basic Information:

| | | | |
|---|---------------|-------------|----------|
| Title: Engineering Probability and Statistics | Code: MTH 301 | | |
| Prerequisites: - | | | |
| Credit hours: 3 | | | |
| Lecture: 2 | Lab: - | Exercise: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5

2- Contents

Probability theory. Discrete and continuous probability distributions. Statistics in engineering. Descriptive Statistics Sampling distributions. Estimation and confidence intervals. Hypothesis testing. Simple regression

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



MTH 302 Numerical Methods in Engineering

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 3, | Semester: 2 |

A- Basic Information:

| | | | |
|---|---------------|-------------|----------|
| Title: Numerical Methods in Engineering | Code: MTH 302 | | |
| Prerequisites: - | | | |
| Credit hours: 3 | | | |
| Lecture: 2 | Lab: - | Exercise: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5

2- Contents

Numerical solution of linear and nonlinear systems - Numerical differentiation and integration - Curve fitting and interpolation - Numerical solution of initial value problems - Boundary and eigen value problems.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



PHY 101 Physics 1

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 1, Semester: 1 | |

A- Basic Information:

Title: Physics 1 Code: PHY 101
Prerequisites: -
Credit hours: 4
Lecture: 2 Lab: 2 Exercise: 2 Total: 6

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 2

2- Contents

Material properties – Physical quantities – Standard units and dimensions – frequency motion, mechanical properties for materials – fluid properties – viscosity – surface tension–sound waves – waves in elastic media - Heat and thermodynamics: heat transfer – Gas motion theory – First law of thermodynamics – entropy and second law of thermodynamics – temperature measurements and thermometers.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



PHY 102 Physics 2

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 1, | Semester: 2 |

A- Basic Information:

| | |
|------------------|---------------|
| Title: Physics 2 | Code: PHY 102 |
| Prerequisites: - | |
| Credit hours: 4 | |
| Lecture: 2 | Lab: 2 |
| | Exercise: 2 |
| | Total: 6 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes: 1, 2

2- Contents

Electricity and magnetism: charge and substance- electric field- column's law- electric flux- Gauss law- electric volt- condenser and insulation materials-current , resistance and electric force – ohm's law and simple circuits- magnetic field- Babot and Savart laws – magnetic flux and gauss law- Faraday law - Magnetic impedance

Topics: engineering light – light properties for spherical surfaces – lenses and mirrors – wave properties for light and Hygen's principle - interference - polarization- and diffraction -

Nuclear physics: nuclear construction – Bohar theorem – principle of quantum theory- laser – optical – electric phenomenon.

3- Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



LNG 101 Technical English Language 1

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 1, | Semester: 1 |

A- Basic Information:

| | |
|-------------------------------------|---------------|
| Title: Technical English Language 1 | Code: LNG 101 |
| Prerequisites: - | |
| Credit hours: 2 | |
| Lecture: 2 | Lab: 2 |
| | Exercise: 0 |
| | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 2

2- Contents

Intensive guided practice in reading and analyzing expository and argumentative prose and in writing and revising essays that demonstrate coherent logical development, an ability to employ effective strategies of argument and persuasion, and a command of written English appropriate for college-level work

2. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

3. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



LNG 201 Technical English Language 2

Course Specifications:

| | |
|---------------------------------------|-----------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Basics |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Basic Sciences |
| Academic Level: 2, | Semester: 1 |

A- Basic Information:

| | | | |
|-------------------------------------|---------------|-------------|----------|
| Title: Technical English Language 2 | Code: LNG 201 | | |
| Prerequisites: LNG 101 | | | |
| Credit hours: 2 | | | |
| Lecture: 2 | Lab: 2 | Exercise: 0 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes: 1, 2

2- Contents

Introduction to academic research and writing through intensive investigation of an issue or topic specified by the instructor. Students will be required to develop and organize a substantial research project related to the topic of the course and to demonstrate the information literacy skills required to find, evaluate, and make appropriate use of primary and secondary materials relevant to their project.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



B. Engineering Code Courses (ENG)



ENG 101 Mechanics 1

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 1, Semester: 1 | |

A- Basic Information:

| | |
|---|---------------|
| Title: Mechanics 1 | Code: ENG 101 |
| Prerequisites: - | |
| Credit hours: 3 | |
| Lecture: 2 Lab: - Exercise: 2 | Total: 4 |

B - Professional Information:

- 1- Intended Learning Outcomes of Course related to program outcomes:**
1, 5

2- Contents

Applications of space vectors – results of group of Forces - momentums - equivalent couples – equivalent groups - equations of equilibrium for rigid bodies - Supports and pivots types - equilibrium under the effect of forces and the space couples - center of mass (groups of particles - flat surfaces) – moment of inertia (mean axes- equal surfaces)

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 102 Mechanics 2

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 1, Semester: 2 | |

A- Basic Information:

| | |
|---|---------------|
| Title: Mechanics 2 | Code: ENG 102 |
| Prerequisites: - | |
| Credit hours: 3 | |
| Lecture: 2 Lab: - Exercise: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5

2- Contents

Position, displacement, velocity, and acceleration of particle – plane motion path of particle – description of plane motion using Cartesian axes – projectiles - tied motion for particle in straight path – motion in fixed axes -motion in polar axes – relative motion between particles - tied motion for particle in circular path – principle of work and energy of motion– principle of conservation of mechanical energy – principle of impulse and momentum of rigid body

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 103 Engineering drawing and projection

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 1, Semester: 1 | |

A- Basic Information:

Title: Engineering drawing and projection Code: ENG 103
Prerequisites: -
Credit hours: 3
Lecture: 1 Labs: 4 Exercises: - Total: 5

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5, 10, 11

2- Contents

Techniques and skills of engineering drawing – engineering operations – orthogonal projection – secondary orthogonal – solid bodies – intersections (cutters for solid bodies – intersections of surfaces) - personals – projections of simple bodies – rules of writing dimensions – drawing of perspectives – deduction of missing projections – drawing of engineering sections.

Drawing of the steel frames - binding and fixing devices - the assembled drawing for some mechanical steel components

Introduction to AutoCAD Fundamentals of engineering drafting by way of computer aided drawing (CAD) software. Basic features and capabilities of CAD software and drafting fundamentals including orthographic projection, and isometric pictorials, part dimensioning in 2 dimensional drawings.

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial
3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 104 Introductions to Computer Systems

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 1, Semester: 1 | |

A- Basic Information:

Title: Introductions to Computer Systems Code: ENG 104
Prerequisites: -
Credit hours: 2
Lecture: 2 Labs: 2 Exercises: - Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5, 10, 11

2- Contents

Computer architecture – computer systems – files systems – computer networks – internet networks – Database systems and information technology – Computer graphics – multimedia systems – methods of solving problems – logical design for the programs and matrices – applications in programming using one structured or visual languages – using this language in solving the engineering problems.

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial
3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 105 Production Engineering

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 1, Semester: 1 | |

A- Basic Information:

| | | | |
|-------------------------------|---------------|--------------|----------|
| Title: Production Engineering | Code: ENG 105 | | |
| Prerequisites: - | | | |
| Credit hours: 4 | | | |
| Lecture: 3 | Labs: 2 | Exercises: - | Total: 5 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5, 10, 11

2- Contents

The engineering substances and its properties - heating and cooling diagrams – heating equilibrium diagrams - alloys - casting operation (sand casting and the preparation of the mold) – forming processes (cold and hot forming: forging - rolling – wire drawing – blanking and piercing - deep drawing - the extrusion) – processes of metal connections (the riveting – welding with its types sticking) – cutting processes (cutting elements – processes – hand machining – automatic cutting machining: lathing - shaping – drilling –milling - grinding – work piece fixation - cutting tools fixation - specifications of the operating machine) – measuring tools (venire caliper – micrometers and its types) – engineering specifications – production cycle – production efficiency - industrial safety – practical training in the different workshops

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 201 Computer Programming

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: All Engineering Departments
Department offering the course: Engineering and Basic Sciences.
Academic Level: 2, Semester: 1

A- Basic Information:

Title: Computer Programming Code: ENG 201
Prerequisites: -
Credit hours: 3
Lecture: 2 Labs: 2 Exercises: - Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes: 1, 5, 10, 11

2- Contents

Basic concepts of programming, problem analysis and developing the programs charts, Primitive data types, operators, variables, JOptionPane & scanner Classes. Flow control I: If statement, If -Else, Nested IF, Switch. Flow control II : for statement, while, do-while, continue, return. Introduction to classes, objects and methods. Introduction to Graphical User Interface (GUI). Java Applets

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial
3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 202 Engineering Thermodynamics

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 2, Semester: 1 | |

A- Basic Information:

Title: Engineering Thermodynamics Code: ENG 202
Prerequisites: ENG 102
Credit hours: 3
Lecture: 2 Labs: - Exercises: 2 Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5, 11

2- Contents

Fundamental concepts - Properties of a pure substance – Equation of state - thermodynamic systems - Work and heat - First law of thermodynamics; Applications to Systems and Control Volumes - Second Law of Thermodynamics; Principle of Carnot cycles; Heat engines, Refrigerators and heat pumps - Principle of the increase of entropy - Applications to systems and control volumes - Irreversibility and availability - Power and refrigeration cycles.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 204 Electrical Engineering Fundamentals

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: All Engineering Departments
Department offering the course: Communications and Electronics Eng
Academic Level: 2, Semester: 1

A- Basic Information:

Title: Electrical Engineering Fundamentals Code: ENG 204
Prerequisites: -
Credit hours: 4
Lecture: 3 Labs: - Exercises: 2 Total: 5

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5, 11

2- Contents

Direct Current - Theory of electric circuits- Delta and Star connections - Sine A.C and D.C circuits - Time vectors diagram- Electric power and power factor in A.C circuits - 3-Phase current - Electric machines - D.C machines – Transformers - Induction and synchronous machines - Fractional power machines.

