B. SC. PROGRAM STATUS REPORT

Computer Engineering

Prepared by Departmental Committee and Coordinated by

Dr. Mohamad Abou El-Nasr
Head of Department
Department of Computer Engineering

DECEMBER 2009
Vision
We envision a department that is committed to education and helping to make an impact and a contribution to society through its quality graduates and cutting edge research agendas in a stimulating intellectual environment where faculty, students and staff can thrive and grow.

Mission
Our mission is to educate and train students so that they have the knowledge to enter the market place and the skills to continually enhance this knowledge, and provide leadership in industry and academia.

Department Objectives
The objectives of the department of computer engineering are:

- Continuously reviewing and updating the programs of studies to maintain the high level of education required by our students.
- Establishing strong relationships with the industry and community through continuous collaboration in terms of research, graduate studies, and training.
- Providing the business and industry communities with high quality industrial engineers who are produced through our learning and program flexibility, hands-on experience, training, and research opportunities.
- Attracting full-time faculty members that are of high calibre and are of different specializations for the next five years.
- Maintaining a minimum of eight full time teaching assistants (GTAs and TAs) in the department.
- Encouraging students to form chapters of international institutes and organizations within the department.
# Table of Contents

## INTRODUCTION
- Computer Engineering: An Overview 1
- The Role of Computer Engineers 1
- Career Opportunities for Computer Engineers 2
- Program Aim and Objectives 3

## PROGRAM PLANNING SHEET
- Curriculum 5
- Course Coding 5
- Degree Offered 6
- Graduation Requirements 7
- Computer Engineering Academic Program Sheet 10
- Course Prerequisites 11
- Academic Program Analysis 16
- Program Analysis by Semester Offering 21
- Program Analysis by Subject Field 24
- Comparison with Previous Program 30

## COURSES SUMMARY
**DESCRIPTION**
- Basic and Applied Science (BA) 31
- Computer Engineering (CC) 34
- The Training and Senior Project 42
- Electronics and Communication Engineering (EC) 43
- Electrical Engineering (EE) 44
- Language, Humanities and Social Science (LH) 45
- Industrial and Systems Engineering (IM) 46
- Mechanical Engineering (ME) 47
- Non-Engineering (NE) 48

## COURSE FILE SUMMARY
- Basic and Applied Science Courses – BA 50
- Computer Engineering Courses – CC 72
- Electronics and Communications Courses – EC 166
- Electrical Engineering Courses – EE 174
- Language, Humanities, & Social Science Courses – LH 180

## INDUSTRIAL AND SYSTEMS ENGINEERING

**Teaching Faculty List**
- Full Time Staff 204
- Assistants 208
- Full Time Graduate Teaching Assistants 210

## Department Facilities
- Experimental Facilities Supporting the Program 211
- Field-Programmable Gate Array (FPGA) Laboratory 212
- Microprocessor Laboratory 213
- Digital Circuits Laboratory 214
- Computer Laboratories 215
- Computer Laboratories 216
- Computer Laboratories 217
- Computer Laboratories 218
- Computer Laboratories 219
- Computer Laboratories 220
- Computer Laboratories 221
- Computer and Network Laboratory 222
- Electrical Machines Laboratory 223
- Electrical Circuits Laboratory 224
- Digital Communication Laboratory 225
- Reverse Engineering Laboratory 226
- Physics Laboratory 227
- Physics Laboratory 228
- Chemistry Laboratory 229
Introduction

Program overview, activities and job opportunities, and program objectives

Computer Engineering: An Overview

Computer engineering as an academic field encompasses the broad areas of computer science and electrical engineering. According to the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers (IEEE) Computer engineering is defined as the discipline that embodies the science and technology of design, construction, implementation, and maintenance of software and hardware components of modern computing systems and computer-controlled equipment. Computer engineering has traditionally been viewed as a combination of both computer science (CS) and electrical engineering (EE). It has evolved over the past three decades as a separate, although intimately related, discipline. Computer engineering is solidly grounded in the theories and principles of computing, mathematics, science, and engineering and it applies these theories and principles to solve technical problems through the design of computing hardware, software, networks, and processes.

Historically, the field of computer engineering has been widely viewed as “designing computers.” In reality, the design of computers themselves has been the province of relatively few highly skilled engineers whose goal was to push forward the limits of computer and microelectronics technology. The successful miniaturization of silicon devices and their increased reliability as system building blocks has created an environment in which computers have replaced the more conventional electronic devices. These applications manifest themselves in the proliferation of mobile telephones, personal digital assistants, location-aware devices, digital cameras, and similar products. It also reveals itself in the myriad of applications involving embedded systems, namely those computing systems that appear in applications such as automobiles, large-scale electronic devices, and major appliances.

The Role of Computer Engineers

Designing computing systems and computing components of products, developing and testing their prototypes, and implementing them to market are examples of what computer engineers would do. Computing systems are components of a wide range of products such as fuel injection systems in vehicles, medical devices such as x-ray machines, communication devices such as cell phones, and household devices such as alarm systems and washing machines. It is through a unique combination of Computer Science and Electrical, Electronics and Communications discipline that the CC student get prepared for careers that deal with computer systems from design through implementation.
The role of computer engineers is to build systems for computers, systems of computers and systems by and with computers for computing, sensing, communication, control, storage, and intelligent processing of information.

Systems for computers as building VLSI chips, data storage, sensors, MEMS, and electronic devices. Systems of computers for example distributed computing, security, networking, etc. And finally systems by/with computers as in the field of design, simulation, signal processing and sensor exploitation, and embedded systems.

Computer engineers continually push the capability and applicability of computers in every industry and every facet of modern life.

**Career Opportunities for Computer Engineers**

Computer engineers are involved in the design of computer-based systems to address highly specialized and specific application needs. Computer engineers work in most industries, including the computer, aerospace, telecommunications, power production, manufacturing, defence, and electronics industries. They design high-tech devices ranging from tiny microelectronic integrated-circuit chips, to powerful systems that utilize those chips and efficient telecommunication systems that interconnect those systems. Applications include consumer electronics (CD and DVD players, televisions, stereos, microwaves, gaming devices) and advanced microprocessors, peripheral equipment, systems for portable, desktop and client/server computing, and communications devices (cellular phones, pagers, personal digital assistants). It also includes distributed computing environments (local and wide area networks, wireless networks, internets, intranets), and embedded computer systems (such as aircraft, spacecraft, and automobile control systems in which computers are embedded to perform various functions). A wide array of complex technological systems, such as power generation and distribution systems and modern processing and manufacturing plants, rely on computer systems developed and designed by computer engineers.

Technological advances and innovation continue to drive Computer Engineering. There is now a convergence of several established technologies (such as television, computer, and networking technologies) resulting in widespread and ready access to information on an enormous scale. This has created many opportunities and challenges for computer engineers. This convergence of technologies and the associated innovation lie at the heart of economic development and the future of many organizations. The situation bodes well for a successful career in computer engineering.

Career opportunities for Computer Engineers cover a whole spectrum of industrial systems and service systems. Industrial systems include Automotive, Aerospace, Apparel, Basic metals, Beverages, Building materials, Chemicals, Computers, Appliances, Electronics, Equipment, Fabricated metals, Food processing, Glass, Ceramics, heavy machinery, Paper, petroleum refining, Pharmaceuticals, Plastics, Power utilities, Publishing, Textiles, Tire and rubber, Wood and furniture. Service Systems include, but are not limited to: Banking, Education, Communications, Financial services, Government, Health and medical, Hotel, Information, Insurance, Repair and maintenance, Restaurant, Retail trade, Transportation, Wholesale trade, Transportation, and Warehousing.
Program Aim and Objectives

The Computer Engineering program at the Arab Academy for Science and Technology and Maritime Transport AASTMT was established in 1994 to prepare graduates for careers in various areas.

The program has been carefully designed and continuously updated according to the engineering criteria 2000 approved by the Accreditation Board for Engineering and Technology (ABET) board of directors on November 1st, 1997. Further improvements have been introduced into the program to match the recommendations by an advisory board form a distinguished group of British universities and institutes, so as to meet the requirements for accreditation by those institutes.

The main objective of the program is to produce and qualify graduate computer engineers that satisfy the following characteristics:

- Possess the ability to design computers and computer-based systems that include both hardware and software to solve novel engineering problems, subject to trade-offs involving a set of competing goals and constraints. In this context, “design” refers to a level of ability beyond “assembling” or “configuring” systems.
- Have a breadth of knowledge in mathematics and engineering sciences, associated with the broader scope of engineering and beyond that narrowly required for the field.
- Acquire and maintain a preparation for professional practice in engineering.
- Demonstrate the ability to design, develop, implement, and improve integrated systems that include people, materials, information, equipment and energy.
- Provide strong ties and linkages between the local economic sectors and industrial communities with the department graduates in areas related to research, hands-on training, and field investigations.

The responsibility of achieving this objective is carried out by computer engineering Faculty and staff experienced in the management of engineering and technical activities.

Program Intended Learning Outcomes (ILOs)

Knowledge and Understanding

On successful completion of the computer engineering program of study, the graduate should be able to demonstrate knowledge and understanding of:

- Basic applied and engineering science, electric and electronic circuits engineering and electrical measurements and measuring instruments.
- Programming concepts, procedural, structured and Object Oriented concepts and different Data Structures.
- Hardware engineering concepts, components and Computer Architecture and organization.
- Understanding the concepts of computer networks and internet and the HW/SW systems and interfacing.
- Understanding the Artificial Intelligence applications and robotics.
- Understanding operating System concepts and different algorithms used in Operating System.
- The key issues of computer engineering such as hardware, software, interfacing, control, networking and Internetworking.
The different analytical and computer methods that can be applied to the various areas of computer engineering.

Intellectual Skills
On completion of the computer engineering program of study, students should be able to:

- Define the engineering problems.
- Select and apply appropriate computer based methods, mathematical and scientific principles for analysing general systems.
- Apply knowledge of mathematics, science, and engineering.
- Design and conduct experiments, as well as to analyze and interpret data.
- Solve a wide range of problems related to the analysis, design, and construction of computing systems.
- Analyze the solution alternatives and choose the optimum one.
- Identify acceptable solutions of problems based on practical engineering constraints.

Practical and Professional Skills
On completion of the computer engineering program of study, students should be able to:

- Plan and undertake a major individual project.
- Prepare and deliver coherent and structured verbal and written technical reports.
- Give technical presentations suitable for the time, place and audience.
- Use the scientific literature effectively and make discriminating use of Web resources.
- Identify, formulate, and solve engineering problems.
- Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- Display an integrated approach to the deployment of communication skills.
- Work effectively with and for others.
- Display personal responsibility by working to multiple deadlines in complex activities.
- Further develop career plans and personal objectives.
Program Planning Sheet

New program structure including the suggested new course titles and codes and comparison between this program and the previous one

Curriculum

The program curriculum provides great flexibility in course selection and offers a broad scientific and engineering base by containing a sequence of courses in mathematics, physics, chemistry, computer and the engineering sciences. These courses are accompanied by computer engineering courses covering the areas of computer architecture, digital system design, data acquisition, microcomputer based design, computer networks, distributed systems, databases, system programming, operating systems, information systems and computing systems analysis and design.

Course Coding

Numbering System

The course code consists of five alphanumeric digits, MN XYZ depending on the nature of the course; whether it is core or elective.
The MN digits: Represent the abbreviations of the subject field.

The X digit: Represents the course level or the year at which the course is offered in the plan of study.

The Y digit: Represents the course group.

The Z digit: Represents the course sequence number within the group.

Abbreviations of Subject Fields

The following abbreviations of subject fields are used in the Degree offered and Graduation Requirements and Course Summary Description sections of this report; and are listed below in an alphabetical order:

- BA – Basic and Applied Science.
- CC – Computer Engineering.
- EE – Electrical Engineering.
- LH – Language, Humanities and Social Science.
- IM – Industrial and Systems Engineering.
- ME – Mechanical Engineering.
- NE – Non-Engineering Courses.

Degree Offered

The program offers the degree of Bachelor of Science (B. Sc.) in Computer Engineering. The candidate for the (B. Sc.) degree is required to pursue scholastic quality and complete a plan of study prepared with his academic advisor and approved by the Computer Engineering Department Council.

The number of credit hours required for graduation is 180 (cr. hr.) spreading over 10 academic semesters. The program contains a sequence of courses that are designed according to the National Academic Reference Standards (NARS) for computer engineering.
Graduation Requirements

College Requirements
A total of 66 credit hours are required by the college as per the following table:

<table>
<thead>
<tr>
<th>Subject Field</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Cr. Hr.</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA</td>
<td>1 BA113</td>
<td>Physics (1)</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2 BA114</td>
<td>Physics (2)</td>
<td>3</td>
<td>BA 113</td>
</tr>
<tr>
<td></td>
<td>2 BA118</td>
<td>Chemistry</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>1 BA123</td>
<td>Mathematics (1)</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2 BA124</td>
<td>Mathematics (2)</td>
<td>3</td>
<td>BA 123</td>
</tr>
<tr>
<td></td>
<td>1 BA141</td>
<td>Engineering Mechanics (1)</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2 BA142</td>
<td>Engineering Mechanics (2)</td>
<td>3</td>
<td>BA 141</td>
</tr>
<tr>
<td></td>
<td>3 BA223</td>
<td>Mathematics (3)</td>
<td>3</td>
<td>BA 124</td>
</tr>
<tr>
<td></td>
<td>4 BA224</td>
<td>Mathematics (4)</td>
<td>3</td>
<td>BA 223</td>
</tr>
<tr>
<td></td>
<td>5 BA323</td>
<td>Mathematics (5)</td>
<td>3</td>
<td>BA224</td>
</tr>
<tr>
<td></td>
<td>6 BA326</td>
<td>Mathematics (6)</td>
<td>3</td>
<td>BA323</td>
</tr>
<tr>
<td>CC</td>
<td>1 CC111</td>
<td>Introduction to Computer</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2 CC112</td>
<td>Structured Programming</td>
<td>3</td>
<td>CC 111</td>
</tr>
<tr>
<td>IM</td>
<td>1 IM111</td>
<td>Industrial Relations</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2 IM112</td>
<td>Manufacturing Technology</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>8 IM400</td>
<td>Practical Training</td>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>8 IM423</td>
<td>Operations Research</td>
<td>3</td>
<td>90 Cr. Hr.</td>
</tr>
<tr>
<td></td>
<td>10 IM535</td>
<td>International Operations Management</td>
<td>3</td>
<td>126 Cr. Hr.</td>
</tr>
<tr>
<td>LH</td>
<td>1 LH131</td>
<td>English (1)</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2 LH132</td>
<td>English (2)</td>
<td>2</td>
<td>LH 131</td>
</tr>
<tr>
<td></td>
<td>3 LH231</td>
<td>English (3)</td>
<td>3</td>
<td>LH 132</td>
</tr>
<tr>
<td>ME</td>
<td>1 ME151</td>
<td>Eng. Drawing and Descriptive Geometry</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td>NE</td>
<td>6 NE 364</td>
<td>Engineering Economy</td>
<td>3</td>
<td>None</td>
</tr>
</tbody>
</table>

College Non Engineering Electives
Two courses (6 Cr. Hr.) from the following list of the college electives

<table>
<thead>
<tr>
<th>NE</th>
<th>Course Title</th>
<th>Cr. Hr.</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 NE 264</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>3 NE 466</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>3 NE 465</td>
<td>3</td>
<td>None</td>
</tr>
</tbody>
</table>

COMPUTER ENGINEERING
Department Requirements
A total of 114 credit hours are required by the department, which are distributed as follows:

- 96 credit hours of compulsory courses.
- A minimum of 18 credit hours of department restricted electives.

The required compulsory and restricted elective courses are listed in the following tables.

<table>
<thead>
<tr>
<th>Subject Field</th>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Cr. Hr.</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC213</td>
<td>Programming Applications</td>
<td>3</td>
<td>CC 112</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC218</td>
<td>Discrete mathematics</td>
<td>3</td>
<td>CC 111</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC215</td>
<td>Data Structure</td>
<td>3</td>
<td>CC 213</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC216</td>
<td>Digital Logic Design</td>
<td>3</td>
<td>CC 111</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC317</td>
<td>Digital Systems Design</td>
<td>3</td>
<td>CC 216</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC319</td>
<td>Advanced Programming</td>
<td>3</td>
<td>CC 215</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC311</td>
<td>Computer Architecture</td>
<td>3</td>
<td>CC 317</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC316</td>
<td>Object-Oriented Programming</td>
<td>3</td>
<td>CC 319</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC341</td>
<td>Digital Electronics</td>
<td>3</td>
<td>EC 238</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC331</td>
<td>Data and Computer Communications</td>
<td>3</td>
<td>EC 320</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC410</td>
<td>Systems Programming</td>
<td>3</td>
<td>CC 319</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC421</td>
<td>Microprocessors Systems</td>
<td>3</td>
<td>CC 311</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC413</td>
<td>Numerical Analysis</td>
<td>3</td>
<td>CC 112, BA 224</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC414</td>
<td>Database Systems</td>
<td>3</td>
<td>CC 319</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC415</td>
<td>Data Acquisition System</td>
<td>3</td>
<td>CC 421</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC416</td>
<td>Computer Graphics</td>
<td>3</td>
<td>CC 319</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC418</td>
<td>Operating Systems</td>
<td>3</td>
<td>CC 410</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC431</td>
<td>Computer Networks</td>
<td>3</td>
<td>CC 331</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC501</td>
<td>Project I</td>
<td>3</td>
<td>S. S.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC511</td>
<td>Artificial Intelligence</td>
<td>3</td>
<td>CC 318, CC 319</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC531</td>
<td>Advanced Networks</td>
<td>3</td>
<td>CC 431</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC502</td>
<td>Project II</td>
<td>6</td>
<td>Project I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CC513</td>
<td>Computing Systems</td>
<td>3</td>
<td>CC 418, CC 421</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EC238</td>
<td>Electronics I</td>
<td>3</td>
<td>EE 231</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EC218</td>
<td>Measurements &amp; Instrumentation</td>
<td>3</td>
<td>EE 231</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EC320</td>
<td>Communications Theory</td>
<td>3</td>
<td>BA 224, EE 231</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EC339</td>
<td>Electronics II</td>
<td>3</td>
<td>EC 238</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EE231</td>
<td>Electrical Circuits I</td>
<td>3</td>
<td>BA124</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EE232</td>
<td>Electrical Circuits II</td>
<td>3</td>
<td>EE 231</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EE328</td>
<td>Electrical Power &amp; Machines</td>
<td>3</td>
<td>EE 232</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EE418</td>
<td>Automatic Control Systems</td>
<td>3</td>
<td>EE328 or EE218</td>
</tr>
</tbody>
</table>

* Senior Standing (Semesters 9 and 10 only).
### Department Restricted Electives

6 courses (18 Cr. Hr.) from the following list of electives

<table>
<thead>
<tr>
<th>Subject</th>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Cr. Hr.</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 412</td>
<td>Computing Algorithms</td>
<td>3</td>
<td>CC 319</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 417</td>
<td>Assembly Language</td>
<td>3</td>
<td>CC 421</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 515</td>
<td>Introduction to Software Engineering</td>
<td>3</td>
<td>CC 319</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 516</td>
<td>Pattern Recognition</td>
<td>3</td>
<td>CC 416</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 517</td>
<td>Modelling &amp; Simulation</td>
<td>3</td>
<td>CC 319, BA 326</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 518</td>
<td>Computer Security</td>
<td>3</td>
<td>CC 319</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 521</td>
<td>Microcomputer Based Design</td>
<td>3</td>
<td>CC 415</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 523</td>
<td>Computer Design and Performance Eval.</td>
<td>3</td>
<td>CC311</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 524</td>
<td>Neural Networks</td>
<td>3</td>
<td>BA 323, CC 112</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 525</td>
<td>Intelligent Robotics</td>
<td>3</td>
<td>CC 319, EE 418</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 527</td>
<td>Computer Aided Design</td>
<td>3</td>
<td>CC 311 or CC 312</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 528</td>
<td>Computer Systems Performance Analysis</td>
<td>3</td>
<td>CC112-CC531</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 529</td>
<td>Distributed and parallel systems</td>
<td>3</td>
<td>CC 431</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 533</td>
<td>Internetwork Programming</td>
<td>3</td>
<td>CC 431</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 535</td>
<td>Internetwork Security</td>
<td>3</td>
<td>CC 431, CC 518</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 537</td>
<td>Computer Forensics</td>
<td>3</td>
<td>Cr. Hrs. 138</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 539</td>
<td>Selected Topics in Networks</td>
<td>3</td>
<td>CC 531</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 540</td>
<td>Computer Systems Engineering</td>
<td>3</td>
<td>Cr. Hrs. 138</td>
</tr>
<tr>
<td>CC</td>
<td>7 – 10</td>
<td>CC 550</td>
<td>Selected topics in Computing</td>
<td>3</td>
<td>Cr. Hrs. 138</td>
</tr>
</tbody>
</table>
# Computer Engineering Academic Program Sheet

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Semester 1</th>
<th>Semester 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 1</td>
<td>BA 113 Physics 1</td>
<td>BA 114 Physics 2</td>
</tr>
<tr>
<td>Semester 1</td>
<td>BA 123 Mathematics 1</td>
<td>BA 118 Chemistry</td>
</tr>
<tr>
<td>Semester 1</td>
<td>BA 141 Engineering Mechanics 1</td>
<td>BA 124 Mathematics 2</td>
</tr>
<tr>
<td>Semester 1</td>
<td>CC 111 Introduction to computer</td>
<td>BA 142 Engineering Mechanics 2</td>
</tr>
<tr>
<td>Semester 1</td>
<td>IM 111 Industrial Relations</td>
<td>CC 112 Structured Programming</td>
</tr>
<tr>
<td>Semester 1</td>
<td>LH 131 English for Special Purposes 1</td>
<td>IM 112 Manufacturing Technology</td>
</tr>
<tr>
<td>Semester 1</td>
<td>ME151 Eng. Drawing &amp; Descriptive Geometry</td>
<td>LH 132 English for Special Purposes 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Semester 3</th>
<th>Semester 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 3</td>
<td>BA 223 Mathematics III</td>
<td>BA 224 Mathematics IV</td>
</tr>
<tr>
<td>Semester 3</td>
<td>CC 213 Programming Applications</td>
<td>CC 215 Data Structure</td>
</tr>
<tr>
<td>Semester 3</td>
<td>CC 218 Discrete Mathematics</td>
<td>CC 216 Digital Logic Design</td>
</tr>
<tr>
<td>Semester 3</td>
<td>EE 231 Electrical Circuits I</td>
<td>EC 218 Measurements &amp; Instrument</td>
</tr>
<tr>
<td>Semester 3</td>
<td>LH 231 Technical Report Writing</td>
<td>EC 238 Electronics I</td>
</tr>
<tr>
<td>Semester 3</td>
<td>NE XXX 1 College elective course</td>
<td>EE 232 Electrical Circuits II</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 3</th>
<th>Semester 5</th>
<th>Semester 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 5</td>
<td>BA 323 Mathematics V</td>
<td>BA 326 Mathematics VI</td>
</tr>
<tr>
<td>Semester 5</td>
<td>CC 317 Digital Systems Design</td>
<td>CC 311 Computer Architecture</td>
</tr>
<tr>
<td>Semester 5</td>
<td>CC 319 Advanced Programming</td>
<td>CC 316 Object-Oriented Programming</td>
</tr>
<tr>
<td>Semester 5</td>
<td>EE 328 Electrical Power &amp; Machines</td>
<td>CC 331 Data and Computer Communications</td>
</tr>
<tr>
<td>Semester 5</td>
<td>EC 339 Electronics II</td>
<td>CC 341 Digital Electronics</td>
</tr>
<tr>
<td>Semester 5</td>
<td>EC 320 Communications Theory</td>
<td>NE 364 Engineering Economy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 4</th>
<th>Semester 7</th>
<th>Semester 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 7</td>
<td>CC 410 Systems Programming</td>
<td>CC 415 Data Acquisition System</td>
</tr>
<tr>
<td>Semester 7</td>
<td>CC 413 Numerical Analysis</td>
<td>CC 416 Computer Graphics</td>
</tr>
<tr>
<td>Semester 7</td>
<td>CC 414 Database Systems</td>
<td>CC 418 Operating Systems</td>
</tr>
<tr>
<td>Semester 7</td>
<td>CC 421 Intro. to Microprocessors</td>
<td>CC XXX Department Restricted Elective</td>
</tr>
<tr>
<td>Semester 7</td>
<td>CC XXX Department Restricted Elective</td>
<td>CC 431 Computer Networks</td>
</tr>
<tr>
<td>Semester 7</td>
<td>EE 418 Automatic Control Systems</td>
<td>IM 400 Practical Training</td>
</tr>
<tr>
<td>Semester 7</td>
<td>IM 423 Operations Research</td>
<td>IM 423 Operations Research</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 5</th>
<th>Semester 9</th>
<th>Semester 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 9</td>
<td>CC 501 Project I</td>
<td>CC 502 Project II</td>
</tr>
<tr>
<td>Semester 9</td>
<td>CC 511 Artificial Intelligence</td>
<td>CC 513 Computing Systems</td>
</tr>
<tr>
<td>Semester 9</td>
<td>CC 531 Advanced Networks</td>
<td>CC XXX Department Restricted Elective</td>
</tr>
<tr>
<td>Semester 9</td>
<td>CC XXX Department Restricted Elective</td>
<td>CC XXX Department Restricted Elective</td>
</tr>
<tr>
<td>Semester 9</td>
<td>CC XXX Department Restricted Elective</td>
<td>IM 535 International Operations Mgt.</td>
</tr>
<tr>
<td>Semester 9</td>
<td>NE XXX 1 College elective course</td>
<td>NE XXX 1 College elective course</td>
</tr>
</tbody>
</table>
### College Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>NE 264</td>
<td>Scientific Thinking</td>
</tr>
<tr>
<td>NE 465</td>
<td>Aesthetics Education and Art Appreciation</td>
</tr>
<tr>
<td>NE 466</td>
<td>Environmental Science and Technology</td>
</tr>
</tbody>
</table>

### Department Restricted Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 412</td>
<td>Computing Algorithms</td>
</tr>
<tr>
<td>CC 417</td>
<td>Assembly Language</td>
</tr>
<tr>
<td>CC 515</td>
<td>Intro. to Software Engineering</td>
</tr>
<tr>
<td>CC 516</td>
<td>Pattern Recognition</td>
</tr>
<tr>
<td>CC 517</td>
<td>Modelling &amp; Simulation</td>
</tr>
<tr>
<td>CC 518</td>
<td>Data Security</td>
</tr>
<tr>
<td>CC 521</td>
<td>Microcomputer Based Design</td>
</tr>
<tr>
<td>CC 523</td>
<td>Comp. Design &amp; Performance Eval.</td>
</tr>
<tr>
<td>CC 524</td>
<td>Neural Networks</td>
</tr>
<tr>
<td>CC 525</td>
<td>Intelligent Robotics</td>
</tr>
<tr>
<td>CC 527</td>
<td>Computer Aided Design</td>
</tr>
<tr>
<td>CC 528</td>
<td>Computer Systems Performance Analysis</td>
</tr>
<tr>
<td>CC 529</td>
<td>Distributed and parallel systems</td>
</tr>
<tr>
<td>CC 533</td>
<td>Internetwork Programming</td>
</tr>
<tr>
<td>CC 535</td>
<td>Internetwork Security</td>
</tr>
<tr>
<td>CC 537</td>
<td>Computer Forensics</td>
</tr>
<tr>
<td>CC 539</td>
<td>Selected Topics in Networks</td>
</tr>
<tr>
<td>CC 540</td>
<td>Computer Systems Engineering</td>
</tr>
<tr>
<td>CC 550</td>
<td>Selected Topics in Computing</td>
</tr>
</tbody>
</table>

### Course Prerequisites

The courses prerequisites are listed in the tables below, which is used by advisors to guide the students through their program of study.
## Prerequisites List – Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Prerequisite</th>
</tr>
</thead>
</table>

### SEMESTER 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 113 Physics 1</td>
<td>None</td>
</tr>
<tr>
<td>BA 123 Mathematics 1</td>
<td>None</td>
</tr>
<tr>
<td>BA 141 Engineering Mechanics 1</td>
<td>None</td>
</tr>
<tr>
<td>CC 111 Introduction to computer</td>
<td>None</td>
</tr>
<tr>
<td>IM 111 Industrial Relations</td>
<td>None</td>
</tr>
<tr>
<td>LH 131 English for Special Purposes 1</td>
<td>None</td>
</tr>
<tr>
<td>BA 118 Chemistry</td>
<td>None</td>
</tr>
</tbody>
</table>

### SEMESTER 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 114 Physics 2</td>
<td>BA 113 Physics 1</td>
</tr>
<tr>
<td>ME151 Eng. Drawing &amp; Projection</td>
<td>None</td>
</tr>
<tr>
<td>BA 124 Mathematics 2</td>
<td>BA 123 Mathematics 1</td>
</tr>
<tr>
<td>BA 142 Engineering Mechanics 2</td>
<td>BA 141 Engineering Mechanics 1</td>
</tr>
<tr>
<td>CC 112 Structured Programming</td>
<td>CC 111 Introduction to Computer</td>
</tr>
<tr>
<td>IM 112 Manufacturing Technology</td>
<td>None</td>
</tr>
<tr>
<td>LH 132 English for Special Purposes 2</td>
<td>LH 131 English for Special Purposes 1</td>
</tr>
</tbody>
</table>

### SEMESTER 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 223 Mathematics III</td>
<td>BA 124 Mathematics 2</td>
</tr>
<tr>
<td>CC 213 Programming Applications</td>
<td>CC 112 Structured Programming</td>
</tr>
<tr>
<td>CC 218 Discrete Mathematics</td>
<td>CC 111 Introduction to Computers</td>
</tr>
<tr>
<td>EE 231 Electrical Circuits I</td>
<td>BA 124 Mathematics 2</td>
</tr>
<tr>
<td>LH 231 Technical Report Writing</td>
<td>LH 132 English for Special Purposes 2</td>
</tr>
<tr>
<td>NE XXX 1 College elective course</td>
<td>None</td>
</tr>
</tbody>
</table>

