ARAB ACADEMY FOR SCIENCE, TECHNOLOGY AND MARITIME TRANSPORT

MARINE ENGINEERING
B. Sc. Program

Status Report: Volume II
December 2009
B. SC. PROGRAM STATUS REPORT

Marine Engineering

Prepared by Departmental Committee and Coordinated by

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Head of Department
Department of Marine Engineering

DECEMBER 2009
**Department Vision/Mission Statements**

**Vision**
Our vision is to become an internationally recognized body that provides and supports the marine community with quality students and research work and that is self sufficient in terms of both human and educational resources.

**Mission**
Our mission is to provide our students quality education through our elite faculty and educational resources to transfer the up-to-date knowledge, skills, tools, and methods that are required by a marine engineer.

**Department Objectives**

- Since the design of Marine systems encompasses many Engineering fields, graduates of this department are called upon to handle diverse professional responsibilities. Therefore, the program includes the fundamentals of physical science and mathematics as well as a broad range of engineering aspects that are environmentally friendly. To provide the appropriate educational breadth, it is also desirable that as many courses in the humanities and social sciences be elected and accommodated.

- The undergraduate program is arranged to give the students broad knowledge in engineering mechanics by requiring basic courses in the areas of structural mechanics, hydrodynamics, marine power systems, marine dynamics, Offshore Oil and Gas pipelines, drilling Technology, Underwater Technology and oil and gas production.

- The program has been planned to satisfy the requirements of the Supreme Council of Universities in Egypt (SCU) and Accreditation Board for Engineering & Technology (ABET).
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Introduction

Program overview, activities and job opportunities, and program objectives

Marine Engineering: Historical Overview

The Marine Engineering program at the Arab Academy for Science and Technology and Maritime Transport has been established in 1972, primarily to provide education and training for the shipping industry. This role is fulfilled through the provision of the Basic Engineering Studies degree and certificates of competency for marine engineers. In 1979 the marine engineering program was developed to offer bachelor degree of engineering (B. Sc.) in marine engineering, plus Third Marine Engineer certificate. The program of study in marine engineering covers the principles of ship design and ship power plants as well as offshore structure design.

Topics as the form, strength, stability and sea keeping qualities, internal arrangement, and resistance and propulsion characteristics of ship hulls are included. The various types of propelling machinery, such as corrosion, fatigue, metallurgical problems, steam plants and several categories of internal combustion engines.

In addition to marine engineering, the department offers specialization in offshore engineering

The Role of Marine Engineering

The Marine Engineering program at the Arab Academy for Science and Technology and Maritime Transport prepares a well qualified marine engineers who play a significant role in shipping industry and marine business. Their responsibility will be the provision, management, design, selection to do installation, operation and maintenance of the engineering systems and associate equipment encountered in the shipping sector as well as marine industry.

Educational Aim and Objectives

Since the design of Marine systems encompasses many Engineering fields, graduates of this department are called upon to handle diverse professional responsibilities. Therefore, the program includes the fundamentals of physical science and mathematics as well as a broad range of engineering aspects that are environmentally friendly. To provide the appropriate educational breadth, it is also desirable that as many courses in the humanities and social sciences be elected and accommodated. It is recognized that the undergraduate program cannot treat all of the important aspects of engineering for the marine environment that may be desired by the student graduate work is therefore encouraged.
The undergraduate program is arranged to give the students broad knowledge in engineering mechanics by requiring basic courses in the areas of structural mechanics, hydrodynamics, marine power systems, and marine dynamics.

The program has been planned to satisfy the requirements of the Supreme Council of Universities in Egypt (SCU) and Accreditation Board for Engineering & Technology (ABET).

**Degree Requirements**

Candidates for bachelor degree of engineering (B. SC.) in Marine Engineering plus Third Marine Engineer Certificate must complete the professional degree program which consists of five years study (10 semesters, 180 Cr. Hrs.). The program of study comprises the following instructional and training phases:

**PHASE - I**
A phase of study at the Academy on internal residence basis for four semesters with a minimum duration of two years

**PHASE - II**
A guided sea-training period on board the training ship of the Academy (AIDA IV), for duration of four months equivalent to a six months period of practical sea training. The guided sea training is carried out under the supervision, guidance and evaluation of the Marine Engineering Department in coordination with the Sea Training Department.

**PHASE - III**
A phase of study at the department on external residence basis for five semesters with a minimum duration of two and half years

Completion of the study of phase - I, together with a guided sea-training period onboard the training ship of the Academy, qualifies the student to appear before a Board of Examiners of Engineers for written and oral examinations for the award of a certificate of competency as Engineer Watch keeper (Third Marine Engineer).

At the beginning of the 9th term, students decide on one of the two offered areas:

- Marine Engineering
- Offshore Engineering

In the final year, students form design teams and work on engineering application projects in their selected major specialization. Professors from universities and professional engineers from the marine industry are invited to evaluate and assess the final students' project report.

**Programme Outcomes**

After successfully completing the programme, the student will have the ability to apply engineering principles and analytical techniques in Mechanical Engineering. He will have an understanding of the engineering design process at both the conceptual and detailed levels. Finally, the student will acquire a range of transferable skills including communication, use of information technology, team work and project management.
Program Intended Learning Outcomes (ILOs)

A- Marine Engineering

Knowledge and Understanding
Students should have knowledge and understanding of:

- Types of marine power plants and marine auxiliary engines.
- Propulsion systems, shafting, shaft bearing, thrust bearing, stern tube and propellers.
- Types of pumps, their construction, performance and characteristics.
- Heat exchangers, central cooling systems.
- Ballast system, bilge system, piping fitting, types of valves, deck machinery and watch keeping duties.
- Steering gear, bow thruster, stabilizer, fresh water generator
- Fire detection and prevention, fire fighting equipment and safety in engine room
- Prevention of pollution, regulation, equipment and sewage systems.
- Fuels, specification, combustion, treatment of oils filtering, purification and clarification.
- Refrigeration system operation and fault finding, air conditioning techniques.
- Ship surveys.

Intellectual Skills
Students should be able to:

- Understand the fundamentals of marine engineering.
- Understand the different types of marine auxiliary machinery.
- Understand fire detection and fighting equipment.
- Realize the regulations and equipment for pollution prevention.

Practical Skills
Students should be able to:

- Identify all of the auxiliary machinery supporting the main engines.
- Identify and solve the most common problems facing him during sea going.
- Recognize the importance of watch keeping for the engine, and how to deal with any emergency case in the engine room.

Transferable Skills
On completion of this group of courses, students should be able to:

- Realize the watch keeping routine duties in port or at sea going and the log book data.
- Know the steps to prepare for maneuvering, and how to keep a safe engine watch.
- Know safety features and design considerations according to the international maritime regulations.

B-Offshore engineering

Knowledge and Understanding
Students should have knowledge and understanding of:

- Types of offshore structures and vehicles, their performance, capabilities and limitations.
- General design of a jacket platform.
- Oil and gas drilling & production technologies
- Safety aspects of offshore installations.
- Wave theories, wave loading, current forces and wind forces on offshore structures
- Structural design of the jacket structure, stresses in cylindrical members and joints.
- Design of topside structures.
- Design of foundation piles.
- Fabrication of the jacket and topside structures
- Transportation, launching and installation operations.
- Drilling equipment, main and auxiliary drilling tools
- Bit-rotation mechanisms, mud engineering, directional drilling
- Casing and cementing operations – drilling complications.
- Types of production systems, offshore pipelines.
- Process plant, general layout and design
- Undersea activities, the tools of underwater operations
- Diving apparatus, robotics and remotely operated vehicles
- Underwater inspection, maintenance and repair operations
- Properties of reservoir rocks, and reservoir fluids
- Reservoir performance, gas and water injection, enhanced recovery methods, well testing, reservoir simulation
- Port facilities, marine terminals, construction shipyards and repair docks
- Design considerations, operational and environmental loads, berthing and mooring loads.
- Fixed structures, floating structures, structural and mooring design,
- Inspection, maintenance and repair operations.

**Intellectual Skills**

Students should be able to:

- Realize the classification and description of the different types of structures, vehicles and systems used in Offshore Engineering
- Understand the design process of offshore structures and the response of the structure to the applied loads
- Understand the different phases of the construction and installation of offshore structures.
- Understand the different aspects of theoretical and applied drilling engineering and the modern equipment used in drilling operation for oil and gas.
- Realize the different techniques, systems and technological processes applied to produce oil and gas economically and safely.
- Realize the various types of vehicles and equipment used in underwater activities for underwater maintenance and repair operations of marine pipelines and offshore installations.
- To survey the different types of marine facilities, including marine terminals, dry docks and cargo handling equipment, discuss their operational, and design features.

**Practical Skills**

Students should be able to:

- Make regular visits for offshore fabrication shipyards and offshore oil and gas producing companies.
Investigate the fatigue behaviour of different materials using laboratory fatigue testing machine.

Carry out simple experiments for drilling fluids testing.

To use Non-destructive testing techniques to identify defects in materials and welds.

**Transferable Skills**

On completion of this group of courses, students should be able to:

- Solve offshore engineering problems by isolating out its separate parts and subjecting them to logical scientific analysis.
- Specify the suitable type of platform for specific operating conditions
- Design a typical jacket structure
- To use his knowledge, skills and practices to start a career in the filed of offshore engineering.
- To use his knowledge and skills deal with port and marine facilities from the design and selection stages up to the maintenance and repair operations.

**C- Ship Engineering**

**Knowledge and Understanding**

On completion of this group of courses, students should have knowledge and understanding of:

- Ship's technique terms, basic principles of ship's stability, trim, resistance and powering.
- Different types of ship, systems of framing, structural members, materials and welding process.
- Basic principles of ship’s design procedure, preliminary design, verification of preliminary design, final design, international rules governing ship's design and ship's drawings.
- Resistance and power calculations, engine selection, basic principles of propeller design and installation.
- Different equipments to be fitted onboard a ship, their functions and specifications.
- Shipbuilding process starting from material selection, ship construction, tests and ship delivery.

**Intellectual Skills**

On completion of this group of courses students should be able to:

- Work onboard a ship as engineer in engine room.
- Use the theories to develop engineering solutions to stability and strength problems in ships.
- Take part in design and construction of a ship in shipyards.
- Use the knowledge gained to analyze the ships’ accidents and methods of repair.

**Practical Skills**

On completion of this group of courses students should be able to:

- Do different operations in ship's engine room.
- Solve stability problems of a ship during sailing.
- Search and collect information to solve engineering problems onboard ships.
- Survey damage and suggest method of repair.
Transferable Skills
On completion of this group of courses students should be able to:

- Solve ship engineering problems by isolating out its separate parts and subjecting them to logical scientific analysis.
- Apply basic engineering science to a broad range of engineering problems.
- Analyze and solve straightforward problems in ship engineering fields.
- Adopt and engineering approach to the solution of problems, time and resource management, team work and report writing at a professional level.
- Adopt a systematic approach to difficult tasks.
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, mechanical engineering and the engineering sciences. These courses are accompanied by marine engineering courses covering the areas of marine engineering, diesel engines, naval architecture engineering and ship design, offshore structure engineering, shipbuilding engineering, oil and gas production, drilling engineering and under water engineering.

Course Coding

Numbering System

The course code consists of five digits, MN XYZ.

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 Management Engineering.
- ME – Mechanical Engineering.
- MM – Marine Engineering.
NE – Non-Engineering Courses.

**Marine Engineering Subject Field Groups**
Marine Engineering (MM) subject field offers courses in the following five groups:

- The Training and Senior Project Group (MM X0X).
- Marine Engineering Courses (MM X1X).
- Marine Diesel Engines & Marine Power Plants Courses (MM X2X).
- Naval Architecture & Ship Construction Courses (MM X4X).
- Offshore Engineering Courses (MM X7X).

**Degree Offered**
The program offers the degree of Bachelor of Science (B. Sc.) in Marine 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 Marine 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 marine engineering.

**Graduation Requirements**

**College Requirements**
A total of 55 credit hours are required by the college as per the following table:

<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><strong>BA</strong></td>
<td>1</td>
<td>BA 113</td>
<td>Physics (1)</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>BA 118</td>
<td>Chemistry</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>BA 123</td>
<td>Mathematics (1)</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>BA 141</td>
<td>Engineering Mechanics (1)</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>BA 114</td>
<td>Physics (2)</td>
<td>3</td>
<td>BA 113</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>BA 124</td>
<td>Mathematics (2)</td>
<td>3</td>
<td>BA 123</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>BA 142</td>
<td>Engineering Mechanics (2)</td>
<td>3</td>
<td>BA 141</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>BA 223</td>
<td>Mathematics (3)</td>
<td>3</td>
<td>BA 124</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>BA 224</td>
<td>Mathematics (4)</td>
<td>3</td>
<td>BA 223</td>
</tr>
<tr>
<td><strong>CC</strong></td>
<td>1</td>
<td>CC 111</td>
<td>Introduction to Computer</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>CC 112</td>
<td>Structured Programming</td>
<td>3</td>
<td>CC 111</td>
</tr>
<tr>
<td><strong>IM</strong></td>
<td>1</td>
<td>IM 111</td>
<td>Industrial Relations</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>IM 112</td>
<td>Manufacturing Technology</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td><strong>LH</strong></td>
<td>1</td>
<td>LH 131</td>
<td>ESP I</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>LH 132</td>
<td>ESP II</td>
<td>2</td>
<td>LH 131</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>LH 231</td>
<td>ESP III</td>
<td>3</td>
<td>LH 132</td>
</tr>
<tr>
<td><strong>ME</strong></td>
<td>2</td>
<td>ME 151</td>
<td>Eng. Drawing &amp; Projection</td>
<td>2</td>
<td>None</td>
</tr>
</tbody>
</table>
Department Requirements
A total of 125 credit hours are required by the department, which are distributed as follows:

- 110 credit hours of compulsory courses.
- A minimum of 15 credit hours of department restricted electives that are selected from the two main course groups as follows:
  - Four courses equivalent to 12 credit hours from the main area of interest.
  - One course, from the other group, equivalent to 3 credits.

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

<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>NE</td>
<td>6</td>
<td>NE 466</td>
<td>Environmental Science &amp; Technology OR</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NM 291</td>
<td>Maritime Law</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>P 101</td>
<td>Physical Education 1</td>
<td>0.5</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>P 102</td>
<td>Physical Education 1</td>
<td>0.5</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>P 203</td>
<td>Physical Education 1</td>
<td>0.5</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>P 204</td>
<td>Physical Education 1</td>
<td>0.5</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>P 305</td>
<td>Physical Education 1</td>
<td>0.5</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>D 101</td>
<td>Leadership 1</td>
<td>0.5</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>D 102</td>
<td>Leadership 2</td>
<td>0.5</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>D 203</td>
<td>Leadership 3</td>
<td>0.5</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>D 204</td>
<td>Leadership 4</td>
<td>0.5</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>D 305</td>
<td>Leadership 5</td>
<td>0.5</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>N 310</td>
<td>Nautical Technology</td>
<td>1</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>N 370</td>
<td>Marine Safety</td>
<td>1</td>
<td>None</td>
</tr>
</tbody>
</table>

Compulsory Courses
A total of 110 Cr. Hr. of the following compulsory courses

<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>CC</td>
<td>7</td>
<td>CC 442</td>
<td>Digital Design and Intro. to Microprocessor</td>
<td>3</td>
<td>CC 112</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>EE 238</td>
<td>Electrical Eng. Fundamentals</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>EE 218</td>
<td>Instrumentation &amp; Measurements</td>
<td>3</td>
<td>EE 238</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>EE 310</td>
<td>Marine Control Systems</td>
<td>2</td>
<td>EE 218</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>EE 320</td>
<td>Marine Electrical Engineering</td>
<td>1</td>
<td>EE 238</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>EE 329</td>
<td>Electrical Machines</td>
<td>3</td>
<td>EE 238</td>
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<tr>
<td></td>
<td>7</td>
<td>EE 418</td>
<td>Automatic Control Systems</td>
<td>3</td>
<td>EE 218</td>
</tr>
<tr>
<td>IM</td>
<td>4</td>
<td>IM 212</td>
<td>Manufacturing Process (1)</td>
<td>3</td>
<td>IM 111</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>IM 423</td>
<td>Operation Research</td>
<td>3</td>
<td>None</td>
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</tbody>
</table>
## Marine Engineering