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 205 Strength of Materials

Course Specifications:

Program on which the course is given:

Bachelor degree

Major or Minor element of program:

Major

Department offering the program:

Industrial Engineering &

Department offering the course:

Engineering and Basic Sciences

Academic Level: 2, Semester: 1

A- Basic Information:

Title: Strength of Materials

Code: ENG 205

Prerequisites: ENG 101

Credit hours: 3

Lecture: 2

Labs: -

Exercises: 2

Total: 4

Simple states of stress and strain - Torsion stresses - Bending and shearing stresses in beams - Compound stresses - Analysis of plane stress - Combined stresses - Analysis of thin-walled pressure vessels - Deflection of beams.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 206 Introductions to Information Technology

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Dept |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 2, Semester: 2 | |

A- Basic Information:

Title: Introductions to Information Technology Code: ENG 206

Prerequisites: -

Credit hours: 3

Lecture: 2

Labs: -

Exercises: 2

Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5, 11

2- Contents

Introduction to the design and use of computer-based information systems - Software and hardware used in information systems - information requirements - Communication systems – Networking - The internet; the foundations, resources and uses of the internet, emphasizing practical skills for finding, reading and authorizing materials - Fundamentals of computer communication networks – Introduction to computer networking elements; communications architectures and protocols, HTML principles and applications - Case studies.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 207 Technical Report Writing

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Departments |
| Department offering the course: | Engineering and Basic Sciences |
| Academic Level: 2, | Semester: 2 |

A- Basic Information:

| | |
|---------------------------------|---------------|
| Title: Technical Report Writing | Code: ENG 207 |
| Prerequisites: - | |
| Credit hours: 2 | |
| Lecture: 2 | Labs: 2 |
| | Exercises: - |
| | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes: 7, 10

2- Contents

Writing the scientific reports by English language: The principles of report preparation - types of reports – formatting the reports – skills of figures and shapes – importing text – chart drawings – optical scanning for the pictures and documents – the border and notes operations in the reports. Saving and indexing the reports – searching for text – coping and safety of information – using the different computer programs packages for writing and demonstrating the reports.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 301 Fluid Mechanics

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: All Departments
Department offering the course: Engineering and Basic Sciences
Academic Level: 3, Semester: 1

A- Basic Information:

| | | | |
|------------------------|---------------|--------------|----------|
| Title: Fluid Mechanics | Code: ENG 301 | | |
| Prerequisites: ENG 102 | | | |
| Credit hours: 3 | | | |
| Lecture: 2 | Labs: 1 | Exercises: 1 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes: 1, 3, 5

2- Contents

Fluid properties, fluid statics, kinematics, fluid dynamics including energy and momentum equations, dimensional analysis, laminar flow, turbulent flow and its applications, forces on immersed bodies, introduction to compressible flow, applications to filtration and fluidization.

Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes, center of pressure, flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping systems.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 302 Principles of Engineering Design

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Departments |
| Department offering the course: | Engineering and Basic Sciences |

Academic Level: 3, Semester: 1

A- Basic Information:

Title: Principles of Engineering Design Code: ENG 302
Prerequisites: ENG 103
Credit hours: 3
Lecture: 2 Labs: - Exercises: 2 Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5, 11

2- Contents

In this course the students are introduced to the proper procedure in engineering design. This procedure includes: Problem formulation, Brain Storming, Selection of best idea, Implementation of the idea and testing it. The principles in each of these steps are explained and clarified using carefully selected case studies, homework, and class work assignments

3- Teaching and Learning Methods

- ## 3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 303 Engineering Economy

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Departments |
| Department offering the course: | Engineering and Basic Sciences |

Academic Level: 3, Semester: 1

A- Basic Information:

Title: Engineering Economy Code: ENG 303
Prerequisites: -
Credit hours: 3
Lecture: 2 Labs: - Exercises: 2 Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 8, 11

2- Contents

This course covers the basic concepts of engineering economics as applied to the evaluation of capital investment alternatives in both the private and public sectors of our economy. Attention is given to the time value of money by showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost. Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy. Economic optimization in design and operations. Cost estimation of products and systems.

3- Teaching and Learning Methods

- ## 3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 304 Advanced Computer Programming

Course Specifications:

| | |
|---------------------------------------|---------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Engineering and Basic Sciences. |
| Academic Level: 2, Semester: 1 | |

A- Basic Information:

| | | | |
|--------------------------------------|---------------|--------------|----------|
| Title: Advanced Computer Programming | Code: ENG 304 | | |
| Prerequisites: ENG 201 | | | |
| Credit hours: 3 | | | |
| Lecture: 2 | Labs: 2 | Exercises: - | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes: 1, 5, 10, 11

2- Contents

Object Oriented Programming introduction: Methods – Classes and Objects: Controlling access to members, Constructor, Overloaded Constructor, software Reusability, Package access, Arrays.

Object Oriented Programming Concepts: Encapsulation, Inheritance, Polymorphism
Graphical User Interface (GUI): Event handler, text field, list, Multiple Selection lists, Panel, Radio buttons, Checkboxes, layout , Menus, Frames, Popup , Tabbed Pane.

Database Basics

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 305 Automatic Control

Course Specifications:

| | |
|---------------------------------------|------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Communications and Electronics Eng |
| Department offering the course: | Communications and Electronics Eng |
| Academic Level: 3, Semester: 1 | |

A- Basic Information:

Title: Automatic Control Code: ENG 305
Prerequisites: -
Credit hours: 3
Lecture: 2 Labs: - Exercises: 2 Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 3, 5, 11

2- Contents

Definitions – classification of control systems - Modeling of some physical systems - the closed and opened systems – the block diagram and transfer function – signal flow chart - modeling by case variables – frequency response analysis – the feed back – the stability and its study – analyzing the root path - Nyquist plot analysis – design methods for the feed back control systems (the advanced angle - the leftover angle)

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 306 Computer Organization

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Communications and Electronics Eng. |
| Department offering the course: | Communications and Electronics Eng |
| Academic Level: 3, Semester: 1 | |

A- Basic Information:

Title: Computer Organization Code: ENG 306
Prerequisites: -
Credit hours: 3
Lecture: 3 Labs: - Exercises: 2 Total: 5

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 3, 5, 11

2- Contents

An Introduction to a Simple Computer: CPU Basics and Organization, Bus, Clocks, Input/Output Subsystem, Memory Organization and Addressing, Interrupts
Marie Machine: The Architecture, Registers and Buses, Instruction Set Architecture, Register Transfer Notation, Instruction Processing, The Fetch-Decode-Execute Cycle, A Simple Program, What Do Assemblers Do, Extending Our Instruction Set, A Discussion on Decoding—Hardwired vs. Microprogrammed Control.

A Closer Look at Instruction Set Architectures: Instruction Formats, Design Decisions for Instruction Sets, Little versus Big Endian, Internal Storage in the CPU - Stacks versus Registers, Number of Operands and Instruction Length, Instruction-Level Pipelining.

Types of Memory: Memory Hierarchy, Locality of Reference, Cache Memory, Virtual Memory

Input/output and Storage Systems: Introduction, Amdahl's Law, I/O Architectures, I/O Control Methods, I/O Bus Operation, Magnetic Disk Technology, Rigid Disk Drives, Optical Disks

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 307 Engineering Management

Course Specifications:

| | |
|---------------------------------------|------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Industrial Engineering |
| Department offering the course: | Industrial Engineering |

Academic Level: 3, Semester: 2

A- Basic Information:

Title: Engineering Management Code: ENG 307
Prerequisites: -
Credit hours: 3
Lecture: 2 Labs: - Exercises: 2 Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 3, 5, 8, 11

2- Contents

Management: Principles of management theory – The environment of management – planning – individual and group decision making – organizational culture, structure and design of management – motivating employees – leadership – interpersonal and organizational communication – control techniques for enhancing organizational effectiveness – the human relationships and the organizational behavior.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 308 Operation Researches

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Engineering and Basic Sciences |

Academic Level: 3, Semester: 1

A- Basic Information:

Title: Operation Researches 1 Code: ENG 308
Prerequisites: MTH 302
Credit hours: 3
Lecture: 2 Labs: - Exercises: 2 Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 2, 3, 5, 12, 14

2- Contents

Models and methods of operations research in solving engineering and management problems. Linear programming, simplex method, duality, sensitivity analysis; transportation, assignment and transshipment models; network flows models; integer programming. Probabilistic models in operations research problems. Queuing theory; Markov chains; decision analysis; Markovian decision process, utility functions

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 401 Environmental Management

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Departments |
| Department offering the course: | Engineering and Basic Sciences |

Academic Level: 4, Semester: 1

A- Basic Information:

Title: Environmental Management Code: ENG 401
Prerequisites: -
Credit hours: 3
Lecture: 3 Labs: - Exercises: - Total: 3

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 8, 10

2- Contents

The importance of studying environmental science – modern technology and its effect on the environment – quality of the environment and development elements – sources of environmental pollution and method of control (air pollution – water pollution – solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 408 Project Management and Control

Course Specifications:

| | |
|---------------------------------------|--------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Departments |
| Department offering the course: | Engineering and Basic Sciences |

Academic Level: 4, Semester: 1

A- Basic Information:

| | | | |
|---------------------------------------|---------------|--------------|----------|
| Title: Project Management and Control | Code: ENG 408 | | |
| Prerequisites: - | | | |
| Credit hours: 3 | | | |
| Lecture: 2 | Labs: - | Exercises: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 8, 11

2- Contents

Development, negotiation and specification of project contract. Project planning and control using activity network models; network logic; scheduling; resource allocation; time-cost trade off methods; multi-project resource allocation and leveling using available industrial software.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 415 Quality Assurances and Engineering Reliability

Course Specifications:

| | |
|---------------------------------------|------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Industrial Engineering |
| Department offering the course: | Industrial Engineering |

Academic Level: 4, Semester: 2

A- Basic Information:

Title: Quality Assurances and Engineering Reliability Code: ENG 415

Prerequisites: -

Credit hours: 3

Lecture: 2

Labs: -

Exercises: 2

Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Design of quality control systems; quality methods for establishing product specifications; process control; variables and attributes charts; acceptance sampling; operating characteristics curves; process capabilities; QC software
Reliability of parallel and serial engineering systems. Life testing. Impact of reliability on the design process in engineering fields such as mechanical, electrical and structural engineering. Studies the effect of equipment reliability on product quality.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



ENG 430 Industrial Training 1 ENG 530 Industrial Training 2

Course Specifications:

| | |
|---------------------------------------|------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Industrial Engineering |
| Department offering the course: | Industrial Engineering |

Academic Level: 4, 5 Semester: Summer before the beginning of the level

A- Basic Information:

| | |
|----------------------------|--|
| Title: Industrial Training | Code: ENG 430, ENG 530 |
| Prerequisites: | Completion of the previous level |
| Credit hours: | 0 |
| Industry field: | 30 hours/week for at least three weeks for each course |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

2- Contents

Practical work for at least 90 hours, on a specific practical engineering problem in one of the industrial, service, or consulting establishments under the supervision of a Staff member and a focal person from the selected establishment.