### SEMESTER 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 224 Mathematics IV</td>
<td>BA 223 Mathematics 3</td>
</tr>
<tr>
<td>CC 215 Data Structure</td>
<td>CC 213 Programming Applications</td>
</tr>
<tr>
<td>CC 216 Digital Logic Design</td>
<td>CC 111 Introduction to computer</td>
</tr>
<tr>
<td>EC 218 Measurements &amp; Instrumentation</td>
<td>EE 231 Electrical Circuits I</td>
</tr>
<tr>
<td>EC 238 Electronics I</td>
<td>EE 231 Electrical Circuits I</td>
</tr>
<tr>
<td>EE 232 Electrical Circuits II</td>
<td>EE 231 Electrical Circuits I</td>
</tr>
<tr>
<td>Course</td>
<td>Prerequisite</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td><strong>SEMESTER 5</strong></td>
<td></td>
</tr>
<tr>
<td>BA 323 Mathematics V</td>
<td>BA 224 Mathematics IV</td>
</tr>
<tr>
<td>CC 317 Digital Systems Design</td>
<td>CC 216 Digital Logic Design</td>
</tr>
<tr>
<td>CC 319 Advanced Programming</td>
<td>CC 215 Data Structure</td>
</tr>
<tr>
<td>EE 328 Electrical Power &amp; Machines</td>
<td>EE 232 Electrical Circuits II</td>
</tr>
<tr>
<td>EC 339 Electronics II</td>
<td>EC 238 Electronics I</td>
</tr>
<tr>
<td>EC 320 Communications Theory</td>
<td>BA 224 Mathematics IV</td>
</tr>
<tr>
<td></td>
<td>EE 231 Electrical Circuits I</td>
</tr>
<tr>
<td><strong>SEMESTER 6</strong></td>
<td></td>
</tr>
<tr>
<td>CC 316 Object-Oriented Programming</td>
<td>CC 319 Advanced Programming</td>
</tr>
<tr>
<td>CC 311 Computer Architecture</td>
<td>CC 317 Digital Systems Design</td>
</tr>
<tr>
<td>NE 364 Engineering Economy</td>
<td>Cr. Hrs. 54</td>
</tr>
<tr>
<td>CC 341 Digital Electronics</td>
<td>EC 238 Electronics I</td>
</tr>
<tr>
<td>CC 331 Data and Computer Communications</td>
<td>EC 320 Communications Theory</td>
</tr>
<tr>
<td>BA 326 Mathematics VI</td>
<td>BA 224 Mathematics IV</td>
</tr>
<tr>
<td><strong>SEMESTER 7</strong></td>
<td></td>
</tr>
<tr>
<td>CC 410 Systems Programming</td>
<td>CC 319 Advanced Programming</td>
</tr>
<tr>
<td>CC 421 Microprocessors Systems</td>
<td>CC 311 Computer Architecture</td>
</tr>
<tr>
<td>CC 413 Numerical Analysis</td>
<td>CC 111 Introduction to computer</td>
</tr>
<tr>
<td></td>
<td>BA 224 Mathematics IV</td>
</tr>
<tr>
<td>CC 414 Database Systems</td>
<td>CC 319 Advanced Programming</td>
</tr>
<tr>
<td>CC XXX Department Restricted Elective</td>
<td>As Designated Below</td>
</tr>
<tr>
<td>EE 418 Automatic Control Systems</td>
<td>BA 323 Mathematics V</td>
</tr>
<tr>
<td><strong>SEMESTER 8</strong></td>
<td></td>
</tr>
<tr>
<td>CC 415 Data Acquisition System</td>
<td>CC 421 Microprocessors Systems</td>
</tr>
<tr>
<td>CC 416 Computer Graphics</td>
<td>CC 319 Advanced Programming</td>
</tr>
<tr>
<td>CC 418 Operating Systems</td>
<td>CC 410 Systems Programming</td>
</tr>
<tr>
<td>CC 431 Computer Networks</td>
<td>CC 331 Data and Computer Communications</td>
</tr>
<tr>
<td>CC XXX Department Restricted Elective</td>
<td>As Designated Below</td>
</tr>
<tr>
<td>IM 400 Practical Training</td>
<td>None</td>
</tr>
<tr>
<td>IM423 Operations Research</td>
<td>Cr. Hrs 90</td>
</tr>
</tbody>
</table>
# Course Prerequisite

## SEMESTER 9

<table>
<thead>
<tr>
<th>Course</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC501</td>
<td>Project I</td>
</tr>
<tr>
<td>CC511</td>
<td>Artificial Intelligence</td>
</tr>
<tr>
<td>CC531</td>
<td>Advanced Networks</td>
</tr>
<tr>
<td>CCXXX</td>
<td>Department Restricted Elective</td>
</tr>
<tr>
<td>NEXXX</td>
<td>1 College elective course</td>
</tr>
<tr>
<td>CC501</td>
<td>Senior Standing</td>
</tr>
<tr>
<td>CC511</td>
<td>CC 218 Discrete Mathematics</td>
</tr>
<tr>
<td></td>
<td>CC 319 Advanced Programming</td>
</tr>
<tr>
<td>CC531</td>
<td>CC 431 Computer Networks</td>
</tr>
<tr>
<td>CCXXX</td>
<td>As Designated Below</td>
</tr>
<tr>
<td>CCXXX</td>
<td>As Designated Below</td>
</tr>
<tr>
<td>NEXXX</td>
<td>None</td>
</tr>
</tbody>
</table>

## SEMESTER 10

<table>
<thead>
<tr>
<th>Course</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC502</td>
<td>Project II</td>
</tr>
<tr>
<td>CC513</td>
<td>Computing Systems</td>
</tr>
<tr>
<td>CCXXX</td>
<td>Department Restricted Elective</td>
</tr>
<tr>
<td>CCXXX</td>
<td>Department Restricted Elective</td>
</tr>
<tr>
<td>IM535</td>
<td>International Operations Mgt.</td>
</tr>
<tr>
<td></td>
<td>CC 501 Senior Project I</td>
</tr>
<tr>
<td></td>
<td>CC 421 Microprocessors Systems</td>
</tr>
<tr>
<td></td>
<td>CC 418 Operating Systems</td>
</tr>
<tr>
<td></td>
<td>As Designated Below</td>
</tr>
<tr>
<td></td>
<td>As Designated Below</td>
</tr>
<tr>
<td></td>
<td>Cr. Hrs 126</td>
</tr>
</tbody>
</table>

YEAR 5
### Prerequisites List – Elective Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>College Electives</strong></td>
<td></td>
</tr>
<tr>
<td>NE 264 Scientific Thinking</td>
<td>None</td>
</tr>
<tr>
<td>NE 465 Aesthetics Education and Art Appreciation</td>
<td>None</td>
</tr>
<tr>
<td>NE 466 Environmental Science and Technology</td>
<td>None</td>
</tr>
<tr>
<td><strong>Department Restricted Electives</strong></td>
<td></td>
</tr>
<tr>
<td>CC 412 Computing Algorithms</td>
<td>CC 319 Advanced Programming</td>
</tr>
<tr>
<td>CC 417 Assembly Language</td>
<td>CC 421 Microprocessors Systems</td>
</tr>
<tr>
<td>CC 515 Intro. to Software Eng</td>
<td>CC 319 Advanced Programming, CC 414 Database Systems</td>
</tr>
<tr>
<td>CC 516 Pattern Recognition</td>
<td>CC 416 Computer Graphics</td>
</tr>
<tr>
<td>CC 517 Modelling &amp; Simulation</td>
<td>CC 319 Advanced Programming, BA 326 Mathematics VI</td>
</tr>
<tr>
<td>CC 518 Data Security</td>
<td>CC 319 Advanced Programming</td>
</tr>
<tr>
<td>CC 521 Microcomputer Based Design</td>
<td>CC 415 Data Acquisition Systems</td>
</tr>
<tr>
<td>CC 523 Comp. Design &amp; Performance Eval.</td>
<td>CC 311 Computer Architecture</td>
</tr>
<tr>
<td>CC 524 Neural Networks</td>
<td>BA 323 Mathematics V, CC 112 Structured Programming</td>
</tr>
<tr>
<td>CC 525 Intelligent Robotics</td>
<td>CC 319 Advanced Programming, EE 418 Automatic Control Systems</td>
</tr>
<tr>
<td>CC 527 Computer Aided Design</td>
<td>CC 311 Computer Architecture, CC 312 Computer Organization</td>
</tr>
<tr>
<td>CC 528 Computer Systems Performance Analysis</td>
<td>CC 112 Structured Programming, CC 531 Local Area Networks</td>
</tr>
<tr>
<td>CC 529 Distributed and parallel systems</td>
<td>CC 431 Computer Networks</td>
</tr>
<tr>
<td>CC 533 Internetwork Programming</td>
<td>CC 431 Computer networks</td>
</tr>
<tr>
<td>CC 535 Internetwork Security</td>
<td>CC 431 Computer networks</td>
</tr>
<tr>
<td>CC 537 Computer Forensics</td>
<td>S.S. Senior Standing (Cr. Hrs. 138)</td>
</tr>
<tr>
<td>CC 539 Selected Topics in Networks</td>
<td>CC 531 Advanced Networks</td>
</tr>
<tr>
<td>CC 540 Computer Systems Engineering</td>
<td>S.S. Senior Standing (Cr. Hrs. 138)</td>
</tr>
<tr>
<td>CC 550 Selected Topics in Computing</td>
<td>S.S. Senior Standing (Cr. Hrs. 138)</td>
</tr>
</tbody>
</table>
## Academic Program Analysis

### YEAR ONE

#### SEMESTER ONE

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Contact Hours</th>
<th>Credit Hours</th>
<th>Prerequisites</th>
<th>MARS Characterization for Engineering by Subject Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Tutorial</td>
<td>Lab</td>
<td>Pre (1)</td>
</tr>
<tr>
<td>BA113</td>
<td>Physics 1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>BA173</td>
<td>Mathematics 1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>BA141</td>
<td>Engineering Mechanics 1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CE111</td>
<td>Introduction to Computers</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>IM111</td>
<td>Industrial Relations</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>LH131</td>
<td>English 1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ME151</td>
<td>Engineering Drawing &amp; Projection</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>14</strong></td>
<td><strong>8</strong></td>
<td><strong>4</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

#### SEMESTER TWO

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Contact Hours</th>
<th>Credit Hours</th>
<th>Prerequisites</th>
<th>MARS Characterization for Engineering by Subject Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Tutorial</td>
<td>Lab</td>
<td>Pre (1)</td>
</tr>
<tr>
<td>BA144</td>
<td>Physics 2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>BA166</td>
<td>Chemistry</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>BA124</td>
<td>Mathematics 2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>BA142</td>
<td>Engineering Mechanics 2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CE112</td>
<td>Structured Programming</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>IM112</td>
<td>Manufacturing Technology</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>LH132</td>
<td>English 2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
<td><strong>6</strong></td>
<td><strong>8</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

---

**COMPUTER ENGINEERING**
### YEAR TWO

#### SEMESTER THREE

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Contact Hours</th>
<th>Credit Hours</th>
<th>Prerequisites</th>
<th>MARS Characterization for Engineering by Subject Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Tutorial</td>
<td>Lab</td>
<td>Pre (1)</td>
</tr>
<tr>
<td>BAZZ3</td>
<td>Mathematics (3)</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>CC213</td>
<td>Programming Applications</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CC216</td>
<td>Discrete Mathematics</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>EE211</td>
<td>Electrical Circuits (1)</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>LH292</td>
<td>English (3)</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>NEXXX</td>
<td>Non Engineering Elective (1)</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>12</td>
<td>10</td>
<td>2</td>
<td>18</td>
</tr>
</tbody>
</table>

#### SEMESTER FOUR

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Contact Hours</th>
<th>Credit Hours</th>
<th>Prerequisites</th>
<th>MARS Characterization for Engineering by Subject Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Tutorial</td>
<td>Lab</td>
<td>Pre (1)</td>
</tr>
<tr>
<td>BAZZ4</td>
<td>Mathematics (4)</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>CC215</td>
<td>Data Structure</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CC216</td>
<td>Digital Logic Design</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>EE211</td>
<td>Measurements and Instrumentations</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>EC238</td>
<td>Electronics (1)</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>EE232</td>
<td>Electrical Circuits (2)</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>12</td>
<td>10</td>
<td>6</td>
<td>18</td>
</tr>
</tbody>
</table>
### YEAR THREE

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Contact Hours</th>
<th>Credit Hours</th>
<th>Prerequisites</th>
<th>NARS Characterization for Engineering by Subject Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Tutorial</td>
<td>Lab</td>
<td>Pre (1)</td>
</tr>
<tr>
<td>BA323</td>
<td>Mathematics (5)</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>CC317</td>
<td>Digital System Design</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CC319</td>
<td>Advanced Programming</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>EC320</td>
<td>Communication Theory</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>EC339</td>
<td>Electronics (2)</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>EE328</td>
<td>Electrical Power &amp; Machines</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>12</td>
<td>10</td>
<td>4</td>
<td>18</td>
</tr>
</tbody>
</table>

### SEMESTER SIX

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Contact Hours</th>
<th>Credit Hours</th>
<th>Prerequisites</th>
<th>NARS Characterization for Engineering by Subject Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Tutorial</td>
<td>Lab</td>
<td>Pre (1)</td>
</tr>
<tr>
<td>BA326</td>
<td>Mathematics (6)</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>CC311</td>
<td>Computer Architecture</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CC316</td>
<td>Object Oriented Programming</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CC331</td>
<td>Data and Computer Communications</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CC341</td>
<td>Digital Electronics</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>NE364</td>
<td>Engineering Economy</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>12</td>
<td>10</td>
<td>8</td>
<td>18</td>
</tr>
</tbody>
</table>
## YEAR FOUR

### SEMESTER SEVEN

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Contact Hours</th>
<th>Credit Hours</th>
<th>Prerequisites</th>
<th>MARS Characterization for Engineering by Subject Area</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Lab</td>
<td>Pre (1)</td>
<td>Pre (2)</td>
<td>A</td>
</tr>
<tr>
<td>CC410</td>
<td>Systems Programming</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>CC319</td>
</tr>
<tr>
<td>CC413</td>
<td>Numerical Analysis</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>CC112</td>
</tr>
<tr>
<td>CC414</td>
<td>Database Systems</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>CC319</td>
</tr>
<tr>
<td>CC421</td>
<td>Microprocessors Systems</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>CC311</td>
</tr>
<tr>
<td>CCXXX</td>
<td>Department Restricted Elective</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>Designer</td>
</tr>
<tr>
<td>EE415</td>
<td>Automatic Control Systems</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>328 or EE2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>12</td>
<td>2</td>
<td>6</td>
<td>18</td>
</tr>
</tbody>
</table>

### SEMESTER EIGHT

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Contact Hours</th>
<th>Credit Hours</th>
<th>Prerequisites</th>
<th>MARS Characterization for Engineering by Subject Area</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lecture</td>
<td>Lab</td>
<td>Pre (1)</td>
<td>Pre (2)</td>
<td>A</td>
</tr>
<tr>
<td>CC415</td>
<td>Data Acquisition Systems</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>CC421</td>
</tr>
<tr>
<td>CC416</td>
<td>Computer Graphics</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>CC319</td>
</tr>
<tr>
<td>CC418</td>
<td>Operating Systems</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>CC410</td>
</tr>
<tr>
<td>CC431</td>
<td>Computer Networks (1)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>CC331</td>
</tr>
<tr>
<td>CCXXX</td>
<td>Department Restricted Elective</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>Designer</td>
</tr>
<tr>
<td>M400</td>
<td>Practical Training</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td>M423</td>
<td>Operations Research</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>30 Cr Hr</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>10</td>
<td>6</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>
## YEAR FIVE

### SEMESTER NINE

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Contact Hours</th>
<th>Credit Hours</th>
<th>Prerequisites</th>
<th>NARS Characterization for Engineering by Subject Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC501</td>
<td>Senior Project (1)</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>3 S.S. None</td>
</tr>
<tr>
<td>CC511</td>
<td>Artificial Intelligence</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3 CC210 CC319</td>
</tr>
<tr>
<td>CC531</td>
<td>Computer Networks (2)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3 CC431 None</td>
</tr>
<tr>
<td>CCXXX</td>
<td>Department Restricted Elective</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3 Designated None</td>
</tr>
<tr>
<td>CCXXX</td>
<td>Department Restricted Elective</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3 Designated None</td>
</tr>
<tr>
<td>MEXXX</td>
<td>Non Engineering Elective (2)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3 None None</td>
</tr>
</tbody>
</table>

| Total  |                                      | 10            | 10           | 8             | 15 Total                                             |

### SEMESTER TEN

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Contact Hours</th>
<th>Credit Hours</th>
<th>Prerequisites</th>
<th>NARS Characterization for Engineering by Subject Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC502</td>
<td>Senior Project (2)</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>6 CC501 None</td>
</tr>
<tr>
<td>CC513</td>
<td>Computing Systems</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3 CC410 CC421</td>
</tr>
<tr>
<td>CCXXX</td>
<td>Department Restricted Elective</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3 Designated None</td>
</tr>
<tr>
<td>CCXXX</td>
<td>Department Restricted Elective</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3 Designated None</td>
</tr>
<tr>
<td>ME535</td>
<td>International Operations Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3 126 Credit</td>
</tr>
</tbody>
</table>

| Total  |                                      | 8             | 10           | 4             | 15 Total                                             |

## COMPUTER ENGINEERING
# Program Analysis by Semester Offering

<table>
<thead>
<tr>
<th>Semester</th>
<th>Contact Hours per Week</th>
<th>NARS Characterization for Engineering</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lecture</td>
<td>Tutorial</td>
<td>Lab</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>12</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>12</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td>12</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Grand Total</td>
<td>122</td>
<td>96</td>
<td>60</td>
</tr>
<tr>
<td>Percentage</td>
<td>44%</td>
<td>35%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Table 1: Distribution of contact hours by semester

![Figure 1: Distribution of contact hours by semester](image-url)
Figure 2: Percentage of contact hours by semester

Figure 3: Distribution of total contact hours.
Figure 4 Distribution of Credit Hours over the NARS Characteristics by Semester.

Figure 5 Percentage of Credit Hours over the NARS Characteristics by Semester.
Program Analysis by Subject Field

<table>
<thead>
<tr>
<th>Semester</th>
<th>Contact Hours per Week</th>
<th>MARS Characterization for Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lecture</td>
<td>Tutorial</td>
</tr>
<tr>
<td>BA</td>
<td>22</td>
<td>16</td>
</tr>
<tr>
<td>CC G0</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>CC G1</td>
<td>46</td>
<td>28</td>
</tr>
<tr>
<td>CC GE</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>EE</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>ME</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>LH</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>ME</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>EC</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Grand To</td>
<td>122</td>
<td>96</td>
</tr>
<tr>
<td>Percenta</td>
<td>44%</td>
<td>35%</td>
</tr>
</tbody>
</table>

Figure 6 Distribution of Total Credit Hours.
Figure 7 Distribution of Contact Hours by Subject Field.

Figure 8 Contact Hours Percentage by Subject Field.
Figure 9: Distribution of Contact Hours by Subject Field.

Figure 10: Percentage of CC Courses Total Contact Hours per Week.
Figure 11: Percentage of Total Contact Hours by CC Course Group.

Figure 12: Distribution of Credit Hours by Subject Field.
Figure 13: Credit hour percentage by subject field.

Figure 14: Distribution of Total Credit Hours by Subject Field.
Figure 15: Distribution of Total Credit Hours by Subject Field.

Figure 16: Distribution of Total CC Courses Credit Hours.
Comparison with Previous Program

Changes to Previous Program
The previous Computer Engineering program has been modified to meet the requirements of the IET professional institute (part of the British Professional Institutes) and more importantly to satisfy the requirements of the Supreme Council of Egyptian Universities. The changes were carried in harmony with the IEEE computer engineering curriculum report 2006.

### Computer Engineering courses

<table>
<thead>
<tr>
<th>Old Courses</th>
<th>New Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>Title</td>
</tr>
<tr>
<td>EC 230</td>
<td>Solid State Electronics</td>
</tr>
<tr>
<td>EC 326</td>
<td>Systems 1</td>
</tr>
<tr>
<td>EE 419</td>
<td>Modern Control</td>
</tr>
<tr>
<td>CC 318</td>
<td>Discrete Mathematics</td>
</tr>
<tr>
<td>CC 411</td>
<td>Int. To Microprocessors</td>
</tr>
<tr>
<td>CC 512</td>
<td>Networks I</td>
</tr>
<tr>
<td>CC 514</td>
<td>Networks II</td>
</tr>
</tbody>
</table>

**NEW COURSE**
- CC 331 Data and Computer Communications
- CC 528 Computer Systems Performance Analysis
- CC 529 Distributed and Parallel Systems
- CC 533 Internetwork Programming
- CC 535 Internetwork Security
- CC 537 Computer Forensics
- CC 539 Selected Topics in Networks
- CC 540 Computer Systems Engineering
- CC 550 Selected Topics in Computing
Courses Summary Description

Brief description of all courses that including the number of credit hours and prerequisites.

Basic and Applied Science (BA)

BA 113 – Physics (1)
Cr.3. Prerequisite: None

Introduction to static electricity and Coulomb’s law - Introduction to static electricity and coulomb’s law - Electric field. - Electric potential. – Capacitors - Electric current, ohm’s law resistors in series and parallel - Kirchhoff’s rule - Introduction to theory of magnetism and different applications - Electromagnetic induction - Optics and waves (nature of light, properties of light waves) - Young’s double slit ‘polarization of light waves.

BA 114 – Physics (2)
Cr.3. Prerequisite: BA113

Introduction to thermodynamics - Reversibility and reversible work - First law of thermodynamics’ Non-flow equation - Steady flow equation - Working Fluid (steam, perfect gas) - Reversible processes.(constant volume, constant pressure, constant temperature, adiabatic) - Reversible process (polytropic) - Second law of thermodynamics - Heat transfer.

BA 118 - Chemistry
Cr.2. Prerequisite: None

Electrochemical reactions and cells, volumetric analysis (practical) - Principles of corrosion, titrate technique, determine of acidity (practical) - Metals and corrosive environments, determine of alkalinity and chloride (practical) - Forms of corrosion uniform, galvanic and differential aeration cell, determination of hardness (practical) - Pitting, stress corrosion cracking and intergranular corrosion forms, determination of dissolved oxygen (practical) - Atmospheric and erosion corrosion, spectrophotometer analysis (practical) - Coating and inhibitors as protection methods, determination of nitrite and nitrate (practical) - Cathodic protection, determination of phosphate and silica (practical) - Classification of fuel, properties of liquid fuel, determination of some heavy metals (practical) - Combustion of fuel, determination of fluorine and chlorine (practical) - Air supply and exhaust gases, determination of turbidity (practical) - Classification of lubricants advantages and disadvantages of different types, oil analysis determination of viscosity and T.B.N (practical) - Properties of lubricants and additives, determination of insoluble and saltwater (practical) - Nature of impurities in water, soft and hard water effect of using impure water on
boilers performance, determination of acidity and water content (practical) - Water treatment, determination of ph (practical) - Air and water pollution, determination of TDS and salinity (practical).

**BA 123 – Mathematics (1)**
*Cr.3. Prerequisite: None*

Basic techniques and rules of differentiation - Trigonometric function: properties, basic identities and their derivatives - Inverse of trigonometric and their derivatives - Logarithmic functions: their properties, basic identities and derivatives - Exponential functions: their properties, basic identities and derivatives - Derivative of hyperbolic functions and their inverse - Parametric differentiation and implicit differentiation - The N\textsuperscript{th} derivative - L’ Hopital rule - Partial differentiation - Maclaurin’s expansion. - Physical application - Curve sketching - Conic sections - General revision.

**BA 124 – Mathematics (2)**
*Cr.3. Prerequisite: BA123*

Definition of indefinite integrals and table of famous integrals - Simple rules of integration and the fundamental theorem of calculus - Fundamental theorem of calculus and integration by parts - Integration by parts and integration of rational functions - Integration of rational functions - Integration of trigonometric powers - Trigonometric substitution and 7\textsuperscript{th} week exam - Integration of quadratic forms and the reduction formulas - Definite integration - Area and volume - Area, volume and length of curve - Average of a function, numerical integration - Matrix Algebra - Solution of systems of linear equations.

**BA 141 – Engineering Mechanics (1)**
*Cr.3. Prerequisite: None*


**BA 142 – Engineering Mechanics (2)**
*Cr.3. Prerequisite: BA141*

Kinematics of a particle – Rectilinear Kinematics - Curvilinear Motion –Projectile Motion - Force & Acceleration (Kinetics) - Work & Energy of a particle (Kinetics) - Rotation of a Rigid Body about a fixed Axis - General Plan Motion - Relative Motion (Velocity) - Relative Motion (Acceleration) - Planar Kinetics of Rigid Body – Equation of Translation Motion - Equation of Rotational Motion - Equation of General Plane Motion - Work and Energy.

**BA 223 – Mathematics (3)**
*Cr.3. Prerequisite: BA124*

Solving first order differential equations: Separable of variables and Homogeneous equation - Solving first order differential equations: Exact and Linear equations - Solving first order differential equations: Bernoulli’s equation and revision on first order differential equations - Solving second order homogeneous differential equations with constant coefficients, method of undetermined coefficients - Solving second order non-homogeneous differential equations with constant coefficients, method of variation of parameters - Continue method of variation of parameters,
solving second order differential equations with variable coefficients (Euler's equation), Laplace transform: Basic definition, First shifting theorem, Laplace transform: Transform differentiation and integration, Unit step function, second shifting theorem, and convolution theorem - Inverse Laplace transforms - Solving differential equations by using Laplace transform - Fourier series: Fourier series for functions of period 2P - Fourier series for even and odd functions - Fourier series for harmonic functions.

BA 224 – Mathematics (4)
Cr.3. Prerequisite: BA223


BA 323 – Mathematics (5)
Cr.3. Prerequisite: BA 224


BA 326 – Mathematics (6)
Cr.3. Prerequisite: BA 124

Computer Engineering (CC)

CC 111 – Introduction to Computers
Cr.3. Prerequisite: None


CC 112 – Structured Programming
Cr.3. Prerequisite: CC 111

Overview of Programming and Problem Solving - C Syntax and Semantics - I/O Formatting and Arithmetic - Conditions and Logical Expressions - Selection Control Structures - Repetitions (Part 1) - Repetitions (Part 2) - Functions (Part 1) - Functions (Part 2) - Arrays (Part 1) - Arrays (Part 2) - Programming applications – problem solving Tech (Part 1) - Programming applications – problem solving Tech (Part 2).

CC 114 – Introduction to programming
Cr.3. Prerequisite: CC 111

Introducing variables, memory concepts and arithmetic - Illustrating application example - Introducing algorithms, pseudocode, program control, checkboxes and dialogs - Sample applications - Introducing the Do While…Loop and Do Until…Loop Repetition Statements - Introducing the Do …Loop While and Do …Loop Until Repetition Statements - Introducing the For … Next Repetition Statement - Introducing the Select Case Multiple-Selection Statement - Introducing One-Dimensional Arrays - Introducing Two-Dimensional Arrays - Two-Dimensional Arrays Application - General Application - Functions and Procedures - Fibonacci Application - Students projects.

CC 213 – Programming Applications
Cr.3. Prerequisite: CC 112


CC 215 – Data Structures
Cr.3. Prerequisite: CC 213

Difference between static data type and dynamic data types - the concept of pointers & dynamic memory allocation - programming practice using dynamic structures.
CC 216 – Digital Logic Design  
*Cr. 3. Prerequisite: CC 111*

Number systems - binary arithmetic and codes - logic gates - Boolean algebra and logic simplifications - Design and realization of combinational circuits - Functions of combinational circuits logic - Flip-Flops - analysis design and realization of counters - analysis and realization of shift registers - Computer aided engineering.

CC 218 – Discrete Mathematics  
*Cr. 3. Prerequisite: CC 216*


CC 243 – Introduction to Computer Organization*  
*Cr. 3. Prerequisite: CC 216*


CC 311 – Computer Architecture  
*Cr. 3. Prerequisite: CC 317*


CC 312 – Computer Organization*  
*Cr. 3. Prerequisite: CC 216*


*Offered only to the department of computer science

*Offered only to other departments*
CC 316 – Object Oriented Programming  
*Cr.3. Prerequisite: CC 319*  

CC 317 – Digital System Design  
*Cr.3. Prerequisite: CC 216*  

CC 319 – Advanced Programming  
*Cr.3. Prerequisite: CC 215*  

CC 331 – Data and Computer Communications  
*Cr.3. Prerequisite: EC 320*  
The goal of the course is to provide a background and context for the concept of computer networks. The broad range of topics that are encompassed in the field of data and computer communications is introduced, and the fundamental concepts of protocols and protocol architectures are examined. Also the course deals with the fundamental concepts of signal, medium, and encoding. Also deals with other aspects of data communications: reliability and efficiency. Error detection and correction in case of errors during transmission will be covered. A variety of multiplexing techniques can be used to provide for efficient use of the medium. Transmission media is discussed included guided and unguided media. Signal encoding techniques are discussed. Data ink control protocols are studied.

CC 341 – Digital Electronics  
*Cr.3. Prerequisite: EC 238*  
Understanding Pulse Fundamentals - working with diodes, transistors and analyzing their circuits - design of diodes and transistors circuits - design and analysis of DTL, TTL and CMOS circuits.

CC 410 – Systems Programming  
*Cr.3. Prerequisite: CC 319*  
Introduction to system programming - machine architecture - machine language - assembly language - two pass assemblers - one pass assemblers - macro facilities - conditional macros - macro processors – loaders – linkers - introduction to formal languages - compilers and interpreters.
CC 411 – Introduction to Microprocessors*
Cr.3. Prerequisite: CC 312 or CC 216

Microprocessors and microcomputers - Microcomputer structure – microprocessor – memory - buses (synchronous and asynchronous) - I/O - 16/32-bit microprocessor architecture - Instruction cycle – microinstructions - micro-programming - instruction decoding - Reduced Instruction Set computer (RISC) architecture - Complex Instruction Set computer (CISC) architecture - Memory (RAM, ROM, memory mapping of I/O) - I/O (parallel and serial I/O interfaces, system clock, clock phases and bit rates) - Interrupts (types, handling of interrupts) - Software aids (text editors and assemblers, linkers and macro-assemblers).

CC 412 – Computing Algorithms
Cr.3. Prerequisite: CC 319

Analyze the asymptotic performance of algorithms - demonstrate a familiarity with major algorithms and data structures - synthesize efficient algorithms in common engineering design situations.

CC 413 – Numerical Analysis
Cr.3. Prerequisite: CC 112

Introduction to numerical methods and their applications - solve science and engineering problems - convergence - error analysis of numerical methods.

CC 414 – Database systems
Cr.3. Prerequisite: CC 319

Relational Database analysis – design - normalization and implementation - implementation skills using Oracle developer - Concurrent transactions - Distributed databases and client server approach.

CC 415 – Data Acquisition Systems
Cr.3. Prerequisite: EC 411

Data Acquisition - Definitions & Applications - Data Acquisition channel structure components - Sensors and Transducers: Types, applications and structural classifications - Signal conditioning - Amplifications reshaping – filtration - Data conversion: principles, devices and limitations - Introduction to data Analysis and elementary control - Case studies - Student Projects.