<table>
<thead>
<tr>
<th>Subject</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Cr. Hr.</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME</td>
<td>ME 231</td>
<td>Thermodynamics</td>
<td>3</td>
<td>BA 114</td>
</tr>
<tr>
<td>ME</td>
<td>ME 256</td>
<td>Mechanical Engineering Drawing</td>
<td>3</td>
<td>ME151</td>
</tr>
<tr>
<td>ME</td>
<td>ME 274</td>
<td>Materials Science</td>
<td>3</td>
<td>BA 114 &amp; BA 142</td>
</tr>
<tr>
<td>ME</td>
<td>ME 276</td>
<td>Stress Analysis</td>
<td>3</td>
<td>ME 274</td>
</tr>
<tr>
<td>ME</td>
<td>ME 355</td>
<td>Theory of Machines</td>
<td>3</td>
<td>BA 142</td>
</tr>
<tr>
<td>ME</td>
<td>ME 362</td>
<td>Hydraulics</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td>ME</td>
<td>ME 431</td>
<td>Heat Transfer</td>
<td>3</td>
<td>ME 231</td>
</tr>
<tr>
<td>ME</td>
<td>ME 454</td>
<td>Machine Design</td>
<td>3</td>
<td>ME 276 &amp; ME 256</td>
</tr>
<tr>
<td>ME</td>
<td>ME 461</td>
<td>Fluid Mechanics</td>
<td>3</td>
<td>ME 362 &amp; BA 124</td>
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<tr>
<td>ME</td>
<td>ME 423</td>
<td>Steam Plant Engineering</td>
<td>3</td>
<td>ME 231 &amp; BA 118</td>
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<tr>
<td>ME</td>
<td>ME 434</td>
<td>Refrigeration &amp; Air Conditioning</td>
<td>3</td>
<td>ME 431</td>
</tr>
<tr>
<td>ME</td>
<td>ME 455</td>
<td>Computer Aided Design</td>
<td>3</td>
<td>ME 454</td>
</tr>
<tr>
<td>ME</td>
<td>ME 524</td>
<td>Maintenance Planning</td>
<td>3</td>
<td>126 CR hrs</td>
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<tr>
<td>MM</td>
<td>MM 211</td>
<td>Marine Engineering (1)</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td>MM</td>
<td>MM 221</td>
<td>Marine Diesel Engine (1)</td>
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**Department Restricted Electives**

At least five courses (15 Cr. Hr.) from the following list of the college electives

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Where the two main course groups are:

- **Group A**: Marine Engineering.
- **Group B**: Offshore Engineering.
## Marine Engineering Academic Program Sheet

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<td>ME 431 Heat Transfer</td>
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### Department Restricted Electives

#### Group A: Marine Engineering

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<td>Ship Propulsion Systems</td>
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#### Group B: Offshore Engineering

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<td>Oil &amp; Gas Production Technology</td>
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### Course Prerequisites

**Prerequisites List – Core Courses**

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### Academic Program Analysis

Analysis of the marine engineering undergraduate program has been carried out based on the national academic reference standard (NARS) for engineering. This analysis is shown in details in the next sections.
# B.S.C. Program Status Report 2009

## Year One

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* A: Humanities and Social Sciences; B: Mathematics and Basic Sciences; C: Basic Engineering Sciences; D: Applied Engineering and Design; E: Computer Applications and ICT; F: Projects and Practice; G: Discretionary
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## Year Five

### Semester Nine

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## Program Analysis by Semester Offering

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| Percentage | 40 | 49 | 11 | 100 | 10 | 23 | 21 | 22 | 9  | 9  | 7  | 100 |

### Distribution of contact hours by semester.

![Distribution of contact hours by semester.](image)

* A: Humanities and Social Sciences; B: Mathematics and Basic Sciences; C: Basic Engineering Sciences; D: Applied Engineering and Design; E: Computer Applications and ICT; F: Projects and Practice; G: Discretionary
Distribution of total contact hours.

Distribution of credit hours per semester by NARS category.

A: Humanities and Social Sciences; B: Mathematics and Basic Sciences; C: Basic Engineering Sciences; D: Applied Engineering and Design; E: Computer Applications and ICT; F: Projects and Practice; G: Discretionary
Program Analysis by Subject Field

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<td>Percentage</td>
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Distribution of total credit hours by NARS category*.
Contact hour distribution by subject field.

Contact hour percentages by subject field.
Percentage of total contact hours by subject field.

Percentage of total contact hours by MM course group.
NARS characterization * per subject area.

NARS characterization * percentage per subject area.

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Courses Summary Description

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

Basic and Applied Science Courses (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, determinate of acidity (practical) - Metals and corrosive environments, determinate 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 Nth 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 and trigonometric powers - Trigonometric substitution and 7th 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

Vector Algebra / Dot and cross product and Applications - Partial Differentiation / and
Derivatives of vector functions - Gradient / Divergence/ curl/ Laplacian - Line Integrals / line
Integrals Independent of the path / Exactness - Conservative vector fields - Double Integrals in
Cartesian and polar coordinates / Green’s Theorem - Surface Integrals / Stokes’ Theorem - Triple
Integrals / Divergence (Gauss’ Theorem) - Review on Integrals Theorems - Complex numbers and
functions / forms of representation - Analytic functions/ Harmonic functions - Line complex
integrals / Cauchy’s Integrals Theorem - Zeros and poles of Analytic functions/ Residues and their
evaluation - Residue Theorem / Application to Real Integral - Introduction to Fourier Integrals and
Transforms.

Computer Engineering Courses (CC)

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

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.

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

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.

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).

Electrical Engineering Courses (EE)

EE 218 – Instrumentation Measurements
Cr.3. Prerequisite: EE238
Introduction to feedback control (1) - Introduction to feedback control (2)- Physical Measurements - Introduction to feedback systems - Liquid level instruments - Liquid flow instruments – PH + Viscosity - Displacement + velocity measurements - Force and torque measurements - Data analysis - Error detectors/comparators - Electric/pneumatic transducers - Amplifier – Actuation.

EE 238 – Electrical Engineering Fundamentals
Cr.3. Prerequisite: B.A 124


EE 329 – Electrical Machines
Cr.3. Prerequisite: EE 238


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


Industrial Engineering and Management Courses (IM)

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


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

Production of steel and cast iron – Forming operations – Heat treatment operations – Cutting tools – Mechanics of metal cutting and turning operations – Cutting fluids – Sand casting – Centrifugal casting, die casting and aspects of the casting process – Gas and Electric arc welding – Electric

**IM 212 – Manufacturing Processes**  
*Cr.3. Prerequisite: IM 112*


**IM 400 – Practical Training**  
*Cr.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.

**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.

**English Language Courses (LH)**

**LH 131 - ESP I**  
*Cr.2. Prerequisite: None*


**LH 132 - ESP II**  
*Cr.2. Prerequisite: LH 131*


**LH 231 - ESP III**  
*Cr.3. Prerequisite: LH 131, LH 132*

Orientation - Overview of technical report writing - Background reports - Process reports - Instructions and manuals - Primary research reports - Feasibility reports - Report format -

**Marine Engineering Courses (MM)**

**MM 211 - Marine Engineering 1**  
Cr. 3. Prerequisite: None

Introduction to marine engineering, types of marine power plants, introduction to marine auxiliary engines transmission of power through propulsion systems - thrust bearing- shafting - shaft bearing- stern tube- propeller - different types of pumps - displacement and retodynamic - construction - performance - characteristics - heat exchangers - central cooling systems.

**MM 221 - Marine Diesel Engines 1**  
Cr. 3. Prerequisite: MM 231


**MM 241 - Naval Architecture and Ship Construction 1**  
Cr. 3. Prerequisite: None

The course deals with the main topics of naval architecture (e.g. - ship’s term - principal dimensions - form coefficients - calculations of areas and volumes - center of gravity and buoyancy - initial stability - trim - resistance and powering) and ship construction (e.g. - ship’s types - systems of framing - welding - material – classification societies - etc...).

**MM 312 - Marine Engineering 2**  
Cr. 3. Prerequisite: MM 211

Pumping systems - cooling systems - ballast system - bilge system - piping fitting - types of valves – deck machinery - watch keeping duties. Introduction to steering gear.

**MM 313 - Watch Keeping Duties**  
Cr. 3. Prerequisite: None

Watch keeping arrangements and procedures - keeping a safe engine watch - keeping a watch in port - keeping an effective engine watch in port under normal circumstances - keeping a safe engine watch at sea going - watch keeping routine duties - engine room log book data steps to prepare for manoeuvring - procedures taken in an emergency case in the engine room.

**MM 317 - Marine and offshore Engineering modelling and simulation**  
Cr. 3. Prerequisite: none

Introduction to geometric main dimensions of ship hull form and platform rigs, drawing and fairing of ship lines, lines plans for different ship types, different types of bows and stern, ship form, space
allocations and general arrangements GA, Midship section, shell expansion drawing, aerofoils and their marine applications, airfoil drawing, applications to rudders and ducts, propeller geometry, propeller drawings, introduction to engine room simulator, simulation of main engines, ship auxiliary system, simulation of electric power plants.

**MM 322 - Marine Diesel Engines 2**  
*Cr.3. Prerequisite: MM 221*

The training machinery installations - main and auxiliary engines preparations - starting - condition monitoring and stopping procedures - actual systems of training ship - cooling - lubrication - fuel and starting systems of main propulsion plant - main diesel engine propulsion system evaluation using the diesel engine combustion performance analyzer - engine trouble shooting study and analysis - marine machinery maintenance.

**MM 342 - Naval Architecture and ship construction 2**  
*Cr.2. Prerequisite: MM241*

Merchant ship types principle dimensions - ship stresses - framing system - ship structural items - typical mid ship sections longitudinal and transverse members - types of rudders - docking of ship - inspection and maintenance work of all under water fittings - different surveys required by the rules of classification societies.

**MM 415 - Marine Engineering 3**  
*Cr.3. Prerequisite: MM 312 - MM221*


**MM 423 - Marine Diesel Engines 3**  
*Cr.3. Prerequisite: MM 221 - MM322*

Review of marine diesel engines constructional features - kinematics and dynamics of crankshaft mechanisms - combustion chamber analysis and design - fixed and moving parts analysis and design. Design of diesel engine cooling and fuel injection systems. Moreover the exhaust system analysis and design will be introduced.

**MM 471 - Introduction to Offshore Engineering**  
*Cr.3. Prerequisite: None*


**MM 516 - Marine Engineering 4**  
*Cr.3. Prerequisite: MM 415*
Marine auxiliary machinery - regulations - safety features and design considerations - running troubles - survey and maintenance of Marine auxiliary machinery - ship docking and survey. Refrigeration machinery and air conditioning.

**MM 524 - Marine Diesel Engines 4**  
*Cr.3. Prerequisite: MM 423*

Importance of marine diesel engines including Duel Fuel Engines as a source of energy production - approaches of reducing the specific fuel consumption of a marine diesel engine - improving engine thermal efficiency. Fuel oil and injection systems for better engine performances improving the total diesel propulsion plant efficiency, energy utilization on board ships, engine rating and practical operation of propulsion machinery, exhaust emission and control, condition monitoring and fault diagnosis expert system of a marine diesel engine.

**MM 528 - Ship Propulsion Systems**  
*Cr.3. Prerequisite: MM 461 – MM 241*

The principals of steam turbine - gas turbine - diesel - diesel electric and combined marine power systems including power cycles - operating characteristics - and limitations. Engine-Hull-propeller matching and propulsion power transmission. Principals of electric power generation - electric load analysis - costing in marine power plant. Decision making for selection of propulsion systems and their components.

**MM 543 - Ship Design**  
*Cr.3. Prerequisite: MM 241 – ME376*

The course deals with topic related to the design process of a ship (e. g. Hydrostatic data - stability - determination of main dimensions - ship strength

**MM 544 - Shipyard Technology**  
*Cr.3. Prerequisite: MM 241 – MM 543*

The course deals with all topics related to shipyards technology (e. g. shipyard layout, site selection - different workshops - welding technology - quality control - management.)

**MM 545 - Ship Resistance and Powering**  
*Cr.3. Prerequisite: ME 461 and MM 241*

The course deals with the main topics of ship resistance and powering. How to calculate the resistance for a particular ship and the selection of power and propeller.

**MM 570 - Underwater Technology**  
*Cr.3. Prerequisite: MM 471*


**MM 571 - Design and Construction of Offshore Structures**  
*Cr.3. Prerequisite: MM 471*

**MM 572 - Drilling Technology**  
*Cr.3. Prerequisite: MM 471*


**MM 573 - Oil and Gas Production Technology**  
*Cr.3. Prerequisite: MM 471*

Physical properties of oil and gas – well completions - bottom hole completion techniques - well productivity – types of production systems - fixed plate forms - floating production - sub-sea systems – offshore pipelines – process plant - general layout and design - produced fluid systems - gas injection systems - separation facilities - oil and gas transfer - oil and gas flow metering - oily water processing – maintenance and safety aspects.

**MM 574 - Port Equipment Engineering**  
*Cr.3. Prerequisite: MM 471*

Port and harbor facilities - marine terminals - construction shipyards - repair docks – general design considerations - design criteria - site selection and layout - facility type requirements - environmental conditions - material selection – operational and environmental loads – berthing loads and fender system design – Mooring loads and design principles – fixed structures - structure types and configurations - selection of optimum structure types - design features – Floating structures - types and applications - structural design - mooring system design. Inspection - maintenance and repair operations.

**MM 575 - Offshore Engineering**  
*Cr.3. Prerequisite: MM 471*


**Mechanical Engineering (ME)**

**ME 151- Engineering Drawing & Projection**  
*Prerequisite: None / CR: 2*

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.

**ME 231- Thermodynamics**  
*Prerequisite: BA 114 / CR: 3*

Classical thermodynamics-Heat transfer by conduction, convection and radiation-Air standard cycles-Steam cycles- Gas turbine cycle-Introduction to refrigeration and air conditioning- psychrometry.

**ME 256- Mechanical Engineering Drawing**  
*Prerequisite: ME 151 / CR: 3*


**ME 274 - Materials Science**  
*Prerequisite: BA 114 and BA 142 / CR: 3*


**ME 276 – Stress Analysis**  
*Prerequisite: ME 274 / CR: 3*

Concept of stress and strain, Normal stresses and strains, shearing stresses and bearing stresses, Stresses due to torsion, Normal forces, and shearing forces and bending moments in beams, Stresses due to bending, Stress and strain transformations, Thin and thick walled cylinders, Stress concentration, Experimental stress analysis, Deflection and buckling of beams and columns.

**ME 355- Theory of Machines**  
*Prerequisite: BA 142 / CR: 3*


**ME 362 – Hydraulics**  
*Prerequisite: BA 114 / CR: 3*

**ME 431 - Heat Transfer**  
*Prerequisite: ME 231 / CR: 3*


**ME 423 - Steam Plant Engineering**  
*Prerequisite: ME 431 / CR: 3*


**ME 434 – Refrigeration & Air conditioning**  
*Prerequisite: ME 431/ CR: 3*

Introduction - Basic Vapor compression System- Load Estimation - Air Conditioning Fundamentals - Air conditioning design - Summer & Winter Cycles - Special systems- Air Conditioning Equipment - Air Conditioning Units.

**ME 454 - Machine Design (Marine)**  
*Prerequisite: ME 252 and ME 276 / CR: 3*


**ME 455 - Computer Aided Design**  
*Prerequisite: ME 454/ CR: 3*

Introduction to computer aided drafting and analysis – 2D and 3D Drafting (parametric solid modeling) – Introduction to the software "Solid Edge" – 2D and 3D parametric modeling – Introduction to finite element analysis – The finite element software "FEMAP" – Application to different machine element problems – Simulation of dynamic systems – MATLAB analysis and graphics – Application to different Mechanical, Hydraulic and Thermal systems (MATLAB 'Simulink') – Introduction to optimization – System and element optimum design problems.
ME 458 – Mechanical Vibrations  
*Prerequisite: ME 355 / CR: 3*


**ME 461 – Fluid Mechanics**  
*Prerequisite: ME 362 / CR: 3*


**ME 542- Maintenance Planning**  
*Prerequisite: 126 Credit Hours / CR: 3*


**ME 565 – TurboMachinery**  
*Prerequisite: ME 461 / CR: 3*


**Non- Engineering Courses (NE)**

**NE 466 - Environmental Sciences and Technology**  
*Cr.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 Marine Engineering program. The course files are organized as follows:

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

BA 113 – Physics (1)

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 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 INFORMATION

Course Title: Physics (2).
Code: BA114.
Hours: Lecture – 2 Hrs. Tutorial-2 Hrs. Laboratory – 1 Hr. Credit – 3.
Prerequisite: BA113 - Physics (1)

GRADING

Class Performance/Attendance: 10%
Midterm1/Assignments – (7th Week): 30%
Midterm # 2/Assignments – (12th Week): 20%
Final Exam: 40%

COURSE DESCRIPTION

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.