3- Teaching and Learning Methods

3.1 – Practical industrial field Training

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 0 % |
| Final Term Examination | 0 % |
| Oral Examination | 50 % |
| Practical Examination | 0 % |
| Semester work | 25 % |
| Report | 25 % |
| Total | 100 % |





C. Chemical Engineering Code Courses (CHE)





CHE 101 General Chemistry

Course Specifications:

| | |
|---------------------------------------|-----------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | All Engineering Departments |
| Department offering the course: | Chemical Engineering |
| Academic Level: 1, Semester: 1 | |

A- Basic Information:

| | | | |
|--------------------------|---------------|--------------|----------|
| Title: General Chemistry | Code: CHE 101 | | |
| Prerequisites: - | | | |
| Credit hours: 3 | | | |
| Lecture: 2 | Labs: 2 | Exercises: - | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 2

2- Contents

Gaseous status –substantial and heat balance in fuel burning operations and chemical operations – properties of solutions – dynamic balance in physical and chemical operations – kinetic chemical interactions – electric chemistry – introduction to chemical corrosion – water processing – building materials – pollution and its treatment.

Selected chemical industries: chemical manures – dyes – polymers – sugar – petrochemicals – semi conductors – oil, greases and industrial detergents.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 201 Chemical Engineering Principles I

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |
| Academic Level: 2, Semester: 1 | |

A- Basic Information:

| | |
|--|---------------|
| Title: Chemical Engineering Principles I | Code: CHE 201 |
| Prerequisites: CHE 101 | |
| Credit hours: 3 | |
| Lecture: 2 | Lab: 0 |
| | Exercises: 2 |
| | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 3, 5, 6, 11

2- Contents:

Basic concepts of material and energy balances - Combined material and energy balances - Balances on non-reactive and reactive processes - Application of material and energy balances on unit operations.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 202 Organic Chemistry

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering
Academic Level: 2, Semester: 1

A- Basic Information:

Title: Organic Chemistry Code: CHE 202
Prerequisites: CHE 101
Credit hours: 4
Lecture: 3 Lab: 2 Exercises: 0 Total: 5

B - Professional Information:

1- Intended Learning Outcomes of Course related to Program outcomes:

1, 5, 11

2- Contents:

Modern presentation of organic chemistry stressing theory and mechanism - extensive use of resonance and conformational analysis; alkanes, cycloalkanes, alkyl halides, alcohols, ethers, alkenes, alkynes, and stereochemistry - Spectroscopy, aromatic compounds, aldehydes and ketones, carboxylic acids and their derivatives, amines, and poly functional compounds.

Organic amines – carbohydrates – general study on the aromatic and organic compounds specially Benzene, naftaline and antherasine - study for the hydration, oxidation, halogenation, nitration and carbonation and some other operations for the organic compounds. Preparation of the azo and diazo compounds and its importance – alcohols and aldehydes, caitonates and the aromatic acids.

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial
3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 203 Inorganic Chemistry

Course Specifications:

Program on which the course is given: Bachelor degree

Major or Minor element of program: Major

Department offering the program: Chemical Engineering

Department offering the course: Chemical Engineering

Academic Level: 2, Semester: 1

A- Basic Information:

Title: Inorganic Chemistry

Code: CHE 203

Prerequisites: CHE 101

Credit hours: 3

Lecture: 3 Lab: 2 Exercises: 0 Total: 5

B - Professional Information:

1- Intended Learning Outcomes of Course related to Program outcomes:

1, 5, 11

2- Contents:

Comparative study for the following groups of materials with focusing on the compounds which are important to the industry " Haogyns – sulphur group – alcalines – earth alcalynes – familiar items of the fourth and fifth groups in the periodic table – transient metals – selected topics in the inorganic chemistry

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial

3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 301 Physical Chemistry

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering
Academic Level: 3, Semester: 1

A- Basic Information:

Title: Physical Chemistry Code: CHE 301
Prerequisites: CHE 101
Credit hours: 4
Lecture: 3 Lab: 2 Exercises: - Total: 5

B - Professional Information:

1- Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1

2- Contents:

Rates of reaction - effects of temperature and pressure on the reaction rate - Adsorption in gases and liquids - Surface reactions - Kinetic theory of gases - Transport properties of gases from molecular theory - PVT relations and equations of state - Dalton and Amagat laws - Zeroth, first, second and third laws of thermodynamics - Raoult's law and vapor-liquid equilibria - Chemical equilibrium and effects of temperature and pressure on the equilibrium constant.

Physical Chemistry Laboratory: Selected experiments in physical chemistry. Experiments cover rates of reaction, effects of temperature and pressure on the reaction rate - Adsorption in gases and liquids - Surface reactions.

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial
3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 302 Material Science and Metallurgy

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |
| Academic Level: 3, Semester: 1 | |

A- Basic Information:

Title: Material Science and Metallurgy **Code:** CHE 302
Prerequisites: ENG 205
Credit hours: 3
Lecture: 3 **Lab:** 0 **Exercises:** 2 **Total:** 5

B – Professional Information:

1- Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5

2- Contents:

Students in this course learn about tools of examination, temperature measurement, metallography, tests for mechanical properties, non-destructive testing, crystalline structure of metals, plastic deformation and working of metals, solidification, solidification theory of liquid metals, equilibrium phase diagrams of binary systems, the iron carbon phase diagram, phase transformations in steel, heat treatment of steel, classification of steels, and the effect of alloying elements, tool steels, cast irons, non-ferrous metals and alloys, metals at high and low temperatures, wear of metals and failure analysis

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 303 Chemical Engineering Principles II

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering
Academic Level: 3, Semester: 1

A- Basic Information:

Title: Chemical Engineering Principles II Code: CHE 303

Prerequisites: CHE 201

Credit hours: 3

Lecture: 3

Lab: 0

Exercises: 2

Total: 5

B – Professional Information:

1- Intended Learning Outcomes of Course related to Program outcomes:

1, 3, 5, 6, 11

2- Contents:

Simultaneous material and energy balances of complete process flowsheets –
Introduction of computer methods to solve chemical engineering problems –
Equation-based approach. Degrees of freedom analysis – Conceptual design of
chemical processes – Introduction to basic Chemical Engineering processes (e.g.
humidification, binary distillation, extraction) – Computer-aided process design.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 304 Chemical Engineering Thermodynamics

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering
Academic Level: 3, Semester: 1

A- Basic Information:

Title: Chemical Engineering Thermodynamics Code: CHE 304

Prerequisites:

Credit hours: 3

Lecture: 3 Lab: 2 Exercises: - Total: 5

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes:

1, 5, 11

2. Contents:

Thermodynamic properties of homogeneous mixtures - partial molal properties - Fugacity. Ideal and non ideal solutions - Heat effects of mixing. Excess properties - Phase equilibria; miscible systems; activity coefficient - Gibbs-Duhem Equations - Chemical reactions equilibria.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 305 Analytical Chemistry

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering
Academic Level: 3, Semester: 2

A- Basic Information:

Title: Analytical Chemistry Code: CHE 305
Prerequisites: CHE 101
Credit hours: 3
Lecture: 3 Lab: 2 Exercises: - Total: 5

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1

2. Contents:

Theory and techniques of gravimetric and volumetric analysis, and fundamentals of electro analytical chemistry.

Analytical Chemistry Laboratory: Selected experiments designed to reinforce concepts covered in CHE 301.

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial
3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 306 Process Dynamics and Control

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |
| Academic Level: 3, Semester: 2 | |

A- Basic Information:

| | |
|--|---------------|
| Title: Process Dynamics and Control | Code: CHE 306 |
| Prerequisites: - | |
| Credit hours: 3 | |
| Lecture: 2 Lab: 2 Exercises: 0 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to Program outcomes:

1, 2, 3, 5, 6, 7, 11

2- Contents:

Automatic control merits and basic features – Classification of control action (open-loop and closed-loop, feed-back and feed-forward, process and position control) – Mathematical tools (Linearization, Laplace transforms and block diagram algebra), Process dynamics (first, second and higher orders) – Measuring and actuating elements – Two-position controller – Three-term controller – Controller mechanism and optimum setting – System stability (algebraic and graphical methods). Laboratory experiments demonstrating the principles covered. These include temperature, pressure, flow and concentration measuring devices, and process control simulation for typical chemical plants.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 401 Reactor Design

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |
| Academic Level: 4, Semester: 1 | |

A- Basic Information:

Title: Reactor Design **Code:** CHE 401
Prerequisites: MTH 302, CHE 304
Credit hours: 4
Lecture: 3 **Lab:** 0 **Exercises:** 2 **Total:** 5

B – Professional Information:

1- Intended Learning Outcomes of Course related to Program outcomes:

1, 2, 3, 5, 7, 11

2- Contents:

Fundamentals of thermodynamics and kinetics of chemical reactions - Analysis of batch, plug-flow and continuous stirred tank reactors for different types of reactions - Non ideal reactor analysis, including residence time distribution, back mixing and dispersion models - Kinetics of isothermal and non-isothermal ideal reactors.

Kinetics of heterogeneous or catalytic reactions - Design of different types of catalytic and non-catalytic reactors - Mass and energy transfer limitations in heterogeneous reaction systems - Catalyst effectiveness - Reactor stability and sensitivity to operating parameters - Optimization of reactor design - Factors affecting choice of reactors.

3- Teaching and Learning Methods

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 402 Heat Transfer

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |
| Academic Level: 4, Semester: 1 | |

A- Basic Information:

| | |
|------------------------|---------------|
| Title: Heat Transfer | Code: CHE 402 |
| Prerequisites: ENG 202 | |
| Credit hours: 3 | |
| Lecture: 3 | Lab: 2 |
| | Exercises: - |
| | Total: 5 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to Program outcomes:

1, 5, 11

2- Contents:

The Heat Transfer course requires that students apply their knowledge of mathematics and science to real thermal engineering systems. In this course an expansion of students engineering skills, developed in thermodynamics and fluid mechanics, is undertaken. Students are required to identify, formulate and solve thermal problems using a combination of mass and energy balances and energy rate equations. The course combines analytical techniques and design principles as applied to thermal systems. The students will have a full understanding of conduction, convection, radiation, condensation and boiling heat transfer and will be able to design a heat exchanger system.