CC 416 – Computer Graphics
Cr.3. Prerequisite: CC 319

History and survey of graphics applications - Overview of graphics systems and output devices - Output primitives including points, lines, circles, splines, area filling, and character generation - Attributes of output primitives -two dimensional transformations - windowing and clipping. Interactive input methods - Introduction to three-dimensional graphics.

* Offered only to other departments
CC 417 – Assembly Language
Cr.3. Prerequisite: CC 421

Introduction to 8086 instructions & directories - Assembly language fundamentals - Input/Output operations - conditional processing – Arithmetic - string processing - disk storage - file processing - terminate and stay resident programs (TSRs) - The course includes a project.

CC 418 – Operating Systems
Cr.3. Prerequisite: CC 410

Introduction to modern operating systems - the concepts, structure, design principles, implementation issues, and mechanisms of operating systems.

CC 421 – Microprocessors Systems
Cr.3. Prerequisite: CC 311

Microprocessors and microcomputers - Microcomputer structure – microprocessor – memory - buses (synchronous and asynchronous) - I/O - 16/32-bit microprocessor architecture - Instruction cycle – microinstructions - micro-programming - instruction decoding - Reduced Instruction Set computer (RISC) architecture - Complex Instruction Set computer (CISC) architecture - Memory (RAM, ROM, memory mapping of I/O) - I/O (parallel and serial I/O interfaces, system clock, clock phases and bit rates) - Interrupts (types, handling of interrupts) - Software aids (text editors and assemblers, linkers and macro-assemblers).

CC 431 – Computer Networks
Cr.3. Prerequisite: CC 331

Introduction – Computer Networks and the Internet – Networking protocol layers OSI and TCP/IP. Application Layer Principles of net applications, web and HTTP, FTP, electronic mail, DNS and Peer to Peer applications. Transport layer, Multiplexing and demultiplexing, Connectionless Transport and UDP –reliable data transfer and connection oriented transport TCP, congestion control. Network layer forwarding and routing, IP protocol, routing algorithms, Broadcast and Multicast routing. Data Link layer, introduction and services, error detection and correction techniques, Multiple access protocols and Link layer addressing, Ethernet and PPP.

CC 442 – Digital Design and Introduction to Microprocessor*
Cr.3. Prerequisite: CC 112

Number systems - binary arithmetic and codes - logic gates - Boolean algebra and logic simplifications - Design and realization of combinational circuits - Functions of combinational circuits logic - Flip-Flops - analysis design and realization of counters – Computer aided engineering - Introduction to microprocessor(part 1).

CC 511 – Artificial Intelligence
Cr.3. Prerequisite: CC 218 - CC319

History and Goals – Representation and search – Knowledge based systems – Logic (Propositional and Predicate) as a representation language – Prolog as an example of an AI language.

* Offered only to other departments
CC 513 – Computing Systems
Cr.3. Prerequisite: CC 418 – CC 421

High performance computing – ILP - RISC architecture - Memory hierarchy – Pipelining - Vector processing - Array processing - Massively parallel processors - Multiprocessor architecture - Data flow computers - VLSI computing and Systolic arrays.

CC 515 – Introduction to Software Engineering
Cr.3. Prerequisite: CC 319

Introduction to software engineering disciplines with emphasis on software life cycle - project management – verification - validation and testing of software.

CC 516 – Pattern Recognition
Cr.3. Prerequisite: CC 416

Smoothing operations - edge detection algorithms - the connected component methodology - shape detection and morphological operations - statistical decision - other paradigms in pattern recognition include hierarchical and partitional clustering - feed-forward and feed-backward neural networks.

CC 517 – Modelling and simulation
Cr.3. Prerequisite: CC319 – BA326

Review of Probability, random variables and distributions - random Processes - discrete and continuous markov Processes - queuing systems - stochastic petri nets - computer generation of random numbers - simulation of an M/M/1 queuing system.

CC 518 – Data Security
Cr.3. Prerequisite: CC 319

Goals of data security – classical encryption techniques – encryption standards – internet security issues for e-mail, e-commerce and firewall.

CC 521 – Micro-Computer Based Design
Cr.3. Prerequisite: CC 415

Comparing between microprocessor and micro-controllers - Programming of micro-controllers embedded systems - Design a plan for micro-based system - dealing with different hardware interfaces including ADC, DAC, serial communication and control circuits.

CC 523 – Computer Design and Performance Evaluation
Cr.3. Prerequisite: CC 311

Comparison between the two major design methodologies based on ISA (Instruction Set Architecture) and ASA (Application Specific Architecture) - The course covers the topics of queuing theory and Markov processes as a tool for computer system performance evaluation - The students are introduced to operational analysis techniques regarding performance of computer systems.
CC 524 – Neural Networks  
*Cr.3. Prerequisite: CC 112 – BA 323*


CC 525 – Intelligent Robotics  
*Cr.3. Prerequisite: CC 319 – EE 418*


CC 527 – Computer Aided Design  
*Cr.3. Prerequisite: CC 311 or CC 312*

To introduce fundamental algorithms and techniques for computer aided integrated circuit design - covers aspects of design flow - physical design - logic optimization - timing analysis and verification - synthesis for testability.

CC 528 – Computer Systems Performance Analysis  
*Cr.3. Prerequisite: CC112 - CC 531*

The purpose of this course is to introduce the student to the principles and techniques of performance measurement in the analysis of computer systems. Such techniques are used to detect bottlenecks, measure the efficiency of computer systems and applications. The student will be introduced to performance measurement techniques, basic principles of queuing theory, experimental design, among others. The student will be expected to do individual assignments. Assignments are to be done individually. The course will consist of both lectures and class discussions.

CC 529 – Distributed and Parallel Systems  
*Cr.3. Prerequisite: CC 431*

This course studies the fundamental aspects of distributed systems and applications. Early foundations and recent developments in distributed systems will be investigated. Both client-server and peer-to-peer application designs will be discussed. Other topics include sockets, reliability, replication, group membership protocols, clock synchronization, and logical timestamps.

CC 531 – Advanced Networks  
*Cr.3. Prerequisite: CC 431*

The course emphasizes topics of fundamental importance concerning the technology and architecture of networks. It highlights various networks protocols and standards and discusses wireless, mobile and adhoc networks, internetworking and interoperability. Students measure networks performance and study their realizations using the available networking facilities.
CC 533– Internetwork Programming  
Cr.3. Prerequisite: CC 431

The course is about the exploration of internet implementation as a network of embedded computing systems. Internetworking skills for design and implementation of hardware and embedded software internet products.

CC 535– Internetwork Security  
Cr.3. Prerequisite: CC 431


CC537 - Computer Forensics  
Cr.3. Prerequisite: Senior Standing

Conducting a computer forensics investigation- Examining the layout of a network- Finding hidden data- Capturing images- Identifying, collecting, and preserving computer evidence- Understanding encryption and examining encrypted files- Documenting the case- Evaluating common computer forensic tools- Presenting and analysing computer evidence.

CC539 - Selected Topics in Networks  
Cr.3. Prerequisite: CC531

Selected Topics in Networks - Wireless Networking - Mobile Networks – Sensor Networks – Content-Based Networking – Autonomic Networks - Network Optimization.

CC540 - Computer Systems Engineering  
Cr.3. Prerequisite: Senior Standing

The course is an integration of key topics from algorithms, computer architecture, operating systems, compilers, and software engineering, in one unified framework. Building a general-purpose computer system from the ground up. Techniques in the design of modern hardware and software systems, and major trade-offs and future trends are introduced. Throughout the course, many cross-section views of the computing field, from the bare bone details of switching circuits to the high level abstraction of object-based software design are presented.

CC 550– Selected Topics in Computing  
Cr.3. Prerequisite: CC 311

Fundamental concepts and issues related to the design and analysis of advanced computing which includes multithreaded, parallel, and distributed computing. This course introduces a discussion of programming techniques, applications, implementations, and performance issues. In addition, selected topics from the following list will also be covered: load balancing, task scheduling, fault-tolerance, coordination & agreement, distributed objects & remote invocation, and distributed transactions & concurrency control. It also gives an introduction to real-time systems, reconfigurable computing, and some advanced topics.
The Training and Senior Project

**IM 400 – Practical Training**  
*C.0. Prerequisite: None.*

This course is a non-credit course and is a college graduation requirement. Students are asked to undertake a minimum of four weeks of practical training in off-campus sites recommended by the college and the department in order to pass this course. Students are required to submit a recognition letter from the site where they received their training; in addition, a report and a presentation are submitted. Course is a Pass/Fail course.

**CC 501 – Senior Project I**  
*C.3. Prerequisite: Senior Standing – Completion of 138 Credit Hours and a GPA of at least 2.00.*

Application-oriented project to show competence in major academic area. Where, an independent research project is conducted under the guidance of a faculty member in the Department of Industrial and Systems Engineering. The research should contribute to the advancement of knowledge in the field. Written report and formal presentation are required.

**CC 502 – Senior Project II**  
*C.6. Prerequisite: CC 501*

Application-oriented project to show competence in major academic area. Where, an independent research project is conducted under the guidance of a faculty member in the Department of Industrial and Systems Engineering. The research should contribute to the advancement of knowledge in the field. Written report and formal presentation are required.
Electronics and Communication Engineering (EC)

EC 218 – Measurements & Instrumentations
Cr.3. Prerequisite: EE 231

Measurements of errors- Accuracy- Precision- Resolution- Sensitivity. Statistical analysis (Mean Deviation- Standard Deviation- and Variance). Units and standards of measurement. Electromechanical indicating instruments. Analog Instruments (DC Ammeter (Ayrton Shunt)- DC Voltmeter- Ohmmeter (Series type- Shunt Type)- AC- Instruments with Rectifiers (full wave and half wave rectifiers)- Bridge measurements (AC Bridges(Maxwell bridge- wien bridge- Schering bridge)- DC Bridges(Wheatstone bridge))- Digital instruments for measuring True RMS Voltmeter- Q-meter- oscilloscope techniques.

EC 238- Electronics (1)
Cr.3. Prerequisite: EE231

Semiconductors - p-n junction - diode current components - junction capacitance - junction diode as a circuit element - special p-n junctions - bipolar junction transistor and field effect transistor: structure- operation – I-V characteristics - large and small analysis.

EC 320 - Communication Theory
Cr.3. Prerequisite: BA 224 – EE 231

Introduction to communication theory. Review of Fourier series and Fourier transform as a mathematical tool for spectral analysis. Concept of power and energy spectral densities and correlation between waveforms. Transmission through linear filters and channels. Hilbert transform and Amplitude Modulation techniques.

EC 339- Electronics (2)
Cr.3. Prerequisite: EC 238

Electronic amplifier theory- power amplifiers- Differential amplifiers- Operational amplifiers filters and Oscillators.
Electrical Engineering (EE)

EE 231 – Electrical Circuits (1)
Cr.3. Prerequisite: BA 124


EE 232 – Electrical Circuits (2)
Cr.3. Prerequisite: EE 231

AC series circuit and series response revision, parallel circuit and Δ to Y-simplification—Source transformation, superposition the node voltage method and the mesh current method—Thevenin’s theorem—Complex power and maximum power calculations—Three phase voltage sources—Analysis of the balanced wye-wye circuit—Analysis of the wye delta & delta wye circuit and delta-delta circuit—Complex power calculation in three phase—Unbalanced and four wire three phase loads—Unbalanced Y loads with neutral (wire disconnected) or having Zo—Inductances and capacitors, series-parallel combinations—The natural response for R-L circuit—The natural response of R-C circuit—General solution of step response of R-L and R-C circuit—Sequential switching.

EE 328 – Electrical Power and Machines
Cr.3. Prerequisite: EE 232

Magnetic circuits and their basic relations—Core loss and transformer basic—Transformer model and voltage regulation—Transformer rating and testing—The law of motor and generator action—construction of dc machines—DC motors characteristics and applications—DC generators characteristics and applications—AC rotating fields and theory of 3-phase induction machines—Circuit model and variable speed drives—Synchronous motors and generators—Single-phase and small motors—The electric power system and energy sources—Pollution problems and plant distribution systems—Switches and circuit breakers—system voltage and motors—System protection and power factor correction.

EE 418 – Automatic Control Systems
Cr.3. Prerequisite: EE 218 OR EE 328

Language, Humanities and Social Science (LH)

LH 131 – English (1)
Cr.2. Prerequisite: None

This course aims at enhancing learner’s four language skills, improving their general and technical lexical repertoire and preparing them to communicate their ideas effectively. The course is also designed to train learners to follow the principles and stages of the writing process and write academic paragraphs.

LH 132 – English (2)
Cr.2. Prerequisite: LH131

This course aims at enabling learners to decode technical discourse in English with ease and precision. The course is also designed to enhance the learners’ oral production and academic writing.

LH 231 – English (3)
Cr.3. Prerequisite: LH132

This course aims at enhancing learners’ writing skills in order to write academic essays and reports following international standards. The course also includes a component on oral presentations of report.
**Industrial and Systems Engineering (IM)**

**IM 111 – Industrial Relations**  
*Cr.2. Prerequisite: None*


**IM 112 – Manufacturing Technology**  
*Cr.2. Prerequisite: None*


**IM 423 – Operations Research**  
*Cr.3. Prerequisite: 90 Credit Hours.*

Introduction to linear programming – Development of linear programming models – The graphical and simplex method – Transportation and assignment methods – Network models and analysis (minimal spanning tree, shortest route, and maximal flow) – Critical path method – Probabilistic approach, project evaluation and review technique (PERT) – Project crashing.

**IM 535 – International Operations Management**  
*Cr.3. Prerequisite: 126 Credit Hours.*

Mechanical Engineering (ME)

ME 151 – Engineering Drawing and Projection
Cr.2. Prerequisite: None

Drawing practices and techniques (Exercises on geometrical construction) - Methods of object projection (Exercises on geometrical construction – Exercises on object projection) - Orthogonal projection (Exercises on orthogonal projection) - Missing views, dimensioning and free hand sketching (Exercises on projection and free hand sketching) - Sectioning and conventions (Exercises on sectional views) - Intersection of geometrical surfaces and development (Exercises in intersection of geometrical surfaces and development) - Standard metal sections and metal structures (Exercises on metal structures) - Compound metal sections and welds (Exercises on metal structures) - Isometric projection & Surface intersections (Exercises on Isometry and surface intersections) - Perspective projection (Exercises on Perspective projection) - Computer Aided drafting using AutoCAD (General Introduction) - Drawing and editing commands in AutoCAD - Writing texts, Dimensioning and viewing commands.
Non-Engineering (NE)

**NE 264 – Scientific Thinking**  
*C.3. Prerequisite: None*

Thinking Patterns Development - Nature and postulates of scientific thinking - Meaning and objective of Science - Scientific values and directions - Science, non-science and other-than science - Engineering and Technology - Properties of science - Mental operations used in science and Scientific Guessing - Types of deductions and Representation - Research methods in natural sciences: definitions, Experiments, Observations, Scientific postulates and their conditions - Verification of scientific postulates - General methods of problems solving - Creative and critical Thinking - Fluency types – Flexibility - Originality and Basics of Brain Storming.

**NE 364 – Engineering Economy**  
*C.3. Prerequisite: 54 Credit Hours.*

Introduction and overview – Cost concepts and the economic environment – Principles of money, time relations – Concept of economic equivalence – Cash flow diagrams interest formulas and uniform series – Cash flow diagrams uniform gradient series and geometric sequence – Nominal and effective interest rates continuous compounding and continuous cash flows – Applications of engineering economy methods of investment assessment – Comparing alternatives useful life is equal to the study period – The imputed market value technique – Depreciation historical methods and cost recovery systems.

**NE 465 – Aesthetic Education and Art Appreciation**  
*C.3. Prerequisite: None.*

Aesthetic training and appreciation on a wide range of types of arts, including Music, Drawing, Painting, Sculpture and Engraving - Applied art (major and minor arts) - The Ancient world, Classical world and Christian world (Christianity) - Islamic and oriental arts - Medieval Western world - Renaissance in the 17th, 18th and 19th Centuries - Modern arts in the 20th Century.

**NE 466 – Environment Science and Technology**  
*C.3. Prerequisite: None.*

Course File Summary

Further description of courses including course information, grading system, course description, textbook and reference book, course aim and objectives, and course outline.

This chapter provides further description of the courses of the Industrial and Systems Engineering program. The course files are organized as follows:

- Basic and Applied Science Courses – BA
- Computer Engineering Courses – CC
- Electronics and Communications Courses - EC
- Electrical Engineering Courses – EE
- Language, Humanities, & Social Science Courses – LH
- Industrial and Systems Engineering Courses – IM
- Non-Engineering Courses – NE
Basic and Applied Science Courses – BA

BA 113 – Physics (1)

COURSE INFORMATION

Course Title: Physics (1).
Code: BA113.
Hours: Lecture – 2 Hrs. Tutorial – 2 Hrs. Laboratory – 1 Hr. Credit – 3.
Prerequisite: None.

GRADING

Class. Experimental physics 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

This course consists of four parts static electricity, electric current, magnetism and light.

TEXT BOOKS


REFERENCE BOOKS

- Raymond A. Serway and John W. Jewett, Physics for scientists and engineers, Brooks Cole; latest edition.
- Michael Nelkon and Philip Parker, Advanced level physics, Heinemann International Literature & Textbooks, latest edition.

COURSE AIM

The aim of this course is to Supply the students with strong back ground in the field of electricity and magnetism which is really needed for the students to complete their study in the field of engineering and technology.

COURSE OBJECTIVES

This course provides the students with good knowledge about the nature and the existence of static electricity, the interaction between different type of charges and the electric field types generated by these charges. The course also, allows the student to distinguish between the static electricity and
the electric current through the application of ohm’s law and gives the student basic information about the structure of simple electric circuit. This course gives a good background about the theory of magnetism and electromagnetic Induction.

**Course Outline**

*Week Number 1:* Introduction to static electricity and Coulomb’s law (1).

*Week Number 2:* Introduction to static electricity and Coulomb’s law (2).

*Week Number 3:* Electric field.

*Week Number 4:* Electric potential.

*Week Number 5:* Capacitors(1)

*Week Number 6:* Capacitors(2)

*Week Number 7:* Exam # 1.

*Week Number 8:* Electric current, ohm’s law resistors in series and parallel (1).

*Week Number 9:* Electric current, ohm’s law resistors in series and parallel (2).

*Week Number 10:* Kirchhoff’s rule.

*Week Number 11:* Introduction to theory of magnetism and different applications.

*Week Number 12:* Exam # 2.

*Week Number 13:* Electromagnetic induction.

*Week Number 14:* Optics and waves (nature of light, properties of light waves).

*Week Number 15:* Young’s double slit ‘polarization of light waves.

*Week Number 16:* Final Exam.
BA 114 – Physics (2)

Course Title: Physics (2).

Code: BA114.

Hours: Lecture – 2 Hrs. Tutorial-2 Hrs. Laboratory – 1 Hr. Credit – 3.

Prerequisite: BA113 - Physics (1)

Class Performance/Attendance: 10%

Midterm1/Assignments – (7th Week): 30%

Midterm # 2/Assignments – (12th Week): 20%

Final Exam: 40%

This course is concerned with the investigation of the behavior of the fluid under different conditions to calculate the net work done on or by the system. It is also concerned with standing the first and second law of thermodynamics. Heat, work and internal energy of the fluids (liquid and gas) should be calculated for different processes under different condition. Heat transfer is also studied through this course.


References available in AAST Library.

The aim of this course is to develop the skills of students to solve the problems of Heat and thermodynamics and understanding the different cases and condition under which thermodynamic system operates.

The objectives of this course are: Understanding the relation between heat, work and the conservation of energy through thermodynamic cycle. Also, the student must know the relation between the different units used through this Course.
COURSE OUTLINE

Week Number 1: Introduction to thermodynamics.
Week Number 2: Reversibility and reversible work.
Week Number 3: First law of thermodynamics’ Non-flow equation.
Week Number 4: Steady flow equation.
Week Number 5: Working Fluid (1.1) (steam).
Week Number 6: Working Fluid (1.2) (steam).
Week Number 7: Working Fluid (2.1) (perfect gas).
Week Number 8: Working Fluid (2.2) (perfect gas).
Week Number 9: Reversible processes, (constant volume, constant pressure).
Week Number 10: Reversible processes, (constant temperature, adiabatic).
Week Number 11: Reversible process, (polytropic).
Week Number 12: Second law of thermodynamics (1).
Week Number 13: Second law of thermodynamics (2).
Week Number 14: Heat transfer (1).
Week Number 15: Heat transfer (2).
Week Number 16: Final Exam.

TOOLS REQUIRED

Use of the steam tab
BA 118 – Chemistry

COURSE INFORMATION

Course Title: Chemistry.
Code: BA118.
Hours: Lecture – 2 Hrs. Laboratory – 2 Hrs. Credit – 2.
Prerequisite: None.

GRADING

Lab., Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

The Science of Chemistry characterized its close relate with the other branches of sciences and with the technological applicants of these sciences and with technological applicants of these sciences, which emerge in the mineral oil, medicate, petroleum, petrochemicals, chemical textile and other industries. This course includes topics of specialized chemical engineering technology without going through details.

TEXT BOOKS & REFERENCES

- Drew principles of industrial water treatment. Third edit. Drew chemical corporat.

COURSE AIM

The aim of course develops for the student, bases of scientific engineering chemistry, and creative student’s scale to identify the technical problems which are related to engineering chemistry.

COURSE OBJECTIVES

Establishing a base for students. Providing the student with knowledge about the effects of the environment on the material whatever its form is indifferent purposes. Accruing Scientific bases
which equality the student to control dominate and protect the used materials. Enabling the student to solve industrial problems in a scientific method.

**COURSE OUTLINE**

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Course Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Electrochemical Reactions and cells. Volumetric Analysis (Practical).</td>
</tr>
<tr>
<td>2</td>
<td>Principles of corrosion. Titrate Technique, Determine of acidity (practical).</td>
</tr>
<tr>
<td>3</td>
<td>Metals and corrosive Environments. Determine of Alkalinity and chloride (practical).</td>
</tr>
<tr>
<td>4</td>
<td>Forms of corrosion uniform, Galvanic and Differential aeration cell. Determination of Hardness (Practical).</td>
</tr>
<tr>
<td>5</td>
<td>Pitting, stress corrosion cracking and intergranular corrosion forms. Determination of Dissolved oxygen (Practical).</td>
</tr>
<tr>
<td>6</td>
<td>Atmospheric and Erosion Corrosion. Spectrophotometer Analysis (Practical).</td>
</tr>
<tr>
<td>7</td>
<td>Coating and inhibitors as protection methods. Determination of nitrite and nitrate (Practical).</td>
</tr>
<tr>
<td>8</td>
<td>Cathodic protection. Determination of phosphate and silica (Practical).</td>
</tr>
<tr>
<td>9</td>
<td>Classification of fuel, properties of liquid fuel. Determination of some heavy Metals (Practical).</td>
</tr>
<tr>
<td>10</td>
<td>Combustion of fuel. Determination of fluorine and chlorine (Practical).</td>
</tr>
<tr>
<td>11</td>
<td>Air supply and Exhaust Gases. Determination of turbidity (Practical).</td>
</tr>
<tr>
<td>12</td>
<td>Classification of lubricants Advantages and disadvantages of different types. Oil Analysis Determination of Viscosity and T.B.N (Practical).</td>
</tr>
<tr>
<td>13</td>
<td>Properties of lubricants and Additives. Determination of Insoluble and Saltwater (Practical).</td>
</tr>
<tr>
<td>15</td>
<td>Water Treatment. Determination of PH (Practical).</td>
</tr>
<tr>
<td>16</td>
<td>Air and water pollution. Determination of TDS and salinity (Practical).</td>
</tr>
</tbody>
</table>
BA 123 – Mathematics (1)

COURSE INFORMATION

Course Title: Mathematics (1).
Code: BA123.
Prerequisite: None.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

The aim of this course is the differentiation and some of its applications, basic differentiable functions of one variable. It includes definitions and intuitive meanings of derivatives; Higher derivatives; Basic techniques of differentiation; Chain Rule; Parametric equations; Partial differentiation; Implicit differentiation; Inverse function theorem; Logarithmic differentiation; differentiation; Logarithmic functions; Exponential functions; Trigonometric functions; Inverse trigonometric functions; Hyperbolic functions; Differentiation of those; Physical and geometric applications of differentiation; Limits; Nth derivative; L'Hôpital rule; Maclaurin’s expansion as approximations of functions; Analytic geometry; Translation of Axes; Conic sections.

TEXT BOOKS

- Printed Notes.

REFERENCE BOOKS


COURSE AIM

This course teaches students main transcendental functions and their basic properties, differentiation and some of its applications; as well as analytic geometry and quadratic curves.
COURSE OBJECTIVES

The course teaches basic transcendental functions and their properties. It develops students’ skills in the techniques of differentiation, and enables them to grasp its intuitive meaning. It also provides them with essential knowledge and skills in analytic geometry.

COURSE OUTLINE

Week Number 1: Basic techniques and rules of differentiation.
Week Number 2: Trigonometric function: properties, basic identities and their derivatives.
Week Number 3: Inverse of trigonometric and their derivatives.
Week Number 4: Logarithmic functions: their properties, basic identities and derivatives.
Week Number 5: Exponential functions: their properties, basic identities and derivatives.
Week Number 6: Derivative of hyperbolic functions and their inverse.
Week Number 7: Parametric differentiation and implicit differentiation.
Week Number 8: The Nth derivative.
Week Number 9: L’ Hopital rule.
Week Number 10: Partial differentiation.
Week Number 11: Maclaurin’s expansion.
Week Number 12: Physical application.
Week Number 13: Curve sketching.
Week Number 14: Conic sections.
Week Number 15: General revision.
Week Number 16: Final Exam.
BA 124 – Mathematics (2)

**Course Information**

Course Title: Mathematics (2).

Code: BA124.


Prerequisite: BA123 - Mathematics (1)

**Grading**

- Class Performance/Attendance: 10%
- Midterm #1/Assignments – (7th Week): 30%
- Midterm #2/Assignments – (12th Week): 20%
- Final Exam: 40%

**Course Description**

This course addresses integration and some of its geometric applications, as well as elementary matrix algebra. It includes definitions and intuitive meanings of indefinite and definite integrals; Fundamental Theorem of Calculus; Basic techniques of integration; Integration by parts; Geometric applications; Integration of powers of trigonometric functions; Substitution; Miscellaneous and Trigonometric substitutions; Integration of rational functions in x through partial fractions; Numerical Integration. Gauss’ method for the solution of linear equations; Matrix inversion and its use in the solution of linear equations.

**Text Books**

- Printed Notes.

**Reference Books**


**Course Aim**

To learn integration using different methods. To use these techniques in solving some application like to find the area, the volume, the length of a curve, and the average of a curve. To solve problems using numerical integration. To learn elementary linear algebra, solution of linear equations using matrices and determinants.
COURSE OBJECTIVES

The course develops students’ skills in the techniques of integration, and enables them to grasp its intuitive meaning. It also provides them with essential knowledge and skills in matrix algebra.

COURSE OUTLINE

*Week Number 1:* Definition of indefinite integrals and table of famous integrals.

*Week Number 2:* Simple rules of integration and the fundamental theorem of calculus.

*Week Number 3:* Fundamental theorem of calculus and integration by parts.

*Week Number 4:* Integration by parts and integration of rational functions.

*Week Number 5:* Integration of rational functions.

*Week Number 6:* Integration of trigonometric powers.

*Week Number 7:* Trigonometric substitution and 7th week exam.

*Week Number 8:* Integration of quadratic forms and the reduction formulas.

*Week Number 9:* Definite integration.

*Week Number 10:* Area and volume.

*Week Number 11:* Area, volume and length of curve.

*Week Number 12:* Average of a function, numerical integration and 12th week exam.

*Week Number 13:* Matrix Algebra.

*Week Number 14:* Solution of systems of linear equations.

*Week Number 15:* General revision.

*Week Number 16:* Final Exam.
BA 141 – Engineering Mechanics (1)
COURSE INFORMATION

Course Title: Engineering Mechanics (1).
Code: BA141.
Prerequisite: None.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION


TEXT BOOKS


REFERENCE BOOKS

Books available in the AAST Library

COURSE AIM

The aim of the course is to provide the student with an introduction to many of the fundamental concepts in Mechanics

COURSE OBJECTIVES

The course treats only rigid-body mechanics, science it forms a suitable basis for the design and analysis of many types of structural, mechanical or electrical devices encountered in engineering

COURSE OUTLINE

Week Number 1: Rectangular components of a force.
Week Number 2: Parallelogram law.
Week Number 3: Equilibrium of particle – springs and cables.

Week Number 4: Moment of force.

Week Number 5: Free body diagram.

Week Number 6: Equilibrium of rigid body.

Week Number 7: Exam # 1.

Week Number 8: Trusses “joint method – zero – force members”.

Week Number 9: Trusses “method of section”.

Week Number 10: Frames.

Week Number 11: Frames (cont).

Week Number 12: Exam # 2.

Week Number 13: Friction

Week Number 14: Mass Moment of Inertia

Week Number 15: Virtual work

Week Number 16: Final Exam.
BA 142 – Engineering Mechanics (2)

Course Title: Engineering Mechanics (2).

Code: BA142.


Prerequisite: BA141.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Introduction of the kinematics of the particle, rectilinear and projectile motions, force and acceleration. Moreover, work and energy of a particle, rotation of a body about a fixed axis, general plan motion, relative velocity and acceleration, equations of translation – rotational.

Text Books


Reference Books

Books available in the AAST Library.

Course Aim

The aim of the course is to provide a clear and thorough presentation of the theory and applications of engineering mechanics.

Course Objectives

The course objectives are to study the geometry of motion (Kinematics) as well as the relationship between the motion of a body and the forces and the moments acting on it (Kinetics).

Course Outline

Week Number 1: Kinematics of a particle – Rectilinear Kinematics.

Week Number 2: Curvilinear Motion – Projectile Motion.
Week Number 3: Force & Acceleration (Kinetics).
Week Number 4: Work & Energy of a particle (Kinetics).
Week Number 5: Rotation of a Rigid Body about a fixed Axis.
Week Number 6: General Plan Motion.
Week Number 7: Exam # 1.
Week Number 8: Relative Motion (Velocity).
Week Number 9: Relative Motion (Acceleration).
Week Number 10: Planar Kinetics of Rigid Body – Equation of Translation Motion.
Week Number 11: Equation of Rotational Motion.
Week Number 12: Exam # 2.
Week Number 13: Equation of General Plane Motion.
Week Number 14: Work and Energy.
Week Number 15: Revision.
Week Number 16: Final Exam.
BA 223 – Mathematics (3)

Course Information

Course Title: Mathematics (3).
Code: BA223.
Prerequisite: BA124 – Mathematics (2).