TEXT BOOKS


REFERENCE BOOKS

References available in AAST Library.

COURSE AIM

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.

COURSE OBJECTIVES

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**

**Week Number 1:** Electrochemical Reactions and cells. Volumetric Analysis (Practical).

**Week Number 2:** Principles of corrosion. Titrate Technique, Determine of acidity (practical).

**Week Number 3:** Metals and corrosive Environments. Determine of Alkalinity and chloride (practical).

**Week Number 4:** Forms of corrosion uniform, Galvanic and Differential aeration cell. Determine of Hardness (Practical).

**Week Number 5:** Pitting, stress corrosion cracking and intergranular corrosion forms. Determine of Dissolved oxygen (Practical).

**Week Number 6:** Atmospheric and Erosion Corrosion. Spectrophotometer Analysis (Practical).

**Week Number 7:** Coating and inhibitors as protection methods. Determine of nitrite and nitrate (Practical).

**Week Number 8:** Cathodic protection. Determine of phosphate and silica (Practical).

**Week Number 9:** Classification of fuel, properties of liquid fuel. Determine of some heavy Metals (Practical).

**Week Number 10:** Combustion of fuel. Determine of fluorine and chlorine (Practical).

**Week Number 11:** Air supply and Exhaust Gases. Determine of turbidity (Practical).

**Week Number 12:** Classification of lubricants Advantages and disadvantages of different types. Oil Analysis Determine of Viscosity and T.B.N (Practical).

**Week Number 13:** Properties of lubricants and Additives. Determine of Insoluble and Saltwater (Practical).

**Week Number 14:** Nature of impurities in water, soft and hard water. Effect of using impure water on Boilers performance. Determine of Acidity and water content (Practical).

**Week Number 15:** Water Treatment. Determine of PH (Practical).

**Week Number 16:** Air and water pollution. Determine of TDS and salinity (Practical).
BA 123 – Mathematics (1)

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 Title: Mathematics (3).

Code: BA223.


Prerequisite: BA124 – Mathematics (2).

Class Performance/Attendance: 10%

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

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

Final Exam: 40%

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 modelling 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 under graduate 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.
Computer Engineering Courses – CC

CC 111 – Introduction to Computers

Course Title: Introduction to Computer Science.

Code: CC111.

Hours: Lecture – 1 Hrs. 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

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

J.Hanly and E. Koffman, "C Program Design for Engineers", Addison Wesley, latest edition

REFERENCE BOOKS

• H.Schildt, "C, the complete reference “, Osborne McGrawHill, latest edition

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 442 – Digital Design and Introduction to Microprocessor

COURSE INFORMATION

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, Functions of combinational circuits logic, Flip-Flops, analysis design and realization of counters, Computer – aided engineering, Introduction to microprocessor(part 1).

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:

- 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 1).
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: Shift register.
Week Number 14: Introduction to microprocessor (part 1).
Week Number 15: Introduction to microprocessor (part 2).
Week Number 16: Final Exam.
Electrical Engineering Courses – EE

EE 218 – Instrumentation Measurements

Course Title: Instrumentation & Measurement
Code: EE 218
Hours: Lecture – 2 Hrs. Tutorial/Lab – 2/2 Hrs. Credit – 3.
Prerequisite: EE238

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

- Chesmond, C.J. “Basic control system technology" ELBS,1989
- Bartelt, Terry ,“Instrumentation and process control”, Thompson Delmar,2007

Course Objectives

To investigate different methods for remote measuring.

- To study how transducers operate and their characteristic
- To study how to analyze data obtained from measurements.
**COURSE OUTLINE**

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Course Content</th>
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<tbody>
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<td>Introduction to feedback control (1).</td>
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<tr>
<td>2</td>
<td>Introduction to feedback control (2).</td>
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<td>3</td>
<td>Physical Measurements.</td>
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<td>4</td>
<td>Introduction to feedback systems.</td>
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<td>5</td>
<td>Liquid level instruments.</td>
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<td>6</td>
<td>Liquid flow instruments.</td>
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<tr>
<td>7</td>
<td>7th week + PH+Viscosity.</td>
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<td>8</td>
<td>Displacement + velocity measurements.</td>
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<td>9</td>
<td>Force and torque measurements.</td>
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<td>10</td>
<td>Data analysis.</td>
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<td>11</td>
<td>Error detectors/comparators.</td>
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<tr>
<td>12</td>
<td>12th week + Electric/pneumatic transducers.</td>
</tr>
<tr>
<td>13</td>
<td>Cont (Amplifier transducers).</td>
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<tr>
<td>14</td>
<td>Actuation.</td>
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<tr>
<td>15</td>
<td>Revision.</td>
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<td>16</td>
<td>Final Exam.</td>
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</tbody>
</table>
EE 238 – Electrical Engineering Fundamentals

COURSE INFORMATION

Course Title: Electrical engineering fundamentals
Code: EE 238
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 study the basic circuit. To study the circuit theorems and investigate the laws of magnetic force.
COURSE OUTLINE

Week Number 1: Introduction
Week Number 2: Basic circuit
Week Number 3: Resistance, voltage, current, and ohm’s law.
Week Number 4: Kirchhoff’s laws.
Week Number 5: Resistances in series or parallel.
Week Number 6: Mesh analysis
Week Number 7: 7th week + Node analysis
Week Number 8: Source transformation
Week Number 9: Superposition, voltage and current divider
Week Number 10: Laws of magnetic force
Week Number 11: Field strength, flux density.
Week Number 12: 12th week + Relation between B, H, I, K
Week Number 13: Alternating current.
Week Number 14: Waves, effective value.
Week Number 15: Power.
Week Number 16: Final exam
EE 329 – Electrical Machines

COURSE INFORMATION

Course Title: Electrical machines
Code: EE 329
Hours: Lecture – 2 Hrs. Tutorial/Lab – 2/2 Hrs. Credit – 3.
Prerequisite: EE 238

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

C. Hubert, 'Electric Machines" Maxwell Macmillan, 1991

COURSE OBJECTIVES

- A study of theory and concept of Electric Machines (AC & DC).
- Deriving equivalent circuit of electrical machines.
- Studying performance and characteristics of machines (AC & DC).

COURSE OUTLINE

Week Number 1: Review on electric circuits.
Week Number 2: Magnetic circuits.
Week Number 4: DC Machines (2): DC machines: equivalent circuit-excitation-voltage control.
Week Number 5: DC Machines (3); DC motors: starting-characteristics.

Week Number 6: DC Machines (4); DC motors: performance and speed control.

Week Number 7: 7th week + Transformers (1): construction-applications.

Week Number 8: Transformers (2); theory-equivalent circuits-tests.

Week Number 9: Transformers (3); voltage regulation-efficiency.

Week Number 10: Three Phase Induction Motors (1): construction-applications.

Week Number 11: Three Phase Induction Motors (2); rotating magnetic field-theory of operation-equivalent circuit.

Week Number 12: 12th week + 3-phase induction motor (3); characteristics-performance-starting.


Week Number 14: Synchronous Machine (2); synchronous alternator: theory of operation-characteristics-synchronization.

Week Number 15: Synchronous Machine (3); synchronous motor.

Week Number 16: Final Exam.
EE 418 – Automatic Control Systems

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
- Modeling 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.
Industrial and Management Engineering Courses – IM

IM 111 – Industrial Relations

COURSE INFORMATION

Course Title: Industrial Relations.
Code: IM 111.
Hours: Lecture – 1 Hr. Tutorial – 0 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

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.
Course Title: Manufacturing Process.

Code: IM 212.

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

Prerequisite: IM 112

Grading

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

Course Description

This course is tailored for departments other than Industrial and Management Engineering and it covers the following topics: Chip type machining processes, cutting tools, work holding devices, mechanics of chip formation, and analytical study of machining processes. It also includes tool wear, process accuracy and product surface finish, precision measurements and metrology, and an overview of non-conventional machining processes.

Text Books


Reference Books


Course Aim

To introduce students to fundamentals of different manufacturing processes applied in the manufacturing industry.

Course Objectives

- To understand the fundamentals of chip type machining processes.
- To be familiar with the different cutting tools used in machining processes.
- To understand the basics of non-traditional and computerized machine tools.
- To comprehend the importance of inspection and quality control measures.
## Course Outline

- **Week Number 1**: Fundamentals of chip – type machining processes.
- **Week Number 2**: Fundamentals of chip – type machining processes.
- **Week Number 3**: Cutting tools for machining.
- **Week Number 4**: Turning and drilling processes.
- **Week Number 5**: Milling Processes.
- **Week Number 6**: Broaching and shaping processes.
- **Week Number 7**: Abrasive machining processes 1.
- **Week Number 8**: Abrasive machining processes 2.
- **Week Number 9**: Numerical control machine tools.
- **Week Number 10**: Non traditional machining processes 1.
- **Week Number 11**: Non traditional machining processes 2.
- **Week Number 12**: Measurements & Inspection 2.
- **Week Number 13**: Measurements & Inspection 2.
- **Week Number 14**: Quality Control.
- **Week Number 15**: Revision
- **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.
**Language, Humanities, & Social Science Courses – LH**

**LH 131 – ESP I**

**Course Information**

Course Title: ESP I.

Code: LH 131.

Hours: Lecture – 3 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%

**Text Books**


**Reference Books**

References available in AAST Library.

**Course Aim**

The course aims at enhancing learners’ 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 the 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:* Unit 3 (Suffixes) + Unit 4 (Programming and Languages) + Graded workshop.

*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) + Graded workshop.

*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) + General revision.

*Week Number 16:* Final exam.
LH 132 – ESP II
COURSE INFORMATION

Course Title: ESP II.
Code: LH 132.
Hours: Lecture – 3 Hrs. Credit – 2.
Prerequisite: LH 131 - ESP I

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

The 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 the 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.
- Employ a variety of relevant grammatical structures.
- Write academic essays and employment correspondence.
COURSE OUTLINE

Week Number 1: Orientation + Unit 9 (Computers in Education).

Week Number 2: Unit 9 (Computers in Education).

Week Number 3: Paragraph writing (Concrete Support).

Week Number 4: Unit 10 (Computers in Medicine).

Week Number 5: Unit 10 (Computers in Medicine) + Essay writing (Analysis).

Week Number 6: Essay writing (Application) + Graded workshop.

Week Number 7: Unit 11 (Robotics) + Progress test I.

Week Number 8: Unit 11 (Robotics) + Summary writing.

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) + Graded workshop.

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) + General revision.

Week Number 16: Final Exam.
LH 231 – ESP III
COURSE INFORMATION

Course Title: ESP III.
Code: LH 231.
Hours: Lecture – 3 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%

TEXT BOOKS


REFERENCE BOOKS


COURSE AIM

The course aims at enhancing learners’ writing skills in order to write various types of technical reports following international standards. The course also includes a component on oral presentations of reports.

COURSE OBJECTIVES

By the end of the course, learners will be able to:

 Identify the different types of technical reports as well as their structure.
 Write effective background reports.
 Recognize the difference between instructional manuals and process description reports.
 Write effective primary research (lab) and feasibility reports.
• Recognize the different sections of a report and how to write each.
• Use a dictionary to know the different meanings of a word / phrase / expression and to differentiate between synonyms.
• Summarize relevant texts.
• Paraphrase relevant texts.
• Include in-text citations in writing when necessary.
• Document report sources.
• Give oral presentations.

COURSE OUTLINE

Week Number 1: Orientation + Overview of technical report writing.
Week Number 2: Background reports.
Week Number 3: Process reports + Instructions and manuals.
Week Number 4: Primary research reports.
Week Number 5: Feasibility reports.
Week Number 6: Report format + Dictionary skills.
Week Number 7: Paraphrasing + Progress test I.
Week Number 8: Summarizing + Further practice on summarizing and paraphrasing.
Week Number 9: Discussion of report outlines + Presentation skills (CD viewing I).
Week Number 10: Quotations and source documentation+ Report writing workshop.
Week Number 11: Use of visual aids in technical writing + Presentation skills (CD viewing II).
Week Number 12: Report writing workshop + Progress test II.
Week Number 13: Mini presentations + Report writing workshop.
Week Number 14: Rehearsals.
Week Number 15: End- of- term presentations.
Week Number 16: Final exam.
Marine Engineering Courses – MM

Marine Engineering Courses Group

MM 211- Marine Engineering 1

Course Information

Course Title: Marine Engineering 1.
Code: MM 211.
Hours: Lecture: 2 Hrs. Tutorial: 3 Hrs. Credit: 3.
Prerequisites: None.

Grading

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

Course Description

Introduction to marine engineering, types of marine power plants, introduction to marine auxiliary engines transmission of power through propulsion systems, thrust bearing, shafting, shaft bearing, stern tube, propeller, different types of pumps, displacement and retodynamic, construction, performance, characteristics, heat exchangers, central cooling systems.

Text Books


Reference Books


Course Aim

The course aims to provide the student the fundamentals of marine engineering and also to introduce all of the marine auxiliary engines.
COURSE OBJECTIVES

The student will be able to identify and deal with all marine auxiliary engines, types of power transmission through propulsion systems and also the construction and performance of all types of pumps, heat exchangers and central cooling systems.

COURSE OUTLINE

Week Number 1: Introduction to marine engineering. Types of marine power plants.
Week Number 2: Introduction to marine auxiliary engines. Transmission of power through propulsion systems.
Week Number 3: Thrust bearing and shafting.
Week Number 4: Shaft bearing, stern tube and propeller.
Week Number 5: Shaft bearing, stern tube and propeller.
Week Number 6: Different types of pumps.
Week Number 7: Different types of pumps. + Quiz.
Week Number 8: Pump construction, performance and characteristics.
Week Number 9: Pump construction, performance and characteristics.
Week Number 10: Heat exchangers, types and construction.
Week Number 11: Heat exchangers, types and construction.
Week Number 12: Heat exchanger operation and temperature control. + Quiz.
Week Number 13: Heat exchanger operation and temperature control.
Week Number 14: Central cooling systems.
Week Number 15: Revision.
Week Number 16: Final Exam.
MM 312 - Marine Engineering 2
COURSE INFORMATION

Course Title: Marine Engineering 2.
Code: MM 312.
Hours: Lecture: 0 Hrs.  Tutorial: 6 Hrs.  Credit: 2.
Prerequisites: MM 211.

GRADING

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

COURSE DESCRIPTION

Pumping systems, cooling systems, ballast system, bilge system, piping fitting, types of valves, deck machinery, watch keeping duties. Introduction to steering gear.

TEXT BOOKS

Training assignment book for the training ship AIDA IV.

REFERENCE BOOKS


COURSE AIM

The course aims to increase the ability of the student to deal with any problems that may face him during sea going.

COURSE OBJECTIVES

The course objectives is to make the student able to identify all of the auxiliary engines that supports the main engine and also to know the most common problems that may face him at sea going and dealing with it.

COURSE OUTLINE

Week Number 1: Introduction to marine engineering systems.
Week Number 2: Pumping systems.
Week Number 3: Cooling systems.
Week Number 4: Ballast system.
Week Number 5: Ballast system.
Week Number 6: Bilge system.
Week Number 7: Bilge system.
Week Number 8: Types of valves.
Week Number 9: Types of valves.
Week Number 10: Deck machinery.
Week Number 11: Deck machinery.
Week Number 12: Watch keeping duties.
Week Number 13: Watch keeping duties.
Week Number 14: Introduction to steering gear system.
Week Number 15: Introduction to steering gear system.
Week Number 16: Final Exam.
MM 313- Watch Keeping Duties

COURSE INFORMATION

Course Title: Watch Keeping Duties.
Code: MM 313.
Hours: Lecture: 0 Hrs. Tutorial: 6 Hrs. 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

Watch keeping arrangements and procedures, keeping a safe engine watch, keeping a watch in port, keeping an effective engine watch in port under normal circumstances, keeping a safe engine watch at sea going, watch keeping routine duties, engine room log book data steps to prepare for maneuvering, procedures taken in an emergency case in the engine room.

TEXT BOOKS

Handouts and printed material.

REFERENCE BOOKS

Service manual of the training ship AIDA IV.

COURSE AIM

This course aims to make the student recognize the importance of watch keeping for the engine, and also how to deal with any emergency case in the engine room.

COURSE OBJECTIVES

To make the student familiar with the watch keeping routine duties in port or at sea going and the log book data. He will be also able to know the steps to prepare for maneuvering, and how to keep a safe engine watch.

COURSE OUTLINE

Week Number 1: Watch keeping arrangements and procedures.
Week Number 2: Watch keeping arrangements and procedures.