Laboratory experiments on conduction, convection, radiation, drop-wise and film condensation, nucleate and film boiling and heat exchangers.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 403 Mass Transfer

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |
| Academic Level: 4, Semester:1 | |

A- Basic Information:

Title: Mass Transfer **Code:** CHE 403
Prerequisites: ENG 202
Credit hours: 3
Lecture: 3 **Lab:** 0 **Exercises:** 2 **Total:** 5

B - Professional Information:

1- Intended Learning Outcomes of Course related to Program outcomes:

1, 5, 11

2- Contents:

Molecular mass transport in fluids - Transport Phenomena and the basic equation of change - Molecular mass transport in liquids - Mass transport phenomena in solids - Mass transfer coefficient in laminar and turbulent flow – Inter-phase mass transport - Continuous two-phase mass transport processes.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 404 Corrosion Engineering

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering
Academic Level: 4, Semester: 1

A- Basic Information:

Title: Corrosion Engineering Code: CHE 404
Prerequisites: CHE 303
Credit hours: 2
Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2- Contents:

Theories and principles of corrosion and prevention - Localized corrosion, pitting, crevice corrosion, cavitations - metallurgical factors - welding problems - material selection - stress corrosion cracking corrosion fatigue - inspection, nondestructive testing - water treatment for boilers and condensers - chemical cleaning flue gas attack - corrosion testing evaluation and simulation - corrosion monitoring and cathode protection.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 405 Mass Transfer Operations

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering
Academic Level: 4, Semester: 1

A- Basic Information:

Title: Mass Transfer Operations Code: CHE 405
Prerequisites: CHE 403
Credit hours: 3
Lecture: 3 Lab: 0 Exercises: 2 Total: 5

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 3, 5, 11

2. Contents:

Molecular mass transport in fluids - Transport Phenomena and the basic equation of change - Molecular mass transport in liquids - Mass transport phenomena in solids - Mass transfer coefficient in laminar and turbulent flow – Inter-phase mass transport - Continuous two-phase mass transport processes.

A laboratory course in mass transfer operations covering experiments on: Vapor-liquid equilibria (VLE), binary system distillation (plate and packed columns), solid-liquid extraction, double-effect evaporation, spray drying. Some reaction kinetics experiments such as tubular reactions are also included.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 406 Bio Organic Chemistry

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Minor
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering

Academic Level: 4, Semester: 2

A- Basic Information:

Title: Bio organic chemistry Code: CHE 406
Prerequisites: CHE 203
Credit hours: 3
Lecture: 3 Labs: - Exercises: 2 Total: 5

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Principles – Carbohydrates – aminoacids – proteins –fatty acids –oils and fats – pharmaceutical compounds

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 407 Mechanical unit operation

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: 4, Semester: 2

A- Basic Information:

Title: Mechanical unit operation Code: CHE 407
Prerequisites: CHE 304
Credit hours: 3
Lecture: 3 Labs: - Exercises: 2 Total: 5

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 3, 5, 7, 11

2- Contents

This course is a study of necessary equations of design to apply them in the design of different chemical processes: absorption and stripping, distillation, solvent extractions, evaporative cooling, solid drying, crystallization, ion exchange, filtration, screening, sedimentation, computation methods in multistage and multicomponent systems and operations including particulate solids.

3- Teaching and Learning Methods

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 408 Process Modeling and Simulation

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering
Academic Level: 4, Semester: 2

A- Basic Information:

Title: Process Modeling and Simulation Code: CHE 408

Prerequisites: MTH 302, CHE 405

Credit hours: 3

Lecture: 3 Lab: 2 Exercises: - Total: 5

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Review of the basic principles of transport of momentum, heat, and mass with applied problems. Numerical methods for solving more complex problems of transport phenomena and kinetics.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 411 Liquefied Natural Gas

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |
| Academic Level: 4, Semester: 1 | |

A- Basic Information:

| | |
|------------------------------|---------------|
| Title: Liquefied Natural Gas | Code: CHE 411 |
| Prerequisites: CHE 304 | |
| Credit hours: 3 | |
| Lecture: 2 | Lab: 0 |
| | Exercises: 2 |
| | Total: 4 |

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 3, 5, 7, 10, 11

2. Contents:

Refrigeration systems - Natural gas preparation and liquefaction, thermodynamic aspects of liquefaction, liquefaction plants - Properties of LNG - Vaporization losses and custody transfer.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 412 Air Pollution

Course Specifications:

Program on which the course is given: Chemical Engineering
Major or Minor element of program: Minor
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering
Academic Level: 4, Semester: 1

A- Basic Information:

Title: Air Pollution **Code:** CHE 412
Prerequisites: Dept. approval
Credit hours: 3
Lecture: 2 **Lab:** 0 **Exercises:** 2 **Total:** 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 6, 8, 10

2. Contents:

Sources, measurements and equipment design for removal of air pollutants - Effects of air pollutants - Dispersion of pollutants in the atmosphere - Particulate matter and its control equipment - Atmospheric photochemical reactions - Instrumentation and emission testing equipment.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 413 Gas Engineering

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Chemical Engineering |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |
| Academic Level: 4, Semester: 2 | |

A- Basic Information:

Title: Gas Engineering **Code:** CHE 413
Prerequisites: CHE 304, CHE 403
Credit hours: 3
Lecture: 2 **Lab:** 0 **Exercises:** 2 **Total:** 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Characterization of natural gas systems - Properties of natural gas systems - Product specification - Qualitative phase behavior - Retrograde condensation - Calculation of vapor-liquid equilibria and applications - Design of multistage separation - Water-hydrocarbon system-dehydration - Overview of sweetening, gas preparation and liquefaction.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 414 Polymer Engineering

Course Specifications:

Program on which the course is given: Chemical Engineering
Major or Minor element of program: Minor
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering
Academic Level: 4, Semester: 2

A- Basic Information:

Title: Polymer Engineering Code: CHE 414
Prerequisites: CHE 101
Credit hours: 3
Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5,11

2. Contents:

Structure and physical properties of polymers, polymer solutions, analysis and testing of polymers, measurement of molecular weight - Types of polymerization reactions; manufacture of polymers; process type of reactors - Polymer processing; plastics, elastomers; properties of commercial polymers; thermoplastics and thermosetting resins.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 415 Engineering Materials Selection

Course Specifications:

Program on which the course is given: Chemical Engineering

Major or Minor element of program: Minor

Department offering the program: Chemical Engineering

Department offering the course: Chemical Engineering

Academic Level: 4, Semester: 1

A- Basic Information:

Title: Engineering Materials Selection Code: CHE 415

Prerequisites: CHE 302

Credit hours: 3

Lecture: 2

Lab: 0

Exercises: 2

Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Application of engineering of materials science principles in the selection and/or specification of metals, ceramics, and plastic materials for use in structural, mechanical, and chemical usage. Mechanical properties, corrosion, oxidation, and variation of properties with temperature are considered.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 416 Water Desalination

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering
Academic Level: 4, Semester: 2

A. Basic Information:

Title: Water Desalination Code: CHE 416
Prerequisites: CHE 402
Credit hours: 3
Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 3, 5, 7, 11

2. Contents:

The course covers the basic concept of water desalination and combines water chemistry, scaling, corrosion, heat transfer principles, material behavior, and design principles as applied to desalination processes. Attention is given to the thermal (flash, vapor compression) and non-thermal (reverse-osmosis, electro -dialysis) desalination techniques. Water properties and quality criteria and standards as well as corrosion behavior and its control in desalination plants will be discussed.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 417 Polymer Processing

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |
| Academic Level: 4, Semester: 2 | |

A- Basic Information:

| | |
|---------------------------|---------------|
| Title: Polymer Processing | Code: CHE 417 |
| Prerequisites: CHE 305 | |
| Credit hours: 3 | |
| Lecture: 2 | Lab: 0 |
| | Exercises: 2 |
| | Total: 4 |

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 3, 5, 7, 11

2. Contents:

Theory and practice of polymer processing. Non-Newtonian flow, extrusion, injection-molding, fiber, film, and rubber processing. Kinetics of and structural development during solidification. Physical characterization of microstructure and macroscopic properties. Component manufacturing and recycling issues, compounding and blending

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 501 Chemical Engineering Computer applications

Course Specifications:

Program on which the course is given: Bachelor degree

Major or Minor element of program: Major

Department offering the program: Chemical Engineering

Department offering the course: Chemical Engineering

Academic Level: 5, Semester: 1

A- Basic Information:

Title: Chemical Engineering Computer applications Code: CHE 501

Prerequisites: ENG 104

Credit hours: 3

Lecture: 3

Labs: 2

Exercises: -

Total: 5

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 5, 11

2- Contents

This is the study of contemporary computer tools toward chemical engineering. Students design, develop and deploy computer applications or as applications which can be implemented via the internet. These applications are developed for inventory and production control systems, statistical application, database/data mining applications and for software system integration. Software tools and packages utilized include: XML, Javascript, Java, MATLAB, MSVBA, and MS Access.

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial

3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 502 Petrochemical Engineering

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |
| Academic Level: 5, Semester: 1 | |

A- Basic Information:

| | |
|--|---------------|
| Title: Petrochemical Engineering | Code: CHE 502 |
| Prerequisites: CHE 101, CHE 201 | |
| Credit hours: 3 | |
| Lecture: 3 Lab: 0 Exercises: 2 | Total: 5 |

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5,11

2. Contents:

Petroleum chemistry; occurrence, composition of crude oil, distillation, catalytic and thermal cracking, alkylation, hydrogenation, isomerization, polymerization -. Techniques and economics of the production of basic and intermediate petrochemicals as well as some end products

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 503 Industrial Technologies in Chemical Engineering

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering
Academic Level: 5, Semester: 1

A- Basic Information:

Title: Industrial Technologies in Chemical Engineering Code: CHE 503

Prerequisites: Completion of 100 Credit hours and Consent of Department

Credit hours: 3

Lecture: 3 Lab: 2 Exercises: - Total: 5

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 3, 5, 7, 11

2. Contents:

Introduction in the chemical industries and definitions – Combined processes in the chemical creation – nitratation – sulpherization – halogenations – Oxidation – polymerization – concentration on the organic industrial processes including the combined processes with operation charts until the final products - study of different physical and industrials knitting – natural knitting – cottons – wool etc..