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Solving first order differential equations: Separable of variables, Homogeneous equation, Exact equation, Linear equation and Bernoulli’s equation. Solving second order homogeneous and non-homogeneous differential equations with constant and variable coefficients. Undetermined coefficients and variation of parameters methods. Laplace transformations, basic properties, first shifting theorem, unit step function, second shifting theorem, transform of derivatives and integrals, and inverse Laplace transforms. Solving differential equations by using Laplace transform. Fourier series: Fourier series for even, odd, and harmonic functions.

Text Books


Reference Books


Course Aim

To study varies methods of solving differential equations, which arise as mathematical modeling in many topics of engineering.
COURSE OBJECTIVES

To study differential equations, Laplace transform and Fourier analysis, that is of fundamental importance in modern engineering and science.

COURSE OUTLINE

Week Number 1: Solving first order differential equations: Separable of variables and Homogeneous equation.

Week Number 2: Solving first order differential equations: Exact and Linear equations.

Week Number 3: Solving first order differential equations: Bernoulli's equation and revision on first order differential equations.

Week Number 4: Solving second order homogeneous differential equations with constant coefficients. Method of undetermined coefficients.

Week Number 5: Solving second order non-homogeneous differential equations with constant coefficients. Method of variation of parameters.

Week Number 6: Continue method of variation of parameters. Solving second order differential equations with variable coefficients (Euler's equation).

Week Number 7: Laplace transform: Basic definition, First shifting theorem.

Week Number 8: Laplace transform: Transform differentiation and integration.

Week Number 9: Unit step function, second shifting theorem, and convolution theorem.

Week Number 10: Inverse Laplace transforms.

Week Number 11: Solving differential equations by using Laplace transform.

Week Number 12: Fourier series: Fourier series for functions of period 2P.

Week Number 13: Fourier series for even and odd functions.

Week Number 14: Fourier series for harmonic functions.

Week Number 15: Revision.

Week Number 16: Final Exam.
BA 224 – Mathematics (4)

Course Information

Course Title: Mathematics (4)
Code: BA 224
Prerequisite: BA 223 – Mathematics (3)

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

This course gives a comprehensive study on the 2D and 3D vectors: algebra, differential and integral calculus, and the physical interpretation of the integral theorems. The course also gives a study on the complex functions, its differentiation and integration, the residue theorems and its application to real integrals.

Text Books


Reference Books


Course Aim

This course aims at enhancing the students knowledge in the subject of “Vector Differential and Integral calculus” as well as Complex Analysis and Integration needed to solve engineering problems at higher level of the undergraduate engineering studies.

Course Objectives

Through this course the student gets to know:

- Vector Differential Calculus
- Vector Integral calculus
- Complex Analytic Functions and Complex Integration.
COURSE OUTLINE

**Week Number 1:** Vector Algebra / Dot and cross product and Applications.

**Week Number 2:** Partial Differentiation / and Derivatives of vector functions.

**Week Number 3:** Gradient / Divergence / curl / Laplacian.

**Week Number 4:** Line Integrals / line Integrals Independent of the path / Exactness.

**Week Number 5:** Conservative vector fields.

**Week Number 6:** Double Integrals in Cartesian and polar coordinates / Green’s Theorem.

**Week Number 7:** Surface Integrals / Stokes’ Theorem / 7th week Exam.

**Week Number 8:** Triple Integrals / Divergence (Gauss’ Theorem).

**Week Number 9:** Review on Integrals Theorems.

**Week Number 10:** Complex numbers and functions / forms of representation.

**Week Number 11:** Analytic functions / Harmonic functions.

**Week Number 12:** Line complex integrals / Cauchy’s Integrals Theorem / 12th week Exam.

**Week Number 13:** Zeros and poles of Analytic functions / Residues and their evaluation.

**Week Number 14:** Residue Theorem / Application to Real Integral.

**Week Number 15:** Introduction to Fourier Integrals and Transforms.

**Week Number 16:** Final Exam.
BA 323 – Mathematics (5)

Course Title: Mathematics (5).

Code: BA 323.


Prerequisite: BA 224 – Mathematics (4).

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

In the first of this course we discuss the solution of ordinary differential equations with variable coefficients using Taylor’s, power series and Frobenius methods, then we go into some special differential equations, as Legendre and Bessel differential equations which lead us to some special functions, as Legendre, Bessel, Gamma and Beta functions. After that we study the method of separation of variables to solve partial differential equations that help us to study some applications like heat transfer in a bar, vibrating of a string and potential fields. In the last of this course we discuss some special complex transformations, conformal mappings, such as bilinear and Schwarz Christoffel transformations.

Text Book


Reference Books


Course Aim

When dealing with some physical problems, an ordinary or partial differential equation arises. Our course aims to give the student the ability to extract exact solutions of these problems.
COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Solve ordinary differential equations with variable coefficients.
- Solve partial differential equations with the method of separation of variables.
- Deal with some special functions.
- Construct some special complex functions.

COURSE OUTLINE

<table>
<thead>
<tr>
<th>Week Number 1:</th>
<th>Taylor's and Power series methods for solving ordinary differential equations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week Number 2:</td>
<td>Differential equation with variable coefficients, ordinary and singular points, solution about ordinary points.</td>
</tr>
<tr>
<td>Week Number 3:</td>
<td>Solution about singular points: Regular singular points, the method of Frobenius - Case I.</td>
</tr>
<tr>
<td>Week Number 4:</td>
<td>The method of Frobenius - Case II and Case III.</td>
</tr>
<tr>
<td>Week Number 5:</td>
<td>Gamma and Beta functions.</td>
</tr>
<tr>
<td>Week Number 6:</td>
<td>Legendre differential equation and Legendre polynomials.</td>
</tr>
<tr>
<td>Week Number 7:</td>
<td>Bessel differential equation.</td>
</tr>
<tr>
<td>Week Number 8:</td>
<td>Bessel function of the 1st kind.</td>
</tr>
<tr>
<td>Week Number 9:</td>
<td>Boundary value problems, partial differential equations and the method of separation of variables.</td>
</tr>
<tr>
<td>Week Number 10:</td>
<td>Heat equation - heat transfer in a bar.</td>
</tr>
<tr>
<td>Week Number 11:</td>
<td>Wave equation - vibration of a string.</td>
</tr>
<tr>
<td>Week Number 12:</td>
<td>Laplace equation and potential fields.</td>
</tr>
<tr>
<td>Week Number 13:</td>
<td>Conformal mappings - Complex functions as mappings.</td>
</tr>
<tr>
<td>Week Number 14:</td>
<td>Bilinear transformations – linear fraction transformation.</td>
</tr>
<tr>
<td>Week Number 15:</td>
<td>Schwarz Christoffel transformation.</td>
</tr>
<tr>
<td>Week Number 16:</td>
<td>Final Exam.</td>
</tr>
</tbody>
</table>
BA 326 – Mathematics (6)

COURSE INFORMATION

Course Title: Mathematics (6).
Code: BA 326.
Prerequisite: BA 124 – Mathematics (2).

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

This course provides a comprehensive knowledge about descriptive statistics and the use of computer statistical packages. Statistical methods of estimation and hypothesis testing. Emphasis on use, validity and understanding of particular statistical models. This course also introduces students to probability, conditional probability; independent event total probability, Bayes theorem and basic counting techniques and random variables. Topics include distribution functions, binomial, geometric and Poisson distributions. The other topics covered are uniform, exponential and normal distributions; joint distributions. An introduction about Random Processes: Definition and classification, stochastic integrals, Fourier transforms of random processes, stationary and non-stationary processes, correlation functions. Power spectral density, transformations of random processes by linear systems. Representation special random processes.

TEXT BOOKS

Mahmoud Gaber, Probability and statistics for engineering student.

REFERENCE BOOKS


COURSE AIM

This course provides a straightforward introduction on the Statistical analysis and the theory of probability and Random process without burdening the student with a great deal of measure theory.
In particular, a principal purpose of the course is to help to build up the important Skills necessary for solving problems.

**COURSE OBJECTIVES**

Through this course the student gets to know how:

- To make statistical analysis and calculating statistical measurements using computer programs like the Minitab program or Excel.
- To introduce the basic ideas of probability and conditional probability and its dependence. It is assumed that the outdone has some knowledge of elementary set theory.
- To introduce discrete and continues random variable and for this need a knowledge of the simpler techniques of calculus desirable.
- To introduce the joint distribution in order to study simple application to random process and signal principles.

**COURSE OUTLINE**

*Week Number 1:* An introduction to Statistics and statistical analysis on data observation.

*Week Number 2:* Statistical measurements.

*Week Number 3:* Elementary probability-Probability theorems.

*Week Number 4:* Conditional probability-Independent and dependent events.

*Week Number 5:* Total probability rule- Bayes Theorem and enumeration methods.

*Week Number 6:* Discrete probability distribution-probability mass function.

*Week Number 7:* Continuous probability distribution -probability density function.

*Week Number 8:* Mathematical expectation, mean and variance.

*Week Number 9:* Special discrete distribution: Bernoulli, Binomial, Geometric and Poisson distributions.

*Week Number 10:* Special continuous distribution: Uniform and exponential distribution.

*Week Number 11:* Special continuous distribution: normal distribution.

*Week Number 12:* Discrete and Continuous joint probability distribution.


*Week Number 15:* Final revision.

*Week Number 16:* Final exam.
Computer Engineering Courses – CC

CC 111 – Introduction to Computers

COURSE INFORMATION

Course Title: Introduction to Computer Science.

Code: CC 111.

Hours: Lecture – 2 Hrs. Tutorial/Laboratory – 2 Hrs. Credit – 3.

Prerequisite: None.

GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7th Week): 30%

Midterm # 2/Assignments – (12th Week): 20%

Final Exam: 40%

COURSE DESCRIPTION

This course provides an introduction to computers and computing. Topics of interest include the impact of computers on society, ethical issues, and hardware/software applications, including internet applications, system unit, storage and input/output devices, numbering systems, system and application software, presentation skills, program development, programming languages, and flow charts, Visual Basic, web page design using HTML, and communications and networks.

TEXT BOOKS


REFERENCE BOOKS


COURSE AIM

- The students must have a general understanding of what computers are and how they operate.
- The students must have good skills in using windows, MS PowerPoint, HTML and Visual Basic.
The students must learn problem solving techniques and program development.

The student should know the available programming languages and their capabilities.

**Course Objectives**

At the end of the course the student should be able to:

- Identify computer hardware components and their specifications and types.
- Use Windows, MS PowerPoint, HTML, and Visual Basic.
- Understand and use numbering systems.

**Course Outline**

*Week Number 1:* Introduction to the World of Computers Input and Output.

*Week Number 2:* The System Unit: Processing and Memory.

*Week Number 3:* Storage and Input/Output Devices.

*Week Number 4:* System Software and Application Software.

*Week Number 5:* Quiz 1 + Program Development, Programming Languages, and Flow charts.

*Week Number 6:* Visual Basic 1.

*Week Number 7:* 7th Week Exam.

*Week Number 8:* Visual Basic 2.

*Week Number 9:* Visual Basic 3.

*Week Number 10:* Quiz 2 + Web page design using HTML 1.

*Week Number 11:* Web page design using HTML 2.

*Week Number 12:* 12th Week Exam.

*Week Number 13:* Communications and Networks 1.

*Week Number 14:* Communications and Networks 2.

*Week Number 15:* Ethics, Computer Crime, Privacy, and other Social Issues.

*Week Number 16:* Final Exam.
CC 112 – Structured Programming

COURSE INFORMATION

Course Title: Structured Programming.
Code: CC112.
Hours: Lecture – 2 Hrs. Laboratory – 2 Hrs. Credit – 3.
Prerequisite: CC111.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

An introduction to C-language Programming is provided in this course, Variable/Constant definitions, Basic Programmes, Sequential Programming, Conditional Programming, Looping and repetitions, Functions, Arrays as well as searching and sorting techniques.

TEXT BOOKS


REFERENCE BOOKS


COURSE AIM

Introducing Structured programming techniques associated with the C-Language, used to program most nowadays systems. Studying their application to practical problems with special emphasis on some practical applications concerning different disciplines.

COURSE OBJECTIVES

Studying C-language programming techniques, sequence, selection and repetition control structures, functions, Arrays, sorting and searching techniques.

COURSE OUTLINE

Week Number 1: Overview of Programming and Problem Solving.
Week Number 2: C Syntax and Semantics.
Week Number 3:  I/O Formatting and Arithmetic.

Week Number 4:  Conditions and Logical Expressions.

Week Number 5:  Selection Control Structures.

Week Number 6:  Repetitions (Part 1).

Week Number 7:  7th Week Exam.

Week Number 8:  Repetitions (Part 2).

Week Number 9:  Functions (Part 1).

Week Number 10: Functions (Part 2).

Week Number 11: Arrays (Part 1).

Week Number 12: 12th Week Exam.

Week Number 13:  Arrays (Part 2).

Week Number 14: Programming applications – problem solving Tech (Part 1).

Week Number 15: Programming applications – problem solving Tech (Part 2).

Week Number 16:  Final Exam.
**CC 114 – Introduction to Programming**

**COURSE INFORMATION**

Course Title:  Introduction to programming

Code:  CC 112.

Hours:  Lecture – 2 Hrs.  Lab/ Tutorial – 2 Hrs.  Credit – 3.

Prerequisite:  CC 111 - Introduction to computer.

**GRADING**

Class Performance/Attendance:  10%

Midterm # 1/Assignments – (7th Week):  30%

Midterm # 2/Assignments – (12th Week):  20%

Final Exam:  40%

**TEXT BOOKS**


**REFERENCE BOOKS**

References available in AAST Library.

**COURSE AIM**

This course will help students know the concepts of programming using VB, and knowing how to use editors to implement these concepts.

**COURSE OBJECTIVES**

Upon completion of this course, students should be able to:

- Explain the different concepts of programming, and knowing the different tools that can be used.
- Experiment this using visual studio

**COURSE OUTLINE**

_Week Number 1:_ Introduction to visual basic.

_Week Number 2:_ Introducing variables, memory concepts and arithmetic.

* Offered only to other departments
Week Number 3: Illustrating application example.

Week Number 4: Introducing algorithms, pseudocode, program control, checkboxes and dialogs.

Week Number 5: Sample applications.

Week Number 6: Introducing the Do While…Loop and Do Until…Loop Repetition Statements.

Week Number 7: Introducing the Do …Loop While and Do …Loop Until Repetition Statements.

Week Number 8: Introducing the For … Next Repetition Statement.

Week Number 9: Introducing the Select Case Multiple-Selection Statement.

Week Number 10: Introducing One-Dimensional Arrays.

Week Number 11: Introducing Two-Dimensional Arrays.

Week Number 12: Two-Dimensional Arrays Application.

Week Number 13: General Application.

Week Number 14: Functions and Procedures.

Week Number 15: Fibonacci Application.

Week Number 16: Students’ projects.
CC 213 – Programming Applications

**COURSE INFORMATION**

Course Title: Programming Applications.

Code: CC 213.


Prerequisite: CC 112.

**GRADING**

Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7th Week): 30%

Midterm # 2/Assignments – (12th Week): 20%

Final Exam: 40%

**COURSE DESCRIPTION**

An advanced C-language Programming is provided in this course: two dimensional arrays, strings, pointers, recursion, structures, bitwise-operators, input-output interfacing as well as text and binary files are covered in details. Projects are required from students to increase their skills in C programming.

**TEXT BOOK**


**REFERENCE BOOKS**


**COURSE AIM**

Introducing different programming techniques associated with the C-Language, used to program most nowadays systems. Studying their application to practical problems with special emphasis on some practical applications concerning different disciplines.

**COURSE OBJECTIVES**

Upon completion of this course the student will be able to: Studying C-language programming techniques, files, pointers, structure, string, and array.

**COURSE OUTLINE**

Week Number 1: Revision of structured programming constructs: selection, repetition, and Functions.
Revision of one dimensional array.

Searching and sorting.

Two dimensional arrays.

Pointers.

Strings.

7th week exam.

Structures.

Structures/Unions.

Recursion.

Text Files.

12th week exam.

Binary Files.

Bitwise Operators/ I/O Interfacing.

Advanced Applications.

Final Exam.
**CC 215 – Data Structures**

**COURSE INFORMATION**

Course Title: Data Structures  
Code: CC 215  
Hours: Lecture – 2 Hrs.  
Tutorial – 2 Hrs.  
Credit – 3.  
Prerequisite: CC 213.

**GRADING**

Class Performance/Attendance: 10%  
Midterm # 1/Assignments – (7th Week): 30%  
Midterm # 2/Assignments – (12th Week): 20%  
Final Exam: 40%

**COURSE DESCRIPTION**

Difference between static data type and dynamic data types - the concept of pointers & dynamic memory allocation - programming practice using dynamic structures.

**TEXT BOOK**


**REFERENCE BOOKS**


**COURSE AIM**

Review of data types and static data structures pointers, dynamic data structures: stack queues linked lists, trees and graphs.

**COURSE OBJECTIVES**

Upon completion of this course the student will be able to:

- Demonstrate the difference between static data type and dynamic data types.
- Introduce the concept of pointers & dynamic memory allocation.
- Give students practical programming experiences using dynamic structures.

**COURSE OUTLINE**

*Week Number 1*: Introduction to static Vs dynamic data structures.
Week Number 2:  Stack data type.

Week Number 3:  Implementation of stack in different applications.

Week Number 4:  Queue data type.

Week Number 5:  Introduction to dynamic programming using pointers.

Week Number 6:  Linked lists.

Week Number 7:  7th week exam.

Week Number 8:  Double & circular linked lists.

Week Number 9:  Introduction to tree structures.

Week Number 10:  Tree traversals.

Week Number 11:  Threaded tree.

Week Number 12:  12th week exam.

Week Number 13:  Graphs representation and traversals.

Week Number 14:  Graphs minimum spanning tree & shortest path.

Week Number 15:  Revision.

Week Number 16:  Final Exam.
CC 216 – Digital Logic Design

COURSE INFORMATION

Course Title: Digital Logic Design
Code: CC 216
Hours: Lecture – 2 Hrs.  Tutorial/Lab – 2/2 Hrs.  Credit – 3.
Prerequisite: CC 111.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

Number systems - binary arithmetic and codes - logic gates - Boolean algebra and logic simplifications - Design and realization of combinational circuits - Functions of combinational circuits logic - Flip-Flops - analysis design and realization of counters - analysis and realization of shift registers - Computer aided engineering.

TEXT BOOK


REFERENCE BOOKS

- Texas Instruments Data Sheets, latest version.

COURSE AIM

To develop engineering skills in the design and analysis of digital logic circuits with applications to digital computer.

COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Knowing the basic differences between analog and digital systems
- Use binary numbers and codes
- Describe the operation of logic gates
- Applying Boolean algebra on K-map
- Design a combinational and sequential logic circuits to simplify function

**COURSE OUTLINE**

*Week Number 1:* Introduction to digital concepts.

*Week Number 2:* Number systems, operations, and codes.

*Week Number 3:* Logic gates.

*Week Number 4:* Boolean algebra and logic simplification – part 1.

*Week Number 5:* Boolean algebra and logic simplification – part 2.

*Week Number 6:* Functions of combinational logic.

*Week Number 7:* 7th week exam.

*Week Number 8:* Decoders, encoders, MUX, DMUX – part 1.

*Week Number 9:* Decoders, encoders, MUX, DMUX – part 2.

*Week Number 10:* Flip-Flops and related devices – part 1.

*Week Number 11:* Flip-Flops and related devices – part 2.

*Week Number 12:* 12th week exam.

*Week Number 13:* Flip-Flops applications.

*Week Number 14:* Counters.

*Week Number 15:* Shift registers.

*Week Number 16:* Final Exam.
CC 218 – Discrete Mathematics
COURSE INFORMATION

Course Title: Discrete Mathematics
Code: CC 218
Prerequisite: CC 111.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION


TEXT BOOK


REFERENCE BOOKS


COURSE AIM

Logic of statements, logical form and equivalence, logic implementation, arguments, predicates, number theory, counting methods, function, relation, methods of proof.

COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Enhance students ability to Comprehend mathematical logic, predicates and methods of proof.
- Introduce mathematical induction. To understand discrete structures like functions and relation.

COURSE OUTLINE

Week Number 1: Logical form & logical equivalence.
Week Number 2: Conditional statement, valid & invalid arguments.

Week Number 3: Predicates & quantified statements.

Week Number 4: Arguments with quantified statements.

Week Number 5: Number theory.

Week Number 6: Counting elements.

Week Number 7: 7th week exam.

Week Number 8: Functions defined on general sets.

Week Number 9: One-to-one, onto, inverse function, composition of functions.

Week Number 10: Relations on sets.

Week Number 11: Reflexivity symmetry, transitivity & equivalence relations.

Week Number 12: 12th week exam.

Week Number 13: Partial order relations.

Week Number 14: Finite state automata.

Week Number 15: Mathematical inductions.

Week Number 16: Final Exam.
CC 243 – Introduction to Computer Organization

**Course Information**

**Course Title:** Introduction to Computer Organization

**Code:** CC 243

**Hours:**
- Lecture – 2 Hrs.
- Tutorial – 2 Hrs.

**Credit:** 3

**Prerequisite:** CC 216

**Grading**

- Class Performance/Attendance: 10%
- Midterm # 1/Assignments – (7th Week): 30%
- Midterm # 2/Assignments – (12th Week): 20%
- Final Exam: 40%

**Course Description**

Computer interconnection structures; computer components, computer function interconnection structures, and bus interconnection. Internal and external memory: computer memory system overview, semiconductors main memory, cache memory, magnetic tape, and optical memory. Input / Output: I/O modules, programmed I/O interrupt-driven I/O, direct memory Access. Operating system: Operating systems overview, scheduling, and memory management. The central processing unit: Computer Arithmetic, characteristics and functions of instruction sets, addressing modes, processor organization, the instruction cycle, instruction pipelining. Control unit Micro-operation, hardware implementation, Control Functions.

**Text Book**


**Reference Books**

- F. Halsall, “Data communication, computer Network and open systems”, Addison Wesley, latest edition

**Course Aim**

Introduce students to the basic knowledge necessary to understand the hardware operation of digital computers and covers the main subjects associated with computer hardware.

*Offered only to the department of computer science*
COURSE OBJECTIVES

Upon completion of this course the student will be able to Presenting the various digital components used in the organization and design of digital computers- Explaining the detailed steps that a designer must go through in order to design an elementary basic computer, Introducing the organization and architecture of the main units of a digital computer.

COURSE OUTLINE


Week Number 3: Digital Components.

Week Number 4: Register Transfer Organization & Micro-operation – part 1.

Week Number 5: Register Transfer Organization & Micro-operation – part 2.

Week Number 6: Basic computer Organization and Design – part 1.

Week Number 7: Basic computer Organization and Design – part 2.

Week Number 8: Central Processing Unit – part 1.

Week Number 9: Central Processing Unit – part 2.

Week Number 10: Central Processing Unit – part 3.

Week Number 11: Memory Organization – part 1.

Week Number 12: Memory Organization – part 2.

Week Number 13: Memory Organization – part 3.


Week Number 16: Final Exam.
CC 311 – Computer Architecture

Course Title: Computer Architecture
Code: CC 311
Prerequisite: CC 317.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description


Text Book


Reference Books


Course Aim

To introduce students to the basic concepts of computer architecture and organization through the study of the fundamentals associated with subject matter.

Course Objectives

- Upon completion of this course the student will be able to:
- Compare between various architectures
- Design MIPS computer architecture from the given instruction set.
- Program the MIPS processor using its own programming language
- Design the control using microprogrammed control
Assess a pipelined architecture

**COURSE OUTLINE**

*Week Number 1:* Introduction-overview of computer architecture-lecture grading policy.

*Week Number 2:* Computer abstraction and technology + project term.

*Week Number 3:* The role of performance.

*Week Number 4:* MIPS Assembly Language.

*Week Number 5:* Instructions for making decisions and procedures calls.

*Week Number 6:* Assembly modes.

*Week Number 7:* 7th week exam.

*Week Number 8:* The processor: Data path and control.

*Week Number 9:* Single-Cycle Data path.

*Week Number 10:* Pipelining.

*Week Number 11:* Pipelining (cont.).

*Week Number 12:* 12th week exam.

*Week Number 13:* Hazards and Dependencies in pipelining.

*Week Number 14:* Cache memory.

*Week Number 15:* Virtual memory.

*Week Number 16:* Final Exam.
CC 312 – Computer Organization

COURSE INFORMATION

Course Title: Computer Organization
Code: CC 312
Prerequisite: CC 216.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

Computer interconnection structures - computer components - computer function interconnection structures - bus interconnection. - Internal and external memory - computer memory system overview - semiconductors main memory - cache memory - magnetic tape - optical memory - Input / Output - I/O modules - programmed I/O - interrupt-driven I/O - direct memory Access - Operating system - Operating systems overview – scheduling - memory management - The central processing unit - Computer Arithmetic - characteristics and functions of instruction sets - addressing modes - processor organization - the instruction cycle - instruction pipelining - Control unit Micro-operation - hardware implementation - Control Functions.

TEXT BOOK


REFERENCE BOOKS


COURSE AIM

Introduce students to the basic knowledge necessary to understand the hardware operation of digital computers and covers the main subjects associated with computer hardware.

* Offered only to other departments
COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Presenting the various digital components used in the organization and design of digital computers
- Explaining the detailed steps that a designer must go through in order to design an elementary basic computer.
- Introducing the organization and architecture of the main units of a digital computer.

COURSE OUTLINE

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Course Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Computer Systems Organization &amp; Architecture - part 1.</td>
</tr>
<tr>
<td>3</td>
<td>Digital Components.</td>
</tr>
<tr>
<td>4</td>
<td>Register Transfer Organization &amp; Micro-operation – part 1.</td>
</tr>
<tr>
<td>5</td>
<td>Register Transfer Organization &amp; Micro-operation – part 2.</td>
</tr>
<tr>
<td>6</td>
<td>Basic computer Organization and Design – part 1.</td>
</tr>
<tr>
<td>7</td>
<td>Basic computer Organization and Design – part 2.</td>
</tr>
<tr>
<td>8</td>
<td>Central Processing Unit – part 1.</td>
</tr>
<tr>
<td>9</td>
<td>Central Processing Unit – part 2.</td>
</tr>
<tr>
<td>10</td>
<td>Central Processing Unit – part 3.</td>
</tr>
<tr>
<td>11</td>
<td>Memory Organization – part 1.</td>
</tr>
<tr>
<td>12</td>
<td>Memory Organization – part 2.</td>
</tr>
<tr>
<td>13</td>
<td>Memory Organization – part 3.</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam.</td>
</tr>
</tbody>
</table>
CC 316 – Object Oriented Programming

Course Title: Object Oriented Programming

Code: CC 316


Prerequisite: CC 319.

Grading

Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7th Week): 30%

Midterm # 2/Assignments – (12th Week): 20%

Final Exam: 40%

Course Description


Text Book


Reference Books


Course Aim

Teach the students the Object oriented techniques, Design, Analysis, and programming with Java.

Course Objectives

Upon completion of this course the student will be able to:

- List & Express OOP concepts * Analyze programs in OO manner.
- Define objects and their interrelationship
- Design & Implements programs in Java OO language

Course Outline

Week Number 1: Overview of Java Language (the procedural features).
<table>
<thead>
<tr>
<th>Week Number</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Object Based programming.</td>
</tr>
<tr>
<td>3</td>
<td>Objects and classes.</td>
</tr>
<tr>
<td>4</td>
<td>Strings.</td>
</tr>
<tr>
<td>5</td>
<td>OOP (Inheritance and interfaces).</td>
</tr>
<tr>
<td>6</td>
<td>OOP Software development (Class design).</td>
</tr>
<tr>
<td>7</td>
<td>7th week exam.</td>
</tr>
<tr>
<td>8</td>
<td>Getting Started with GUI programming.</td>
</tr>
<tr>
<td>9</td>
<td>Creating user interfaces.</td>
</tr>
<tr>
<td>10</td>
<td>Applets and advanced GUI.</td>
</tr>
<tr>
<td>11</td>
<td>Exception Handling.</td>
</tr>
<tr>
<td>12</td>
<td>12th week exam.</td>
</tr>
<tr>
<td>13</td>
<td>Multithreading.</td>
</tr>
<tr>
<td>14</td>
<td>I/O streams.</td>
</tr>
<tr>
<td>15</td>
<td>Networking.</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam.</td>
</tr>
</tbody>
</table>
CC 317 – Digital System Design

COURSE INFORMATION

Course Title: Digital System Design
Code: CC 317
Hours: Lecture – 2 Hrs. Tutorial / Lab – 2/2 Hrs. Credit – 3.
Prerequisite: CC 216.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

Introduction to digital design, combinational digital design and realization using: decoders, encoders, buffer, multiplexers, comparators, adders, and ALU, sequential design and realization using: latches, flip-flops, counters, and shift registers, memories, CPLD, and FPGA. Synchronous analysis and design using algorithmic state machines ASM, Digital design practice, CAD, using FPGA and CPLD.

TEXT BOOK


REFERENCE BOOKS


COURSE AIM

To introduce the students to combinational and sequential digital systems design and troubleshooting. The student will be familiar with ASM analysis and design.

COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Breakdown any digital design problem and work through the standard steps of design and analysis to the implementation stage.
- Utilize the knowledge of combinational design & realization using ICs, Memories and programmable devices.
- Implement synchronous analysis, design and realization using Algorithmic state machine ASM.
- Design on FPGA, CPLD chips using VHDL or Verilog.
- Work with digital design practical applications.

COURSE OUTLINE

Week Number 1: Introduction to digital design, Introduction to digital design: Codes, Standard Representation of logic Functions.

Week Number 2: Introduction to digital design, Quine-McCluskey.

Week Number 3: Algorithmic state machine chart (ASM Chart), Propagation delay, Clock Skew, Timing Hazards.

Week Number 4: Part of combinational logic design practices: VHDL.

Week Number 5: Part of combinational logic design practices, CPLD, PLA, PLD, GAL, Combinational logic Design practices continued.

Week Number 6: Sequential logic design practices.

Week Number 7: 7th Week Exam.

Week Number 8: Memories and programmable devices, applications with VHDL-based design using FPGA, CPLD.

Week Number 9: Combinational logic Design practices continued.

Week Number 10: Sequential logic design practices – part 1.

Week Number 11: Sequential logic design practices – part 2.

Week Number 12: 12th Week Exam.

Week Number 13: Sequential logic design practices – part 1.