Week Number 3: Keeping a safe engine watch in port.

Week Number 4: Keeping an effective engine watch in port under normal circumstances.

Week Number 5: Keeping an effective engine watch in port under normal circumstances.

Week Number 6: Keeping a safe engine watch at sea going.

Week Number 7: Keeping a safe engine watch at sea going.

Week Number 8: Keeping a safe engine watch at sea going.

Week Number 9: Watch keeping routine duties.

Week Number 10: Watch keeping routine duties.

Week Number 11: Engine room log book data.

Week Number 12: Steps to prepare for maneuvering.

Week Number 13: Steps to prepare for maneuvering.

Week Number 14: Watch keeping Duties

Week Number 15: Procedures taken in an emergency case in the engine room.

Week Number 16: Final Exam.
**MM 317 - Marine and Offshore Engineering Modeling and Simulation**

**Course Information**

Course Title: Computer Applications in marine and Offshore Engineering  
Code: MM 317  
Hours: Lecture: 2  Tutorial: 3  Credit: 3  
Prerequisites: None

**Grading**

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

**Course Description**

Introduction to geometric main dimensions of ship hull form and platform rigs, drawing and fairing of ship lines, lines plans for different ship types, different types of bows and stern, ship form, space allocations and general arrangements GA, Midship section, shell expansion drawing, aerofoils and their marine applications, airfoil drawing, applications to rudders and ducts, propeller geometry, propeller drawings, introduction to engine room simulator, simulation of main engines, ship auxiliary system, simulation of electric power plants.

**Text Books**

Principles of Naval Architecture, edited by Edward V. Lewis, SNAME 1988

**Reference Books**

- Principles of Naval Architecture, edited by Edward V. Lewis, SNAME 1988  
- Diesel Engine Simulator  

**Course Aim and Objectives**

The course aims to familiarize the students with the fundamental knowledge and computer based drafting skills required in a ship and or class design office. The course also aims at enhancing geometric features of ship hull form and offshore platforms and rigs. It is also intended to expose the student to engine room environment through simulation process. Use of available computer codes will be made (e.g. AutoCad, Autoship, maxsurf, PropCad, Engine simulators …etc).
## COURSE OUTLINE:

<table>
<thead>
<tr>
<th>Week Number 1</th>
<th>Introduction to geometric main dimensions of ship hull form and platform rigs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week Number 2</td>
<td>Drawing and fairing of ship lines</td>
</tr>
<tr>
<td>Week Number 3</td>
<td>Lines plans for different ship types.</td>
</tr>
<tr>
<td>Week Number 4</td>
<td>Drawing of different types of bows and stern.</td>
</tr>
<tr>
<td>Week Number 5</td>
<td>Ship form, space allocations, and general arrangements GA.</td>
</tr>
<tr>
<td>Week Number 6</td>
<td>Midship section.</td>
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<tr>
<td>Week Number 7</td>
<td>Shell expansion drawing</td>
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<tr>
<td>Week Number 8</td>
<td>Introduction to aerofoils and their marine applications.</td>
</tr>
<tr>
<td>Week Number 9</td>
<td>Airfoil drawing, applications to rudders and ducts.</td>
</tr>
<tr>
<td>Week Number 10</td>
<td>Propeller geometry.</td>
</tr>
<tr>
<td>Week Number 11</td>
<td>Propeller drawings.</td>
</tr>
<tr>
<td>Week Number 12</td>
<td>Introduction to engine room simulator</td>
</tr>
<tr>
<td>Week Number 13</td>
<td>Simulation of main engines,</td>
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<tr>
<td>Week Number 14</td>
<td>Simulation of ship auxiliary systems,</td>
</tr>
<tr>
<td>Week Number 15</td>
<td>Simulation of electric power plants.</td>
</tr>
<tr>
<td>Week Number 16</td>
<td>Final Exam.</td>
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</tbody>
</table>
MM 415 - Marine Engineering 3

**COURSE INFORMATION**

Course Title: Marine Engineering 3.

Code: MM 415.

Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.

Prerequisites: MM 312.

**GRADING**

Class Performance/Attendance: 10%

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

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

Final Exam: 40%

**COURSE DESCRIPTION**

Steering gear, bow thruster, stabilizer, fresh water generator, fire detection and prevention, fire fighting equipment and safety in engine room, prevention of pollution, regulation, equipment and sewage systems. Fuels, specification, combustion, treatment of oils filtering, purification, clarification, etc…

**TEXT BOOKS**

Morsy, M.E> “General knowledge for Marine Engineers “Alex, El- Salam Publisher, Latest edition.

**REFERENCE BOOKS**

Taylor, D. A. “Introduction to Marine Engineering “

Jackson, I, and Morton, T.D “General Engineering knowledge for marine Engineers.

**COURSE AIM**

Developing the knowledge about marine auxiliary machinery

**COURSE OBJECTIVES**

Safety features and designs consideration according to the international regulations.

**COURSE OUTLINE**

*Week Number 1:* Shafting Arrangement.

*Week Number 2:* Shafting Arrangement.
Week Number 3: Shafting Arrangement.
Week Number 4: Pumps design consideration.
Week Number 5: Pumps design consideration.
Week Number 6: Shipboard Piping Systems design.
Week Number 7: Quiz.
Week Number 8: Shipboard Piping Systems design.
Week Number 9: Heat Exchanger Design.
Week Number 10: Heat Exchanger Design.
Week Number 11: Marine Pollution
Week Number 12: Quiz.
Week Number 13: Deck Machinery.
Week Number 14: Procedures taken in an emergency case in the engine room.
Week Number 15: Revision
Week Number 16: Final Exam.
**MM516 - Marine Engineering 4**

**Course Information**

Course Title: Marine Engineering 4.

Code: MM 516.

Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.

Prerequisites: MM 415.

**Grading**

Class Performance/Attendance: 10%

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

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

Final Exam: 40%

**Course Description**

The course deals with the main topics of fuel & oil handling on board ships, fuel oil purification, steering gear, refrigeration system operation and fault finding, air condition and different techniques, fire fighting equipments and ship survey.

**Text Books**

Morsy, M.E “General knowledge for Marine Engineers “Alex., El- salam Publisher,1995.

**Reference Books**

Souchotle E, smith, DW and Crawford, J marine auxiliary machinery London, newness – Butter worth Publication, LTD 1975, IMO regulations. Course Aim:

Developing the knowledge about marine auxiliary machinery

**Course Objectives**

Safety features and designs consideration according to the international regulations.

**Course Outline**

*Week Number 1:* Fuel & Oil handling on board ships.

*Week Number 2:* Fuel Oil Purification.

*Week Number 3:* Fuel Oil Clarification.

*Week Number 4:* Steering Gear.
Week Number 5: Steering Gear.
Week Number 6: Steering Gear.
Week Number 7: Quiz.
Week Number 8: Refrigeration System operation & Fault Finding.
Week Number 9: Refrigeration System operation & Fault Finding.
Week Number 10: Air conditioning and different techniques.
Week Number 11: Fire Fighting Equipment.
Week Number 12: Quiz.
Week Number 13: Fire Fighting System.
Week Number 14: Ship Survey.
Week Number 15: Revision.
Week Number 16: Final Exam.
Marine Power Plants Courses

**MM 221 - Marine Diesel Engines 1**

**COURSE INFORMATION**

Course Title: Marine Diesel Engines 1.

Code: MM 221.

Hours: Lecture: 2 Hrs. Tutorial: 4 Hrs. Credit: 3.

Prerequisites: ME 231.

**GRADING**

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

**COURSE DESCRIPTION**

Classification of internal combustion engines, construction details, systems of marine diesel engines, super-charging, marine fuels and fuel injection systems, combustion and diesel knocking, engine preparation and starting, engine performance and heat balance analysis and calculation. Operation and trouble shooting. Hands-on laboratory work is an integral part of this course.

**TEXT BOOKS**


**REFERENCE BOOKS**


**COURSE AIM**

The course aims to develop the abilities of student to deal with the most common problems may be occur in marine diesel engines.
**COURSE OBJECTIVES**

To make the student know the fundamentals of internal combustion engines and the marine diesel engines with all auxiliary systems.

**COURSE OUTLINE**

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Historical review and the importance of diesel engines as a prime mover.</td>
</tr>
<tr>
<td>2</td>
<td>Classification of diesel engines and operating cycles including dual fuel engines, some useful terms.</td>
</tr>
<tr>
<td>3</td>
<td>Construction details of marine diesel engines including dual fuel engines.</td>
</tr>
<tr>
<td>4</td>
<td>Construction details of marine diesel engines including dual fuel engines.</td>
</tr>
<tr>
<td>5</td>
<td>Construction details of marine diesel engines including dual fuel engines.</td>
</tr>
<tr>
<td>6</td>
<td>Exhaust scavenging processes in diesel engines.</td>
</tr>
<tr>
<td>7</td>
<td>Pressure charging and turbochargers.</td>
</tr>
<tr>
<td>8</td>
<td>Pressure charging and turbochargers.</td>
</tr>
<tr>
<td>9</td>
<td>Fuel and fuel injection systems.</td>
</tr>
<tr>
<td>10</td>
<td>Fuel and fuel injection systems.</td>
</tr>
<tr>
<td>11</td>
<td>Combustion and diesel knocking.</td>
</tr>
<tr>
<td>12</td>
<td>Lubrication and engine cooling.</td>
</tr>
<tr>
<td>13</td>
<td>Engine preparation, starting and reversing system.</td>
</tr>
<tr>
<td>14</td>
<td>Engine performance and heat balance analysis.</td>
</tr>
<tr>
<td>15</td>
<td>Operation and some working difficulties.</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam.</td>
</tr>
</tbody>
</table>
MM 322 - Marine Diesel Engines 2

COURSE INFORMATION

Course Title: Marine Diesel Engines 2.

Code: MM 322.

Hours: Lecture: 0 Hrs.  Tutorial: 6 Hrs.  Credit: 3.

Prerequisites: MM 221.

GRADING

Class Performance/Attendance: 10%

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

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

Final Exam: 40%

COURSE DESCRIPTION

The training machinery installations, main and auxiliary engines preparations, starting, condition monitoring and stopping procedures, actual systems of training ship, cooling, lubrication, fuel and starting systems of main propulsion plant, main diesel engine propulsion system evaluation using the diesel engine combustion performance analyzer, engine trouble shooting study and analysis, marine machinery maintenance.

TEXT BOOKS

Handouts and printed matters.

REFERENCE BOOKS

Service manuals of the training ship AIDA IV.

COURSE AIM

The course aims to increase the ability of student to deal with any problems of marine diesel engines that he may face in sea training.

COURSE OBJECTIVES

To make the student able to identify the marine diesel engine parts and all other supporting systems and also the steps of main diesel engine preparation, starting and watch keeping.

COURSE OUTLINE

Week Number 1: Propulsion system installations.
Week Number 2: Main engine preparation, starting and watch keeping.

Week Number 3: Main engine preparation, starting and watch keeping.

Week Number 4: Main engine cooling system.

Week Number 5: Main engine lubrication oil system.

Week Number 6: Main engine lubrication oil system.

Week Number 7: Main engine fuel oil system.

Week Number 8: Main engine starting system.

Week Number 9: Monitoring system, control room and analyzer.

Week Number 10: Engine trouble shooting analysis and study.

Week Number 11: Engine trouble shooting analysis and study.

Week Number 12: Principle of marine diesel engine maintenance.

Week Number 13: Daily routine maintenance.

Week Number 14: Daily routine maintenance.

Week Number 15: Auxiliary diesel generators construction, system, operation

Week Number 16: Final Exam.
MM 423 - Marine Diesel Engines 3

COURSE INFORMATION

Course Title: Marine Diesel Engines 3.
Code: MM 423.
Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.
Prerequisites: MM 221, ME 275, ME 376.

GRADING

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

COURSE DESCRIPTION

Review of marine diesel engines constructional features, kinematics and dynamics of crankshaft mechanisms, combustion chamber analysis and design, fixed and moving parts analysis and design. Design of diesel engine cooling and fuel injection systems. Moreover the exhaust system analysis and design will be introduced.

TEXT BOOKS


REFERENCE BOOKS


COURSE AIM

The course provides an understanding of loading failure and design of the main engine parts and different systems.

COURSE OBJECTIVES

Equipping the students with the basic skills required to design and analysis the engine fixed and moving elements.

COURSE OUTLINE

Week Number 1: Prerequisite for design and design condition.
Week Number 2: Prerequisite for design and design condition.
Week Number 3: Design of piston assembly.
Week Number 4: Design of connecting rod assembly.
Week Number 5: Design of crankshaft.
Week Number 6: Design of crankshaft.
Week Number 7: Quiz.
Week Number 8: Design of engine structure.
Week Number 9: Design of engine structure.
Week Number 10: Design and performance of fuel system.
Week Number 11: Design of lubrication system elements.
Week Number 12: Design of cooling system components.
Week Number 13: Design of super-charger.
Week Number 14: Design of super-charger.
Week Number 15: Review.
Week Number 16: Final Exam.
MM 429 - Electric Ship Design

COURSE INFORMATION

Course Title: Electric Ship Design.

Code: MM 429.

Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.

Prerequisites: EE 329.

GRADING

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

COURSE DESCRIPTION

Review of marine engineering physical principles, propulsion and electric power, energy conversion, power plant concept, overview of main ship machinery, main prime movers, thrust producing devices, propellers, propeller engine matching, electrical components, electric motors, AC generators, power electronics and converters, example of electric propulsion drives, principle of All Electric Ships, applications.

TEXT BOOKS


REFERENCE BOOKS

- W. Stevenson and J Grainger, "power system analysis “ McGraw Hall, 1994
- Dhar "computer Aided power system operation and Analysis”, MC grow - Hill New Delhi, 1982

COURSE AIM

To give Marine Engineering students an integrated treatment of the essentials of power systems on board ships, and to cover the main topics of electric ship design.

COURSE OBJECTIVES

- To study a.c and d.c. distribution systems.
- To investigate protective devices characteristics
- To study faults of power system and protection schemes
To evaluate and compare between the different ship propulsion configurations
To realize the effects of electric ship propulsion on the design and performance of ships.

**COURSE OUTLINE**


*Week Number 2:* DC Radial Distributors with Concentrated Loads: Kinds of dc distributors. Voltage and current profiles of dc distributors fed from one end. Effect of feeding from both ends. Uniformly Loaded distributors: Uniformly loaded distributors. Power loss in uniformly loaded distributors


*Week Number 4:* AC Radial Distributors: A.C. radial distributor analysis and vector diagram. Power factor correction and its effect on distribution voltage profile AC Ring Distributor: A.C. ring distributor currents and voltages

*Week Number 5:* Cables: Classification of cables. Cables construction. Cable capacitance


*Week Number 8:* Review of ship definitions, types, dimensions, capacities, general arrangements…etc.

*Week Number 9:* Resistance and propulsion, hull resistance, propulsion, propulsion chains, power demand.

*Week Number 10:* Type of energy, energy conversion, overview of energy conversion, energy flow diagram.

*Week Number 11:* Power plant concepts, mechanical concepts, redundancy, engine room layout.

*Week Number 12:* Overview of main machinery, prime movers, marine fuels, transmission components, electrical components, propulsors.
Week Number 13: Propeller performance, open water diagram, four quadrant diagrams, CP propellers

Week Number 14: Matching propulsion engine to propellers, basic matching, and transformation of ship resistance to engine brake power, off design conditions, simplified method of calculations, applications and exercise.

Week Number 15: Effects on ship design and performance, All Electric Ship AES Case study.

Week Number 16: Final Exam.
**MM 524 - Marine Diesel Engines 4**

**Course Information**

Course Title: Marine Diesel Engines 4.

Code: MM 524.

Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.

Prerequisites: MM 423.

**Grading**

Class Performance/Attendance: 10%

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

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

Final Exam: 40%

**Course Description**

Importance of marine diesel engines including Dual Fuel Engines as a source of energy production approaches of reducing the specific fuel consumption of a marine diesel engine, improving engine thermal efficiency. Fuel oil and injection systems for better engine performances improving the total diesel propulsion plant efficiency, energy utilization on board ships, engine rating and practical operation of propulsion machinery, exhaust emission and control, condition monitoring and fault diagnosis expert system of a marine diesel engine.

**Text Books**


**Reference Books**

- S.H. Heushell, “Medium & High Speed Diesel Engines for Marine Use”, Institute of M.E.

**Course Aim**

Providing the student to understand the advanced techniques used for improving the energy utilization of diesel propulsion machinery and exhaust emission control.