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 504 Plant Design

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |
| Academic Level: 5, Semester: 1 | |

A- Basic Information:

Title: Plant Design **Code:** CHE 504
Prerequisites: CHE 401, CHE 405
Credit hours: 3
Lecture: 3 **Lab:** 0 **Exercises:** 2 **Total:** 5

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 3, 5, 6

2. Contents:

Process choice, synthesis and screening of alternatives - Project planning - Safety and environmental issues - Construction of a detailed flow sheet using a process simulator (currently HYSIS) - Material and energy balances - Conservation of material and energy flows. Detailed design of equipment: size, construction details, materials of construction, instrumentation and control. Process economics: capital cost estimation, manufacturing cost estimation, profit forecast, return on investment - Sensitivity to errors in cost estimates - Venture analysis: the combined effect of technological and commercial uncertainties, the quantification of risk - Planning investment.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 505 Petroleum Refining Engineering

Course Specifications:

Program on which the course is given: Bachelor degree

Major or Minor element of program: Major

Department offering the program: Chemical Engineering

Department offering the course: Chemical Engineering

Academic Level: 5, Semester: 1

A- Basic Information:

Title: Petroleum Refining Engineering Code: CHE 505

Prerequisites: CHE 405

Credit hours: 3

Lecture: 3 Lab: 0 Exercises: 2 Total: 5

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 3, 5, 6

2. Contents:

Refinery organization - Refinery feed stocks and products - Crude distillation - Cracking and reforming – Hydrotreating - Alkylation. Lubricating oils production - Petroleum gases – Hydroprocessing; product blending, environmental constraints on refinery products - Term project using actual refinery data to be utilized for typical design calculation on the above operations.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 509 Project 1*

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |
| Academic Level: 5, Semester: 1 | |

A- Basic Information:

| | | | |
|---|---------------|--|----------|
| Title: Project 1* | Code: CHE 509 | | |
| Prerequisites: Completion of 144 Credit hours and Consent of Department | | | |
| Credit hours: 3 | | | |
| Lecture: 2 | Labs: 2 | | |
| | Exercises: - | | Total: 4 |

B - Professional Information:

- 1- Intended Learning Outcomes of Course related to program outcomes:**
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

2- Contents

Students will be assigned Chemical industrial projects in which they will be expected to apply Principles of Chemical Engineering analysis and design to solve a given real world problem. Reports and presentations will be emphasized in addition to the technical content.

3- Teaching and Learning Methods

- 3.1 - lecture 3.2 - Tutorial
3.3 - practical training / lab and industry visits

4- Weighting of Assessments

| | |
|------------------------|---------------------------|
| Mid-Term Examination | 0 % |
| Final Term Examination | 0 % |
| Oral Examination | 50 % at the end of IE 510 |
| Practical Examination | 0 % |
| Semester work | 50 % |
| Other types | 0 % |
| Total | 100 % |

- * Continuous Course; one oral examination for both CHE 509 and CHE 510 at the end of CHE 510



CHE 510 Project 2

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: **5**, Semester: **2**

A- Basic Information:

| | | | |
|------------------------|---------------|--------------|----------|
| Title: Project 2 | Code: CHE 510 | | |
| Prerequisites: CHE 509 | | | |
| Credit hours: 3 | | | |
| Lecture: 2 | Labs: 4 | Exercises: - | Total: 6 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

2- Contents

Continuation and conclusion of the investigations on the chemical industrial problems of Project I; written reports and team presentations are required.

3- Teaching and Learning Methods

| | |
|--|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab and industry visits | |

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 0 % |
| Final Term Examination | 0 % |
| Oral Examination | 50 % |
| Practical Examination | 0 % |
| Semester work | 25 % |
| Report evaluation | 25 % |
| Total | 100 % |

- * Continuous Course; one oral examination for both CHE 509 and CHE 510 at the end of CHE 510



CHE 511 Electroplating

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: **5**, Semester: **1**

A- Basic Information:

| | |
|--|---------------|
| Title: Electroplating | Code: CHE 511 |
| Prerequisites: - | |
| Credit hours: 3 | |
| Lecture: 2 Lab: 0 Exercises: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Electrochemistry – Electrochemical cells – Surface preparation – throwing power – Electrochemical baths – Factors affecting electroplating – temperature – bath concentration.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 512 Ceramics

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: 5, Semester: 1

A- Basic Information:

| | |
|--|---------------|
| Title: Ceramics | Code: CHE 512 |
| Prerequisites: - | |
| Credit hours: 3 | |
| Lecture: 2 Lab: 0 Exercises: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

General ceramics fabrication processes – preparation of raw material – cold forming processes – ceramic building material; bricks, tiles, sewer pipes – sanitary ware.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 513 Refractories

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: 5, Semester: 1

A- Basic Information:

| | |
|--|---------------|
| Title: Refractories | Code: CHE 513 |
| Prerequisites: - | |
| Credit hours: 3 | |
| Lecture: 2 Lab: 0 Exercises: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Glazes – drying – firing – hot forming and melt forming – stone ware – porcelain, gypsum – enameling abrasives – Cement – Properties of refractories. Equilibrium diagrams.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 514 Printing

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: 5, Semester: 1

A- Basic Information:

Title: Printing Code: CHE 514
Prerequisites: -
Credit hours: 3
Lecture: 2 **Lab:** 0 **Exercises:** 2 **Total:** 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Printing inks – printing on different materials such as textile, paper, plastics - etc. Stability effect of different factors on printing quality

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 515 Painting Technology

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: **5**, Semester: **1**

A- Basic Information:

| | |
|--|---------------|
| Title: Painting Technology | Code: CHE 515 |
| Prerequisites: - | |
| Credit hours: 3 | |
| Lecture: 2 Lab: 0 Exercises: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Paints compositions – Classification of paints – primers and final coats – surface preparation – reaction of paint systems. Paints for corrosion resistance.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 516 Waste water treatment

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: **5**, Semester: **1**

A- Basic Information:

| | |
|--|---------------|
| Title: Waste water treatment | Code: CHE 516 |
| Prerequisites: - | |
| Credit hours: 3 | |
| Lecture: 2 Lab: 0 Exercises: 2 | Total: 4 |

B - Professional Information:

- 1- Intended Learning Outcomes of Course related to program outcomes:**
3, 5, 10, 12, 13, 14

2- Contents

Water analysis – Water treatment – clarification – disinfection – activated sludge process – Biological waste treatment

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 517 Synthetic Fibers

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: **5**, Semester: **1**

A- Basic Information:

| | |
|--|---------------|
| Title: Synthetic Fibers | Code: CHE 517 |
| Prerequisites: - | |
| Credit hours: 3 | |
| Lecture: 2 Lab: 0 Exercises: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Classification of synthetic fibers – Properties of fibers, Nylon 6 – Nylon 6,6 – Amide fibers – Glass fibers – Teflon.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 518 Gas Sweetening

Course Specifications:

Program on which the course is given:

Bachelor degree

Major or Minor element of program:

Minor

Department offering the program:

Chemical Engineering

Department offering the course:

Chemical Engineering

Academic Level: 5, Semester: 1

A- Basic Information:

Title: Gas Sweetening

Code: CHE 518

Prerequisites: -

Credit hours: 3

Lecture: 2 Lab: 0

Exercises: 2

Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Basic process principles, amine processes, carbonate processes, physical absorption methods, new amine-type processes, solid bed sweetening, liquid sweetening, sulfur production, and tail gas conditioning.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 519 Paper Technology

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: **5**, Semester: **2**

A- Basic Information:

| | |
|--|---------------|
| Title: Paper Technology | Code: CHE 519 |
| Prerequisites: - | |
| Credit hours: 3 | |
| Lecture: 2 Lab: 0 Exercises: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Raw materials of papers - fabrication processes – emulsions – pulp formation – evaporation processes - drying.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 520 Industrial Safety

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: **5**, Semester: **2**

A- Basic Information:

| | |
|--|---------------|
| Title: Industrial Safety | Code: CHE 520 |
| Prerequisites: - | |
| Credit hours: 3 | |
| Lecture: 2 Lab: 0 Exercises: 2 | Total: 4 |

B - Professional Information:

- 1- Intended Learning Outcomes of Course related to program outcomes:**
3, 5, 10, 12, 13, 14

2- Contents

Introduction, preventing emergencies in the process industry, Human error, Identification and assessment of hazards, Fires and explosions, Hazard of plant modification, case studies, miscellaneous topics to be covered by invited lecturers.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 521 Plasticizers

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: **5**, Semester: **2**

A- Basic Information:

| | | | |
|---------------------|---------------|--------------|----------|
| Title: Plasticizers | Code: CHE 521 | | |
| Prerequisites: - | | | |
| Credit hours: 3 | | | |
| Lecture: 2 | Lab: 0 | Exercises: 2 | Total: 4 |

B - Professional Information:

- 1- Intended Learning Outcomes of Course related to program outcomes:**
3, 5, 10, 12, 13, 14

2- Contents

Study for the properties – important and effect of their applications – Study for the different techniques of their addition to polymers.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 522 Foams

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Minor
Department offering the program: Chemical Engineering
Department offering the course: Chemical Engineering

Academic Level: 5, Semester: 2

A- Basic Information:

Title: Foams Code: CHE 522
Prerequisites: -
Credit hours: 3
Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Chemical composition and raw materials – low and high density foams – testing of foams – additives improving properties.

3- Teaching and Learning Methods

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 523 Rubber

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: 5, Semester: 2

A- Basic Information:

Title: Rubber Code: CHE 523
Prerequisites: -
Credit hours: 3
Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Natural rubber – isoprene – rubbers – elastomers – chemical vulcanization reaction – ABS.