Week Number 14: Sequential logic design practices – part 2.

Week Number 15: Additional Real-life system design.

Week Number 16: Final Exam.
CC 319 – Advanced Programming

course information

Course Title: Advanced Programming
Code: CC 319
Prerequisite: CC 213.

grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

course description


text book


reference books


course aim

Develop engineering skills in the design and analysis programming of C# language.

course objectives

Upon completion of this course the student will be able to:

- Highlight the main features of the C# programming language.
- Teach students how to design and write a computer programming for complex system
- Develop software skills in the design and analysis of C# programming

course outline

Week Number 1: An introduction to C# programming language.
Week Number 2: Input / output statement expressions.

Week Number 3: Windows application design.

Week Number 4: Condition statement and iteration statements – part 1.

Week Number 5: Condition statement and iteration statements – part 2.

Week Number 6: Method and modular programming.

Week Number 7: 7th week exam.

Week Number 8: Arrays & objects.

Week Number 9: Strings object and string methods (Part 1).

Week Number 10: Strings object and string methods (Part 2).

Week Number 11: Classes.

Week Number 12: 12th week exam.

Week Number 13: OOP Programming.

Week Number 14: Inheritance (Part 1).

Week Number 15: Inheritance (Part 2).

Week Number 16: Final Exam.
CC 331 – Data and Computer Communications

C O U R S E I N F O R M A T I O N

Course Title: Data and Computer Communications
Code: CC 331
Prerequisite: EC 320.

G R A D I N G

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

C O U R S E D E S C R I P T I O N

The goal of the course is to provide a background and context for the concept of computer networks. The broad range of topics that are encompassed in the field of data and computer communications is introduced, and the fundamental concepts of protocols and protocol architectures are examined. Also the course deals with the fundamental concepts of signal, medium, and encoding. Also deals with other aspects of data communications: reliability and efficiency. Error detection and correction in case of errors during transmission will be covered. A variety of multiplexing techniques can be used to provide for efficient use of the medium. Transmission media is discussed included guided and unguided media. Signal encoding techniques are discussed. Data ink control protocols are studied.

T E X T B O O K


R E F E R E N C E B O O K S


C O U R S E A I M

See Course Description.

C O U R S E O B J E C T I V E S

See Course Description.
COURSE OUTLINE

Week Number 1: Introduction to data Communication and Networking Concepts.
Week Number 2: Protocol Architecture.
Week Number 3: Data Communication - Data transmission.
Week Number 4: Guided and Wireless Transmission.
Week Number 5: Signal Encoding Techniques.
Week Number 6: Digital Data Communication techniques.
Week Number 7: 7th Week Exam.
Week Number 8: Types of Multiplexing.
Week Number 9: Wide Area Networks – Circuit Switching and Packet Switching.
Week Number 10: Wide Area Networks – ATM.
Week Number 11: Wide Area Networks –Routing in Switched Networks and Congestion Control.
Week Number 12: 12th Week Exam.
Week Number 13: Local Area Networks- Overview.
Week Number 14: Local Area Networks-High Speed LANs.
Week Number 15: Local Area Networks- Wireless LANs.
Week Number 16: Final Exam.
**CC 341 – Digital Electronics**

**Course Information**

Course Title: Digital Electronics  
Code: CC 341  
Hours: Lecture – 2 Hrs.  
Tutorial/Lab – 2 1/2 Hrs.  
Credit – 3.

Prerequisite: EC 238

**Grading**

Class Performance/Attendance: 10%  
Midterm # 1/Assignments – (7th Week): 30%  
Midterm # 2/Assignments – (12th Week): 20%  
Final Exam: 40%

**Course Description**

Understanding pulse fundamentals. Working with diodes, transistors and analyzing their circuits, design of diodes and transistors circuits. design and analysis of DTL, TTL, and CMOS circuits.

**Text Book**


**Reference Books**


**Course Aim**

Introduce students to the different types of integrated circuit logic gates, their characteristics, performance and design.

**Course Objectives**

Upon completion of this course the student will be able to:

- Understand the different integrated circuit logic gates (DTL, HTL, RTL, TTL, ECL, MOS, I2L, CMOS).
- Discuss the characteristics and performance of each of the above types of IC logic gates.
- Design logic gate circuits as well as circuits to interface between different types of IC logic gates.
COURSE OUTLINE

Week Number 1: Pulse Fundamentals.

Week Number 2: Diode Switching.

Week Number 3: Transistor Switching – part 1.

Week Number 4: Transistor Switching – part 2.

Week Number 5: Design of Basic logic gates.


Week Number 7: 7th Week Exam.

Week Number 8: TTL Logic gates.

Week Number 9: Emitter coupled logic, Integrated Injection logic.

Week Number 10: P-MOS and N-MOS logic gates.

Week Number 11: CMOS Logic Gates.

Week Number 12: Comparison and interfacing of different logic gate types – part 1.

Week Number 13: Comparison and interfacing of different logic gate types – part 2.

Week Number 14: Introduction to logic circuit Design – part 1.

Week Number 15: Introduction to logic circuit Design – part 2.

Week Number 16: Final Exam.
CC 410 – Systems Programming

COURSE INFORMATION

Course Title: Systems Programming
Code: CC 410
Prerequisite: CC 319.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

Introduction to system programming - machine architecture - machine language - assembly language - two pass assemblers - one pass assemblers - macro facilities - conditional macros - macro processors – loaders – linkers - introduction to formal languages - compilers and interpreters.

TEXT BOOK


REFERENCE BOOKS


COURSE AIM

Study the concepts and the theory behind some system software such as assemblers, loaders, macro processors and linkers. Study the concepts and the theory behind the structure and implementation of high level programming languages processors.

COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Studying the architecture of a hypothetical machine, its assembly language, macro language.
- Programming in assembly language.
• Studying the structure and design of assemblers, linkers and loaders
• Studying the concepts and theory behind the implementation of high level programming languages.

**Course Outline**

*Week Number 1:* System programming Vs. Application programming, Examples for system software, Languages for implementation of system software.

*Week Number 2:* Machine language, Instruction set, addressing modes.

*Week Number 3:* Programming in assembly language.

*Week Number 4:* Structure and design of a two pass assembler – part 1.

*Week Number 5:* Structure and design of a two pass assembler – part 2.

*Week Number 6:* Structure and design of one pass assemblers.

*Week Number 7:* 7th week exam.

*Week Number 8:* Programming in macro languages.

*Week Number 9:* Structure and design of macro processors.

*Week Number 10:* Loaders and linkers (Part 1).

*Week Number 11:* Loaders and linkers (Part 2).

*Week Number 12:* 12th week exam.

*Week Number 13:* Introduction to formal Languages and processing of high level languages (Part 1).

*Week Number 14:* Introduction to formal Languages and processing of high level languages (Part 2).

*Week Number 15:* Introduction to formal Languages and processing of high level languages (Part 3).

*Week Number 16:* Final Exam.
CC 411 – Introduction to Microprocessors

Course Title: Introduction to Microprocessors

Code: CC 411

Hours: Lecture – 2 Hrs. Tutorial/Lab – 2/2 Hrs. Credit – 3.

Prerequisite: CC 312 or CC216.

Grading

Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7th Week): 30%

Midterm # 2/Assignments – (12th Week): 20%

Final Exam: 40%

Course Description

Microprocessors and microcomputers - Microcomputer structure – microprocessor – memory - buses (synchronous and asynchronous) - I/O - 16/32-bit microprocessor architecture - Instruction cycle – microinstructions - micro-programming - instruction decoding - Reduced Instruction Set computer (RISC) architecture - Complex Instruction Set computer (CISC) architecture - Memory (RAM, ROM, memory mapping of I/O) - I/O (parallel and serial I/O interfaces, system clock, clock phases and bit rates) - Interrupts (types, handling of interrupts) - Software aids (text editors and assemblers, linkers and macro-assemblers).

Text Book


Reference Books


Course Aim

Identify The Microprocessors Category and study the internal structure and external connections of an example microprocessor (Intel 80386).

Course Objectives

Upon completion of this course the student will be able to:

* Offered only to other departments
Work with the Intel 80386 microprocessor, its connected peripherals, and its assembly language format.

**COURSE OUTLINE**

*Week Number 1:* Introduction to microprocessors Historical background.

*Week Number 2:* 80386 Microprocessor architecture.

*Week Number 3:* Real mode software model.

*Week Number 4:* Addressing modes.

*Week Number 5:* The instruction set & Machine Language coding.

*Week Number 6:* Protected mode Architecture Model.

*Week Number 7:* 7th week exam.

*Week Number 8:* Virtual memory Management.

*Week Number 9:* Memory Interface.

*Week Number 10:* DRAM.

*Week Number 11:* Input/output interface.

*Week Number 12:* 12th week exam.

*Week Number 13:* Interrupts and exception processing.

*Week Number 14:* The 486 and Pentium microprocessors family.

*Week Number 15:* Revision.

*Week Number 16:* Final Exam.
CC 412 – Computing Algorithms
COURSE INFORMATION

Course Title: Computing Algorithms
Code: CC 412
Prerequisite: CC 319.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

Analyze the asymptotic performance of algorithms - demonstrate a familiarity with major
algorithms and data structures - synthesize efficient algorithms in common engineering design
situations.

TEXT BOOK

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, “Introduction to

REFERENCE BOOKS


COURSE AIM

Analyze the asymptotic performance of algorithms. Apply important algorithmic design paradigms
and methods of analysis to solve problems. Measure the performance of algorithms and Proof
correctness of algorithms. Introduction to parallel Algorithms

COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Argue correctness of Algorithms
- Analyze worst case running time of algorithms
- Explain the basic properties of randomized algorithms
- Learn how to use the major algorithms, data structures and design paradigms
## COURSE OUTLINE

<table>
<thead>
<tr>
<th>Week Number 1</th>
<th>Introduction to the course objectives and policies.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week Number 2</td>
<td>Analysis of Algorithms, Asymptotic Notations.</td>
</tr>
<tr>
<td>Week Number 3</td>
<td>Asymptotic Notations (part 2).</td>
</tr>
<tr>
<td>Week Number 4</td>
<td>Divide and Conquer and Quiz #1.</td>
</tr>
<tr>
<td>Week Number 5</td>
<td>Sorting: Heapsort, Priority Queues.</td>
</tr>
<tr>
<td>Week Number 6</td>
<td>Linear-time Sorting.</td>
</tr>
<tr>
<td>Week Number 7</td>
<td>7th week exam.</td>
</tr>
<tr>
<td>Week Number 8</td>
<td>Greedy Methods.</td>
</tr>
<tr>
<td>Week Number 9</td>
<td>Binary Search Trees, red black trees and interval trees.</td>
</tr>
<tr>
<td>Week Number 10</td>
<td>Minimum Spanning Trees, Network flow algorithms.</td>
</tr>
<tr>
<td>Week Number 11</td>
<td>Graph representation.</td>
</tr>
<tr>
<td>Week Number 12</td>
<td>Computational Geometry, closest pair problem.</td>
</tr>
<tr>
<td>Week Number 13</td>
<td>String Matching.</td>
</tr>
<tr>
<td>Week Number 14</td>
<td>Introduction to some of the applied algorithmic settings such as operations research and cryptography.</td>
</tr>
<tr>
<td>Week Number 15</td>
<td>Projects and Assignments discussion and presentations.</td>
</tr>
<tr>
<td>Week Number 16</td>
<td>Final Exam.</td>
</tr>
</tbody>
</table>
Course Title: Numerical Analysis
Code: CC 413
Prerequisite: CC 112 - BA224.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Introduction to numerical methods and their applications - solve science and engineering problems - convergence - error analysis of numerical methods.

Text Book


Reference Books


Course Aim

Allow students to master the approximation techniques used in numerical solutions that arise in science and engineering problems. Teach students why numerical methods work, what type of errors to expect and when an application might lead to difficulties.

Course Objectives

Upon completion of this course the student will be able to:
Introduction to numerical methods and errors of computers, errors analysis, error propagation, roots of equations of one variable linear equations, Eigen values and Eigen vectors.

Numerical differentiation, integration, interpolation, least square error, and regression.

**Course Outline**

*Week Number 1:* Solution of equations of one variable: Bisection method, False Position method, and secant method.

*Week Number 2:* Solution of equations of one variable: Successive Approximation method, and modified Successive Approximation method.

*Week Number 3:* Solution of equations of one variable: Newton Raphson method and nearly equal roots.

*Week Number 4:* Solution of equations of one variable: Berge Vieta method (of roots of polynomials).

*Week Number 5:* Error Analysis and Propagation: Types and sources of errors and ill-conditioning and instability.

*Week Number 6:* Error Analysis and Propagation: Process graphs, error propagation with examples.

*Week Number 7:* Solutions of linear equations: (Direct Methods) Gauss elimination and Gauss Jordan methods.

*Week Number 8:* Solutions of linear equations: (Direct Methods) Gauss Jordan method for Integral matrices.

*Week Number 9:* Solutions of linear equations: (Indirect Methods) Jacobi, Gauss Siedel, and conditions of convergence.

*Week Number 10:* Matrix Inversion using direct methods for solution of linear equations. Eigen values.

*Week Number 11:* Numerical Interpolation (Linear, Quadratic, and Lagrange polynomials).

*Week Number 12:* Numerical Differentiation and Integration (Mid-point integration).

*Week Number 13:* Numerical Integration (Trapezoidal, Simpson, and Gaussian integration).

*Week Number 14:* Linear and Quadratic regression.

*Week Number 15:* Lagrange regression and revision.

*Week Number 16:* Final Exam.
CC 414 – Database systems  
**Course Information**

Course Title: Database systems  
Code: CC 414  
Hours: Lecture – 2 Hrs.  
Tutorial – 2 Hrs.  
Credit – 3.  
Prerequisite: CC 319.

**Grading**

Class Performance/Attendance: 10%  
Midterm # 1/Assignments – (7th Week): 30%  
Midterm # 2/Assignments – (12th Week): 20%  
Final Exam: 40%

**Course Description**

Relational Database analysis – design - normalization and implementation - implementation skills using Oracle developer - Concurrent transactions - Distributed databases and client server approach.

**Text Book**


**Reference Books**

- ORACLE developer manuals.

**Course Aim**

Help students to achieve a high level of proficiency at design and implementation of relational database systems for real-world design problems.

**Course Objectives**

Upon completion of this course the student will be able to:

- Explain database design concepts  
- Design a database system for a real-world problem.  
- Implement and verify a database system using ORACLE Developer 2000
COURSE OUTLINE

Week Number 1: Introductory to database concepts.
Week Number 2: Relational data model of relational database systems.
Week Number 3: Relational Integrity rules.
Week Number 4: Relational algebra.
Week Number 5: Basic relational analysis and data modeling.
Week Number 6: Normalization of database tables. (Part 1).
Week Number 7: 7th week exam.
Week Number 8: Normalization of database tables. (Part 2).
Week Number 9: Extended relational analysis and data modeling.
Week Number 10: Developing Entity / relationship diagram.
Week Number 11: Developing a database design and Implementation of a real-world problem.
Week Number 12: 12th week exam.
Week Number 13: Transaction management and concurrency control.
Week Number 14: Internal level of database systems
Week Number 15: Distributed databases and client-server Architecture.
Week Number 16: Final Exam.
CC 415 – Data Acquisition System

COURSE INFORMATION

Course Title: Data Acquisition System
Code: CC 415
Hours: Lecture – 2 Hrs. Tutorial / Lab – 2/2 Hrs. Credit – 3.
Prerequisite: CC 421.

GRADING

Class Performance/Attendance: 10%
Midterm #1/Assignments – (7th Week): 30%
Midterm #2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

Data Acquisition, Definitions & Applications, Data Acquisition channel structure components, Sensors and Transducers: Types, applications, structural classifications, Signal conditioning, Amplifications reshaping, and filtration, Data conversion, principles, devices and limitations, Introduction to data Analysis and elementary control, Case studies, Student Projects.

TEXT BOOK


REFERENCE BOOKS


COURSE AIM

To introduce the basic techniques of automatic sensing and measurements in the non-digital world. To train students on the principles and to acquire skills in dealing with sensing different physical phenomena; mechanical, electric, electronic, and optical.

COURSE OBJECTIVES

Upon completion of this course the student will be able to:

COURSE OUTLINE

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction.</td>
</tr>
<tr>
<td>2</td>
<td>Data acquisition systems &amp; data acquisition channel.</td>
</tr>
<tr>
<td>3</td>
<td>Sensors &amp; transducers.</td>
</tr>
<tr>
<td>4</td>
<td>Signal conditioning: operational amplifiers &amp; applications.</td>
</tr>
<tr>
<td>5</td>
<td>Signal conditioning: operational amplifiers.</td>
</tr>
<tr>
<td>6</td>
<td>Signal conditioning: analog filters.</td>
</tr>
<tr>
<td>7</td>
<td>7th week exam.</td>
</tr>
<tr>
<td>8</td>
<td>Review of computer interfacing techniques.</td>
</tr>
<tr>
<td>9</td>
<td>Special applications of operational amplifiers.</td>
</tr>
<tr>
<td>10</td>
<td>Digital to analog conversion.</td>
</tr>
<tr>
<td>11</td>
<td>Actuators.</td>
</tr>
<tr>
<td>12</td>
<td>12th week exam.</td>
</tr>
<tr>
<td>13</td>
<td>Analog to digital conversion – part 1.</td>
</tr>
<tr>
<td>14</td>
<td>Analog to digital conversion – part 2.</td>
</tr>
<tr>
<td>15</td>
<td>Projects presentation.</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam.</td>
</tr>
</tbody>
</table>
CC 416 – Computer Graphics

COURSE INFORMATION

Course Title: Computer Graphics
Code: CC 416
Hours: Lecture – 2 Hrs. Tutorial / Lab– 2/2 Hrs. Credit – 3.
Prerequisite: CC 319.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

History and survey of graphics applications - Overview of graphics systems and output devices - Output primitives including points, lines, circles, splines, area filling, and character generation - Attributes of output primitives - two dimensional transformations - windowing and clipping. Interactive input methods - Introduction to three-dimensional graphics.

TEXT BOOK


REFERENCE BOOKS


COURSE AIM

Introduce the student to the basic principles for design, use and understanding of 2-d as well as 3-d graphics. The hardware and software components of graphics systems are examined.

COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Provides the student with the necessary knowledge in mathematics, algorithms design and programming skills to develop graphics applications.
COURSE OUTLINE


Week Number 3: Color display – Color models.

Week Number 4: Output Primitives: Bresenham line and Mid-point Circle / Ellipse drawing algorithms (Part 1).

Week Number 5: Output Primitives: Bresenham line and Mid-point Circle / Ellipse drawing algorithms (Part 2).

Week Number 6: Drawing free curves: Bezier and Spline techniques.

Week Number 7: 7th week exam.

Week Number 8: Two – Dimensional Transformations.

Week Number 9: Viewing transformation.

Week Number 10: Line and Polygon clipping algorithms.

Week Number 11: Filling algorithms.

Week Number 12: Animation.

Week Number 13: Three – Dimensional Concepts Viewing and Representation.

Week Number 14: Three – Dimensional Transformations.

Week Number 15: Revision.

Week Number 16: Final Exam.
CC 417 – Assembly Language

COURSE INFORMATION

Course Title: Assembly Language
Code: CC 417
Hours: Lecture – 2 Hrs. Tutorial /Lab – 2 /2 Hrs. Credit – 3.
Prerequisite: CC 421.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

Introduction to 8086 instructions & directories, Assembly language fundamentals, Input/Output operations, conditional processing, Arithmetic, string processing, disk storage, file processing, terminate and stay resident programs (TSRs). The course includes a project.

TEXT BOOK


REFERENCE BOOKS


COURSE AIM

Learning the assembly language instructions set, directives, macros, and data allocation statements. Interact programs with the operating system including memory management and input/output services.

COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Understand the hardware and software architectures and assembly language fundamentals.
- Use the assembler.
- Apply input/output services conditional processing, arithmetic and string operations.
COURSE OUTLINE

Week Number 1: Introduction to assembly usage.
Week Number 2: Layout of assembly program.
Week Number 3: Assemble, link and run programs.
Week Number 4: Test the input services.
Week Number 5: Test the output services.
Week Number 6: Program control instructions and skills.
Week Number 7: Structure programming.
Week Number 8: Arithmetic skills & project assignment.
Week Number 9: Numeric concepts.
Week Number 10: String properties.
Week Number 11: Create libraries.
Week Number 12: Macro usage.
Week Number 13: Disk manipulation.
Week Number 14: Disk and file usage.
Week Number 15: Project grading.
Week Number 16: Final Exam.
CC 418 – Operating Systems  

COURSE INFORMATION

Course Title: Operating Systems  
Code: CC 418  
Hours: Lecture – 2 Hrs.  
Tutorial / Lab – 2 /2 Hrs.  
Credit – 3.  
Prerequisite: CC 410.

GRADING

Class Performance/Attendance: 10%  
Midterm # 1/Assignments – (7th Week): 30%  
Midterm # 2/Assignments – (12th Week): 20%  
Final Exam: 40%

COURSE DESCRIPTION

Introduction to modern operating systems - the concepts, structure, design principles, implementation issues, and mechanisms of operating systems.

TEXT BOOK


REFERENCE BOOKS


COURSE AIM

Introduce concepts of managing modern computer resources which is handled by various OS techniques. It also aims at exposing the student to practical OS features and techniques.

COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Discuss main OS concepts.
- Solve sample resource management problems
- list important OS algorithms
- Evaluate OS performance, and be exposed to the Linux OS
COURSE OUTLINE

Week Number 1: Introduction and Computer System Overview.
Week Number 2: Computer System Overview (cont.).
Week Number 3: Operating System Overview.
Week Number 4: Process Description and Control.
Week Number 5: Threads.
Week Number 6: Concurrency: Software Approaches for Mutual Exclusion.
Week Number 7: 7th week exam.
Week Number 8: Concurrency: Other approaches for mutual exclusion (hardware support and OS support (semaphores)).
Week Number 9: Concurrency: Deadlock prevention, avoidance, and detection.
Week Number 10: Memory Management.
Week Number 11: Virtual Memory: Hardware and Control Structures.
Week Number 12: 12th week exam.
Week Number 13: Virtual Memory: OS Software.
Week Number 14: Uniprocessor Scheduling.
Week Number 15: Disk Scheduling and Revision.
Week Number 16: Final Exam.
CC 421 – Microprocessors Systems

COURSE INFORMATION

Course Title: Microprocessors Systems
Code: CC 421
Prerequisite: CC 311.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

Microprocessors and microcomputers. Microcomputer structure: microprocessor, memory, busses (synchronous and asynchronous) and I/O). 16/32-bit microprocessor architecture: Instruction cycle, microinstructions, micro-programming, instruction decoding, Reduced Instruction Set computer (RISC) architecture, Complex Instruction Set computer (CISC) architecture. Memory (RAM, ROM, memory mapping of I/O. I/O (parallel and serial I/O interfaces, system clock, clock phases and bit rates). Interrupts (types, handling of interrupts). Software aids (text editors and assemblers, linkers and macro-assemblers).

TEXT BOOK


REFERENCE BOOKS


COURSE AIM

Identify The Microprocessors Category and study the internal structure and external connections of an example microprocessor (Intel 80386).

COURSE OBJECTIVES

Upon completion of this course the student will be able to:

Study the Intel 80386 microprocessor, its connected peripherals, and its assembly language format.
## COURSE OUTLINE

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to microprocessors Historical background.</td>
</tr>
<tr>
<td>2</td>
<td>80386 Microprocessor architecture.</td>
</tr>
<tr>
<td>3</td>
<td>Real mode software model.</td>
</tr>
<tr>
<td>4</td>
<td>Addressing modes.</td>
</tr>
<tr>
<td>5</td>
<td>The instruction set &amp; Machine Language coding.</td>
</tr>
<tr>
<td>6</td>
<td>Protected mode Architecture Model.</td>
</tr>
<tr>
<td>7</td>
<td>7th week exam.</td>
</tr>
<tr>
<td>8</td>
<td>Virtual memory Management.</td>
</tr>
<tr>
<td>9</td>
<td>Memory Interface.</td>
</tr>
<tr>
<td>10</td>
<td>DRAM.</td>
</tr>
<tr>
<td>11</td>
<td>Input/output interface.</td>
</tr>
<tr>
<td>12</td>
<td>12th week exam.</td>
</tr>
<tr>
<td>13</td>
<td>Interrupts and exception processing.</td>
</tr>
<tr>
<td>14</td>
<td>The 486 and Pentium microprocessors family.</td>
</tr>
<tr>
<td>15</td>
<td>Revision.</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam.</td>
</tr>
</tbody>
</table>
CC 431 – Computer Networks

COURSE INFORMATION

Course Title: Computer Networks
Code: CC 431
Prerequisite: CC 331.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

Introduction – Computer Networks and the Internet – Networking protocol layers OSI and TCP/IP- Application Layer Principles of net applications, web and HTTP, FTP, electronic mail, DNS and Peer to Peer applications. Transport layer, Multiplexing and demultiplexing, Connectionless Transport and UDP –reliable data transfer and connection oriented transport TCP, congestion control. Network layer forwarding and routing, IP protocol, routing algorithms, Broadcast and Multicast routing. Data Link layer, introduction and services, error detection and correction techniques, Multiple access protocols and Link layer addressing, Ethernet and PPP.

TEXT BOOK


REFERENCE BOOKS


COURSE AIM

To provide unified view of the broad field of computer networks. To emphasize networking principles and topics of fundamental importance concerning the different networking layers, following a top down system approach.
COURSE OBJECTIVES

Upon completion of this course the student will be able to develop network applications and see through the complexity of computer networks and will learn the distinct concepts and protocols in computer architecture.

COURSE OUTLINE

Week Number 1: Introduction.
Week Number 2: Computer Networks, Protocols, Architectures and Internet.
Week Number 3: Application Layer Principles and the web.
Week Number 4: HTTP, FTP, SMTP.
Week Number 5: DNS, peer to peer applications and socket programming.
Week Number 6: Transport layer services and UDP
Week Number 7: Midterm Exam.
Week Number 8: Reliable data transfer and TCP and congestion control.
Week Number 9: Network Layer and Inside the router.
Week Number 10: IP Internet Protocol.
Week Number 11: Routing algorithms and broadcast and multicast routing.
Week Number 12: 12th Week Exam.
Week Number 13: Data Link Layer and error detection and correction.
Week Number 14: Multiple Access Protocols, link addressing.
Week Number 15: Ethernet, PPP and Revision.
Week Number 16: Final Exam
CC 442 – Digital Design and Introduction to Microprocessor

Course Title: Digital Design and Introduction to Microprocessor
Code: CC 442
Prerequisite: CC 112.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Number systems - binary arithmetic and codes - logic gates - Boolean algebra and logic simplifications - Design and realization of combinational circuits - Flip-Flops – Design of sequential circuits - Analysis and realization of counters – Computer aided engineering - Introduction to microprocessor.

Text Book


Reference Books


Course Aim

To develop engineering skills in the design and analysis of digital logic circuits with applications to digital computer and microprocessors.

Course Objectives

Upon completion of this course the student will be able to:

* Offered only to other departments
Knowing the basic differences between analog and digital systems.
• Use binary numbers and codes.
• Describe the operation of logic gates.
• Applying Boolean algebra and K-map to simplify function.
• Design combinational and sequential logic circuit.

COURSE OUTLINE

Week Number 1: Introduction to digital concepts.
Week Number 2: Number system, operation, and codes.
Week Number 3: Logic gates.
Week Number 4: Boolean algebra and logic simplification – part 1.
Week Number 5: Boolean algebra and logic simplification – part 2.
Week Number 6: Function of combinational logic.
Week Number 7: 7th week exam.
Week Number 8: Decoders, Encoders, MUX, and DMUX – part 1.
Week Number 9: Decoders, Encoders, MUX, and DMUX – part 2.
Week Number 12: 12th Week Exam.
Week Number 13: Shift register.
Week Number 14: Introduction to microprocessor – part 1.
Week Number 15: Introduction to microprocessor – part 2.
Week Number 16: Final Exam.
CC 511 – Artificial Intelligence

Course Title: Artificial Intelligence

Code: CC 511


Prerequisite: CC 218 – CC319.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

History and Goals – Representation and search – Knowledge based systems – Logic (Propositional and Predicate) as a representation language – Prolog as an example of an AI language.

Text Book


Reference Books


Course Aim

To explain the basic concepts of artificial intelligence. Discuss a wide variety of search techniques and explain the methods for encoding knowledge in computer systems.

Course Objectives

Upon completion of this course the student will be able to:

- Implement a wide variety of intelligent applications using C, Prolog, and shells

Course Outline

Week Number 1: Introduction to AI: Definition - History – Goals.

Week Number 3: Blind search techniques.

Week Number 4: Informed (Heuristic) search techniques: Hill Climbing – Best First – A*

Week Number 5: Admissibility – Monotonicity – Informedness of a heuristic function.

Week Number 6: Game trees.

Week Number 7: 7th week exam.

Week Number 8: Expert systems & knowledge-based systems.

Week Number 9: Propositional Logic: Syntax – Semantic – Proof by resolution refutation.

Week Number 10: First Order Logic: Syntax – Semantic.

Week Number 11: First Order Logic: Resolution - Soundness – Completeness.

Week Number 12: 12th week exam.


Week Number 14: Prolog tree data structuring.

Week Number 15: AI Applications.

Week Number 16: Final Exam.
CC 513 – Computing Systems

Course Title: Computing Systems
Code: CC 513
Prerequisite: CC 418 – CC 421.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

High performance computing, ILP, RISC architecture, Memory hierarchy, Pipelining, Vector processing, Array processing, Massively parallel processors, Multiprocessor architecture, Data flow computers, VLSI computing and Systolic arrays

Text Book


Reference Books


Course Aim

To introduce concepts of high performance computing advanced computing architectures and multiprocessing requirements. The impact of VLSI on modern computing architectures is emphasized with applications on different architectures.

Course Objectives

Upon completion of this course the student will be able to:
Identify different architectures, have a solid background on parallel processing concepts and have enhanced design skills using FPGA.

COURSE OUTLINE

Week Number 1: Introduction to high performance computing.
Week Number 2: ILP.
Week Number 3: Memory and I/O Subsystems.
Week Number 4: Memory and Vector processing – part 1.
Week Number 5: Memory and Vector processing – part 2.
Week Number 6: Pipelining computers.
Week Number 7: 7th week exam.
Week Number 8: Array processors – part 1.
Week Number 9: Array processors – part 2.
Week Number 10: Multiprocessor architecture – part 1.
Week Number 11: Multiprocessor architecture – part 2.
Week Number 12: Multiprocessing control.
Week Number 13: Dataflow computers – part 1.
Week Number 14: Dataflow computers – part 2.
Week Number 15: Systolic arrays.
Week Number 16: Final Exam.
CC 515 – Introduction to Software Engineering

Course Title: Introduction to Software Engineering

Code: CC 515


Prerequisite: CC 319.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Introduction to software engineering disciplines with emphasis on software life cycle - project management – verification - validation and testing of software.