**Course Objectives**

Acquainted with the latest developments and new trends in area of M.D.E, also to provide appreciation of engines exhaust emission impact on environmental and human health. To be able to analyze machinery condition and performance using artificial intelligent.
## Course Outline

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to the important of M.D.E as a power source.</td>
</tr>
<tr>
<td>2</td>
<td>Progress of SFOC reduction.</td>
</tr>
<tr>
<td>3</td>
<td>Progress of SFOC reduction.</td>
</tr>
<tr>
<td>4</td>
<td>Improving engine operation cycle efficiency.</td>
</tr>
<tr>
<td>5</td>
<td>Improving engine operation cycle efficiency.</td>
</tr>
<tr>
<td>6</td>
<td>Improving the overall efficiency of the diesel propulsion system.</td>
</tr>
<tr>
<td>7</td>
<td>Quiz.</td>
</tr>
<tr>
<td>8</td>
<td>Improving the overall efficiency of the diesel propulsion system.</td>
</tr>
<tr>
<td>9</td>
<td>Propulsion machinery management (operation and analysis).</td>
</tr>
<tr>
<td>10</td>
<td>Propulsion machinery management (operation and analysis).</td>
</tr>
<tr>
<td>11</td>
<td>Emission from combustion engines and their control.</td>
</tr>
<tr>
<td>12</td>
<td>Quiz.</td>
</tr>
<tr>
<td>13</td>
<td>Condition monitoring and diagnostic system of M.D.E.</td>
</tr>
<tr>
<td>14</td>
<td>Condition monitoring and diagnostic system of M.D.E.</td>
</tr>
<tr>
<td>15</td>
<td>Review.</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam.</td>
</tr>
</tbody>
</table>
MM 528- Ship Propulsion Systems

Course Information

Course Title: Ship Propulsion Systems.

Code: MM 528.

Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.

Prerequisites: MM 543.

Grading

Class Performance/Attendance: 10%

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

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

Final Exam: 40%

Course Description

The principals of steam turbine, gas turbine, diesel, diesel electric and combined marine power systems including power cycles, operating characteristics, and limitations. Engine-Hull-propeller matching and propulsion power transmission. Principals of electric power generation, electric load analysis, costing in marine power plant. Decision making for selection of propulsion systems and their components.

Textbooks


Reference Books

- Nina Morgan, “Marine Technology Reference Book”

Course Aim

Present day and future ships and their propulsion systems, comparative study of different versions of marine propulsion systems, resistance and power calculation. The selection of power plants based on economical-technical and operational data. Decision making for selection of propulsion systems and their components.


**COURSE OBJECTIVES**

To familiarise the student with the different versions of marine propulsion and their components, also to be able to match the ship’s hull, propeller and main engine for optimum performance. To design and select on economical-technical basis the most suitable propulsion system for a given ship.

**COURSE OUTLINE**

Present day ships and their propulsion systems.

At the beginning of the course a basic types and size of a ship will be selected as a continuous assessment project. + Library assignment.

Statistical survey.

Estimating ship power using Admiralty formula.

Comparative study of different types of propulsion systems.

Quiz + ship’s resistance calculation.

Ship’s resistance calculation (cont.).

Ship’s power calculation.

Ship’s power calculation (cont.).

Evaluation and selection of ship’s propulsion system. + Quiz.

Evaluation and selection of ship’s propulsion system (cont.).

Quiz. (Oral + written).

Decision making technique to decide the optimum selection. + Quiz.

Decision making technique to decide the optimum selection (cont.).

Review.

Final Exam. + (Oral + Final report is to be submitted).
Naval Architecture & Ship Construction Courses

**MM 241- Naval Architecture and Ship Construction 1**

**Course Information**

Course Title: Naval Architecture and Ship Construction 1.

Code: MM 241.

Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.

Prerequisites: 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 deals with the main topics of naval architecture (e.g., ship’s term, principal dimensions, form coefficients, calculations of areas and volumes, center of gravity and buoyancy, initial stability, trim, resistance and powering) and ship construction (e.g., ship’s types, systems of framing, welding, material, classification societies, etc…).

**Text Books**


**Reference Books**


**Course Aim**

On completion of this course, students will know ship’s terms, basic principles of ship’s stability, trim, resistance and powering. Also students will be well acquainted with different types of ships, system framing, structural members, materials and welding process.

**Course Objectives**

Explain basic ship terms, principle dimensions and particulars. Basic principles of ship’s stability, trim, resistance and powering. Explain different types of ships, system framing, different structural members, welding, material and role of classification societies.


**COURSE OUTLINE**

*Week Number 1:* Discussion of application ship’s term.

*Week Number 2:* Arch. Principles structure terms.

*Week Number 3:* Application coefficient of forms.

*Week Number 4:* Discussion on system framing.

*Week Number 5:* Application area, volume moment.

*Week Number 6:* Discussion on stiffeners types.

*Week Number 7:* Quiz + Discussion center of gravity.

*Week Number 8:* Discussion of structural components.

*Week Number 9:* Discussion for stability of ships.

*Week Number 10:* Discussion stresses in ships.

*Week Number 11:* Application resistance.

*Week Number 12:* Quiz + Drawing mid-ship section.

*Week Number 13:* Discussion propeller action.

*Week Number 14:* Discussion on welding.

*Week Number 15:* Revision.

*Week Number 16:* Final Exam.
**MM 342 - Naval Architecture and Ship Construction 2**

**Course Information**

Course Title: Naval Architecture and Ship Construction 2.

Code: MM 342.

Hours: Lecture: 0 Hrs.  
Tutorial: 6 Hrs.  
Credit: 3.

Prerequisites: MM 241.

**Grading**

Class Performance/Attendance: 10%

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

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

Final Exam: 40%

**Course Description**

Merchant ship types principle dimensions, ship stresses, framing system, ship structural items, typical mid ship sections longitudinal and transverse members, types of rudders, docking of ship, inspection and maintenance work of all under water fittings, different surveys required by the rules of classification societies.

**Text Books**

Handouts and printed matters.

**Reference Books**

Service manual of the training ship AIDA IV.

**Course Aim**

On completion of this course, student will be able to know Merchant ship types, principle dimensions and all ship stresses. Also the student will know the ship structural items.

**Course Objectives**

The student will be able to know the ship design fundamentals, docking of ship, inspection and maintenance of all under water fittings. The student will also know the different surveys required by the rules of classification societies.

**Course Outline**

*Week Number 1:*  Merchant ship types.
Week Number 2: Principle dimensions.

Week Number 3: Ship stresses.

Week Number 4: Framing system.

Week Number 5: Ship structural items.

Week Number 6: Ship structural items.

Week Number 7: Typical mid ship sections.

Week Number 8: Longitudinal and transverse members.

Week Number 9: Types of rudders.

Week Number 10: Docking of ships.

Week Number 11: Docking of ships.

Week Number 12: Inspection and maintenance work of all under water fittings on dry dock.

Week Number 13: Inspection and maintenance work of all under water fittings on dry dock.

Week Number 14: Different surveys required by the rules of classification societies.

Week Number 15: Different surveys required by the rules of classification societies.

Week Number 16: Final Exam.
**Course Information**

**Course Title:** Ship Design.

**Code:** MM 543.

**Hours:** Lecture: 2 Hrs.  Tutorial: 2 Hrs.  Credit: 3.

**Prerequisites:** MM 241, ME 376.

**Grading**

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

**Course Description**

The course deals with topic related to the design process of a ship (e.g., Hydrostatic data, stability, determination of main dimensions, ship strength...)

**Text Books**


**Reference Books**


**Course Aim**

To present the fundamentals of ship design calculation and determine the stress level for ship structure components under static and dynamic loads and to cover the safety aspects of ship design.

**Course Objectives**

To qualify the student to understand the procedure of ship design operation and exercise some calculation required in the design procedure and get familiar with the results of these result been evaluated.
COURSE OUTLINE

Week Number 1: Hydrostatic data.
Week Number 2: Stability and stability criteria.
Week Number 3: Draft and trim.
Week Number 4: Classification of marine vehicles.
Week Number 5: Classification of ship’s weight.
Week Number 6: General procedure for cargo ship design, preliminary main dimension.
Week Number 7: Quiz – Light ship weight estimation.
Week Number 8: Approximate hydrostatic and relation between hull form parameter.
Week Number 9: Hull form generation methods.
Week Number 10: Different types of hull form.
Week Number 11: Different shape of sections, bow and stern.
Week Number 12: Quiz – Geometric modifications.
Week Number 13: Static and dynamic loading.
Week Number 14: Longitudinal strength calculations.
Week Number 15: Transverse strength calculations.
Week Number 16: Final Exam.
MM 544 - Shipyard Technology

Course Title: Shipyard Technology.
Code: MM 544.
Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.
Prerequisite: MM 241, MM 543.

Grading:

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

Course Description:
The course deals with all topics related to shipyards technology (e.g. shipyard layout, site selection, different work shops, welding technology, quality control, management.)

Text Books


Reference Books

- Shipbuilding Technology.
- Principal of Naval Arch.

Course Aim

To present the basic fundamentals of shipbuilding Technique & the required stages which carried out the shipyard.

Course Objectives

To qualify the student to understand the techniques in shipbuilding industry and to be familiar with the welding process and its tests.

Course Outline:

Week Number 1: Parameters affecting site selection.
Week Number 2: Shipyard layout.
Week Number 3: Stocking stage.

Week Number 4: Stocking stage 2.

Week Number 5: Preparation stage 1.

Week Number 6: Preparation stage 2.

Week Number 7: Quiz. 7th Week Exam

Week Number 8: Sub assembly stage 1.

Week Number 9: Sub assembly stage 2.

Week Number 10: Assembly stage.

Week Number 11: Erection stage 1.

Week Number 12: Quiz. 12th Week Exam

Week Number 13: Erection stage 2.

Week Number 14: Outfitting stage 1.

Week Number 15: Outfitting stage 2.

Week Number 16: Final Exam.
MM 545 - Ship Resistance and Powering

**COURSE INFORMATION**

Course Title: Ship Resistance and Powering.

Code: MM 545.

Hours: 3 Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.

Prerequisites: ME 46.

**GRADING**

Class Performance/Attendance: 10%

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

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

Final Exam: 40%

**COURSE DESCRIPTION**

The course deals with the main topics of ship resistance and powering. How to calculate the resistance for a particular ship and the selection of power and propeller.

**TEXT BOOKS**

E. C. Tupper, "Introduction to Naval Architecture", latest Edition

**REFERENCE BOOKS**

- Principal of Naval Architecture, SNAME, 1988.

**COURSE AIM**

To acquaint the student with the different methods of ship power predictions and conventional methods for propeller design. The student will be able to assess the machinery power needed to propel the ship at a certain design speed.

**COURSE OBJECTIVES**

- Introducing the different types of ship resistance.
- The principal of thrust generation and performance of different propulsion devices.

**COURSE OUTLINE**

*Week Number 1:* Introduction to ship resistance, and the use of dimensional analysis.
Week Number 2: Frictional resistance.
Week Number 3: Wave making resistance.
Week Number 4: Other components of resistance.
Week Number 5: Use of models to determine ship resistance.
Week Number 6: Relation of hull form to resistance.
Week Number 7: Quiz. Application of different methods to determine ship resistance.
Week Number 8: Different methods of ship propulsion.
Week Number 9: Theory of propeller action.
Week Number 10: Theory of propeller action. (continue)
Week Number 11: Propeller geometry.
Week Number 12: Quiz. Law of similitude for propellers.
Week Number 13: Interaction between hull and propeller.
Week Number 14: Cavitations.
Week Number 15: Propeller design, machinery power calculation.
Week Number 16: Final Exam.
Offshore Engineering Courses

**MM 471 - Introduction to Offshore Engineering**

**COURSE INFORMATION**

Course Title: Introduction to Offshore Engineering.

Code: MM 471.

Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.

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**

Lecture notes.

**REFERENCE BOOKS**

- A Mather “Offshore Engineering – An Introduction”.
- M. Patel “Dynamics of Offshore Structures”
- J- Crawford “Offshore Installation Practice”
- W.J. Graff “Introduction to Offshore Structures”

**COURSE AIM**

To introduce the student to the field of Offshore Engineering with a broad classification and description of the different types of structures, vehicles and systems used and the various advanced technologies applied in this fast developing field.
COURSE OBJECTIVES

The student should be able to specify the suitable type of platform for specific operating conditions. Calculate the main loads affecting the structure. Identify the different systems on a typical platform.

COURSE OUTLINE

Week Number 1: Offshore Prospecting.
Week Number 2: Types of Offshore Structures and Vehicles.
Week Number 3: Types of Offshore Structures and Vehicles.
Week Number 4: Categories of Loads.
Week Number 5: Environmental loads (waves-currents- winds).
Week Number 6: General design of a jacket platform.
Week Number 7: Quiz. Oil and gas drilling technology
Week Number 8: Oil and gas drilling technology (Continue).
Week Number 9: Oil and gas drilling technology + Quiz.
Week Number 10: Production technology.
Week Number 11: Production technology (Continue).
Week Number 12: Quiz. Production technology
Week Number 13: Safety aspects of Offshore installations.
Week Number 14: Safety aspects.
Week Number 15: Safety aspects.
Week Number 16: Final Exam.
MM 570 - Underwater Technology

COURSE INFORMATION

Course Title: Underwater Technology.

Code: MM 570.

Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.

Prerequisites: MM 471.

GRADING

Class Performance/Attendance: 10%

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

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

Final Exam: 40%

COURSE DESCRIPTION

Survey of undersea activities in oceanography and offshore engineering – the tools of underwater operations, decompression chambers, diving apparatus, submarines, robotics and remotely operated vehicles – design criteria and applications – corrosion and cathodic protection – underwater inspection, maintenance and repair operations.

TEXT BOOKS


REFERENCE BOOKS

- “An Introduction to offshore Maintenance”, (OPL).
- “Underwater Technology”, (MTD).
- h.Talkington “Undersea work systems “.

COURSE AIM

To study the various types of vehicles and equipment used in underwater activities and the use of these tools for underwater maintenance and repair operations of marine pipelines and offshore installations.

COURSE OBJECTIVES

To educate the student and prepare him for a prospective career as a maintenance inspection engineer for offshore platforms and subsea systems.
COURSE OUTLINE

Week Number 1: Underwater work systems and tasks.

Week Number 2: Underwater work systems and tasks (Continue).

Week Number 3: Environmental factors.

Week Number 4: Vehicle systems and concepts.

Week Number 5: Underwater tools and manipulators.

Week Number 6: Rigging and mooring equipment.

Week Number 7: Quiz. Rigging and mooring equipment (Continue).

Week Number 8: Underwater cutting and welding.

Week Number 9: Underwater instrumentation.


Week Number 11: Submersibles and remotely operated vehicles.

Week Number 12: Quiz. Design criteria – Applications.

Week Number 13: Underwater Inspection, maintenance and repair operations.

Week Number 14: Underwater Inspection, maintenance and repair operations (Continue).

Week Number 15: Underwater Inspection, maintenance and repair operations (Continue).

Week Number 16: Final Exam.
MM 571 - Design and Construction of Offshore Structures

COURSE INFORMATION

Course Title: Design and Construction of Offshore Structures.
Code: MM 571.
Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.
Prerequisites: MM 471.

GRADING

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

COURSE DESCRIPTION

Wave theories, wave loading and offshore structures, Morison equation, wave slamming, current forces – wind forces on offshore structures – wave spectra and random loading – structural design of the jacket structure, stresses in cylindrical members and joints – design of topside structures – construction materials, steel structures, concrete structures – fabrication of the jacket and topside structures – transportation, launching, lifting and upending operations – pilling and installation operations – certifications and regulations.

TEXT BOOKS

Lecture notes.

REFERENCE BOOKS

- W.J. Graff “Introduction to Offshore Structures”
- Handbook of Coastal and Ocean Engineering” Vol. (2)
- Barltrop & Adams “Dynamics of Fixed Marine Structures”
- M Patel “Dynamics of Offshore Structures”

COURSE AIM

To cover the different aspects of the design process of offshore structures, the response of the structure to the applied loads and to discuss in detail the different phase of the construction and installation of offshore structures.

COURSE OBJECTIVES

The student should be able to:
• Design a typical jacket structure.
• Supervise the construction and installation phases.