3- Teaching and Learning Methods

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 524 Food Processing Technology

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: 5, Semester: 2

A- Basic Information:

Title: Food Processing Technology Code: CHE 524
Prerequisites: -
Credit hours: 3
Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 525 Introduction to combustion Phenomena

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: **5**, Semester: **2**

A- Basic Information:

| | |
|---|---------------|
| Title: Introduction to combustion Phenomena | Code: CHE 525 |
| Prerequisites: - | |
| Credit hours: 3 | |
| Lecture: 2 Lab: 0 Exercises: 2 | Total: 4 |

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Develops a foundation in combustion phenomena including transport and other mechanisms in homogeneous and heterogeneous combustion. Environmental implications of combustion. Elementary modeling and preliminary design calculations in industrial and modern applications of combustion, such as hazardous waste incineration, gas turbines, catalytic converters, and coal combustion systems. Regulatory concerns, stoichiometry, thermochemistry, incinerators and air pollution control

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CHE 526 Selected Topics in Chemical Engineering

Course Specifications:

| | |
|---------------------------------------|----------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Chemical Engineering |
| Department offering the course: | Chemical Engineering |

Academic Level: **5**, Semester: **2**

A- Basic Information:

Title: Selected Topics in Chemical Engineering Code: CHE 525

Prerequisites: -

Credit hours: 3

Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B - Professional Information:

1- Intended Learning Outcomes of Course related to program outcomes:

3, 5, 10, 12, 13, 14

2- Contents

Special topics to be selected by the department to address new subjects in Chemical Engineering.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



D. Communications and Electronics Engineering Code Courses (CEE)





CEE 201 Electronics 1

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 2, Semester: 1 | |

A- Basic Information:

Title: Electronics 1 Code: CEE 201

Code: CEE 201

Prerequisites: -

Credit hours: 3

Lecture: 3

Lab: 0

Exercises: 2

Total: 5

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Bipolar joint applications –Transistor principles and the dynamic and static characteristics – Thirystor - single pole elements - the basic characteristics - principles of the light sender elements - the laser from the semiconductors - the revealer of the light - the luminous cells - the laser characteristics and its applications - a technology of the integral circles - the crystal growth - the oxidation - the precipitation of the film - the spread - the printing of the circuits and the digging.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 202 Electronics and Electrical Measurements

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 2, Semester:

A- Basic Information:

Title: Electronics and Electrical Measurements Code: CEE 202

Prerequisites: -

Credit hours: 4

Lecture: 3 Lab: - Exercises: 2 ^ Total: 5

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Definitions - functions and properties of the measurement equipments - Standard measurements - the statistical analysis for the error in the measurement – wave's indicator – signals generator - digital measuring equipments - recording measuring equipments – energy converters – Data transfer systems from digital to numerical – testing systems with computer control.

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial
3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 203 Electronics Tests 1

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 2, Semester:1 | |

A- Basic Information:

| | |
|----------------------------|---------------|
| Title: Electronics Tests 1 | Code: CEE 203 |
| Prerequisites: CEE 201 | |
| Credit hours: 2 | |
| Lecture: 1 | Lab: 3 |
| | Exercises: - |
| | Total: 4 |

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 5, 11

2. Contents:

Conducting experiments which covers the basics of electronics and the logical circuits using testing and electronic measurement equipments – Methods of measurements - elements and methods of testing and programming of the computer

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 204 Electronics 2

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 2, Semester: 1

A- Basic Information:

Title: Electronics 2 **Code:** CEE 204
Prerequisites: CEE 201
Credit hours: 4
Lecture: 4 **Lab:** 0 **Exercises:** 2 **Total:** 6

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

The characteristics and processing of (JFET) and (MOSFET) - the effect of the surfaces - effect of the narrow canal - different types for MOS - feeding circuits of FET - Digital and analog applications of FET - single circuits industry - elements of the mobile charge - the integrated circuits with high numbers - the testing of a correlation and assembling of the integrated circuits - the basic regular circuits (the transistors) – design of power circuits - nourishing an organizer - the resort the volt - PNPN valve - THYRISTOR applications – two directions equipments - the cell of the semi-conductive and its related equipments

3. Teaching and Learning Methods

- 3.1 - lecture
- 3.2 - Tutorial
- 3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 301 Fundamentals of Electromagnetism

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 3, Semester: 1

A- Basic Information:

Title: Fundamentals of Electromagnetism Code: CEE 301

Prerequisites: -

Credit hours: 3

Lecture: 3 Lab: - Exercises: 2 Total: 5

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Direction analysis - the basic relations for static electric field – Gauss law - the volt function - the theory of separation – Laplace equation – Poisson's equation - electrostatic power - magnetic field theories - the magnetic inductance and Faraday law - magnetic direction volt - similarity between the magnetic field and the electric field - the continuity equation in time - the conditions at the ambient surface - the temporal variable fields and Maxwell's equations

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial
3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 302 Logical and digital circuits

Course Specifications:

Program on which the course is given: Bachelor degree

Major or Minor element of program: Major

Department offering the program: Electronics and Communications Eng.

Department offering the course: Electronics and Communications Eng.

Academic Level: 3, Semester: 1

A. Basic Information:

Title: Digital and logical circuits

Code: CEE 302

Prerequisites: CEE 204

Credit hours: 3

Exercises: 2

Total: 5

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 5, 11

2. Contents:

Boolean algebra – Logic gates – Logic Minimization - Logic and digital units concepts–number systems and data representation–k-maps Boolean algebra–decision elements – combinational and sequential circuits – flip - flops – minimization techniques , design and construction of logic subsystems – such as decoders , multiplexers , adders , and multipliers – Combinational logic circuits – sequential logic circuits –Introduction to AID and DIA converters – Introduction to digital Integrated circuits

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 305 Electronic Circuits 1

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 3, Semester: 1 | |

A- Basic Information:

| | | | |
|------------------------------|---------------|--------------|----------|
| Title: Electronic Circuits 1 | Code: CEE 305 | | |
| Prerequisites: CEE 201 | | | |
| Credit hours: 3 | | | |
| Lecture: 3 | Lab: - | Exercises: 2 | Total: 5 |

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 5, 11

2. Contents:

Introduction to analysis and design of modern analog electronic circuits, diode circuits, bipolar and field effect transistor circuits, transistor amplifier circuits and operational amplifier circuits
The opposition and mixed constants for high frequency amplifiers – intermediate and harmonic amplifiers – Bode plot and the frequency response – the harmonic vibrators – circuits of mixing and modification – power amplifiers.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 306 Electronic Tests 2

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 3, Semester: 2 | |

A. Basic Information:

| | |
|---------------------------|---------------|
| Title: Electronic Tests 2 | Code: CEE 306 |
| Prerequisites: CEE 203 | |
| Credit hours: 3 | |
| Lecture: 1 | Lab: 3 |
| | Exercises: - |
| | Total: 4 |

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 5, 11

2. Contents:

way of use the wave plotter – the resonance circuits – trouble fixation of Zenner regulator – the use of the diode as a source – the luminous electronic equipments – the counters – the amplifiers and organizers of the integrated circuits – transistor (JFET type) – applications of the computer programming and computer organization.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 401 Signals analysis

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 4, Semester: 1 | |

A. Basic Information:

Title: Signals analysis Code: CEE 401

Code: CEE 401

Prerequisites: -

Credit hours: 3

Lecture: 3

Lab: 0

Exercises: 2

Total: 5

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Representation of signals in the time and alternative range - the intermittent and continuous signals - the periodic signals - intermittent and continuous Fourier transfer - the spectral presentation – non periodic functions - samples and the spectral analysis – spectral power and energy

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 402 Electronic Circuits 2

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 4, Semester: 1

A- Basic Information:

Title: Electronic Circuits 2 Code: CEE 402
Prerequisites: CEE 302
Credit hours: 3
Lecture: 3 Lab: - Exercises: 2 Total: 5

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 5, 11

2. Contents:

The circuits of process amplifier –differential amplifiers – signals generators – volts organizers – the effective filters - the closing circuits – using the programming packages in the design and analysis of the electronic circuits.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 403 Integrated Circuits

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 4, Semester: 1 | |

A- Basic Information:

Title: Integrated Circuits **Code:** CEE 403
Prerequisites: CEE 305
Credit hours: 3
Lecture: 3 **Lab:** 0 **Exercises:** 2 **Total:** 5

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 5, 11

2. Contents:

Technology of the integrated circuits: implementation of the integrated circuits – the horizontal implementation and its economics - principles of design – Batt circuits metal/oxide/semiconductor/ the negative and the metal/semiconductor oxide/ synchronous. Gallium-Arsen digital circuits - applications of the digital and analog integrated circuits: transistor logic – transistor – connected transmitter logic – the digital circuits for metal/oxide/semiconductor - the widespread amplifiers and the transient conducting amplifiers - the radio frequency amplifiers and the medium frequency - the harmonic and non-harmonic pulses – the pulse which is controlled by volt – the closed stage ring – applications of the sending and receiving circuits.

3- Teaching and Learning Methods

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 404 Electronic Tests 3

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 4, Semester: 1 | |

A- Basic Information:

| | |
|---------------------------|---------------|
| Title: Electronic Tests 3 | Code: CEE 404 |
| Prerequisites: CEE 306 | |
| Credit hours: 3 | |
| Lecture: 1 | Exercises: - |
| Lab: 3 | Total: 4 |

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 5, 11

2. Contents:

Experimental tests in the field of electronic circuits includes: applications on the binaries circuits – Performance of transistors – The various transistor amplifiers with single stage and multi-stages – feed back amplifiers – frequency response for amplifiers and presenting the frequency range – processes amplifiers. Thyristor specifications and its applications – TRIAC and DIAC properties – operations of amplifier circuits – experiments on gates and logic circuits.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 405 Optical semiconductors

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 4, Semester: 1 | |

A- Basic Information:

Title: Optical semiconductors Code: CEE 405

Prerequisites: CEE 202

Credit hours: 3

Lecture: 3

Lab: 0

Exercises: 2

Total: 5

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1,5,11

2. Contents:

Fundamentals of light wave communication in optical fiber waveguides, physical description of fiber optic systems. Properties of optical fiber and fiber components. Electro-optic devices: light sources and modulators, detectors and amplifiers; optical transmitter and receiver systems. Fiber optic link design and specification; fiber optic networks.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 406 Microprocessor Systems

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 4, Semester: 2 | |

A- Basic Information:

| | |
|-------------------------------|---------------|
| Title: Microprocessor Systems | Code: CEE 406 |
| Prerequisites: CEE 202 | |
| Credit hours: 3 | |
| Lecture: 3 | Lab: 2 |

Exercises: - Total: 5

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Theory and design of microprocessors – semiconductors technology – microprocessor architecture- microprocessor programming and interfacing- types of microprocessor- assembly language – software development – input/ output design – applications- interfacing- connection- memory components- support circuits – machine language and assembly language.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 407 Electromagnetic Waves

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 4, Semester: 2

A- Basic Information:

Title: Electromagnetic Waves Code: CEE 407
Prerequisites: CEE 301
Credit hours: 3
Lecture: 3 Lab: - Exercises: 2 Total: 5

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Maxwell Equations – Lorentz power law polarity –Pointing theory –Non electromagnetic waves – Maxwell equation static solutions –dipoles medium types – Polarized medium – homogeneous medium –plasma –boundary conditions – wave propagation in the different media - wave propagation in ideal and actual (with loss) materials – reflection and movement of waves on the flat surfaces – non vertical projection for plane waves in lossless medium.