Text Book


Reference Books


Course Aim

To expose students to the software life cycle and to understand how to analyze, design, implement and test large-scale software. To practice teamwork in developing software project and to introduce techniques and standard documents used in each stage of the software life cycle.

Course Objectives

Upon completion of this course the student will be able to:

- The software life cycle model requirement and specifications
- Design models, structured and object oriented design, program development, programming development tools, configuration control
- Program testing and verification, maintenance, Reliability, CASE
## COURSE OUTLINE

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Software Engineering.</td>
</tr>
<tr>
<td>2</td>
<td>Introducing the notion of S/W process.</td>
</tr>
<tr>
<td>3</td>
<td>The software process models.</td>
</tr>
<tr>
<td>4</td>
<td>Project Management.</td>
</tr>
<tr>
<td>5</td>
<td>Software Requirements (Part 1).</td>
</tr>
<tr>
<td>6</td>
<td>Software Requirements (Part 2).</td>
</tr>
<tr>
<td>7</td>
<td>UML.</td>
</tr>
<tr>
<td>8</td>
<td>Project Presentation.</td>
</tr>
<tr>
<td>9</td>
<td>Architectural Design.</td>
</tr>
<tr>
<td>10</td>
<td>Object Oriented Design.</td>
</tr>
<tr>
<td>11</td>
<td>Rapid Application Development.</td>
</tr>
<tr>
<td>12</td>
<td>Critical Systems Development.</td>
</tr>
<tr>
<td>13</td>
<td>Topics in Software Engineering: Verification and Validation.</td>
</tr>
<tr>
<td>14</td>
<td>Topics in Software Engineering: Testing.</td>
</tr>
<tr>
<td>15</td>
<td>Project Presentation (Final).</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam.</td>
</tr>
</tbody>
</table>
CC 516 – Pattern Recognition

Course Information

Course Title: Pattern Recognition
Code: CC 516
Prerequisite: CC 511.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Smoothing operations - edge detection algorithms - the connected component methodology - shape detection and morphological operations - statistical decision - other paradigms in pattern recognition include hierarchical and partitional clustering - feed-forward and feed-backward neural networks.

Text Book


Reference Books


Course Aim

Introduces a thorough grounding of the principles of image analysis and pattern recognition and seeks to develop students’ knowledge on its techniques. It concentrates on the fundamental theory of image processing with emphasis on the areas of image enhancement, segmentation, and their applications. In addition, on finishing this course, students will be familiar with the most frequently used pattern recognition techniques, such as statistical classifiers, clustering and neural networks.

Course Objectives

Upon completion of this course the student will be able to:

- Cover a balanced mixture of theory and practice including laboratory sessions and tutorials
- Use of the MATLAB image toolbox and will be able to apply it to real life problems
Practical area includes blood cell classification and face recognition.

**COURSE OUTLINE**

*Week Number 1:* Introduction.

*Week Number 2:* Point Operations.

*Week Number 3:* Smoothing Transformations.

*Week Number 4:* Edge detection.

*Week Number 5:* Scene Segmentation and Labelling.

*Week Number 6:* Shape detection.

*Week Number 7:* 7th week exam.

*Week Number 8:* Morphological Operations.

*Week Number 9:* Statistical Decision Making.

*Week Number 10:* Minimization of Classification Error.

*Week Number 11:* Hierarchical Clustering.

*Week Number 12:* 12th week exam.

*Week Number 13:* Partitional Clustering.

*Week Number 14:* Feed Forward Neural Networks.

*Week Number 15:* HopField Networks.

*Week Number 16:* Final Exam.
CC 517 – Modelling and Simulation

Course Title: Modelling and Simulation

Code: CC 517


Prerequisite: CC 112.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Review of Probability, random variables and distributions - random Processes - discrete and continuous markov Processes - queuing systems - stochastic petri nets - computer generation of random numbers - simulation of an M/M/1 queuing system.

Text Book


Reference Books


Course Aim

To understand the models as tools to make predictions about the behavior of systems. Acquiring the necessary conceptual and practical background for representing discrete and continuous random processes.

Course Objectives

Upon completion of this course the student will be able to:

- To emphasize basic principles of the field of Modeling and Simulation
- Highlight the different stages in building a discrete event simulation model and the architecture of a simulation software
## COURSE OUTLINE

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction.</td>
</tr>
<tr>
<td>2</td>
<td>Review of probability, random variables and distributions</td>
</tr>
<tr>
<td>3</td>
<td>The exponential and Poisson distributions.</td>
</tr>
<tr>
<td>4</td>
<td>Generation of random numbers and distributions.</td>
</tr>
<tr>
<td>5</td>
<td>Operational laws. Little law and its applications.</td>
</tr>
<tr>
<td>6</td>
<td>Random processes, state transition diagrams.</td>
</tr>
<tr>
<td>7</td>
<td>7th week exam.</td>
</tr>
<tr>
<td>8</td>
<td>Discrete and Continuous Markov processes, steady state solutions.</td>
</tr>
<tr>
<td>9</td>
<td>Continuous Markov processes (continue).</td>
</tr>
<tr>
<td>10</td>
<td>Queuing models – performance measures.</td>
</tr>
<tr>
<td>11</td>
<td>Applications.</td>
</tr>
<tr>
<td>12</td>
<td>12th week exam.</td>
</tr>
<tr>
<td>13</td>
<td>Modelling with stochastic Petri nets.</td>
</tr>
<tr>
<td>14</td>
<td>Modelling with stochastic Petri nets (continue).</td>
</tr>
<tr>
<td>15</td>
<td>Features of Simulation languages.</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam.</td>
</tr>
</tbody>
</table>
CC 518 – Data Security

**Course Information**

- **Course Title:** Data Security
- **Code:** CC 518
- **Hours:**
  - Lecture – 2 Hrs.
  - Tutorial – 2 Hrs.
  - Credit – 3.
- **Prerequisite:** CC 319.

**Grading**

- Class Performance/Attendance: 10%
- Midterm # 1/Assignments – (7th Week): 30%
- Midterm # 2/Assignments – (12th Week): 20%
- Final Exam: 40%

**Course Description**

Analyze the asymptotic performance of algorithms - demonstrate a familiarity with major algorithms and data structures - synthesize efficient algorithms in common engineering design situations.

**Text Book**


**Reference Books**


**Course Aim**

To understand what computer security is? and why it is important?. To understand the security concept and security levels standard for trusted systems. To understand the (encryption) techniques to protect stored & transmitted data and it is important to understand some security history, and describes what these security standards are and how they are developed.

**Course Objectives**

Upon completion of this course the student will be able to:

- Threats to computer systems
- Attacks methods
- Intrusion detection
COURSE OUTLINE

Week Number 1: Goals of data & information security and Threats -Types of Attacks.

Week Number 2: Classical Encryption Techniques.

Week Number 3: Playfair Cipher and Hill Cipher.

Week Number 4: Polyalphabetic Cipher and Transposition techniques.

Week Number 5: Block Cipher & DES:-Simplified DES.

Week Number 6: Block cipher design principles and Block cipher modes of operation.

Week Number 7: 7th week exam.

Week Number 8: Advanced encryption standard: Evaluation criteria for AES.

Week Number 9: Electronic mail Security Threats.

Week Number 10: Message authentication Techniques.

Week Number 11: Pretty good privacy(PGP) message generation.

Week Number 12: 12th week exam.

Week Number 13: Firewall design principles.

Week Number 14: Trusted systems.

Week Number 15: Security Aspects and Intruders.

Week Number 16: Final Exam.
CC 521 – Micro-Computer Based Design

Course Information

Course Title: Micro-Computer Based Design
Code: CC 521
Prerequisite: CC 415.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Comparing between microprocessors and micro-controllers. Programming of micro controllers embedded systems. Design a plan for micro based system, dealing with different hardware interface including ADC, DAC, and serial communication and control circuits.

Text Book


Reference Books


Course Aim

Teach student how to design a system of input and output devices and control it using a micro controller.

Course Objectives

Upon completion of this course the student will be able to understand how to design and implement a micro based system

Course Outline

Week Number 1: Introduction to Microcontrollers.
Week Number 2: Programming micro controllers using assembly language.
Week Number 5: Embedded system design consideration.
Week Number 6: Embedded system design steps.
Week Number 7: 7th week exam.
Week Number 8: Interfacing with keypad.
Week Number 9: Interfacing with 7-segment display.
Week Number 10: Interfacing with ADC and DAC.
Week Number 11: Dealing with serial communication.
Week Number 12: 12th Week Exam.
Week Number 13: Design of final project.
Week Number 14: Design tools II.
Week Number 15: Presentation of project
Week Number 16: Final Exam.
CC 523 – Computer Design and Performance Evaluation

Course Title: Computer Design and Performance Evaluation

Code: CC 523


Prerequisite: CC 311.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Comparison between the two major design methodologies based on ISA (Instruction Set Architecture) and ASA (Application Specific Architecture). The course covers the topics of queuing theory and Markov processes as a tool for computer system performance evaluation. Moreover, the students are introduced to operational analysis techniques regarding performance of computer systems.

Text Book


Reference Books


Course Aim

The course introduces the student to the principles of design, build and test of special-purpose processors. Moreover, the students are introduced to the concepts of evaluating the performance of such processors. It is intended for the final year BS. Students or first year graduates specializing in computer engineering.
COURSE OBJECTIVES

The course introduces the student to the principles of design, build and test of special-purpose processors. Moreover, the students are introduced to the concepts of evaluating the performance of such processors. It is intended for the final year BS. Students or first year graduates specializing in computer engineering.

COURSE OUTLINE

Week Number 1: Introduction to ISA-based Computer Design, Sequencing and Control.

Week Number 2: Hardwired and Micro-Programmed Control.

Week Number 3: Single-Cycle Hardwired Control and Multiple-Cycle Micro-Programmed Control.

Week Number 4: Pipelined Control and Performance Evaluation.

Week Number 5: Instruction Set Architecture and Addressing Evaluation.

Week Number 6: Central Processing Unit Design.

Week Number 7: 7th week exam.

Week Number 8: High Performance CPU Concepts.

Week Number 9: Design Parameters; Area, Time and Cost.

Week Number 10: Operational Analysis.

Week Number 11: M/G/I Queuing model.

Week Number 12: 12th Week Exam.

Week Number 13: Discrete-Time Markov Chains.

Week Number 14: Benchmark System Evaluation.

Week Number 15: Revision

Week Number 16: Final Exam.
CC 524 – Neural Networks

Course Title: Neural Networks

Code: CC 524


Prerequisite: CC 112 – BA323.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description


Introduction to MATLAB environment. Single perceptron, Multilayer perceptron, Competitive networks, Kohonen networks, ART networks, And Hopfield networks using MATLAB.

Text Book


Reference Books


Course Aim

This course will provide students with detailed skills to use Artificial neural networks for solving many types of engineering problems such as mapping, clustering, and constrained optimization, in such areas as pattern recognition, signal processing, and control systems.
COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Explain the basic concepts of neural networks.
- Discuss a wide variety of neural networks with architecture, training, algorithms, and applications.
- Demonstrate the architecture, training, and applications of a wide variety of neural networks using MATLAB simulation package.

COURSE OUTLINE

Week Number 1: Introduction to basic concepts of neural networks.
Week Number 2: The basic neuron.
Week Number 3: The multilayer perceptron.
Week Number 4: Artificial neural networks: applications, learning rules, and architecture.
Week Number 5: Competitive neural networks.
Week Number 6: Kohonen self-organizing networks.
Week Number 7: Adaptive reasoning theory (ART) – part 1.
Week Number 8: Adaptive reasoning theory (ART) – part 2.
Week Number 9: Hopfield neural networks.
Week Number 10: Neural networks implementation.
Week Number 11: Neural networks applications – part 1.
Week Number 12: Neural networks applications – part 2.
Week Number 13: Neural networks applications – part 3.
Week Number 14: Neural networks applications – part 4.
Week Number 15: Neural networks applications – part 5.
Week Number 16: Final Exam.
**CC 525 – Intelligent Robotics**

**COURSE INFORMATION**

Course Title: Intelligent Robotics  
Code: CC 525  
Hours: Lecture – 2 Hrs.  
Tutorial – 2 Hrs.  
Credit – 3.  
Prerequisite: CC 319 – EE 418.

**GRADING**

Class Performance/Attendance: 10%  
Midterm # 1/Assignments – (7th Week): 30%  
Midterm # 2/Assignments – (12th Week): 20%  
Final Exam: 40%  

**COURSE DESCRIPTION**


**TEXT BOOK**


**REFERENCE BOOKS**


**COURSE AIM**

To teach students the principles and techniques of designing intelligent robotic systems.

**COURSE OBJECTIVES**

Upon completion of this course the student will be able to:

- Understanding the basic principles of robot manipulator systems  
- Study the kinematics, Static, and Dynamics of a robotic system  
- Study the problem of trajectory planning  
- Understanding the different types of sensors and their use in the different robotic applications  
- Explaining robot arm and motion control
• Design and implementation of an intelligent robot

COURSE OUTLINE

Week Number 1: Introduction.
Week Number 2: Object location.
Week Number 3: General transformation.
Week Number 4: Kinematics: Homogenous Transformation.
Week Number 5: Kinematics: Forward / Inverse kinematics.
Week Number 6: Introduction to AI.
Week Number 7: 7th week Exam.
Week Number 8: Robot Sensors.
Week Number 9: Image Processing.
Week Number 10: Pattern recognition and computer vision.
Week Number 11: Autonomous Mobile Robots.
Week Number 12: 12th week Exam.
Week Number 13: Trajectory planning for Robot.
Week Number 14: Robot Control.
Week Number 15: Revision.
Week Number 16: Application.
CC 527 – Computer Aided Design

Course Title: Computer Aided Design
Code: CC 527
Prerequisite: CC 311 or CC 312.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

To introduce fundamental algorithms and techniques for computer aided integrated circuit design. It covers aspects of design flow, physical design, logic optimization, timing analysis and verification, synthesis for testability.

Text Book


Reference Books


Course Aim

To learn new design technologies, large-scale designs using VLSI technology and modern computer techniques used in Digital circuit designs & implementation.

Course Objectives

Upon completion of this course the student will be able to produce highly qualified and skilled engineers who can cope with state of the art technologies in digital circuit design & implementation.
COURSE OUTLINE

Week Number 1: Introduction to CMOS Circuits.
Week Number 2: Circuit & system Representation.
Week Number 3: Circuit Characterization.
Week Number 4: Circuit performance estimation.
Week Number 5: Interconnect and Wiring.
Week Number 6: Combinational Circuit Design.
Week Number 7: 7th week Exam.
Week Number 8: Sequential Circuit Design.
Week Number 9: Design methodology and Tools.
Week Number 10: Datapath subsystems – part 1.
Week Number 11: Datapath subsystems – part 2.
Week Number 12: 12th week Exam.
Week Number 13: Design tools I.
Week Number 14: Design tools II.
Week Number 15: Revision.
Week Number 16: Final exam.
CC 528 – Computer Systems Performance Analysis

Course Information

Course Title: Computer Systems Performance Analysis
Code: CC 528
Prerequisite: CC 112 – CC 531.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

The purpose of this course is to introduce the student to the principles and techniques of performance measurement in the analysis of computer systems. Such techniques are used to detect bottlenecks, measure the efficiency of computer systems and applications.

Text Book


Course Aim

The student will be introduced to performance measurement techniques, basic principles of queuing theory, experimental design, among others. The student will be expected to do individual assignments. Assignments are to be done individually. The course will consist of both lectures and class discussions.

Course Objectives

Upon completion of this course the student will be able to: produce highly qualified and skilled engineers who can cope with state of the art technologies in performance analysis and design.

Course Outline

Week Number 1: Introduction to Performance Analysis.
Week Number 2: Approaches to Performance Analysis.
Week Number 3: Workloads.
Week Number 4: Simulation

Week Number 5: Experimental Design: k Factors with 2 levels.

Week Number 6: Experimental Design: k Factors, 2 levels with Replication.

Week Number 7: 7th week Exam

Week Number 8: Experimental Design: 2 Factors with multiple levels.

Week Number 9: Experimental Design: 1 Factor Designs.

Week Number 10: Experimental Design: Fractional Factorial Designs.

Week Number 11: Operational Analysis.

Week Number 12: 12th week Exam.

Week Number 13: More Operational Analysis.

Week Number 14: Introduction to Queuing Theory.

Week Number 15: Revision.

Week Number 16: Final exam.
CC 529 – Distributed and Parallel Systems

Course Title: Distributed and Parallel Systems
Code: CC 529
Prerequisite: CC 431.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

This course studies the fundamental aspects of distributed systems and applications. Early foundations and recent developments in distributed systems will be investigated. Both client-server and peer-to-peer application designs will be discussed. Other topics include sockets, reliability, replication, group membership protocols, clock synchronization, and logical timestamps.

Text Book


Course Aim

This course studies the fundamental aspects of distributed systems and applications. Early foundations and recent developments in distributed systems will be investigated. Both client-server and peer-to-peer application designs will be discussed. Other topics include sockets, reliability, replication, group membership protocols, clock synchronization, and logical timestamps.

Course Objectives

Upon completion of this course the student will be able to produce highly qualified and skilled engineers who can cope with state of the art technologies in distributed systems.

Course Outline

Week Number 1: Introduction to distributed architectures.
Week Number 2: Communication among systems.
Week Number 3: Naming.

Week Number 4: Synchronization (1)

Week Number 5: Synchronization (2)

Week Number 6: Consistency

Week Number 7: Replication.

Week Number 8: 7th week exam.

Week Number 9: Fault tolerance (1)

Week Number 10: Fault tolerance (2).

Week Number 11: distributed systems: object based, file

Week Number 12: 12th week Exam.

Week Number 13: Distributed systems: file, web-based, coordination-based

Week Number 14: Distributed systems: coordination-based.

Week Number 15: Distributed and parallel systems

Week Number 16: Final exam.
CC 531 – Advanced Networks

COURSE INFORMATION

Course Title: Advanced Networks
Code: CC 531
Prerequisite: CC 431.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

The course emphasizes topics of fundamental importance concerning the technology and architecture of networks. It highlights various networks protocols and standards and discusses wireless, mobile and adhoc networks, internetworking and interoperability. Students measure networks performance and study their realizations using the available networking facilities.

TEXT BOOK

Lecture Notes and hand outs.

REFERENCE BOOKS


COURSE AIM

- To emphasize topics of fundamental importance concerning the technology and architecture of networks.
- To highlight various network protocols & standards.
- To discuss LANs, wireless LAN and mobile internetworking & interoperability.
- To make students able to measure network performance.
- To expose students to actual network realizations, using the available networking facilities.
COURSE OBJECTIVES

Upon completion of this course the student will be able to analyse mobile and wireless networks and Multimedia networking. Student will learn about network management and

COURSE OUTLINE

Week Number 1: Introduction to wireless and Mobile networks.
Week Number 2: Wifi 802.11 Wireless LAN.
Week Number 3: Beyond 802.11: Bluetooth, WiMAX and Cellular Internet Access.
Week Number 4: Mobility management and Mobile IP.
Week Number 5: Multimedia Networking applications.
Week Number 6: Streaming stored audio and video.
Week Number 7: 7th week exam.
Week Number 8: Protocols for Real-Time Interactive applications
Week Number 9: Mobile adhoc networks MANET.
Week Number 10: Simulation and modelling of wireless Mobile and adhoc networks.
Week Number 12: 12th Week Exam.
Week Number 13: Networks management.
Week Number 14: Network administration.
Week Number 15: Revision.
Week Number 16: Final Exam.
CC 533 – Internetwork Programming

Course Information

Course Title: Internetwork Programming
Code: CC 533
Hours: Lecture – 2 Hrs. Tutorial/ Lab – 2/2 Hrs. Credit – 3.
Prerequisite: CC 431.

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

The course is about the exploration of internet implementation as a network of embedded computing systems. Internetworking skills for design and implementation of hardware and embedded software internet products.

Text Book


Reference Books


Course Aim

- To emphasize topics of fundamental importance concerning the technology and architecture of network applications.
- To highlight various protocols & standards.
- To make students able to create network applications.

Course Objectives

Upon completion of this course the student will be able to design and implement hardware and embedded software internet product.
COURSE OUTLINE

Week Number 1: Introduction
Week Number 2: TCP/IP Protocol Architecture
Week Number 3: Sockets programming
Week Number 4: Client/Servers programming paradigm
Week Number 5: TCP UDP Socket programming
Week Number 6: Internet Addressing and Subnets
Week Number 7: 7th week exam
Week Number 8: Classless Interdomain Routing
Week Number 9: Routing tables and Routers Architecture
Week Number 10: Routers Architectures and Routing protocols
Week Number 11: Network Protocol Analyzers
Week Number 12: 12th week exam
Week Number 13: Traffic Generation Hardware
Week Number 14: Linux Kernel Network Implementation
Week Number 15: Kernel Hacking
Week Number 16: Final Exam
CC 535 – Internetwork Security

Course Information

Course Title: Internetwork Security
Code: CC 535
Prerequisite: CC431

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Hacking and the Law, Network Mapping, Vulnerability Assessment, Network Mapping tools, Vulnerability Scanners, Sniffing, Defenses, Denial of Service Techniques using address spoofing, Man-in-the-middle, Defenses, Stack-Based Buffer Overflow Attacks and Password Attacks and Cracker tools, Web Attacks, RootKits, Trojans and Backdoors, Intrusion Detection tools, Writing new intrusion detection signatures, HoneyNets, Forensics

Text Book


Reference Books


Course Aim

Hands on experimentation and evaluation of Internet Security theory, principles, and practices. Laboratory component involves implementing both defensive and offensive security techniques.

Course Objectives

Upon completion of this course the student will be able to perform ethical hacking and access the security of networks and computer systems.

Course Outline

Week Number 1: Legal and Moral Responsibilities.
Week Number 2: Network Reconnaissance Techniques.
Week Number 3: IP Address Spoofing.
Week Number 4: Gaining Access.
Week Number 5: Maintaining Access.
Week Number 6: Intrusion Detection.
Week Number 7: 7th week exam.
Week Number 8: Firewalls.
Week Number 9: Wireless Networks Security.
Week Number 10: Worms and Viruses.
Week Number 11: Virtual Private networks.
Week Number 12: 12th week exam.
Week Number 14: Ethical Hacking.
Week Number 15: Overall Computer and Network Security Assessment.
Week Number 16: Final Exam.
CC 537 – Computer Forensics

Course Title: Computer Forensics
Code: CC 537
Hours: Lecture – 2 Hrs. Tutorial/Lab – 2/2 Hrs. Credit – 3.
Prerequisite: Senior Standing

Grading
Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description
Conducting a computer forensics investigation- Examining the layout of a network- Finding hidden data- Capturing images- Identifying, collecting, and preserving computer evidence- Understanding encryption and examining encrypted files- Documenting the case- Evaluating common computer forensic tools- Presenting and analysing computer evidence.

Text Book

Reference Books

Course Aim
It offers a complete overview of the basic skills and available certifications in computer forensics.

Course Objectives
The course introduces a selection of topics in computer forensics. The student will be able to:
- Document electronic evidence
- Analyze searched for and bookmarked data
Mind and find the loopholes in a computer system
Analyze signatures and hashes

COURSE OUTLINE

Week Number 1: Computer Forensics: an overview.
Week Number 2: Computer Hardware overview.
Week Number 3: File Systems.
Week Number 4: Conducting a computer forensics investigation.
Week Number 5: Acquiring Digital Evidence.
Week Number 6: File Signatures analysis and hash analysis.
Week Number 7: 7th week exam.
Week Number 8: Windows operating system artifacts
Week Number 9: Creating paperless reports.
Week Number 10: Computer Forensic Investigations - Document Forensics.
Week Number 12: 12th week exam.
Week Number 13: Computer Forensic Investigations - Mobile Forensics – part 2
Week Number 14: Computer Forensic Investigations - Network Forensics.
Week Number 15: Computer Forensic Investigations - Investigating X-Files.
Week Number 16: Final Exam.
CC 539 – Selected in Topics in Networks

Course Title: Selected in Topics in Networks
Code: CC 539
Prerequisite: CC531

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

Advanced topics in networking. Topics may include, but are not limited to: Internet analysis, routing techniques - Wireless Networking - Mobile Networks – Sensor Networks – Content-Based Networking – Autonomic Networks - Network Optimization.

TEXT BOOK

No specific textbook, lecture notes and exerts from literature will be handed out to students.

REFERENCE BOOKS

Collection of papers from IEEE ACM Journals.

COURSE AIM

This course presents selected topics in networks aiming to introduce the student to the latest state of the art networking issues.

COURSE OBJECTIVES

This course presents selected topics in networks

COURSE OUTLINE

Week Number 1: Overview
Week Number 2: TCP/IP, IPv6 and Internet.
Week Number 3: Wireless Networking – Setup, Security and Hotspotting
Week Number 4: Wireless and Mobile networks.
Week Number 5: MANET analysis and routing.
Week Number 6: Network Optimization
Week Number 7: 7th Week Exam
Week Number 8: Multimedia networking.
Week Number 9: Networking in Cloud Computing
Week Number 10: Sensor Networks- Network Architecture
Week Number 11: Sensor Networks-Topology Control
Week Number 12: 12th Week Exam
Week Number 13: Data-Centric Networking
Week Number 14: Content-Based Networking
Week Number 15: Quality of Service
Week Number 16: Final Exam
CC 540 – Computer Systems Engineering

COURSE INFORMATION

Course Title: Computer Systems Engineering
Code: CC 540
Prerequisite: Senior Standing

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

The course objective is to integrate key topics from algorithms, computer architecture, operating systems, compilers, and software engineering, in one unified framework. This will be done constructively, by building a general-purpose computer system from the ground up. In the process, many ideas and techniques used in the design of modern hardware and software systems are explored, and major trade-offs and future trends are discussed. Throughout the course, the student gains many cross-section views of the computing field, from the bare bone details of switching circuits to the high level abstraction of object-based software design.

TEXT BOOK


REFERENCE BOOKS

Selected Papers from Journals and Transactions.

COURSE AIM

This is mostly a hands-on course, which evolves around implementing a series of hardware and software modules to integrate key topics from algorithms, computer architecture, operating systems, compilers, and software engineering, in one unified framework.

COURSE OBJECTIVES

This is mostly a hands-on course, which evolves around implementing a series of hardware and software modules. Each module development task will be accompanied by a design document and an executable solution (illustrating what the module is supposed to do), a detailed implementation document (proposing how to build it), and a test script (specifying how to test it).
**COURSE OUTLINE**

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Course Overview and demonstration of some games</td>
</tr>
<tr>
<td>2</td>
<td>Boolean arithmetic</td>
</tr>
<tr>
<td>3</td>
<td>Sequential Logic</td>
</tr>
<tr>
<td>4</td>
<td>Machine Language</td>
</tr>
<tr>
<td>5</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>6</td>
<td>Assembler</td>
</tr>
<tr>
<td>7</td>
<td>7th week exam</td>
</tr>
<tr>
<td>8</td>
<td>Virtual machine I</td>
</tr>
<tr>
<td>9</td>
<td>Virtual machine II</td>
</tr>
<tr>
<td>10</td>
<td>High Level Language</td>
</tr>
<tr>
<td>11</td>
<td>Compiler I</td>
</tr>
<tr>
<td>12</td>
<td>12th week</td>
</tr>
<tr>
<td>13</td>
<td>Compiler II</td>
</tr>
<tr>
<td>14</td>
<td>Operating System I</td>
</tr>
<tr>
<td>15</td>
<td>Operating System II</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam</td>
</tr>
</tbody>
</table>
CC 550 – Selected Topics in Computing

Course Title: Selected Topics in Computing
Code: CC 550
Prerequisite: CC311 – CC316

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Fundamental concepts and issues related to the design and analysis of advanced computing which includes multithreaded, parallel, and distributed computing. This course introduces a discussion of programming techniques, applications, implementations, and performance issues. In addition, selected topics from the following list will also be covered: load balancing, task scheduling, fault-tolerance, coordination & agreement, distributed objects & remote invocation, and distributed transactions & concurrency control. It also gives an introduction to real-time systems, reconfigurable computing, and some advanced topics.

Text Book


Reference Books


Course Aim

To present fundamental algorithms and impossibility results from the concurrent programming literature, and to cover techniques for formally specifying and verifying concurrent systems. Some
advanced computing systems will be covered such as embedded systems, reconfigurable computing and real-time systems.

**Course Objectives**

The course introduces a selection of advanced topics in computer systems architecture and systems software and their relationships. It deals with design issues, implementation techniques, and structure and use of tools to support the implementation of computer systems and complex systems software.

**Course Outline**

*Week Number 1:* Concurrent Programming concepts: an overview.

*Week Number 2:* Techniques for parallelizing programs.

*Week Number 3:* Synchronization algorithms for shared-memory systems.

*Week Number 4:* Distributed Programming: an overview.

*Week Number 5:* Fault-Tolerance in Distributed Systems.

*Week Number 6:* Parallel Programming: Languages, Libraries, and Tools.

*Week Number 7:* 7th week exam.

*Week Number 8:* System Design for maintainability and power efficiency

*Week Number 9:* Embedded Systems.

*Week Number 10:* Cloud Computing.

*Week Number 11:* Polymorphic processors.

*Week Number 12:* 12th week exam.

*Week Number 13:* Real-time Systems

*Week Number 14:* Reconfigurable computing.

*Week Number 15:* High performance Computing.

*Week Number 16:* Final Exam.
Electronics and Communications Courses – EC

EC 218 - Measurements & Instrumentation

Course Title: Measurements & Instrumentation
Code: EC 218
Hours: Lecture – 2 Hrs. Tutorial/Lab – 2/2 Hrs. Credit – 3.
Prerequisite: EE 231

Graduation

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Measurements of errors, Accuracy, Precision, Resolution, Sensitivity. Statistical analysis (Mean, Deviation, Standard Deviation, and Variance). Units and standards of measurement. Electromechanical indicating instruments. Analog Instruments (DC Ammeter (Ayrton Shunt), DC Voltmeter, Ohmmeter (Series type, Shunt Type), AC Instruments with Rectifiers (full wave and half wave rectifiers), Bridge measurements (AC Bridges(Maxwell bridge, Wien bridge, Schering bridge), DC Bridges(Wheatstone bridge)), Digital instruments for measuring basic parameters, True RMS voltmeters, Q-meter, Oscilloscope techniques.