COURSE OUTLINE

Week Number 1: An overview of engineering procedures.
Week Number 2: Design loads and forces.
Week Number 3: Structural design of the jacket structure.
Week Number 4: Structural design of the jacket structure (Continue).
Week Number 5: Tubular joint design.
Week Number 6: Tubular joint design (Continue).
Week Number 7: Quiz. Tubular joint design (Continue)
Week Number 8: Design of the topside structures.
Week Number 9: Design of the topside structures (Continue).
Week Number 10: Design of the topside structures (Continue).
Week Number 11: Pile foundations.
Week Number 12: Quiz. Pile foundations (Continue)
Week Number 13: Fabrication and transportation operations + installation operations
Week Number 14: Certification and regulations.
Week Number 15: Final Exam.
MM 572 - Drilling Technology

COURSE INFORMATION

Course Title: Drilling Technology.
Code: MM 572.
Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.
Prerequisites: MM 471.

GRADING

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

COURSE DESCRIPTION

Drilling objectives – physical and mechanical properties of rocks – drilling methods, drilling equipment, main and auxiliary drilling tools, drilling bits, drilling string, bit-rotation mechanisms – Mud engineering, drilling fluids, directional drilling, drilling practices – casing and cementing operations – drilling complications – drilling economics.

TEXT BOOKS

Lecture notes.

REFERENCE BOOKS

- M.Maclachlan “An Introduction to Marine drilling “OPL.
- A.Buurgayne “Applied Drilling Engineering “ OSPE.
- R.Sheffield “Floating Drilling Equipment and LTS use “.
- B.Daven Port “Horizontal and vertical Drilling “.

COURSE AIM

To present and discuss the different aspects of theoretical and applied drilling engineering, covering the latest techniques advanced technology and modern equipment used in drilling operation for oil and gas.

COURSE OBJECTIVES

To provide the student with the necessary knowledge and practices in order to be able to start a career as a drilling engineer.
COURSE OUTLINE

Week Number 1: Petroleum geology.

Week Number 2: Offshore exploration techniques.

Week Number 3: Offshore drilling methods.

Week Number 4: Offshore drilling methods (Continue) + Quiz.

Week Number 5: Main and auxiliary drilling equipment.

Week Number 6: Main and auxiliary drilling equipment (Continue).

Week Number 7: Quiz. Main and auxiliary drilling equipment (Continue).

Week Number 8: Mud engineering.

Week Number 9: Mud engineering (Continue).

Week Number 10: Drilling operations.

Week Number 11: Drilling operations (Continue).

Week Number 12: Quiz. Drilling operations (Continue).

Week Number 13: Drilling complications.

Week Number 14: Marine operations.

Week Number 15: Drilling economics.

Week Number 16: Final Exam.
MM 573 - Oil and Gas Production Technology

COURSE INFORMATION

Course Title: Oil and Gas Production Technology.

Code: MM 573.

Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.

Prerequisites: MM 471.

GRADING

Class Performance/Attendance: 10%

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

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

Final Exam: 40%

COURSE DESCRIPTION

Physical properties of oil and gas – well completions, bottom hole completion techniques, well productivity – types of production systems, fixed plate forms, floating production, sub-sea systems – offshore pipelines – process plant, general layout and design, produced fluid systems, gas injection systems, separation facilities, oil and gas transfer, oil and gas flow metering, oily water processing – maintenance and safety aspects.

TEXT BOOKS

Pdf file free download "Oil and gas production handbook", www.chemengfiles.com/chemical-engineering-ebooks

REFERENCE BOOKS

- M.J. Economies “Petroleum Production Systems”
- A mather “Offshore Engineering – An Introduction“
- Offshore Oil and Gas Process Engineering “
- Offshore Production Operations (SPE) no. 17

COURSE AIM

To discuss in detail the different techniques, systems and technological processes applied to produce oil and gas economically and safely.

COURSE OBJECTIVES

To provide the student with the necessary knowledge, skills and practices to be able to occupy the job of a process engineer onboard offshore installations.
COURSE OUTLINE

Week Number 1: Well completions.
Week Number 2: Well completions (Continue).
Week Number 3: Types of production platforms.
Week Number 4: Types of production platforms (Continue).
Week Number 5: Types of production platforms (Continue) + Quiz.
Week Number 6: Offshore Pipelines.
Week Number 7: Quiz Offshore Pipelines (Continue).
Week Number 8: Process Plant Layout.
Week Number 9: Oil & gas separation.
Week Number 10: Oil & Gas Production Systems.
Week Number 11: Oil & Gas Production Systems (Continue).
Week Number 12: Quiz Oil & Gas Production Systems (Continue).
Week Number 13: Oil & Gas Production Systems (Continue).
Week Number 14: Enhanced oil recovery.
Week Number 15: Maintenance and safety aspects.
Week Number 16: Final Exam.
# MM 574 - Port Equipment Engineering

## Course Information

<table>
<thead>
<tr>
<th>Course Title:</th>
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<tbody>
<tr>
<td>Code:</td>
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<tr>
<td>Hours:</td>
<td>Lecture: 2 Hrs.  Tutorial: 2 Hrs.  Credit: 3.</td>
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<tr>
<td>Prerequisites:</td>
<td>MM 471.</td>
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## Grading

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

## Course Description

Port and harbor facilities, marine terminals, construction shipyards, repair docks – general design considerations, design criteria, site selection and layout, facility type requirements, environmental conditions, material selection – operational and environmental loads – berthing loads and fender system design – Mooring loads and design principles – fixed structures, structure types and configurations, selection of optimum structure types, design features – Floating structures, types and applications, structural design, mooring system design. Inspection, maintenance and repair operations.

## Text Books

- Lecture notes.

## Reference Books

- J.w. Gayth waite “Design of Marine Facilities”
- H. Agerschon “Planning and Design of Ports and Marine Terminals”
- G. Tsinker “Marine Structure Engineering”

## Course Aim

To survey the different types of marine facilities including marine terminals, dry docks and cargo handling equipment and discuss their operational and design features with special emphasis on the maintenance and repair operations needed to utilize these expensive facilities and systems efficiently.
COURSE OBJECTIVES

To provide the student with the knowledge and skills to deal with port and marine facilities from the design and selection stages up to the maintenance and repair operations.

COURSE OUTLINE

Week Number 1: Port and harbor facilities.

Week Number 2: Port and harbor facilities (Continue).

Week Number 3: General Design considerations.

Week Number 4: Operational and Environmental loads.

Week Number 5: Operational and Environmental loads (Continue) + Quiz.

Week Number 6: Berthing loads and fender system design.

Week Number 7: Quiz. Berthing loads and fender system design (Continue).

Week Number 8: Mooring loads and design principles.

Week Number 9: Mooring loads and design principles (Continue).

Week Number 10: Fixed Structures.

Week Number 11: Fixed Structures (Continue).

Week Number 12: Quiz + Floating Structures.

Week Number 13: Floating Structures (Continue).

Week Number 14: Inspection, maintenance and repair operations.

Week Number 15: Inspection, maintenance and repair operations (Continue).

Week Number 16: Final Exam.
MM 575 - Offshore Engineering

COURSE INFORMATION

Course Title: Offshore Engineering.

Code: MM 575.

Hours: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.

Prerequisites: MM 471.

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

COURSE AIM

This course will be designed and tailored to meet special requirements and to satisfy specific needs for the students in order to cover, in depth one of the topics or areas of specialization within the field of Offshore Engineering, e.g. Offshore pipeline engineering.

COURSE OBJECTIVES

To provide the student with the knowledge and necessary skills related to the field of offshore pipeline engineering and develop an understanding of fundamental engineering principles for the design, construction and operation of offshore pipeline systems.

COURSE OUTLINE

**Week Number 1:** Introduction to offshore pipelines.

**Week Number 2:** Route selection and site investigation.

**Week Number 3:** Materials and fabrication.

**Week Number 4:** Materials and fabrication (continued).

**Week Number 5:** Pipeline hydraulics.

**Week Number 6:** Pipeline hydraulics (Continue).

**Week Number 7:** 1st Midterm Exam Loads and design.

**Week Number 8:** Loads and design (continued).

**Week Number 9:** Stability.

**Week Number 10:** Construction and installation.

**Week Number 11:** Construction and installation (Continue).

**Week Number 12:** 2nd Midterm Exam Corrosion.

**Week Number 13:** Corrosion (continued).

**Week Number 14:** Operation, inspection and repair.

**Week Number 15:** Operation, inspection and repair (continued) – Codes and standards.

**Week Number 16:** Final Exam.
Mechanical Engineering Courses – ME

ME 151 - Engineering Drawings & Projection

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
ME 231- Thermodynamics

COURSE INFORMATION

Course Title: Thermodynamics.

Code: ME 231.

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

Prerequisites: BA114.

GRADING

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

COURSE DESCRIPTION

Classical thermodynamics-Heat transfer by conduction, convection and radiation-Air standard cycles-Steamb cycles- Gas turbine cycle-Introduction to refrigeration and air conditioningpsychrometry.

TEXT BOOKS


REFERENCE BOOKS

M. David,” Engineering Thermodynamics with Application “, Collage Publication , Latest Edition,

COURSE AIM

The course is designed to identify various aspects and area of thermo dynamics in order to put the student in the right position to be able to solve the simple problems related to course topics.

COURSE OBJECTIVES

The main objective of the course is to highlight the main topics which constitute general fundamental basic of Thermal Engineering.

COURSE OUTLINE

Week Number 1: Introduction.

Week Number 2: Heat Transfer (Fourier’s Law, Newton’s Law, Stefan-Boltzmann Law).
Week Number 3: Heat Transfer (Composite wall).
Week Number 4: Heat Transfer (cylinder & sphere).
Week Number 5: Heat Engine Cycles (Introduction, Carnot Cycle).
Week Number 6: Heat Engine Cycles (Constant Pressure Cycle, Constant Volume Cycle).
Week Number 7: Heat Engine Cycles (Diesel Cycle, Dual Cycle) - 7th Quiz.
Week Number 8: Steam Cycle (Rankin Cycle).
Week Number 9: Steam Cycle (Using Steam Chart).
Week Number 10: Gas Turbine Cycle.
Week Number 11: Gas Turbine Cycle.
Week Number 12: Refrigeration and Air Conditioning - 12th Quiz.
Week Number 13: Refrigeration and Air Conditioning (Using Refrigeration charts).
Week Number 14: Psychometry.
Week Number 15: Psychometry (Psychometric charts).
Week Number 16: Final Exam.
ME 252 - Mechanical Engineering Drawing

Course Title: Mechanical Engineering Drawing.

Code: ME 256.

Hours: Lecture – 2Hrs. Tutorial – 4Hrs. Credit – 3.

Prerequisites: ME 151

Grading

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

Course Description


Text Books

- Notes prepared and edited (from several related text books, standards and codes in use) to cover the syllabus

Reference Books


Course Aim

To enable the student to make detail and assembly drawings with enough care and accuracy and according to appropriate conventions.
COURSE OBJECTIVES

As a Continuation to first term course. More applications to Mechanical Engineering Drawing – to relate the applications of drafting techniques to mechanical Engineering practice. To provide sufficiently understanding to conventional representation of different M/C elements, using current standards and Codes.

COURSE OUTLINE

Week Number 1: AutoCAD basics.
Week Number 2: Object construction and manipulation.
Week Number 3: Geometric construction.
Week Number 4: Layers, text and dimensioning.
Week Number 5: Section views, hatching and construction of blocks.
Week Number 6: Solid modelling, primitives and Boolean operations.
Week Number 7: Creating solid models from 2D polylines – Quiz.
Week Number 8: Viewing, modifying and editing solids, solid modelling exercises.
Week Number 9: Assembly drawing with applications in Mechanical, Industrial and Marine Engineering – Assembly drawing exercises.
Week Number 10: Free hand sketching – Assembly drawing exercises.
Week Number 11: Fits and Tolerances - Assembly drawing exercises.
Week Number 12: Applications on Fits and Tolerance on Drawings - Assembly drawing exercises – Quiz.
Week Number 13: Conventional representation of Mechanical elements.
Week Number 14: Surface finish and machining symbols - Assembly drawing exercises.
Week Number 15: Welding and hydraulic symbols - Assembly drawing exercises.
Week Number 16: Final Exam.
ME 274 - Materials Science

COURSE INFORMATION

Course Title: Material Science
Code: ME 274
Hours: Lecture – 2Hrs  Tutorial – 2Hrs  Credit – 3
Prerequisites: BA 114 & BA 142

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

- B.Hull& V. John “Non-Destructive testing“, Macmillan, 1988

COURSE AIM

To give the student a sound background in the science of engineering materials

COURSE OBJECTIVES

To cover the relationship between the structure & properties of engineering materials. How to modify the structure to achieve specific properties with emphasis on some typical applications.
COURSE OUTLINE

Week Number 1: Classification of Engineering Materials – General Introduction.
Week Number 2: Atomic Bonding in Solids.
Week Number 3: The Crystalline Structure of Materials.
Week Number 4: The Crystalline Structure of Materials.
Week Number 5: The Crystalline Structure of Materials.
Week Number 9: Introduction to Thermal Equilibrium Diagrams.
Week Number 10: Introduction to Thermal Equilibrium Diagrams.
Week Number 11: Non-Destructive Testing.
Week Number 12: Heat Treatment of Metals - Quiz.
Week Number 14: Corrosion: An Introduction.
Week Number 15: General Revision.
Week Number 16: Final Exam.
ME 275 - Stress Analysis

Course Title: Stress Analysis

Code: ME 275

Hours: Lecture: 2 Tutorial: 2 Credit: 3

Prerequisites: ME 274

Grading

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

Course Description

Concept of stress and strain, Normal stresses and strains, shearing stresses and bearing stresses, Stresses due to torsion, Normal forces, shearing forces and bending moments in beams, Stresses due to bending, Stress and strain transformations, Thin and thick walled cylinders, Stress concentration, Experimental stress analysis, Deflection and buckling of beams and columns.

Text Books


Reference Books


Course Aim

To present the advanced concepts and modern techniques of stress and strain analysis with applications to various mechanical components and structures and to introduce the students to the modern experimental techniques in stress analysis.
COURSE OBJECTIVES

To develop ability to calculate normal forces, shearing forces and bending moments in members subjected to various types of loadings. The course enables the students to determine different types of stresses in different members and to calculate the deflection and buckling of beams and columns.

COURSE OUTLINE

Week Number 1: Introduction to the concept of stress and strain: Normal stresses and strains.
Week Number 2: Shear stresses, shearing strains and bearing stresses.
Week Number 3: Shear stresses and deformations due to torsion.
Week Number 4: Normal forces, shearing forces and bending moments in beams.
Week Number 5: Stresses due to bending.
Week Number 6: Stress and strain transformations: Introduction.
Week Number 7: Stress and strain transformations: Principal stresses and planes and Mohr's circle of stress - Quiz
Week Number 8: Maximum shear stress, yield criteria, analysis of strain.
Week Number 9: Analysis of stresses in thin walled and thick walled pressure cylinders.
Week Number 10: Stress concentration in machine elements.
Week Number 11: Experimental stress analysis: strain gauges.
Week Number 12: Deflection due to bending: Double integration - Quiz
Week Number 13: Deflection due to bending: Strain energy and Castigliano's method.
Week Number 14: Buckling of columns: Euler equation.
Week Number 15: Buckling of columns: Eccentric loading of slender columns.
Week Number 16: Final Exam
ME 355 - Theory of Machines

Course Title: Theory of Machines.

Code: ME 355.


Prerequisites: BA 142.

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


Course Aim

To provide a fair understanding of the performance of various mechanisms and principal machine elements as regards their Kinematics and dynamics

Course Objectives

Forming a base for studies in Robotics applications

Course Outline

Week Number 1: Introduction - Types of motion.
Week Number 2: Velocity analysis of machine components – instantaneous centre method.

Week Number 3: Acceleration analysis.

Week Number 4: Acceleration analysis (Cont.).

Week Number 5: Dynamic force analysis – Dynamic bearing reactions.

Week Number 6: Balancing of rotating masses.

Week Number 7: Balancing of reciprocating masses (Cont.) - Quiz.

Week Number 8: Balancing of reciprocating masses (Cont.).

Week Number 9: Cams.

Week Number 10: Cams (Cont.).

Week Number 11: Kinetic energy storage and flywheel.

Week Number 12: Gear geometry and fundamental law of gearing - Quiz.

Week Number 13: Gear trains (conventional and epicyclic).

Week Number 14: Gear trains (conventional and epicyclic) (Cont.).

Week Number 15: Gyroscopic couples.

Week Number 16: Final Exam.
ME 362 – Hydraulics

COURSE INFORMATION

Course Title: Hydraulics
Code: ME 362
Hours: Lecture – 2 Hrs.  Tutorial – 2 Hrs.  Credit – 3
Prerequisites: BA 114

GRADING

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

COURSE DESCRIPTION

Introduction - Physical properties of fluids – Fluid statics – Forces on submerged surfaces and buoyancy – Introduction to fluids kinematics – Dynamics of incompressible flow – Flow and velocity measurement – Similitude and dimensional analysis – Flow through pipes – Pumps (Types and performance)

TEXT BOOKS


REFERENCE BOOKS


COURSE AIM

The subject aims at providing the student with the fundamental knowledge of incompressible flow, and easily understanding the basic principle of hydrostatics and hydrodynamics.