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial
3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 408 Electronic tests 4

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 4, Semester: 2 | |

A- Basic Information:

Title: Electronic Tests 4 Code: CEE 408
Prerequisites: CEE 402
Credit hours: 3
Lecture: 1 Lab: 3 Exercises: - Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 5, 11

2. Contents:

Laboratory experiments in the field of electronic circuits include: optics analyzers, digital measuring devices – digital harmonic plotters – logical analyzers – The vibrators – the governed vibrators by the volt – the suddenly closing circuits –the harmonious amplifiers – the rates of the expansion and the retrievers. Laboratory experiments in the electronic circuits engineering, communications and fine and optical waves.

3. Teaching and Learning Methods

- 3.1 - lecture
- 3.2 - Tutorial
- 3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 411 Microwave electronics

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 4, Semester: 1 | |

A- Basic Information:

Title: Microwave electronics Code: CEE 411

Prerequisites: CEE 402

Credit hours: 3

Lecture: 2 Lab: 0

Exercises: 2

Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Guidance for the rectangular and cylindrical waves – idle main components – the shell lines - microwaves transistors and amplifiers – low noise amplifiers – microwaves oscillators - idle surface components - the converters and the phase displacements.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 412 Advanced electronic measurements

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Minor
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 4, Semester: 1

A- Basic Information:

Title: Advanced electronic measurements Code: CEE 412

Prerequisites: CEE 202

Credit hours: 3

Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Integrated measurements amplifiers – comparisons and taking of the samples and the stoping - the converters (digital/analog and analog/digital) - the electric variables - signals preparation and its filtration – idle elements – systems and components of signals attainments.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 413 Electronic design with aids of computer

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 4, Semester: 1 | |

A- Basic Information:

Title: Electronic design with aids of computer Code: CEE 413

Prerequisites: CEE 204

Credit hours: 3

Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

The electronic systems and the circulating standard components in electronic and communications - the design of the schemata and the printed circuits – the computer software packages in the electronic design – examples for the electronic design using these computer software packages.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 414 Fundamentals of Biomedical Engineering

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 4, Semester: 1 | |

A- Basic Information:

Title: Fundamentals of Biomedical Engineering Code: CEE 414

Prerequisites: CEE 305, CEE 401

Credit hours: 3

Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

The safety and the insulations in the medical equipments - the manners of the noise deletion - the hearted helpful equipments – physiological measurements and the vital sensitivity - a processing of the vital signals and different photographic methods.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 415 Information systems

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 4, Semester: 2 | |

A- Basic Information:

Title: Information systems Code: CEE 415
Prerequisites: ENG 205
Credit hours: 3
Lecture: 2 **Lab:** 0 **Exercises:** 2 **Total:** 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Concepts of the information systems - components of the information systems - the functions of the information systems – organizing the function of information systems - the separate systems – manipulation of the commercial systems – systems of information management – decision support systems – expert systems – operating systems – office automation – implementation support systems – Data processing systems – files processing – data relationships – types of databases - relational databases - common databases – management systems - systems analysis - systems design – system manipulation – system maintenance

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 416 Telecommunications

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Minor
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 4, Semester: 2

A- Basic Information:

Title: Telecommunications Code: CEE 416
Prerequisites: CEE 401
Credit hours: 3
Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Wireless telephony – Client circuits – Communication cables – Used tones –
Telephony circuits - Communication methods - Electronic communication-
Communication between cities.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 417 Computer circuits design

Course Specifications:

Program on which the course is given: Bachelor degree

Major or Minor element of program: Minor

Department offering the program: Electronics and Communications Eng.

Department offering the course: Electronics and Communications Eng.

Academic Level: 4, Semester: 2

A- Basic Information:

Title: Computer circuits design Code: CEE 417

Prerequisites: CEE 402

Credit hours: 3

Lecture: 2 Lab: 0

Exercises: 2 Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Introduction to digital electronic - IC's fabrication technology- Binary circuit characteristics using transistors-logic gates families- types and characteristics, metal transistor gates- oxide -semiconductor and gates characteristics NMOS, CMOS, PMOS - regeneration digital logic circuits - flip-flops - schmit impulse -multi vibrator circuits - temporary ICS - semiconductor memory - ROM types ,static and dynamic writing - power sources and regulators - Energy loss Data Bus

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| Type of Assessments | Percentage |
|------------------------|------------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 418 Artificial intelligence

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 4, Semester: 2 | |

A- Basic Information:

Title: Artificial intelligence Code: CEE 418

Prerequisites: ENG 305

Credit hours: 3

Lecture: 2

Lab: 0

Exercises: 2

Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2 Contents:

Fundamental of artificial intelligent – random search – knowledge coding – Mathematical logic for knowledge - engineering and expert systems – Natural language processing – Knowledge representation – production system – Robots – Condensed introduction to programming using Lisip language and overall review for programming by Prolog language – programming applications in AI field focusing on: structure of customer accounting system including research operations, logical presentation, and decision making process in the uncertainty case - computer vision and neural networks.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 501 Signal processing

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 5, Semester: 1 | |

A- Basic Information:

Title: Signal processing Code: CEE 501
Prerequisites: CEE 401
Credit hours: 3
Lecture: 3 Lab: 0 Exercises: 2 Total: 5

B – Professional Information:

1. Intended Learning Outcomes related to Program outcomes (ILOs):

1, 5, 11

2 Contents:

Discrete time-signals and systems – Linear time-invariant systems and their properties – Sampling of continuous-time signals and convolution. IIR and FIR filter designs- Effects of finite word length- The discrete Fourier transform- Fast Fourier transform algorithms- Relations between Fourier Transform (FT)- Discrete-frequency FT (DFFT) or Fourier series, Discrete-time FT (DTFT), and Discrete FT (DFT: Discrete both time and frequency).

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 502 Communication systems

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 5, Semester: 1

A- Basic Information:

Title: Communication systems Code: CEE 502
Prerequisites: CEE 402
Credit hours: 3
Lecture: 3 Lab: 0 Exercises: 2 Total: 5

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2 Contents:

Analog to digital converter - introduction to communication system - Analysis of analog and digital communication systems – types of analog and digital modulation – adaptive filters – receiver design – rate of binary error in channels – binary rate – symbol rate – sources types - Amplitude modulation - Amplitude demodulation - navio band frequency modulation - phase modulation - phase and frequency demodulation - Amplitude and frequency modulated receivers - impulse modulation PAM, PWM, PPM - nesises in modulation systems – the encrypted modulation – the differential encrypted modulation - the frequency and temporal division – the wide and frequent encryption

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 503 Communication networks

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Major
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 5, Semester: 1

A- Basic Information:

Title: Communication networks Code: CEE 503
Prerequisites: EEC 402
Credit hours: 3
Lecture: 3 Lab: - Exercises: 2 Total: 5

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Concepts of communication Networks –basics of communications network design – network hierarchical – special structures in the global and wide and local networks - high-speed access control protocols - routing protocols, traffic management and network topologies – performance, modeling and simulation techniques.

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial
3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 504 Digital Communications

Course Specifications:

Program on which the course is given: Bachelor degree.
Major or Minor element of program: Major
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 5, Semester: 1

A- Basic Information:

Title: Digital Communications Code: CEE 504
Prerequisites: CEE 402
Credit hours: 3
Lecture: 3 Lab: 0 Exercises: 2 Total: 5

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Analog pulse modulation: sampling theorem, PAM, PWM, PCM, delta modulation – Baseband transmission – TDM – Digital carrier modulation: ASK, PSK, FSK, - Error rate performance of digital modulation techniques: coherent receivers – non coherent receivers – channel coding – speed spectrum techniques.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 505 Luminous Communications

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Minor
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 5, Semester: 1

A- Basic Information:

Title: Luminous Communications Code: CEE 505
Prerequisites: CEE 402
Credit hours: 3
Lecture: 3 Lab: - Exercises: 2 Total: 5

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

The physical principles and work of the light and laser emission joints – the luminous – The guidance and the fiber optics – ways and methods of the luminous communications – performance of the luminous connection ring.

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial
3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 506 Electronic tests 5

Course Specifications:

Program on which the course is given: Bachelor degree

Major or Minor element of program: Major

Department offering the program: Electronics and Communications Eng.

Department offering the course: Electronics and Communications Eng.

Academic Level: 5, Semester: 2

A- Basic Information:

Title: Electronic tests 5

Code: CEE 506

Prerequisites: CEE 403

Credit hours: 3

Credit hours: 3

Exercises:-

Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 5, 11

2. Contents:

Laboratory experiments in the fields of: digital communication system – properties of closed phase ring – optical communication systems – television circuits properties – antennas, fine waves and micrometry circuits – integrated circuits.

3. Teaching and Learning Methods

3.1 - lecture 3.2 - Tutorial

3.3 - practical training / lab

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 509 Project 1*

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 5, Semester: 1 | |

A- Basic Information:

| | |
|-------------------------------------|---------------|
| Title: Project 1* | Code: CEE 509 |
| Prerequisites: Completion of 144 CR | |
| Credit hours: 3 | |
| Lecture: 2 | Lab: 2 |
| Exercises: - | Total: 4 |

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

2. Contents:

Students will be assigned projects in which they will be expected to apply Principles of Communications and Electronics Engineering, analysis and design to solve a given real world problem. Reports and presentations will be emphasized in addition to the technical content.