Text Books

“Modern electronic instrumentation and measurements techniques” Albert Helfrick and William Cooper

Reference Books

- Larry Jones and A. Foster Chin, “Electronic measurements and instruments”
- J.B.GUPTA, “Electronic and Electrical Measurements and Instrumentation”

Course Aim

An Introduction to the basic concepts and techniques of measuring physical electrical and electronic quantities. To train students for the effective usage of the basic Lab instruments.
COURSE OBJECTIVES

Understanding the basic measurement techniques such as accuracy, precision, standards. To study the operation and construction of analog, electronic and digital multi-meters.

COURSE OUTLINE

Week Number 1: Definitions, The importance of electronic measurements for engineers, Types of errors

Week Number 2: Statistical analysis

Week Number 3: Review on the fundamental and derived units, Classification of standards, Electrical standards, IEEE standards

Week Number 4: Permanent magnet moving coil

Week Number 5: DC voltmeters, sensitivity, Use the sensitivity method for the design of DC voltmeter, Analyze a circuit taken into consideration in loading effect

Week Number 6: Series type and shunt type ohmmeters, Calibration of DC instruments

Week Number 7: 7th week exam

Week Number 8: Alternating current indicating instruments, AC voltmeters with full wave rectifiers and half Wave rectifiers.

Week Number 9: DC bridges and sources of error, AC bridges

Week Number 10: AC voltmeters using rectifiers

Week Number 11: True RMS– Responding Voltmeter

Week Number 12: Component measuring instruments, Basic Q-meter circuits: a- Direct connection b- Series connection c- Parallel connection Sources of error”

Week Number 13: Oscilloscope measurements (phase shift, period and voltages)

Week Number 14: Oscilloscope block diagram

Week Number 15: Oscilloscope techniques, Special oscilloscopes, (a) storage oscilloscope, (b) sampling oscilloscope (c) Digital storage oscilloscope”

Week Number 16: Final exam
EC 238 - Electronics (1)

Course Information

Course Title: Electronics (1)
Code: EC238
Prerequisite: EE231

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Semiconductors - p-n junction - diode current components - junction capacitance - junction diode as a circuit element - special p-n junctions - bipolar junction transistor and field effect transistor: structure, operation – I-V characteristics - large and small analysis.

Text Books


Reference Books


Course Aim

Introducing different electronic devices used in constructing modern electronic circuits: diodes – bipolar junction transistor and field effect transistor. Studying their performance with special emphasis on some practical applications.

Course Objectives

Studying semiconductor materials, p-n junction diodes, diode as a circuit element, special diodes, Bipolar Junction Transistor (BJT) and Field Effect Transistor (FET).

Course Outline

Week Number 1: Types of solids: conductor, insulator, semiconductor.
**Week Number 2:** Conduction and valence bands, energy gap, covalent bond – Semiconductor types – Doping of semiconductors.

**Week Number 3:** Mobility and conductivity in semiconductors (intrinsic and extrinsic) – Hole and electron concentration - Drift current.

**Week Number 4:** Diffusion and drift currents – Built-in voltage in a p-n junction – Depletion layer in a p-n junction.

**Week Number 5:** p-n junction diode - Forward and reverse bias - Diode as a circuit element.

**Week Number 6:** Half wave and full wave rectifier - Smoothing circuits - Clipping circuits - Clamping circuits.

**Week Number 7:** Special diodes: Zener diodes - Light emitting diodes (LEDs) – Photodiodes - Varactor diodes - Solar cells.

**Week Number 8:** Bipolar Junction Transistor (BJT): construction – types – symbol - energy band diagram– operation - dc equivalent circuit.

**Week Number 9:** BJT: dc solution and biasing circuits - bias stability.

**Week Number 10:** BJT: I-V Characteristics of BJT - Load line - Operating point – h-parameters.

**Week Number 11:** BJT: Small signal analysis – ac equivalent circuit – Transistor amplifier - Voltage and current gains.


**Week Number 13:** Metal oxide semiconductor FET: MOSFET: construction – symbol – operation.

**Week Number 14:** I-V Characteristics of MOSFET, Enhancement and depletion modes, E-MOSFET: construction, operation and I-V characteristics - ac solution of all FET types.

**Week Number 15:** Complementary MOSFET (CMOS): symbol - operation - Logic gates using CMOS.

**Week Number 16:** Final exam.
## EC 320 - Communication Theory

### Course Information

<table>
<thead>
<tr>
<th><strong>Course Title:</strong></th>
<th>Communication theory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Code:</strong></td>
<td>EC 320</td>
</tr>
<tr>
<td><strong>Hours:</strong></td>
<td>Lecture – 2 Hrs.</td>
</tr>
<tr>
<td></td>
<td>Tutorial – 2 Hrs.</td>
</tr>
<tr>
<td></td>
<td>Credit – 3.</td>
</tr>
<tr>
<td><strong>Prerequisite:</strong></td>
<td>BA 224, EE 231</td>
</tr>
</tbody>
</table>

### Grading

<table>
<thead>
<tr>
<th><strong>Class Performance/Attendance:</strong></th>
<th>10%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Midterm # 1/Assignments – (7th Week):</strong></td>
<td>30%</td>
</tr>
<tr>
<td><strong>Midterm # 2/Assignments – (12th Week):</strong></td>
<td>20%</td>
</tr>
<tr>
<td><strong>Final Exam:</strong></td>
<td>40%</td>
</tr>
</tbody>
</table>

### Course Description

Introduction to communication theory. Review of Fourier series, and Fourier transform as a mathematical tool for spectral analysis. Concept of power and energy spectral densities and correlation between waveforms. Transmission through linear filters and channels. Hilbert transform and Amplitude Modulation techniques.

### Text Books:


### Reference Books:

Alan V. Oppenheim “Signals and systems” Prentice Hall

### Course Aim

The course introduces the concept of line spectrum as well as the continuous spectrum using FT to introduce the mathematical background and a brief introduction to communication systems to be continued in the following communication course as follows:

### Course Objectives

- Classification of signals and their spectrum.
- Fourier Transform and its properties in time and frequency domains.
- Linear Systems.
- Introduction to communication systems and Amplitude Modulation and Demodulation.
COURSE OUTLINE

Week Number 1: Classification of Signals - sum of periodic signals

Week Number 2: Orthogonality - Fourier Analysis of Periodic Signals

Week Number 3: Fourier Transform and Properties of F.T.

Week Number 4: Properties of F.T. (cont.)

Week Number 5: F.T. of Special Functions

Week Number 6: Fourier Transform of periodic signals - Digital & analog signals

Week Number 7: Discrete Fourier transform - Sampling Theory

Week Number 8: Auto-correlation & cross-correlation of power and energy signals - Spectral densities of power and energy signals

Week Number 9: Hilbert transform

Week Number 10: Response of low-pass and band-pass filters

Week Number 11: Double side band transmitted carrier amplitude modulation and demodulation

Week Number 12: DSB Surprised carrier amplitude modulation and demodulation

Week Number 13: Single side band amplitude modulation

Week Number 14: Single side band amplitude demodulation

Week Number 15: Vestigial side band amplitude modulation and demodulation

Week Number 16: Final exam
EC 339 - Electronics (2)

COURSE INFORMATION

Course Title: Electronics (2)

Code: EC 339

Hours: Lecture – 2 Hrs.  Tutorial/Lab – 2 1/2 Hrs.  Credit – 3.

Prerequisite: EC 238

GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7th Week): 30%

Midterm # 2/Assignments – (12th Week): 20%

Final Exam: 40%

COURSE DESCRIPTION:

Electronic amplifier theory, power amplifiers, Differential amplifiers, Operational amplifiers filters and Oscillators.

TEXT BOOKS

- C.J. Savant, M.S. Rooden, G.L. Carpenter, "Electronic Design", Addison Wesley
- Martin Rodan and Gordon Carpenter, "Electronic Design: from concept to reality"

REFERENCE BOOKS

- Boylestad, Nashelsky, Electronic Devices & circuit theory, Prentice Hall, 2005

COURSE AIM

The student should be able to analyze and design BJT and FET amplifiers, Power amplifiers, operational amplifiers, filters and oscillators.

COURSE OBJECTIVES

Familiarize students with:

- Analysis and design of BJT
- Analysis of FET amplifiers
- Frequency response of BJT and FET.
- Power Amplifiers
- Analysis and design of integrated circuits
Filters and Oscillators

**Course Outline**

*Week Number 1:* Revision, Transistor theory, Amplifier circuits, course overview

*Week Number 2:* Mid frequency-band equivalent circuit of transistor amplifiers. Voltage gain, current gain, input and output impedance.

*Week Number 3:* Low and High frequency response of transistor amplifiers. Design of transistor amplifiers.

*Week Number 4:* Multistage amplifiers, overall gain, frequency response, gain-bandwidth product.

*Week Number 5:* Field Effect transistor amplifiers, DC and mid-band frequency solution.

*Week Number 6:* Power amplifiers, classes of operation. Efficiency, push-pull power amplifiers.

*Week Number 7:* Feedback amplifiers.

*Week Number 8:* Sinusoidal oscillators.

*Week Number 9:* Square wave oscillators.

*Week Number 10:* Operational amplifiers, specifications. Analysis of basic Op-Amp circuits (Inverting and non-Inverting amplifiers), applications.

*Week Number 11:* Op-Amp applications.

*Week Number 12:* RC active filters.

*Week Number 13:* Power supplies, switching mode power supply.

*Week Number 14:* Introduction to IC fabrication.

*Week Number 15:* Revision

*Week Number 16:* Final exam
Electrical Engineering Courses – EE

EE 231 – Electrical Circuits (1)

COURSE INFORMATION

Course Title: Electrical circuits (1)
Code: EE 231
Hours: Lecture – 2 Hrs.  Tutorial/Lab – 2/2 Hrs.  Credit – 3.
Prerequisite: BA 124

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION


TEXT BOOK


REFERENCE BOOKS


COURSE OBJECTIVES

To provide the students with the basic tools to analysis and solve for the currents and voltages in each branch of d-c circuits and to introduce the concepts of a-c circuits such as phasor, wave, and response.
COURSE OUTLINE

Week Number 1: Basic dc circuit elements, series and parallel Networks
Week Number 2: Ohm's law and Kirchoff's laws
Week Number 3: Nodal Analysis
Week Number 4: Mesh Analysis
Week Number 5: Electric circuit theorems "source transformation"
Week Number 6: Superposition
Week Number 7: Thevenin's Theorem and Norton Theorem
Week Number 8: Maximum power transfer
Week Number 9: Alternating current Fundamentals and AC generation
Week Number 10: RMS value, average value, form factor and crisp factor
Week Number 11: Phasor concept
Week Number 12: Relation between voltage and current in resistor, capacitor and inductor
Week Number 13: Response of RL and RC circuits
Week Number 14: Sinusoidal response of RLC circuit
Week Number 15: Series Resonance
Week Number 16: Final exam
EE 232 – Electrical Circuits (2)

COURSE INFORMATION

Course Title: Electrical circuits (2)

Code: EE 232

Hours: Lecture – 2 Hrs.  Tutorial/Lab – 2 Hrs.  Credit – 3.

Prerequisite: EE231

GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7th Week): 30%

Midterm # 2/Assignments – (12th Week): 20%

Final Exam: 40%

COURSE DESCRIPTION


TEXT BOOK


REFERENCE BOOKS


COURSE OBJECTIVES

Enhancement of skills related to AC circuit analysis, three phase circuit balanced and unbalanced load and the natural response of R-L and R-C circuits.

COURSE OUTLINE

Week Number 1: A.C. series circuit and series resonance revision Y- Δ transformation.

Week Number 2: Source transformation and Node Voltage method.
Week Number 3: The mesh current method thevenin theorem.

Week Number 4: Complex power & Maximum Power Calculation

Week Number 5: Three Phase Systems

Week Number 6: Balanced Y- Y Circuit

Week Number 7: Y- Δ, Δ-Y , Δ-Δ 3 Phase Systems

Week Number 8: Power Calculation in 3 Phase System

Week Number 9: Unbalanced Δ Connected 3 Phase System

Week Number 10: 3 Phase unbalanced System

Week Number 11: Inductor and Capacitor

Week Number 12: Natural Response of R-L Circuit

Week Number 13: Natural Response of R-C Circuit

Week Number 14: Step Response of R-L & R-c Circuits

Week Number 15: Sequential Switching

Week Number 16: Final exam
EE 418 – Automatic Control Systems

**Course Information**

Course Title: Automatic control systems

Code: EE 418

Hours: Lecture – 2 Hrs.  Tutorial/Lab – 2/2 Hrs.  Credit – 3.

Prerequisite: EE218 OR EE 328

**Grading**

- Class Performance/Attendance: 10%
- Midterm # 1/Assignments – (7th Week): 30%
- Midterm # 2/Assignments – (12th Week): 20%
- Final Exam: 40%

**Course Description**


**Text Book**


**Reference Books**

- Y. El Gamal A.Amer, “Introduction to Control Engineering”, AAST 1988
- K.O.Gaw, “Modern Control Engineering”, Prentice Hall New Delhi, 1984

**Course Objectives**

- Stability concept and time domain analysis using time and frequency response
- Modelling and analysis of simple physical system are investigated
- To study controller units, their type analysis and tuning
COURSE OUTLINE

Week Number 1: Introduction to control system.
Week Number 2: Differential equation of physical systems.
Week Number 3: Block diagram models using MATLAB.
Week Number 4: Signal flow graph models using MATLAB.
Week Number 5: Test input signals.
Week Number 6: Performance of 1st and 2nd order system.
Week Number 7: 7th week + Effect of 3rd pole and a zero on the 2nd order system.
Week Number 8: Stability concept Routh- Hurwitz stability criterion.
Week Number 9: Root locus techniques.
Week Number 10: Bode plots.
Week Number 11: Nyquist plots.
Week Number 12: 12th week + Approaches to system design, advantage of feedback.
Week Number 13: Approaches to system design, advantage of feedback.
Week Number 14: Analog controllers.
Week Number 15: Analog controllers (2).
Week Number 16: Final Exam.
Language, Humanities, & Social Science Courses – LH

LH 131 – ESP (1)
COURSE INFORMATION

Course Title: ESP 1.
Code: LH131.
Hours: Lecture – 3 Hr. Credit – 2.
Prerequisite: none

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

TEXT BOOKS


REFERENCE BOOKS

References available in AAST Library.

COURSE AIM

This course aims at enhancing learner’s four language skills, improving their general and technical lexical repertoire and preparing them to communicate their ideas effectively. The course is also designed to train learners to follow the principles and stages of the writing process and write academic paragraphs.

COURSE OBJECTIVES

By the end of this course, learners will be able to:

- Use listening and reading strategies appropriately.
- Communicate about a variety of technical topics orally.
- Use basic computer terms and relevant general vocabulary meaningfully and accurately.
- Apply word-formation rules of prefixation and suffixation.
- Use some relevant grammatical structures.
Apply the stages of the writing process effectively.
Write well-structured, unified and coherent paragraphs.

COURSE OUTLINE

Week Number 1: Orientation + Unit 1 (Personal Computing)
Week Number 2: Unit 1 (Personal Computing) + Unit 2 (Portable Computers).
Week Number 3: Unit 2 (Portable Computers)
Week Number 4: The process of academic writing
Week Number 5: An overview of paragraph writing
Week Number 6: Suffixes + Unit 4 (Programming and Languages)
Week Number 7: Unit 4 (Programming and Languages) + Progress test I
Week Number 8: Unity and Coherence
Week Number 9: Coherence + Writing workshop
Week Number 10: Unit 5 (Computer Software)
Week Number 11: Unit 6 (Computer Networks)
Week Number 12: Unit 7 (Computer Viruses) + Progress test II
Week Number 13: Unit 7 (Computer Viruses)
Week Number 14: Unit 8 (Computers in the Office)
Week Number 15: Unit 8 (Computers in the Office)
Week Number 16: Final Exam.
LH 132 – ESP (2)
COURSE INFORMATION

Course Title: ESP 2.
Code: LH132.
Hours: Lecture – 3 Hrs. Credit – 2.
Prerequisite: ESP 1 (LH131)

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

TEXT BOOKS


REFERENCE BOOKS

References available in AAST Library.

COURSE AIM

This course aims at enabling learners to decode technical discourse in English with ease and precision. The course is also designed to enhance the learners’ oral production and academic writing.

COURSE OBJECTIVES

By the end of this course, learners will be able to:

- Use a variety of listening and reading strategies appropriately
- Communicate about numerous technical topics orally
- Use basic computer terms and relevant general vocabulary meaningfully and accurately
- Apply word-formation rules of prefixation, suffixation and compounding
- Write academic essays and employment correspondence
Week Number 1: Orientation + Unit 9 (Computers in Education)
Week Number 2: Unit 9 (Computers in Education).
Week Number 3: Paragraph writing (Concrete Support I)
Week Number 4: Unit 10 (Computers in Medicine) + Summary Writing
Week Number 5: Unit 10 (Computers in Medicine)
Week Number 6: Unit 11 (Robotics)
Week Number 7: Essay writing (Analysis) + Progress test I
Week Number 8: Essay writing (Application)
Week Number 9: Unit 12 (Virtual Reality)
Week Number 10: Unit 12 (Virtual Reality) + Unit 13 (Machine Translation)
Week Number 11: Unit 13 (Machine Translation)
Week Number 12: CVs. & letters of application + Progress test II
Week Number 13: Interviewing skills
Week Number 14: Unit 14 (Multimedia)
Week Number 15: Unit 14 (Multimedia)
Week Number 16: Final Exam.
**LH 231 – ESP (3) Technical Report Writing**

**COURSE INFORMATION**

Course Title: ESP 3 (Technical Report Writing).
Code: LH231.
Hours: Lecture – 3 Hrs. Credit – 3.
Prerequisite: ESP 1 (LH131) + ESP 2 (LH 132)

**GRADING**

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

**TEXT BOOKS**


**REFERENCE BOOKS**


**COURSE AIM**

This course aims at enhancing learners’ writing skills in order to write academic essays and reports following international standards. The course also includes a component on oral presentations of report.

**COURSE OBJECTIVES**

By the end of this course, learners will be able to:

- Apply the stages of the writing process.
- Write well-structured, unified and coherent academic essays.
- Apply the ethics of academic writing.
- Summarize relevant texts.
- Paraphrase relevant texts.
- Include in-text citations in writing when necessary.
- Document report sources.
- Write formal reports.
- Give oral presentations.
COURSE OUTLINE

Week Number 1: Orientation + Overview of Essay Writing
Week Number 2: Patterns of essay organization I: Logical division of ideas
Week Number 3: Patterns of essay organization II: Chronological order
Week Number 4: Patterns of essay organization III: Cause and effect order
Week Number 5: Patterns of essay organization IV: Comparison and contrast order
Week Number 6: Introduction to technical reports and plagiarism + Dictionary skills
Week Number 7: Summarizing + Progress test I
Week Number 8: Paraphrasing + Further practice on summarizing and paraphrasing
Week Number 9: Report format and outlines + Presentation skills (CD Viewing I)
Week Number 10: Quotations and source documentation + Writing workshop
Week Number 11: Use of illustrations in technical writing + Presentation skills
Week Number 12: Writing workshop + Progress test II
Week Number 13: Mini-presentations + Writing workshop
Week Number 14: Rehearsals
Week Number 15: End-of-term presentations
Week Number 16: Final Exam.
Industrial and Systems Engineering Courses – IM

IM 111 – Industrial Relations

Course Title: Industrial Relations.
Code: IM 111.
Hours: Lecture – 1 Hr.  Tutorial – 0 Hrs.  Credit – 2.
Prerequisite: None.

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam 40%

COURSE DESCRIPTION

This course identifies the different types of industries, production techniques, management and organization structure, the different types of hazards and dangers and how to prevent them. Also it clarifies the meaning of production planning and control and cost calculations.

TEXT BOOKS

Lecture Notes

REFERENCE BOOKS


COURSE AIM

To introduce students to the basis knowledge and concepts related to industrialization and work organizations, industrial health and safety, and the history of engineering and technology.

COURSE OBJECTIVES

- Identify the different types of industries, production techniques, and management and organization structure.
- Understand the meaning of production planning and control and cost calculations.
- Understand and identify the different types of hazards and dangers and to prevent them.
COURSE OUTLINE

Week Number 1: Introduction to Course.
Week Number 2: Types of Industries and Production Techniques.
Week Number 3: Management and Organization Structure.
Week Number 4: Production Planning and Control.
Week Number 5: Industrial Cost Estimation Techniques.
Week Number 6: Industrial Economy and Breakeven Analysis.
Week Number 7: Exam # 1.
Week Number 8: Accidents at Work – Rules and Regulations.
Week Number 9: Hazards Classification, Prevention, and Personal Safety.
Week Number 10: Fire Hazards Identification and Prevention.
Week Number 11: Chemical Hazards and Prevention – Accident Reporting.
Week Number 12: Exam # 2.
Week Number 13: Quality Control and Labour Relations.
Week Number 14: Science, Engineering, and Technology.
Week Number 15: Industrial Revolutions.
Week Number 16: Final Exam.
IM 112 – Manufacturing Technology

COURSE INFORMATION

Course Title: Manufacturing Technology.
Code: IM 112.
Hours: Lecture – 1 Hr. Laboratory – 2 Hrs. Credit – 2.
Prerequisite: None.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam 40%

COURSE DESCRIPTION

The course provides an introduction to engineering materials and their properties, production of common metals. It covers types of manufacturing, basic manufacturing processes such as casting, metal forming, welding and machining. An overview of some advanced manufacturing processes is also included. In addition, it introduces measurement standards, instruments, deviations and methods.

TEXT BOOKS


REFERENCE BOOKS


COURSE AIM

Introduce the different methods for processing engineering materials and get acquainted with the basic concepts and necessary information related to manufacturing techniques.
COURSE OBJECTIVES

Understanding the different stages or phases for engineering materials processing, learning the basic concepts of metal forming and casting, understanding the concepts of metal machining and welding techniques and associated applications, learning different measuring techniques and how they can be used for quality control purposes.

COURSE OUTLINE

Week Number 1: Production of steel and cast iron.
Week Number 2: Forming operations (Rolling – Drawing – Extrusion – Forging).
Week Number 3: Heat treatment operations (Hardening-Annealing-Tempering-Nor realizing).
Week Number 4: Cutting tools (Geometry & materials).
Week Number 5: Mechanics of metal cutting and turning operations.
Week Number 6: Cutting fluids (Function – Type – Selection).
Week Number 7: Exam # 1.
Week Number 8: Sand casting (Pattern design & mould preparations).
Week Number 9: Centrifugal casting, die casting and aspects of the casting process.
Week Number 10: Gas and Electric arc welding.
Week Number 11: Electric resistance and pressure welding and aspects of the welding process.
Week Number 12: Exam # 2
Week Number 13: Standards of measurements, Measuring Instruments.
Week Number 14: Measuring Instruments (Vernier, micrometer, dial gauge, block gauges).
Week Number 15: Measuring methods (Indirect and comparative measurements).
Week Number 16: Final Exam.
**IM 423 – Operations Research**  
**Course Information**

Course Title: Operations Research.  
Code: IM 423.  
Prerequisite: 90 Credit Hours.

**Grading**

Class Performance/Attendance: 10%  
Midterm # 1/Assignments – (7th Week): 30%  
Midterm # 2/Assignments – (12th Week): 20%  
Final Exam: 40%

**Course Description**

The course provides the basic concepts and fundamentals of management science, problems addressed by operations research, and problem formulations in linear programs. It includes the graphical solution of linear programs, simplex method, transportation model, assignment model, network planning, and critical path and PERT methods.

**Text Books**


**Reference Books**


**Course Objectives**

- To promote the scientific approach to solve management problems.  
- To build up capability to construct mathematical models of practical problems and solve them.  
- To acknowledge the role of computer technology in solving problem of operations research.

**Course Outline**

*Week Number 1:* Course Overview.  
*Week Number 2:* Linear Programming.  
*Week Number 3:* Graphical Method.
Week Number 4:  Linear Programming Applications.

Week Number 5:  The Simplex Method.

Week Number 6:  Transportations Method – Formulation and Initial Solution.

Week Number 7:  7th Week Exam.

Week Number 8:  Transportations Method – Finding the Optimal Solution.

Week Number 9:  Assignment Method.

Week Number 10: Critical Path Method.


Week Number 12:  12th Week Exam.

Week Number 13: Project Crashing

Week Number 14: Network Analysis – Shortest Route and Minimal Spanning Tree.

Week Number 15: Network Analysis – Maximal Flow.

Week Number 16: Final Exam.
IM 535 – International Operations Management

COURSE INFORMATION

Course Title: International Operations Management.

Code: IM 535.

Hours: Lecture – 3 Hrs. Tutorial – 0 Hrs. Credit – 3.

Prerequisite: 126 Credit Hours.

GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7th Week): 30%

Midterm # 2/Assignments – (12th Week): 20%

Final Exam: 40%

COURSE DESCRIPTION

The course introduces the students to the concepts of international business environment, international trade and direct foreign investments, foreign exchange, and economic cooperation.

TEXT BOOKS


REFERENCE BOOKS


COURSE OBJECTIVES

The objective of this course, which is a part of the college requirements, is to introduce the students from different disciplines to the ever-growing field of international business. It tackles the main issues of the evolution of firm strategy as part of the internationalization process, plus the countervailing forces that firms are likely to encounter during that process. In addition, the elements of the external international business environment are briefly introduced. The student will be better able to interact with the business world in the environment of globalization.

COURSE OUTLINE

Week Number 1: International Business Environment- An overview.

Week Number 2: The Cultural and Legal Environment.

Week Number 3: The Political Environment.
Week Number 4: The Economic Environment Facing Business (1).

Week Number 5: The Economic Environment Facing Business (2).

Week Number 6: International Trade Theories (1).

Week Number 7: 7th week Exam.

Week Number 8: International Trade Theories (2).

Week Number 9: Governmental Influence on Trade.

Week Number 10: Regional Economic Integration.

Week Number 11: Factor Mobility and Foreign Direct Investment.

Week Number 12: 12th week Exam.

Week Number 13: The Foreign Exchange Market.

Week Number 14: The determination of Exchange Rates.

Week Number 15: Global Manufacturing and Supply Chain management.

Week Number 16: Final Exam.
Mechanical Engineering Courses – ME

ME 151 - Engineering Drawings & Projection

COURSE INFORMATION

Course Title: Engineering Drawings & Projection
Code: ME 151
Hours: Lecture – 2Hrs  Tutorial – 2Hrs  Credit – 2
Prerequisites: None

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION


TEXT BOOKS

Engineering Drawing Book prepared and edited from several related books.

REFERENCE BOOKS


COURSE AIM

To give the student the ability to communicate by means of engineering drawing and to relate the applications of drawing techniques to mechanical engineering practice.
**COURSE OBJECTIVES**

To provide the basic information for engineering drawing and to present the different types of drawings in generic and basic forms with enough depth.

**COURSE OUTLINE**

- **Week Number 1:** Drawing practices and techniques (Exercises on geometrical construction)
- **Week Number 2:** Methods of object projection (Exercises on geometrical construction – Exercises on object projection)
- **Week Number 3:** Orthogonal projection (Exercises on orthogonal projection)
- **Week Number 4:** Missing views, dimensioning and free hand sketching (Exercises on projection and free hand sketching)
- **Week Number 5:** Sectioning and conventions (Exercises on sectional views)
- **Week Number 6:** Intersection of geometrical surfaces and development (Exercises in intersection of geometrical surfaces and development)
- **Week Number 7:** Standard metal sections and metal structures (Exercises on metal structures) – Quiz
- **Week Number 8:** Compound metal sections and welds (Exercises on metal structures)
- **Week Number 9:** Isometric projection (Exercises on Isometry)
- **Week Number 10:** Isometric projection & Surface intersections (Exercises on Isometry and surface intersections)
- **Week Number 11:** Perspective projection (Exercises on Perspective projection)
- **Week Number 12:** Perspective projection (Cont.) (Exercises on interior and exterior perspective projection) – Quiz
- **Week Number 13:** Computer Aided drafting using AutoCAD (General Introduction)
- **Week Number 14:** Drawing and editing commands in AutoCAD
- **Week Number 15:** Writing texts, Dimensioning and viewing commands
- **Week Number 16:** Final Examination
Non-Engineering Courses – NE

NE 264 – Scientific Thinking
COURSE INFORMATION

Course Title: Scientific Thinking
Code: NE 264
Hours: Lecture – 4 Hrs. Credit – 3
Prerequisite: none

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION


TEXT BOOKS

Scientific Thinking, Prof. Abdel-Moneim Hassan.

REFERENCE BOOKS

References available in the Academy library.

COURSE AIM

The main goal of the course is to develop the thinking skills of engineering and technology students.
COURSE OBJECTIVES

The objectives of the course is to have students learn to define science use reasoning skills such as, analysis, synthesis, including, deducing, increasing, apply the methods science to solve problems, use creative thinking skills in real situations.

COURSE OUTLINE

Week Number 1: Thinking patterns development.

Week Number 2: Meaning & construction of science, scientific values & directions.

Week Number 3: Science, non-science & other-than science, engineering & technology.

Week Number 4: Properties of science & the thinking processes.

Week Number 5: Objectives of science & postulates of scientific thinking.

Week Number 6: Mental operations used in science, scientific guessing methods of reasoning in mathematics.

Week Number 7: Types of deductions & the 7th week exam.

Week Number 8: Methods of reasoning in natural sciences.

Week Number 9: Research methods in natural sciences.

Week Number 10: Experiments & observations; scientific postulates & their conditions creative thinking.

Week Number 11: Verification of scientific postulates.

Week Number 12: Flexibility & originality.

Week Number 13: Creative thinking, fluency types.

Week Number 14: Basics of brainstorming; methods of decision making.

Week Number 15: General revision.

Week Number 16: Final exam.
NE 364 – Engineering Economy

Course Title: Engineering Economy.
Code: NE 364.
Hours: Lecture – 2 Hrs. Tutorial – 2 Hrs. Credit – 3
Prerequisite: 54 Credit Hours.

GRADING

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

A study of basic concepts emphasizing analysis of aggregate economy. Examination of the processes of price determination and calculation of optimum demand for maximum profit. Basic principles of money-time relationship. Methods of investment assessment and fundamental techniques of comparison of investment opportunities. Theories of depreciation of physical facilities and study of cost recovery systems.

TEXT BOOKS


REFERENCE BOOKS


COURSE OBJECTIVES

- Introduction basic cost concepts and economic environment.
- Familiarization of the principles of money time relations and basics of investments opportunities assessment and evaluation.
COURSE OUTLINE

Week Number 1: Introduction and overview.