COURSE OBJECTIVES

The course objective is to help acquiring good insight into the field of hydraulics in general.
Week Number 1: Introduction
Week Number 2: Physical properties of fluids
Week Number 3: Fluid statics
Week Number 4: Forces on submerged surfaces and buoyancy
Week Number 5: Introduction to fluids kinematics
Week Number 6: Dynamics of incompressible flow
Week Number 7: Flow Measurements - Quiz
Week Number 8: Velocity measurement
Week Number 9: Similitude and dimensional analysis
Week Number 10: Similitude and dimensional analysis (Cont.)
Week Number 11: Flow through pipes
Week Number 12: Flow through pipes (Cont.) - Quiz
Week Number 13: Pumps (Types)
Week Number 14: Pumps (Performance)
Week Number 15: Revision
Week Number 16: Final Examination
ME 423 – Steam Plant Engineering

**Course Information**

Course Title: Steam Plant Engineering  
Code: ME 423  
Hours: Lecture – 2 Hrs. Tutorial – 2 Hrs. Credit – 3  
Prerequisites: ME 431

**Grading**

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

**Course Description**

- Thermodynamics of vaporous: ideal and practical cycles, re-heating superheating and regeneration. Steam tables and charts.  
- Boilers: types and classification, heating surfaces, mountings and fittings, combustion and combustion equipment, insulation, de-superheats control systems  
- Turbines: theory, types, flow through nozzles, jet deflection, super saturation, power calculations, design of components, governors.  
- Plant: Real cycle, steam systems, feed water system, plant performance, air ejector, de-aerators, evaporators condenser

**Text Books**


**Reference Books**


**Course Aim**

Studying steam power plant performance and the needs of high power units (Propulsion or Electric Generation). Design of components. Safety aspects of pressure vessels. Calculation of gear balance for huge power plants.
COURSE OBJECTIVES


COURSE OUTLINE

Week Number 1: Introduction, Characteristics of Steam Power Plants. Main Components Real Cycle Representation.

Week Number 2: Thermodynamics of Vapours Superheating, Reheating. Regeneration, Supersaturating and Under Cooling.

Week Number 3: Boilers: Types, Classification of Pressure Vessels

Week Number 4: Mountings, Fittings, Heating Surfaces & Tubing

Week Number 5: Efficiency Calculations & Equivalent Evaporation

Week Number 6: Combustion & Combustion Equipment Insulation Control

Week Number 7: Desuper Heaters Steam to Steam Generators - Quiz

Week Number 8: Steam Turbines: Types & Theory of Action

Week Number 9: Flow of Steam through Nozzles Power Calculation

Week Number 10: Turbine Efficiency Calculation Velocity Diagrams

Week Number 11: Turbine Design (Casing, Rotors and Blading)

Week Number 12: Glands, Bearings, and Governing - Quiz

Week Number 13: Steam Plant Systems, Performance & Heat Balance

Week Number 14: Condensers & Air Ejectors

Week Number 15: Deaerators & Evaporators

Week Number 16: Final Examination
ME 431 - Heat Transfer
COURSE INFORMATION

Course Title: Heat Transfer
Code: ME 431
Hours: Lecture – 2 Hrs. Tutorial – 2 Hrs. Credit – 3
Prerequisites: ME 333 or ME 231

GRADING

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

COURSE DESCRIPTION

Steady state conduction, one dimension unsteady state conduction. Principles of convection. Natural convection systems. Radiation heat transfer, Design of surface heat exchangers

TEXT BOOKS


REFERENCE BOOKS:
- V.P Mikhenks “Heat Transfer”
- Fogiel M “The Essentials of Heat Transfer” Vol 1 &2 Research and Education Association

COURSE AIM

This course presents on elementary treatment of the principles of heat transfer

COURSE OBJECTIVES

The main objective of this course is to highlight the general principles of heat transfer method, processes, heat exchangers design..

COURSE OUTLINE

Week Number 1: Review of Heat Transfer
Week Number 2: Steady State Conduction in One Dimension
Week Number 3: General Conduction Equations – External Surfaces
Week Number 4: General Conduction Equations – External Surfaces
Week Number 5: Steady State Conduction in Two Dimensions
Week Number 6: Steady State Conduction in Two Dimensions
Week Number 7: Principles of connections - Quiz
Week Number 8: Principles of connections
Week Number 9: Empirical Relations for Forced Connection
Week Number 10: Empirical Relations for Forced Convection
Week Number 11: Empirical Relations for Forced Convection
Week Number 12: Natural Convection Systems
Week Number 13: Radiation Heat Transfer
Week Number 14: Design of surface heat exchangers
Week Number 15: Design of compact heat exchangers
Week Number 16: Final Examination
ME 434 - Refrigeration & Air conditioning

COURSE INFORMATION

Course Title: Refrigeration & Air conditioning

Code: ME 434

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

Prerequisites: ME 431

GRADING

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

COURSE DESCRIPTION


TEXT BOOKS

- Charts and tables.
- Stoecker W.F., “Refrigeration and Air Conditioning“, McGraw Hill, NY

REFERENCE BOOKS

ASHRAE Hand book

COURSE AIM

To give the basic principles of the refrigeration and air conditioning systems and cycles

COURSE OBJECTIVES

To prepare the student for the advanced courses of the both branches.

COURSE OUTLINE

Week Number 1: Introduction

Week Number 2: Basic Vapour compression System-1
Week Number 3: Basic Vapour compression System-2
Week Number 4: Basic Vapour compression System-3
Week Number 5: Load Estimation
Week Number 6: Load Calculations
Week Number 7: Load Calculations - Quiz
Week Number 8: Air Conditioning Fundamentals-1
Week Number 9: Air Conditioning Fundamentals-2
Week Number 10: Air Conditioning Fundamentals-3
Week Number 11: Air conditioning design
Week Number 12: Summer & Winter Cycles
Week Number 13: Special systems
Week Number 14: Air Conditioning Equipment
Week Number 15: Air Conditioning Units
Week Number 16: Final Examination
**ME 454 - Machine Design**

**Course Information**

<table>
<thead>
<tr>
<th>Course Title:</th>
<th>Machine Design.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code:</td>
<td>ME 454.</td>
</tr>
<tr>
<td>Hours:</td>
<td>Lecture: 2Hrs.</td>
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<td></td>
<td>Tutorial: 2Hrs.</td>
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<td>Credit: 3.</td>
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<td>Prerequisites:</td>
<td>ME 252.</td>
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**Grading**

<table>
<thead>
<tr>
<th>Class Performance/Attendance:</th>
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<tbody>
<tr>
<td>Midterm # 1/Assignments – (7th Week):</td>
<td>30%</td>
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<tr>
<td>Midterm # 2/Assignments – (12th Week):</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam:</td>
<td>40%</td>
</tr>
</tbody>
</table>

**Course Description**

- Introduction & simple stresses and strain
- Stresses in machine parts
- Complex stress and strain
- Threaded fasteners
- Flexible mechanical elements
- Welded and adhesive joints
- Gears
- Shafts
- Power screws

**Text Books**


**Reference Books**


**Course Aim**

The aim of this course is to:

- To impart an appreciation of basic design considerations
- To give the students an awareness of the factors effecting design in relation to problems in engineering applications

**Course Objectives**

To provide sufficiently advanced understanding of machine design concept and to enable students to be creative in mechanical, marine and industrial applications.
COURSE OUTLINE

Week Number 1: Introduction & simple stresses and strain.
Week Number 2: Stresses in machine parts.
Week Number 3: Stresses in machine parts (continued).
Week Number 4: Complex stress and strain.
Week Number 5: Complex stress and strain (continued).
Week Number 6: Threaded fasteners.
Week Number 7: Threaded fasteners (cont.) – Quiz.
Week Number 8: Power screws.
Week Number 9: Flexible mechanical elements.
Week Number 10: Flexible mechanical elements – welded joints.
Week Number 11: Welded and adhesive joints.
Week Number 12: Gears (introduction) – Quiz.
Week Number 13: Gears (spur gears & helical gears).
Week Number 14: Gears (bevel gears & worm gears).
Week Number 15: Shafts.
Week Number 16: Final Exam.
ME 455 - Computer Aided Design

COURSE INFORMATION

Course Title: Computer aided design.
Code: ME 455.
Hours: Lecture – 2Hrs. Tutorial – 4Hrs. Credit – 3.
Prerequisites: ME 456

GRADING

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

COURSE DESCRIPTION

Introduction to computer aided drafting and analysis – 2D and 3D Drafting (parametric solid modelling) – Introduction to the software "Solid Edge" – 2D and 3D parametric modelling – Introduction to finite element analysis – The finite element software "FEMAP" – Application to different machine element problems – Simulation of dynamic systems – MATLAB analysis and graphics – Application to different Mechanical, Hydraulic and Thermal systems (MATLAB 'Simulink') – Introduction to optimization – System and element optimum design problems.

TEXT BOOKS

- CAD lecture notes

REFERENCE BOOKS


COURSE AIM

The aim of this course is to enable the student to know how to design, analyze and present various problems encountered in the field of mechanical engineering with enough accuracy and speed by the aid of the computer.
COURSE OBJECTIVES

To help the student to cope with modern computer software available for mechanical and general engineering systems and element design.

COURSE OUTLINE

Week Number 1: Introduction to computer aided drafting and analysis.

Week Number 2: Introduction to the software "Solid Edge".

Week Number 3: Basics of solid 2D and 3D parametric modelling using Solid Edge.

Week Number 4: Solid Edge profile environment.

Week Number 5: Primary and treatment features with Solid Edge.

Week Number 6: Introduction to finite element analysis.

Week Number 7: The finite element software "FEMAP" – Quiz.

Week Number 8: "FEMAP" model and mesh generation.

Week Number 9: Application to different machine element problems.

Week Number 10: MATLAB analysis and graphics.

Week Number 11: MATLAB analysis and graphics (Cont.)

Week Number 12: Simulation of dynamic systems – Quiz.

Week Number 13: Application to different Mechanical, Hydraulic and Thermal systems (MATLAB 'Simulink').

Week Number 14: Introduction to Optimization.

Week Number 15: System and element optimum design problems.

Week Number 16: Final Exam.
ME 458 - Mechanical Vibration

**Course Information:**

Course Title: Mechanical Vibration  
Code: ME 458  
Hours: Lecture – 2 Hrs.  
Tutorial – 2 Hrs.  
Credit – 3  
Prerequisites: ME 355

**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:**

- William Thomson, “Theory of vibrations and applications “, prentice Hall.  

**Course Aim:**

To enable the student to recognize the importance and significance of the mechanical vibrations phenomena

**Course Objectives:**

To build up students capabilities to formulate and analyze problems of vibrations

**Course Outline:**

*Week Number 1:* Introduction & Harmonic and periodic motions  
*Week Number 2:* Equivalent systems
Week Number 3: Equivalent systems (cont.)

Week Number 4: Free vibrations of single degree of freedom systems

Week Number 5: Free vibrations of single degree of freedom systems (cont.)

Week Number 6: Forced vibrations of single degree of freedom systems

Week Number 7: Forced vibrations of single degree of freedom systems - Quiz.

Week Number 8: Transmissibility

Week Number 9: Vibration measurements

Week Number 10: Vibration measurements (Cont.)

Week Number 11: Vibration under general forcing conditions

Week Number 12: Two degree of freedom systems - Quiz.

Week Number 13: Two degree of freedom systems (cont.)

Week Number 14: Multi-degree of freedom systems (Eigen value and Eigen vector problems)

Week Number 15: Revision

Week Number 16: Final Examination
ME 461 - Fluid Mechanics
COURSE INFORMATION

Course Title: Fluid Mechanics
Code: ME 461
Hours: Lecture – 2 Hrs. Tutorial – 2 Hrs. Credit – 3
Prerequisites: ME 362

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


COURSE AIM

To enable the student to have a systematic and easily understood account of the basic principles of fluid Mechanics.

COURSE OBJECTIVES

To give a lucid and concise exposition of flow patterns, fluid forces and resistance to motion and applications of fluid flow theories to engineering problems.
<table>
<thead>
<tr>
<th>Week Number 1</th>
<th>Differential analysis of fluid flow</th>
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</thead>
<tbody>
<tr>
<td>Week Number 2</td>
<td>Kinematics of fluids flow</td>
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<tr>
<td>Week Number 3</td>
<td>Kinematics of fluids flow (Cont.)</td>
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<tr>
<td>Week Number 4</td>
<td>Linear Motion, Angular Motion and Deformation</td>
</tr>
<tr>
<td>Week Number 5</td>
<td>Conservation of Mass and Stream Function</td>
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<tr>
<td>Week Number 6</td>
<td>Velocity potential and irrotational flows</td>
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<tr>
<td>Week Number 7</td>
<td>General equations of motion (Navier-Stokes equations) - Quiz</td>
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<tr>
<td>Week Number 8</td>
<td>Euler’s equations of motion</td>
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<tr>
<td>Week Number 9</td>
<td>Basic two-dimensional potential flows</td>
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<td>Week Number 10</td>
<td>Superposition of plane potential flows</td>
</tr>
<tr>
<td>Week Number 11</td>
<td>Introduction to compressible fluid flow</td>
</tr>
<tr>
<td>Week Number 12</td>
<td>Mach number and speed of sound - Quiz</td>
</tr>
<tr>
<td>Week Number 13</td>
<td>Isentropic and Non-isentropic flow of ideal gas</td>
</tr>
<tr>
<td>Week Number 14</td>
<td>Normal shock waves</td>
</tr>
<tr>
<td>Week Number 15</td>
<td>Revision</td>
</tr>
<tr>
<td>Week Number 16</td>
<td>Final Exam</td>
</tr>
</tbody>
</table>
ME 542 - Maintenance Planning
COURSE INFORMATION

Course Title: Maintenance Planning
Code: ME 521
Hours: Lecture: 2Hrs. Tutorial: 2Hrs. Credit: 3
Prerequisites: 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

Maintenance definition, concept, objectives, Management functions, Types of maintenance, maintenance cycle, construction of maintenance planning system, computer management maintenance system, diagnostic capabilities of Predictive maintenance, Economic aspects of maintenance engineering, Investigation of failure, statistical techniques, Reliability, availability, system redundancy.

TEXT BOOKS

Maintenance Planing Prepared by Eng. Nabil El Khouly

REFERENCE BOOKS

▪ John M. Gross Fundamentals of Preventive Maintenance, NY.

COURSE AIM

Student should understand maintenance concept and types. The importance of maintenance planning & control to judge choose, and adapt maintenance system, which provide optimum solution to maintenance problems with the minimum expenditure.

COURSE OBJECTIVES

Providing a tool for better maintenance & regular operations and increasing safety for both crew and equipment, including many elements such as operational planning, cost control, stock control, information and instruction.
COURSE OUTLINE

Week Number 1: Introduction
Week Number 2: Maintenance situation.
Week Number 3: Maintenance cycle
Week Number 4: Working examples on cycle schedule
Week Number 5: Computer aided maintenance
Week Number 6: Economic aspects of maintenance engineering,
Week Number 7: Diagnostic capabilities of Predictive maintenance
Week Number 8: Vibration Analysis (introduction, Types of Equipment, system Applications.
Week Number 9: Case study
Week Number 10: Motor Analysis ((introduction, Types of Equipment, system Applications, case study)
Week Number 11: Organization of different maintenance type
Week Number 12: Investigation of failure
Week Number 13: Reliability in maintenance
Week Number 14: Case study
Week Number 15: Case study
Week Number 16: Final examination
ME 565 – Turbomachinery

COURSE INFORMATION

Course Title: Turbomachinery  
Code: ME 525  
Hours: Lecture – 2 Hrs. Tutorial – 2 Hrs.  Credit – 3  
Prerequisites: ME 461

GRADING

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

COURSE DESCRIPTION

Various types of turbo-machines, from wind turbines to high-ratio compressors. Compressible flow turbo-machines and their characteristics. Emphasis on practical design and performance parameter. Theory, practice and educational of turbine Components

TEXT BOOKS:


REFERENCE BOOKS


COURSE AIM

Study different types of pumps, compressors, and turbines to evaluate their characteristics and performance.

COURSE OBJECTIVES

- The student is introduced to different types of turbomachinery.  
- The student can determine the performance of different types of turbomachinery.