3. Teaching and Learning Methods:

- 3.1. Lectures,
- 3.2. Practical training/Lab
- 3.3 Industrial visits

4- Weighting of Assessments

| | |
|------------------------|---------------------------|
| Mid-Term Examination | 0 % |
| Final Term Examination | 0 % |
| Oral Examination | 50 % at the end of IE 510 |
| Practical Examination | 0 % |
| Semester work | 50 % |
| Other types | 0 % |
| Total | 100 % |

* Continuous Course; one oral examination for both IE 509 and IE 510 at the end of IE 510



CEE 510 Project 2*

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 5, Semester: 2 | |

A- Basic Information:

| | |
|------------------------|---------------|
| Title: Project 2* | Code: CEE 510 |
| Prerequisites: CEE 509 | |
| Credit hours: 3 | |
| Lecture: 2 | Lab: 4 |
| Exercises: - | Total: 6 |

B – Professional Information:

1- Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

2. Contents:

Continuation and conclusion of the investigations on the communication or electronic problems of Project I; written reports and team presentations are required.

3. Teaching and Learning Methods:

- 3.1. Lectures,
- 3.2. Practical training/Lab
- 3.3 Industrial visits

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 0 % |
| Final Term Examination | 0 % |
| Oral Examination | 50 % |
| Practical Examination | 0 % |
| Semester work | 25 % |
| Report evaluation | 25 % |
| Total | 100 % |

Continuous Course; one oral examination for both IE 509 and IE 510 at the end of IE510



CEE 511 Robotics Engineering

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 5, Semester:1 | |

A- Basic Information:

Title: Robotics Engineering Code: CEE 511

Prerequisites: MTH 202

Credit hours: 3

Lecture: 2 Lab: 0

Exercises: 2 Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Introduction in the theory and applications of robot - the space description of the robot - Robot mechanics and dynamics - The dynamic of robot motivators – the inverse motivators - the work of the motion path – kinematics and dynamics control of the robot (motion – force) – control of the motivators forces computer vision – robot programming languages – the fixed robot in the industrial sites – industrial applications.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 512 Computer Engineering

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Minor
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 5, Semester: 1

A- Basic Information:

Title: Computer Engineering Code: CEE 512
Prerequisites: ENG 104
Credit hours: 3
Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

The basics of the computer organization – computer instructions – processing unit – design of arithmetic logic units – Control unit – control by micro programs – memory organization –operating systems – time management – assumptions and the measurement of the goals – politics – space management – the levels of storage – address translation – the pages – the files – structures of the files – user interface – the orders translator – the helpful and reactive programs – the synchronization – basics of networks.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 513 Radar systems

Course Specifications:

Program on which the course is given: Bachelor degree
Major or Minor element of program: Minor
Department offering the program: Electronics and Communications Eng.
Department offering the course: Electronics and Communications Eng.
Academic Level: 5, Semester: 1

A- Basic Information:

Title: Radar systems Code: CEE 513

Prerequisites: CEE 416

Credit hours: 3

Lecture: 2 Lab: 0

Code: CEE 513

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

The basics and Types of the radar (pulse radar – Doppler – frequency formation) – the equipments of the sending and the reception – the antennas – hammer Land surveyor the radar – measurements of the range, angle and speed – analysis of the research signals and continuation methods – properties of the reflected signals from the goals –applications in the military and civil fields and the remote sensations.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 514 Neural networks

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 5, Semester:1 | |

A- Basic Information:

Title: Neural networks Code: CEE 514
Prerequisites: ENG 305
Credit hours: 3
Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Introduction to natural Neural structure – introduction to Artificial Neural Networks and parallel processing – Artificial Neural Networks main components – Neural Networks classification – supervised Neural Networks learning – self organizing learning – Neural Networks design – preprocessing data – network structure – learning Algorithms – artificial Neural Networks multilayer models – Hopfield model – Boltzman model - Neural Networks and expert systems – multilayer neural network applications

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 515 Printed Circuit Design and Fabrication

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 5, Semester: 1 | |

A- Basic Information:

Title: Printed Circuit Design and Fabrication Code: CEE 515

Prerequisites: CEE 406

Credit hours: 3

Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Printed Circuit Board (PCB) scales (size and types)- Surface treatments – Capacitors and coils for PCB connection – Spaces connection – Actual resources and earth's connectors- Components for positioning – Cooling requirements and Group density- Tests for surface- Design rules for different PCB and their applications: Digital, Analog, High frequency, and auto-technical. Programs for PCB design – PCB safety – Light printing – Silc-screen printing – Electronic board's fabrication – Auto-mechanical operations in PCB technology- Multi-layered boards – Technical methods for welding and assembly components.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 516 Industrial Electronics

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 5, Semester: 1 | |

A. Basic Information:

Title: Industrial Electronics **Code:** CEE 516
Prerequisites: CEE 204
Credit hours: 3
Lecture: 2 **Lab:** 0 **Exercises:** 2 **Total:** 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

The usage of electronics in measurement equipments: Length and temperature – self waves and its usage in intelligence systems – circuit bracers and its usage in industry and traffic control – noise measurement system – different heating system using high frequency for conductive materials – sensitivity systems – loading systems – temperature recording and magnetic amplifiers – exhaust system analysis – control system for power system .

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 517 Introductions to VLSI Design

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 5, Semester: 2 | |

A- Basic Information:

Title: Introduction to VLSI Design Code: CEE 517

Prerequisites: CEE 402

Credit hours: 3

Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Design of VLSI circuits- Stick diagramming- NMOS transistors- Switch and gate Logic- PLAs- Finite-state machines- Design rules- CAD system- Speed and power considerations- Floor planning- Layout techniques- Fabrication of VLSI – Two basic MOS technologies and other available technologies- Oxidation- Photoengraving- Chemical etching diffusion.

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 518 Satellite systems

Course Specifications:

Program on which the course is given: Bachelor degree

Major or Minor element of program: Minor

Department offering the program: Electronics and Communications Eng.

Department offering the course: Electronics and Communications Eng.

Academic Level: 5, Semester: 2

A- Basic Information:

Title: Satellite systems

Code: CEE 518

Prerequisites: CEE 416

Credit hours: 3

Lecture: 2 Lab: 0 Exercises: 2 Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Introduction – considerations of the orbits – the joint of the radio frequency – the techniques of the modification – the elements of the satellite – elements of the land stations – technology of the numerous attainment – systems of Intel sat and DBS – the personal communications and the communications of the moving across the satellites.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 519 Mobile communications systems

Course Specifications:

Program on which the course is given: Bachelor degree

Major or Minor element of program: Minor

Department offering the program: Electronics and Communications Eng.

Department offering the course: Electronics and Communications Eng.

Academic Level: 5, Semester: 2

A. Basic Information:

Title: Mobile communications systems Code: CEE 519

Prerequisites: CEE 416
Grade 3

Credit hours: 3

Lecture: 2

Lab: 0

Exercises: 2

Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Principles of cellular radio – Mobile radio propagation and channel modeling – Multiple access methods – Physical and Logical channels – Digital mobile communication systems: TDMA, GSM, CDMA, WCDMA - multi – carrier and OFDM systems.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 520 Antennas and wave propagation

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Major |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 2, Semester: 2 | |

A- Basic Information:

| | |
|--------------------------------------|---------------|
| Title: Antennas and wave propagation | Code: CEE 520 |
| Prerequisites: CEE 301, CEE 407 | |
| Credit hours: 3 | |
| Lecture: 2 | Lab: 0 |
| | Exercises: 2 |
| | Total: 4 |

B - Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Basic definitions and theorems- Formulation of the radiation problems- Isotropic point source- Power and field patterns- Directivity and gain- Radiation impedance- Wave polarization- Radiation from current elements- Analysis and design of linear wire antenna- Linear array antenna- Uda-Yagi antenna- Log-periodic antenna- Aperture antenna- Antenna measurement techniques - Basic principles and analytical techniques of electromagnetic wave propagation- Transmission lines- Waveguides and resonators - Basic microwave networks- Scattering.

3. Teaching and Learning Methods

| | |
|--------------------------------|----------------|
| 3.1 - lecture | 3.2 - Tutorial |
| 3.3 - practical training / lab | |

4. Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 10 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 10 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 521 Advanced electronic systems

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 5, Semester: 2 | |

A- Basic Information:

Title: Advanced electronic systems Code: CEE 521

Prerequisites: CEE 402

Credit hours: 3

Lecture: 2

Lab: 0

Exercises: 2

Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Methods and ways of design and analysis of the digital and analogue electronic circuits – video and audio systems using the microwaves, satellites, the mobile technology and personal computer

3- Teaching and Learning Methods

3.1 lecture 3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 522 Wireless networks and mobile systems

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 5, Semester: 2 | |

A- Basic Information:

Title: Wireless networks and mobile systems Code: CEE 522

Prerequisites: CEE 416

Credit hours: 3

Lecture: 2

Lab: 0

Exercises: 2

Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

Multidisciplinary, project-oriented design course that considers aspects of wireless and mobile systems including wireless networks and link protocols, mobile networking including support for the Internet Protocol suite, mobile middleware, and mobile applications. Students complete multiple experiments and design projects

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |



CEE 523 Special Topics in Communication Engineering

Course Specifications:

| | |
|---------------------------------------|-------------------------------------|
| Program on which the course is given: | Bachelor degree |
| Major or Minor element of program: | Minor |
| Department offering the program: | Electronics and Communications Eng. |
| Department offering the course: | Electronics and Communications Eng. |
| Academic Level: 5, Semester: 2 | |

A. Basic Information:

Title: Special Topics in Communication Engineering Code: CEE 523

Prerequisites: DEPT.

Credit hours: 3

Lecture: 2

Lab: 0

Exercises: 2

Total: 4

B – Professional Information:

1. Intended Learning Outcomes of Course related to Program outcomes (ILOs):

1, 5, 11

2. Contents:

A topic to be selected by the department to address new subjects in Communications Engineering.

3- Teaching and Learning Methods

3.1 lecture

3.2 Tutorial

4- Weighting of Assessments

| | |
|------------------------|-------|
| Mid-Term Examination | 20 % |
| Final Term Examination | 60 % |
| Oral Examination | 0 % |
| Practical Examination | 0 % |
| Semester work | 20 % |
| Other types | 0 % |
| Total | 100 % |