Week Number 2: Cost concepts and the economic environment.

Week Number 3: Principles of money – time relations, the concept of economic equivalence.

Week Number 4: Cash flow diagrams: Interest formulas and uniform series.

Week Number 5: Cash flow diagrams: Uniform gradient series and geometric sequence.

Week Number 6: Nominal and effective interest rates, continuous compounding and continuous cash flows.

Week Number 7: Exam # 1.

Week Number 8: Applications of engineering economy: Methods of investment assessment.

Week Number 9: Comparing alternatives: Useful life is equal to the study period.

Week Number 10: Comparing alternatives: Useful life is shorter than the study period.

Week Number 11: Comparing alternatives: Useful life is longer than the study period.

Week Number 12: Exam # 2.

Week Number 13: The imputed market value technique.

Week Number 14: Depreciation: Historical Methods.

Week Number 15: Depreciation: Cost recovery systems.

Week Number 16: Final Exam.
NE 465 – Aesthetic Education and Art Appreciation

Course Title: Aesthetic Education and Art Appreciation
Code: NE 465
Hours: Lecture – 4 Hrs. Credit – 3
Prerequisite: none

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description

Aesthetic training and appreciation on a wide range of types of arts, including Music, Drawing, Painting, Sculpture and Engraving; Applied art (major and minor arts); The Ancient world, Classical world and Christian world (Christianity); Islamic and oriental arts; Medieval Western world; Renaissance in the 17th, 18th and 19th Centuries; Modern arts in the 20th Century.

Text Books

Aesthetic education & Art appreciation (Prof. Naema El-Shishiny Arabic and English).

Reference Books

- Largesse Encyclopedia of Modern Art (1800 to present).
- A course history of arts (Herbert Read).
- The McMillan encyclopedia of Art.

Course Aim

A work of art produces an agreeable impression as processing aesthetic beauty which is the result of the satisfaction of the mind and the stimulation of our senses.

Course Objectives

Student to be acquainted with different forms of arts (fine arts and applied arts) their techniques and main elements + An output over the ages of man’s creativity, thus the appreciation of art’s essence and permanent values.
COURSE OUTLINE

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to aesthetic education.</td>
</tr>
<tr>
<td>2</td>
<td>Drawing.</td>
</tr>
<tr>
<td>3</td>
<td>Painting.</td>
</tr>
<tr>
<td>4</td>
<td>Sculpture.</td>
</tr>
<tr>
<td>5</td>
<td>Engraving.</td>
</tr>
<tr>
<td>6</td>
<td>Applied Art, introduction to art appreciation.</td>
</tr>
<tr>
<td>7</td>
<td>The Ancient world &amp; 7th week exam.</td>
</tr>
<tr>
<td>8</td>
<td>The ancient world.</td>
</tr>
<tr>
<td>9</td>
<td>Classical world (Christianity).</td>
</tr>
<tr>
<td>10</td>
<td>Christian world.</td>
</tr>
<tr>
<td>11</td>
<td>Islamic + oriental arts.</td>
</tr>
<tr>
<td>12</td>
<td>Medieval world.</td>
</tr>
<tr>
<td>13</td>
<td>Renaissance + 17th C.</td>
</tr>
<tr>
<td>14</td>
<td>18th C + 19th C.</td>
</tr>
<tr>
<td>15</td>
<td>20th C + modern arts.</td>
</tr>
<tr>
<td>16</td>
<td>Final exam.</td>
</tr>
</tbody>
</table>
NE 466 – Environmental Science and Technology

Course Title: Environmental Science and Technology
Code: NE 466
Hours: Lecture – 4 Hrs. Credit – 3
Prerequisite: none

Grading

Class Performance/Attendance: 10%
Midterm # 1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

Course Description


Text Books


Reference Books

- Tolba, KK., Saving Our Planet Challenges and Hopes, Centre for Arab Unity Studies, Beirut 1992 (Arabic).

Course Aim

To raise the level of environmental awareness of the students, and provide them with the necessary knowledge, capabilities and attitude that will enable them the necessary knowledge, capabilities and attitudes that will enable them to deal more positively with environmental resources and their
components, through learning about the diversity and complexity within the environment and the changes and transformations that occur through human activities.

**COURSE OBJECTIVES**

Developing the students understanding of the earth’s resources – Helping the students to understanding man kinds position within the environment – Correcting the common erroneous notion that natural resources can limitlessly sustain human exploitation – Explaining that most forms of environmental degradation are a result of consumerist lifestyle – Stressing the role of Science and technology in the development of man’s relation with the environment – changing students negative attitudes regarding the environment.

**COURSE OUTLINE**

*Week Number 1:* The biosphere the natural built environment, ecosystem components.

*Week Number 2:* Environmental resources, ecological systems and equilibrium.

*Week Number 3:* The evolution of mankind’s relation with the environment.

*Week Number 4:* The development of human awareness regarding environment problems.

*Week Number 5:* Population and the environment.

*Week Number 6:* Development and the environment.

*Week Number 7:* 2 hrs revision and 2 hrs the seventh week exam.

*Week Number 8:* Environment and sustainable development.

*Week Number 9:* Poverty and the environment.

*Week Number 10:* Environment and consumer lifestyle.

*Week Number 11:* Relation between human health and environmental degradation.

*Week Number 12:* Discussion of reports as a 12th week exam.

*Week Number 13:* Environmental improvement.

*Week Number 14:* Economic and social returns, benefits of pollution abatement.

*Week Number 15:* Environmental management.

*Week Number 16:* Final exam.
Teaching Faculty List

A list of teaching faculty staff includes: Alphabetical names (last name first), position, date, university, specialization, experience in industry, research activities.

Full Time Staff

ABD ALLAH, I H A B

Ph. D. 2009, Salford University, London.

Specialization
Robotics.

Experience in Industry
ROBOCON contest referee and participant.

Research Activities
Intelligent Robotics, bioinformatics and bioengineering.

ABDUL BAITH, MOHAMED

Ph. D. 1992, University Of Vienna, Austria.

Specialization
Computer Systems Security.

Experience in Industry

- Public Telephone Switching (Siemens & Alcatel) Austria.
- Secure Software System in Railway Automation, in Cooperation with (Siemens, Alcatel, and Seibersdorf Research Center), Austria.
- International project (AEG Austria), Vienna.
- Consultant in Scientific Committee at Umm Al Qura University, Makkaha EL Mokaramah, Saudi Arabia.

Research Activities
ABOU EL-FARAG, AHMED

Ph. D. 2009, Cairo University, Egypt.

Specialization

Experience in Industry
Periodic Real-Time Tasks for FPGAs.

Research Activities

ABOU EL-NASR, MOHAMED (HEAD OF DEPARTMENT)

Ph. D. 2003, Georgia Institute of Technology, USA

Specialization
Computer Networks, Embedded systems.

Experience in Industry

- Consultant of Network design and Security.
- Researcher at the Manufacturing Research Center MARC– Georgia Institute of Technology USA 2001-2003
- Trainer of CISCO network systems.

Research Activities

EL-SONNI, MOHAMED

Ph. D. 1978, University of Illinois, U.S.A.

Specialization
Computer Graphics and computer hardware design.

Experience in Industry
Consultancy

Research Activities
Computer vision and Image Processing and 3-D Modelling.

EL-ZOUKA, HESHAM

Ph. D. 2006, university of Nottingham, UK.

Specialization
Computer Engineering
Experience in Industry

- Installation and Maintaining of Hardware (Servers and PCs)
- Installing and Configuring Computer Network Devices (Switches, Routers, Firewalls)
- Experience in developing computer projects and systems for private and public organizations including evaluation and monitoring.
- Working knowledge in discrete event simulators, Environments Special Software such as GIS and Remote Sensing.
- Developing and Teaching technical classes for computer majors.
- Consulting experience in the areas of Network Security Systems.

Research Activities

HOSNY, WAEL
Ph. D. 2006, University of Western Ontario, Canada.

Specialization
Computer Networks.

Experience in Industry


Research Activities
Distributed Systems, Differentiated Services, Feedback control and Computer Networks.

ISMAIL, OSAMA
Ph. D. 1994, Queens University, U.S.A.

Specialization
Robotics Control, Computer Algorithms (sequential & Parallel).

Experience in Industry

- Microcontrollers Applications.
- Landmine Detection by using mobile robot.

Research Activities
Robotics Applications, Vehicle Tracking system and Parallel/Sequential Algorithms.
SAEB, MAGDY

Ph. D. 1985, School of Engineering, University of California, Irvine, U.S.A.

Specialization
Data communication security.

Experience in Industry
Chief Researcher Malaysian Institute of Microelectronic Systems (MIMOS).

Research Activities
Data Communication Security, FPGA Implementations of Data Security Algorithms

YOUSSEF, SHERIN

Ph. D. 2005, university of Nottingham, UK.

Specialization
Computer Networks.

Experience in Industry
- Neuro-based Learning of Mobile Robots with Evolutionary Path Planning.
- Dynamically Adaptive Data Clustering Using Intelligent Swarm-like Agents

Research Activities
Automated Barcode Recognition for Smart Identification and Inspection Automation, Hybrid Reinforcement Learning in Autonomous Mobile Systems.

ZADAH, FATMA


Specialization
Robotic Interception of Moving Targets.

Experience in Industry
- Multimedia Modelling of Autonomous Mobile Robots.
- Range Sensory Based Robot Navigation in unknown Terrains

Research Activities
Active Network Based Intrusion Response System, FPGA Based Implementation of Real Time Communication System.
Assistant Lecturer, M. Sc. 2003, AASTMT, Alexandria, Egypt.

Specialization
Computing System.

Research activities
System Design.

EL-SHENNAWY, MARWA

Assistant Lecturer, M. Sc. 2005, AASTMT, Alexandria, Egypt.

Specialization
System Architecture.

Research activities
Developing System and image processing.

FAROUK, HALA AHMED

Assistant Lecturer, M. Sc. 2004, AASTMT, Alexandria, Egypt.

Specialization

Research activities

FATHY, CHERINE

Assistant Lecturer, M. Sc. 2004, AASTMT, Alexandria, Egypt.

Specialization
Computer Networks.

Research activities
Network Optimization.

FAYED, SALEMA

Assistant Lecturer, M. Sc. 2007, AASTMT, Alexandria, Egypt.

Specialization
Wireless sensor networks.
Research activities
Query optimization in wireless sensor networks, Applying evolutionary techniques such as genetic algorithms to optimize query processing.

HANAFY, HANY

Assistant Lecturer, M. Sc. 2008, AASTMT, Alexandria, Egypt.

Specialization
Data Mining - Clustering

Research activities
Enhanced Density Based Algorithm for Clustering Large Datasets.

KADRY, RANIA

Assistant Lecturer, M. Sc. 2005, AASTMT, Alexandria, Egypt.

Specialization
Computer engineering.

Research activities
Biomedical engineering.

KHAEDRAI, AHMAD

Assistant Lecturer, M. Sc. 2004, AASTMT, Alexandria, Egypt.

Specialization
Virtual Reality.

Research activities
Image processing, computer networks.

NAGY, SHERINE

Assistant Lecturer, M. Sc. 2008, AASTMT, Alexandria, Egypt.

Specialization
Feature Selection applied on Text data for classification.

Research activities
Reading pattern recognition papers involving both feature selection used for text and image mining.

SABRY, ABDALLAH

Assistant Lecturer, M. Sc. 2007, AASTMT, Alexandria, Egypt.

Specialization
Computer Networks.
Research activities
Network optimization and MAC layer implementation in MANET.

Full Time Graduate Teaching Assistants

ASLAN, MOHAMED
Teaching Assistant, B. Sc. 2008, AASTMT, Alexandria, Egypt.

BARSOUM, SHERINE
Teaching Assistant, B. Sc. 2008, AASTMT, Alexandria, Egypt.

EL-HABASHY, AHMED
Teaching Assistant, B. Sc. 2006, AASTMT, Alexandria, Egypt.

FAHALLA, KARMA
Teaching Assistant, B. Sc. 2008, AASTMT, Alexandria, Egypt.

FAYED, ARIGE
Teaching Assistant, B. Sc. 2006, AASTMT, Alexandria, Egypt.

KHEDRI, MAAN
Teaching Assistant, B. Sc. 2008, AASTMT, Alexandria, Egypt.

MOHAMMED, ABD EL-RAHMAN
Teaching Assistant, B. Sc. 2007, AASTMT, Alexandria, Egypt.

SHOUKRY, SAMER
Teaching Assistant, B. Sc. 2003, AASTMT, Alexandria, Egypt.
Department Facilities

Description of the department facilities including laboratories, workshops, computing and information facilities, and the courses supported by these facilities.

Experimental Facilities Supporting the Program

The program utilizes a number of well-equipped laboratories for instructions and research. Hands-on experience is highly emphasized throughout the program and ultra modern equipment is to serve the interests of both the students and staff. The laboratories serving the program are:

1. Field-Programmable Gate Array (FPGA) Laboratory.
2. Microprocessor Laboratory.
3. Digital Circuits Laboratory.
5. Computer and Network Laboratory.
6. Electrical Machines Laboratory.
7. Electrical Circuits Laboratory.
8. Digital Communication Laboratory.
9. Reverse Engineering Laboratory.
10. Physics Laboratory.
11. Chemistry Laboratory.
Field-Programmable Gate Array (FPGA) Laboratory

LABORATORY INFORMATION

An up-to-date Laboratory with facilities that contains essential software programs as MATLAB and Xilinix software in order to support the students with all tools required to develop system architecture, low level languages and Network simulation.

Room no.: College Engineering & Technology - 241
Capacity: 28 students.

MAJOR EQUIPMENT

- Computer Intel P. V core 2 Duo, RAM 1 GB, HD 160GB, DVD writer, 17 " LCD monitor.
- Microsoft Windows Operating System.
- MATLAB Software.
- Xilinx Software.

THE LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 311</td>
<td>Computer Architecture</td>
<td>6</td>
</tr>
<tr>
<td>CC 317</td>
<td>Digital System Design</td>
<td>5</td>
</tr>
<tr>
<td>CC 417</td>
<td>Assembly Language</td>
<td></td>
</tr>
<tr>
<td>CC 431</td>
<td>Computer Networks (1)</td>
<td>9</td>
</tr>
<tr>
<td>CC 523</td>
<td>Computer Performance</td>
<td></td>
</tr>
<tr>
<td>CC 524</td>
<td>Neural Networks</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Elective
The laboratory gives the students the opportunity to use the microprocessors kit for running several programs written in assembly language and it provides various tests and runs numerous experiments, also, it help the students to establish interfacing between computer and different input/output devices, Finally, it supports the students with all materials required to create different micro-controller chips.

Room no.: College Engineering & Technology - 326
Capacity: 25 students

**Laboratory Equipment**

- Computer Intel P. V core 2 Duo, RAM 1 GB, HD 160GB, DVD writer.
- Microcomputer Teaching System
- Portable Programmer
- Microprocessor Application Board
- Microprocessor Training System
- CPLD Card XC 9500 Complex Programmable Logic Device
- FPGA (Field Programmable Gate Array) Development Boards
  - Spartan-3A DSP 1800A Development Board with embedded MicroBlaze Softcore.
  - Spartan-3 Starter Kit with XC3S200 FPGA chip and 512KB SRAM.
- Data Acquisition Experiments.
- Running assembly programs on 8088/86 Microprocessors boards.

**The Laboratory Serves the Following Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 341</td>
<td>Digital Electronics</td>
<td>6</td>
</tr>
<tr>
<td>CC 411</td>
<td>Introduction to Microprocessor</td>
<td>7</td>
</tr>
<tr>
<td>CC 415</td>
<td>Data Acquisition Systems</td>
<td>8</td>
</tr>
<tr>
<td>CC 421</td>
<td>Introduction to Microprocessor</td>
<td>7</td>
</tr>
<tr>
<td>CC 514</td>
<td>Intelligent Robotics</td>
<td>Elective</td>
</tr>
<tr>
<td>CC 521</td>
<td>Microcomputer Based Design</td>
<td>Elective</td>
</tr>
<tr>
<td>CC 527</td>
<td>Computer Aided Design</td>
<td>Elective</td>
</tr>
</tbody>
</table>

**B. Sc. Program Status Report 2009**
Digital Circuits Laboratory

LABORATORY INFORMATION

A completely equipped laboratory that contains precision measurement equipments and tools for use in digital logical experiments. The laboratory houses a collection of equipment used for the generating signals and visualizing it.

Room no.: College Engineering & Technology - 441
Capacity: 25 students

LABORATORY EQUIPMENT

- Programmable Logic FX12 (XV4VFX12)
- Xilinx University Program Development System XUPV2P with Virtex 2 pro XC2VP30 and two embedded hardcore PowerPC 405 processors.
- Programmable Logic Digilent D2FT.
- Accessory Board Memory.
- Accessory Board Network (NET1)
- Accessory Board Digilent Analog I/O (ALO).
- Logic Pulser.
- Oscilloscope.
- Function Generator.

THE LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 216</td>
<td>Digital Logic</td>
<td>4</td>
</tr>
</tbody>
</table>
Computer Laboratories

LABORATORY INFORMATION

Lab Name: Lab 106
Room no.: College Engineering & Technology - 106
Capacity: 25 students

LABORATORY EQUIPMENT

- Personal Computers
- Microsoft Dot Net 2005 software.

THE LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 112</td>
<td>Structured Programming</td>
<td>2</td>
</tr>
<tr>
<td>CC 215</td>
<td>Data Structures</td>
<td>4</td>
</tr>
</tbody>
</table>
Computer Laboratories

LABORATORY INFORMATION

Lab Name: Lab 204
Room No.: College Engineering & Technology - 204
Capacity: 25 students

MAJOR EQUIPMENT

- Personal Computers
- Oracle Database Software

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 414</td>
<td>Database systems</td>
<td>7</td>
</tr>
</tbody>
</table>
Computer Laboratories

LABORATORY INFORMATION

Lab Name: Lab 206
Room No.: College Engineering & Technology - 206
Capacity: 25 students

MAJOR EQUIPMENT

- Personal Computers.
- Microsoft Dot Net Software.
- Linux Operating Systems in addition to Microsoft Operating system.

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 418</td>
<td>Operating Systems</td>
<td>8</td>
</tr>
<tr>
<td>CC 518</td>
<td>Data Security</td>
<td>Elective</td>
</tr>
</tbody>
</table>
Computer Laboratories

LABORATORY INFORMATION

Lab Name: Lab 300
Room No.: College Engineering & Technology - 300
Capacity: 25 students

MAJOR EQUIPMENT

- Personal Computers.
- Microsoft Operating System in addition to Linux Operating System.
- Microsoft Office 2007 Software.
- Microsoft Dot Net Software.

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 111</td>
<td>Introduction to Computers</td>
<td>1</td>
</tr>
<tr>
<td>CC 112</td>
<td>Structured Programming</td>
<td>2</td>
</tr>
<tr>
<td>CC 213</td>
<td>Programming Applications</td>
<td>3</td>
</tr>
<tr>
<td>CC 418</td>
<td>Operating Systems</td>
<td>8</td>
</tr>
<tr>
<td>CC 511</td>
<td>Artificial Intelligence</td>
<td>9</td>
</tr>
</tbody>
</table>
Computer Laboratories

LABORATORY INFORMATION

Lab Name: Lab 304
Room No.: College Engineering & Technology - 304
Capacity: 25 students

MAJOR EQUIPMENT

- Personal Computers.
- Microsoft Windows Operating System.
- Microsoft Dot Net Software.
- Microsoft Office Software.

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 316</td>
<td>Object Oriented programming</td>
<td>6</td>
</tr>
<tr>
<td>CC 319</td>
<td>Advanced Programming</td>
<td>5</td>
</tr>
<tr>
<td>CC 515</td>
<td>Introduction to Software Engineering</td>
<td>Elective</td>
</tr>
</tbody>
</table>
Computer Laboratories

LABORATORY INFORMATION

Lab Name: Lab 307
Room No.: College Engineering & Technology - 307
Capacity: 25 students

MAJOR EQUIPMENT

- Personal Computers.
- Microsoft Windows Operating System.
- Visual C Software.
- Microsoft Dot Net Software.

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 416</td>
<td>Computer Graphics</td>
<td>8</td>
</tr>
<tr>
<td>CC 516</td>
<td>Pattern Recognition</td>
<td>Elective</td>
</tr>
<tr>
<td>CC 517</td>
<td>Modelling and simulation</td>
<td>Elective</td>
</tr>
</tbody>
</table>
Computer Laboratories

LABORATORY INFORMATION

Lab Name: lab 312
Room No.: College Engineering & Technology - 312
Capacity: 25 students

MAJOR EQUIPMENT

- Personal Computers.
- Microsoft Windows Operating System.
- Microsoft Dot Net Software.

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course no.</th>
<th>Courses Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 111</td>
<td>Introduction to Computers</td>
<td>1</td>
</tr>
<tr>
<td>CC 112</td>
<td>Structured Programming</td>
<td>2</td>
</tr>
<tr>
<td>CC 213</td>
<td>Programming Applications</td>
<td>3</td>
</tr>
</tbody>
</table>
Computer and Network Laboratory

LABORATORY INFORMATION

Lab Name: Computer and Network Lab
Room No.: College Engineering & Technology - 239
Capacity: 28 students

MAJOR EQUIPMENT

- Workstation, dual core AMD 2.6 GHz, 2 GB RAM, Hard Disk 250 GB
- Workstation, Intel core 2 Quad Q6700, 4 GB RAM, Hard Disk 450 GB, Monitor HPI2045w
- Intel XP455 Networkprocessor
- Secure Embedded Web Application Kit Rabbit3000
- Serial to Ethernet Application Kit Rabbit CoreRCM3000
- Airborne 802.11 b wireless LAN Node Module Evaluation and Development Kit
- 4 port USB KVM switch kit "Trendnet"
- 8 port 10/100 desktop switch "Netgear"
- Ethernet DSL router with 4 port switch "Linksys"
- 3 COM 8 port switch

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course no.</th>
<th>Courses Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC 331</td>
<td>Intro. to Computer Communications</td>
<td>6</td>
</tr>
<tr>
<td>CC 431</td>
<td>Computer Network I</td>
<td>9</td>
</tr>
<tr>
<td>CC 531</td>
<td>Computer Network II</td>
<td>Elective</td>
</tr>
<tr>
<td>CC 518</td>
<td>Computer Security</td>
<td>Elective</td>
</tr>
</tbody>
</table>
Electrical Machines Laboratory

LABORATORY INFORMATION

The laboratory serves in performing the following project activities:

- Unity power factor lost converter for D.C. motor.
- D.C. step down chopper for D.C. motor.
- Four-quadrant drive for D.C. motor.
- Three-phase chopper control induction motor.
- Voltage control of wind driven induction generator.
- Series Motor Drive.
- Three phase Wind Induction Generator Station.
- Inverter Bridge leg.

Room no.: 201
Capacity: 20 students.

MAJOR EQUIPMENT

- Inductive Load.
- D.C. machine.
- AC Synch. Motor.
- Power Back.
- Machine Control Panel.
- Electrical Motor.
- Tachometer Generator.
- Transformer.
- Power Factor Unit.
- Amplitude Meter.
- Voltmeter.
- Wattmeter.
- Shunt Regulator.
- Ammeter.
- 2 Speed Motor.
- Synchronizing Device and Unit.
- Tacho Generator.
- Power Electronics Components.

THE LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 321</td>
<td>Electrical Machine 1</td>
<td>5</td>
</tr>
<tr>
<td>EE 322</td>
<td>Electrical Machine 2</td>
<td>6</td>
</tr>
<tr>
<td>EE 328</td>
<td>Electrical Power &amp; Machines</td>
<td>6</td>
</tr>
<tr>
<td>EE 329</td>
<td>Electrical Machines</td>
<td>7</td>
</tr>
<tr>
<td>EE 422</td>
<td>Electrical Machine 3</td>
<td>7</td>
</tr>
<tr>
<td>EE 424</td>
<td>Electrical Drives1</td>
<td>8</td>
</tr>
<tr>
<td>EE 521</td>
<td>Special Electrical Machine</td>
<td>9</td>
</tr>
<tr>
<td>EE 522</td>
<td>Electrical Drives2</td>
<td>10</td>
</tr>
<tr>
<td>EE 421</td>
<td>Power Electronics 1</td>
<td>6</td>
</tr>
<tr>
<td>EE 423</td>
<td>Power Electronics 2</td>
<td>7</td>
</tr>
</tbody>
</table>
Electrical Circuits Laboratory

LABORATORY INFORMATION

The lab provides various tests and runs numerous experiments to out the following research activities:

- Making basic measurements with the HP8590 E-Series and L-Series spectrum Analyzer.
- Decreasing the frequency span using the marker.
- Tracking unstable signals using marker track and the max. hold and min. hold function.
- Tracing of the output of some power electronic circuits using the storage oscilloscope.
- Transferring of output data of different circuits is done using a system of storage oscilloscope and Computer PC.
- Studying of different shapes available in the function generation and comparison between their average root mean square value and instantaneous values.

Room no.: 034

Capacity: 25 students

LABORATORY EQUIPMENT

- Spectrum Analyzers.
- Digital Oscilloscopes.
- Analog Oscilloscopes.
- Multiplexer.
- Wattmeter.
- Digital power Supply.
- Analog power Supply.
- Function Generator.
- Digital LCR Meter.
- Digital Multimeter.
- Analog Multimeter.
- Test Boards.

THE LABORATORY SERVICES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 238</td>
<td>Electrical Eng. Fundamentals</td>
<td>3, 4</td>
</tr>
<tr>
<td>EE 231</td>
<td>Electrical Circuits 1</td>
<td>3</td>
</tr>
<tr>
<td>EE 236</td>
<td>Electrical engineering 1</td>
<td>4</td>
</tr>
<tr>
<td>EE 232</td>
<td>Electrical Circuits 2</td>
<td>4</td>
</tr>
<tr>
<td>EE 312</td>
<td>Electric Measure. &amp; Inst. 2</td>
<td>5</td>
</tr>
</tbody>
</table>
Digital Communication Laboratory

LABORATORY INFORMATION

Room No. : 132
Capacity : 25

MAJOR EQUIPMENT

- 4 Power Supplies.
- Signal Analyzer.
- Spectrum Analyzer.
- Function Generators.
- 2 Analog Oscilloscopes, 1 Digital Oscilloscope.
- Signal generator.
- D.C Power Supply.
- 2 PSG 1000 Synthesized Signal Generator.
- Multi-meter Function Generator.
- 8111A Pulse/Function Generator.
- 3 Function Arbitrary 33120A Wave Generator.
- ISO-Tech IDM 205 RMS
- 4 Oscilloscope Multiplexers.
- 2 DAE SHIN DOA-141 all in one.
- Lab-Volt Digital Training Kit.
- 2 Frequency Counter.
- Oscilloscope 20 MHz SN9205, HP Oscilloscope 150 MHz.
- 2 H-CAI-ECS-C Electronic Communication systems.
- Hampden Hbt 460 Digital multi-meter.
- RF generator.
- 2 Personal Computer

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 217</td>
<td>Measurements &amp; Instrumentation</td>
<td>4th</td>
</tr>
<tr>
<td>EC 218</td>
<td>Measurements &amp; Instrumentation</td>
<td>4th</td>
</tr>
<tr>
<td>EC422</td>
<td>Introduction to Digital Communications</td>
<td>8th</td>
</tr>
<tr>
<td>EC523</td>
<td>Signal Space and Applications</td>
<td>9th</td>
</tr>
</tbody>
</table>
Reverse Engineering Laboratory

L A B O R A T O R Y I N F O R M A T I O N

A completely equipped laboratory that contains precision measurement equipment and gauges for use in experimental machining investigations and studies in quality control and to provide measurements and services to other disciplines. The laboratory houses a collection of equipment used for the following functions:

- General and precision measurements.
- Surface texture assessment.
- Calibration of measuring instruments.
- Inspection based in dimensional, form and geometrical tolerances.
- 3-D measurement, screw thread measurements, gear measurements, and complex shape measurements.

Room no.: Industrial services centre (ISC) - 005

Capacity: 15 students

L A B O R A T O R Y E Q U I P M E N T

- Profile projection
- Granite surface plate.
- Precision bench centres.
- Coordinate measuring machine (CMM).
- Toolmaker’s microscope.
- 3-D CNC – Vision Measuring.
- Profile, roundness and roughness measuring machine.
- Measuring hand tools, instruments and accessories: Block gauge sets, vernier callipers and height gauges, micrometers, sine bars, sine plates, digital bevels... etc.


<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM 112</td>
<td>Manufacturing Technology</td>
<td>2</td>
</tr>
<tr>
<td>IM 213</td>
<td>Material Removal Processes</td>
<td>4</td>
</tr>
<tr>
<td>IM 314</td>
<td>Material Forming Processes</td>
<td>5</td>
</tr>
<tr>
<td>IM 418</td>
<td>Automated Industrial Systems</td>
<td>8</td>
</tr>
<tr>
<td>IM 511E</td>
<td>Engineering Metrology</td>
<td>9, 10</td>
</tr>
<tr>
<td>IM 501</td>
<td>Senior Project Part (1)</td>
<td>9</td>
</tr>
<tr>
<td>IM 502</td>
<td>Senior Project Part (2)</td>
<td>10</td>
</tr>
</tbody>
</table>
Physics Laboratory

LABORATORY INFORMATION

Lab Name: Physics Lab I
Room No.: 114
Capacity: 25

MAJOR EQUIPMENT

- Power Supplies
- Electronic Components
- Boards
- Laser Tubes
- Function generators
- Heaters
- Photo Electric System
- Cathode Ray Oscilloscopes

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course no.</th>
<th>Courses Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 114</td>
<td>Physics I</td>
<td>1</td>
</tr>
</tbody>
</table>
Physics Laboratory

LABORATORY INFORMATION

Lab Name: Physics Lab II
Room No.: 116
Capacity: 25

MAJOR EQUIPMENT

- Power Supplies
- Heaters
- Thermopiles
- Boil's Apparatus
- Function Generators

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course no.</th>
<th>Courses Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 114</td>
<td>Physics II</td>
<td>2</td>
</tr>
</tbody>
</table>
Chemistry Laboratory

LABORATORY INFORMATION

Lab Name: Chemistry
Room No.: 214,150
Capacity: 25

MAJOR EQUIPMENT

- Chemicals and Reagents
- Pipettes, Burettes, Conical Flasks, Beakers, Funnels, Measuring Cylinders, Measuring Flasks.
- Projector
- Spectrophotometers
- pH meter
- Water analysis
- Test Oil Sets
- Sensitive Balances
- Oven
- Distill Water System

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course no.</th>
<th>Courses Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 118</td>
<td>Chemistry</td>
<td>1st and 2nd</td>
</tr>
</tbody>
</table>