COURSE OUTLINE

Week Number 1: Main Types of Turbomachines and Performance Basic Laws
Week Number 2: Main Types of Turbomachines and Performance Basic Laws
Week Number 3: Dimensional Analysis and Model Testing
Week Number 4: Dimensional Analysis and Model Testing
Week Number 5: Hydraulic Pumps (Centrifugal and Axial Pumps)
Week Number 6: Hydraulic Pumps (Centrifugal and Axial Pumps)
Week Number 7: Hydraulic Pumps (Centrifugal and Axial Pumps) - Quiz
Week Number 8: Hydraulic Turbines
Week Number 9: Hydraulic Turbines
Week Number 10: Hydraulic Turbines
Week Number 11: Centrifugal Compressors and Fans
Week Number 12: Centrifugal Compressors and Fans - Quiz
Week Number 13: Centrifugal Compressors and Fans
Week Number 14: Axial Compressors and Fans
Week Number 15: Axial Compressors and Fans
Week Number 16: Final Examination
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

ABDEL RADI, MOHAMED EL-NOUR

Ph.D. 1984, University of Glasgow, UK,

Specialization
“OFFSHORE ENGINEERING”.

Experience in Industry
Co-operation with major oil and gas companies to propose, develop and supervise graduation project for the students of Marine Engineering Department in the field of Offshore Structures and systems. These projects are selected to reflect typical practical problems and technical issues encountered in the offshore industry.

Research Activities

- Offshore platform structures design.
- Oil and gas industry.

NAGI EL SEMELAWY

Professor, Ph.D. (1984) University of Glasgow, UK

Specialization
Naval Architecture Engineering.

HASAN, AMR ALY

Ph.D. 2002, University of Nottingham, UK,

Specialization
“Refrigeration and air conditioning”.
Research Activities

- Investigation of Heat Transfer Characteristics
- Air Conditioning and marine applications using Computational Fluid Dynamics
- Experimental and Numerical Investigation of Optimum location for FCU in an all-water Air conditioning system

KOTB, MOHAMED ABBAS (VISITING)

Ph.D. 1985, Virginia polytechnic and state university, USA,

Specialization
“Aero / Hydrodynamics,Marine Propeller,Energy System”

Experience in Industry
Surveyor on ships

Research Activities

- Propeller and propulsion system.
- Renewable energy.
- Marine hydrodynamic.

HEGAZ, EL-SAYED (VISITING)

Ph.D., Faculty of Engineering, University of Alexandria, EGYPT,

Specialization
“STRUCTURAL SHIP DESIGN”

Experience in Industry
Surveyor on ships.

Research Activities

- Naval Architecture and ship design and construction.
- Marine conventions.
- Pollution at sea.

ELSAYED, TAREK AHMED

Ph.D., 1998, University of Califonia, Berkeley, USA,

Specialization
Naval Architecture and Offshore Engineering

Experience in Industry
Four years of industrial experience in Marine Offshore Petroleum Oil and Gas corporations in the USA
Research Activities

- Underwater Inspection
- Safety and Reliability of Submarine Oil and Gas Pipelines

SHEHADA, MOHAMED FAHMY

PhD., 2006, University of Heriot Watt, UK

Specialization
"MATERIAL ENGINEERING"

Experience in Industry

- Marine engineering on commercial ships (Safety, Maintenance and operation).
- Safety system, Quality control and Non-destructive testing engineer for welding and repairs in steel structures, work for many projects such as bridges, ships and offshore

Research Activities

- Acoustic Emission applications for Steel Pipe and Pipeline Applications.
- Cleaning and Detecting internal pipeline defects.
- Material science engineering.

AHMED, AHMED NAGUIB

PhD., 2007, University of Alexandria, EGYPT.

Specialization
"MARINE ENGINEERING AND NAVAL ARCHITECTURE"

Research Activities

- Shipyard engineering.
- Shipbuilding technologies and development.
- Ship production management.
- Planning, quality and accuracy control in shipyard.

Part Time Staff

IBRAHEEM, MOHAMED KHALEEL

Ph.D. 1979, Faculty of Engineering, University of Alexandria, EGYPT,

Specialization
Diesel Engine
ABDELAFAR, WALID ABDELAZIZ

Ph.D. 2005, Faculty of Engineering, Brighton University, ENGLAND,

Specialization
Diesel engine

ELGOHRY, MOHAMMED MORSY

Ph.D. 2004, Faculty of Engineering, Hanover University, GERMANY,

Specialization
Diesel Engine

ZAYTON, MAHMOUD MOHAMMED

Ph.D. 1994, Faculty of Engineering, University of Alexandria, EGYPT

Specialization
Electrical Power

RADWAN, AYMAN

Ph.D. 2007, Faculty of Engineering, University of Alexandria, EGYPT,

Specialization
Maintenance Planning

ELHEWY, AHMED H

Ph.D. 2005, Faculty of Engineering, New Castle University, ENGLAND,

Specialization
Marine Engineering

EL-RAZAK, YASSER MOHAMED AHMED

Ph.D. 2005, Faculty of Engineering, University of Alexandria, EGYPT,

Specialization
Marine Engineering & Naval Architecture

BANAOAN, ADEL

Ph.D. 1995, Faculty of Engineering, University of Alexandria, EGYPT,

Specialization
Computer aided hydrodynamics design of small marine units currently built in Egypt with particular emphasis on some special purpose units
Assistants

SHARARA, AHRAF

M.Sc. 1997 Faculty of Engineering, University of Alexandria, Egypt.

Specialization
Marine Engineering

Research activities
Vibration analysis

MEHANAA, AHMED KHLIFA


Specialization
Marine Engineering

Research activities
Ship design

ABDALLA, ALY HASSAN

Teaching Assistant, B.Sc. 2007, Arab Academy for Science and Technology and Maritime Transport, Egypt.

Specialization
Marine Engineering

Research activities
Propeller performance.

Marine hydrodynamic.

KAMAL, AHMED SAMIR

Teaching Assistant, B.Sc. 2007, Arab Academy for Science and Technology and Maritime Transport, Egypt.

Specialization
Marine Engineering

Research activities
Renewable energy.

TAWFEK, AHMED ARBY

Teaching Assistant, B.Sc. 2008, Arab Academy for Science and Technology and Maritime Transport, Egypt.

Specialization
Marine Engineering
Research activities
Underwater vehicles.
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. Computer Integrated Manufacturing (CIM) Laboratory.
2. Work Analysis and Ergonomics Laboratory.
3. Reverse Engineering Laboratory.
4. Engineering Workshop (Metal Cutting, casting and Welding)
5. Testing of Materials Laboratory.
6. Non-destructive Testing Laboratory.
7. Electric Machine Laboratory.
8. Analogue Automatic Control Laboratory.
9. Digital Automatic Control Laboratory.
10. Computer Laboratory.
11. Physics Laboratory.
12. Chemistry Laboratory.
13. Mechatronics Laboratory.
14. Advanced Manufacturing Laboratory.
Engine Room Simulator

LABORATORY INFORMATION

Lab Name: Engine Room Simulator

Room No.: 028 College of Maritime Transport and Technology

Capacity: 25

MAJOR EQUIPMENT

- Engine Room
  - Large scale mimic
  - Visual display unit
  - Watch call system
  - Sound system
- Engine Control Room
  - Control room console
  - Main switch board
  - Boiler control
- Color Graphic Station

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Semester /Certificate</th>
<th>Hours/Week</th>
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<tr>
<td>MM 221</td>
<td>Marine Diesel Engine (1)</td>
<td>4th MM Term</td>
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<tr>
<td>MM 211</td>
<td>Marine Diesel Engine (2)</td>
<td>6th MM Term</td>
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<tr>
<td>MM423</td>
<td>Marine Diesel Engine (3)</td>
<td>8th MM Term</td>
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</tbody>
</table>
Internal Combustion Engine

LABORATORY INFORMATION:

Lab Name: Internal Combustion Engine

Room No.: Workshop (2)

Capacity: 25

MAJOR EQUIPMENT:

- AKASAKA diesel engine with auxiliary systems (1 unit)
- SULZAR diesel engine with auxiliary systems (1 unit)
- FIAT diesel engine with switch board (2 units)
- DEUTZ diesel engine for maintenance training (2 units).
- Diesel engine for maintenance training (2 units)

LABORATORY SERVES THE FOLLOWING COURSES:

<table>
<thead>
<tr>
<th>Course No.</th>
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<tr>
<td>MM 221</td>
<td>Marine Diesel Engine (1)</td>
<td>4th MM Term</td>
<td>4</td>
</tr>
</tbody>
</table>
Marine Engineering Lab (1)

LABORATORY INFORMATION

This lab is used for educational and training purposes of marine engineering and maritime transportation students and graduates.

Lab Name: Marine engineering (1)

Room No.: Workshop (3)

Capacity: 25

MAJOR EQUIPMENT

The lab incorporates some of the equipment a trainee would face in marine engine rooms, such as; Valves and main thrust bearings. This lab covers areas related to the different types of valves, their purposes of use, how to maintain valves e.g. packing a gland, preparing gaskets, and lapping of valves to their respective seats using proper tools and materials. A main thrust bearing is available for the purpose of dismantling, inspection, measuring the clearances, re-conditioning of thrust pads, and assembly.

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course No.</th>
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<th>Hours/Week</th>
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<tr>
<td>MM 211</td>
<td>Marine Engineering (1)</td>
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<tr>
<td>MM 312</td>
<td>Marine Engineering (2)</td>
<td>5th MM Term</td>
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<tr>
<td>MM 415</td>
<td>Marine Engineering (3)</td>
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<td>MM 516</td>
<td>Marine Engineering (4)</td>
<td>Elec. Course group(A)</td>
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</table>
**Marine Engineering Lab (2)**

**LABORATORY INFORMATION**

This lab is used for educational and training purposes of marine engineering and maritime transportation students and graduates.

Lab Name: Marine engineering(2)

Room No.: Workshop (4)

Capacity: 25

**MAJOR EQUIPMENT**

This lab is assigned to pumps, compressors, and steering gear training for marine engineering and maritime transport students. The lab covers areas related to the different types of pumps and compressors, their applications in use, their constructional details, probable defects and faults and their remedial actions. Trainees from different disciplines, related to those areas, practice the importance of steering gear, its vital role in a ship, and its operational procedure at sea, especially in emergency situations.

**LABORATORY SERVES THE FOLLOWING COURSES**

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Semester /Certificate</th>
<th>Hours/Week</th>
</tr>
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<tbody>
<tr>
<td>MM 211</td>
<td>Marine Engineering (1)</td>
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<tr>
<td>MM 312</td>
<td>Marine Engineering (2)</td>
<td>6th MM Term</td>
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<td>MM 415</td>
<td>Marine Engineering (3)</td>
<td>8th MM Term</td>
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<tr>
<td>MM 516</td>
<td>Marine Engineering (4)</td>
<td>Elec. Course group(A)</td>
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</tr>
</tbody>
</table>
Fluid Mechanics & Hydraulic Lab

LABORATORY INFORMATION

Lab Name: Fluid Mechanics & Hydraulic Lab
Room No.: 007
Capacity: 25

MAJOR EQUIPMENT

- Venture meter
- Orifice meter
- Pipe friction equation
- Flow channel equation open channel
- Smoke tunnel
- Pumping station
- Flow in closed channels (Flow channel)
- Two hydraulic bench
- Michell tilting pad apparatus

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>ME 362</td>
<td>Hydraulics</td>
<td>6th MM Term</td>
<td>2</td>
</tr>
</tbody>
</table>
Hydraulics Laboratory

LABORATORY INFORMATION

Lab Name: Hydraulics Lab

Room No.:

Capacity: 25

MAJOR EQUIPMENT

- Hydraulics Trainer, Single Sided, Cart Mounted
- Cylinder Loading Option
- Accumulator Option
- Electro-Hydraulics Trainer Single Sided, Cart Mounted
- Plc & Loop Proportional Control Option
- Electro-Pneumatic Trainer Single Sided, Cart Mounted
- Air Compressor System
- Pneumatic & Plc Sequence Control
- Training Manuals

LABORATORY SERVES THE FOLLOWING COURSES

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<tbody>
<tr>
<td>ME 362</td>
<td>Hydraulics</td>
<td>6th MM Term</td>
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<tr>
<td>ME 461</td>
<td>Fluid Mechanics</td>
<td>7th MM</td>
<td>2</td>
</tr>
</tbody>
</table>
Refrigeration & Air Conditioning Laboratory

LABORATORY INFORMATION

Lab Name: Refrigeration & Air Conditioning

Room No.: 008

Capacity: 25

MAJOR EQUIPMENT

- Car air conditioning lab. Unit
- Indirect refrigeration system exp.
- Heat pump
- Absorption refrigeration unit
- Lab: Test unit for refrigeration cycle with different components

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
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<th>Course No.</th>
<th>Course Title</th>
<th>Semester /Certificate</th>
<th>Hours/Week</th>
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</thead>
<tbody>
<tr>
<td>ME 231</td>
<td>Thermodynamics (2)</td>
<td>3rd MM</td>
<td>2</td>
</tr>
<tr>
<td>ME 434</td>
<td>Refrigeration &amp; Air Conditioning</td>
<td>8th MM Term</td>
<td>2</td>
</tr>
</tbody>
</table>
Heat Transfer Laboratory

LABORATORY INFORMATION

Lab Name: Heat Transfer
Room No.: 007
Capacity: 25

MAJOR EQUIPMENT

- Heat conduction Apparatus
- Heat Exchanger
- Combustion units
- Compressor
- Steam power plant
- Convection heat transfer apparatus.

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Semester / Certificate</th>
<th>Hours/Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 231</td>
<td>Thermodynamics</td>
<td>3rd MM</td>
<td>2</td>
</tr>
<tr>
<td>ME 431</td>
<td>Heat Transfer</td>
<td>7th MM</td>
<td>2</td>
</tr>
<tr>
<td>ME 434</td>
<td>Refrigeration &amp; Air Conditioning</td>
<td>8th MM</td>
<td>2</td>
</tr>
</tbody>
</table>
Testing of Materials Laboratory

LABORATORY INFORMATION

Lab Name: Testing of Materials
Room No.: 011
Capacity: 25

MAJOR EQUIPMENT

- Universal testing machines
- Torsion testing machine
- Impact testing machine
- Hardness testing machine
- Heat treatment furnace

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Semester /Certificate</th>
<th>Hours/Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 274</td>
<td>Material Science</td>
<td>3rd</td>
<td>2</td>
</tr>
</tbody>
</table>
Non-Destructive Testing Laboratory

LABORATORY INFORMATION

Lab Name: Non-Destructive testing

Room No.:  

Capacity: 25

MAJOR EQUIPMENT

- Ultrasonic testing equipment
- Magnetic particles
- Visual inspection equipment (Endoscope)
- Metallurgical Microscope

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Semester /Certificate</th>
<th>Hours/Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 274</td>
<td>Material Science</td>
<td>3rd MM</td>
<td>2</td>
</tr>
<tr>
<td>MM 544</td>
<td>Shipyard Technology</td>
<td>10th MM Term</td>
<td>2</td>
</tr>
</tbody>
</table>
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.
- Synchronizing 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 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>
<tr>
<td>EE 424</td>
<td>Electrical Drives 1</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 Drives 2</td>
<td>10</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 SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 231</td>
<td>Electrical Circuits 1</td>
<td>3</td>
</tr>
<tr>
<td>EE 232</td>
<td>Electrical Circuits 2</td>
<td>4</td>
</tr>
<tr>
<td>EE 236</td>
<td>Electrical engineering 1</td>
<td>4</td>
</tr>
<tr>
<td>EE 238</td>
<td>Electrical Eng. Fundamentals</td>
<td>3, 4</td>
</tr>
<tr>
<td>EE 312</td>
<td>Electric Measure. &amp; Inst. 2</td>
<td>5</td>
</tr>
</tbody>
</table>
Digital Automatic Control Laboratory

LABORATORY INFORMATION

Room No.: 105
Capacity: 20 students

MAJOR EQUIPMENT

- Programmable Logic Controller “OMRON”
- Programmable Logic Controller “SIEMENS S5-115U”
- Programmable Logic Controller Trainer.
- Lab-Volt 32 Bit Microprocessor Trainer
- Heat Kd-ETW 3800 Microprocessor Trainer.
- DC Motor Control Simulator.
- Rotary Transfer Unit Simulator.
- Traffic Control Simulator.
- Washing Machine Simulator.
- Mentor Robot Arm.
- Digital Multimeter.
- 7 Dell OptiPlex 760, Intel Core2Duo 3.0Ghz desktop computer with USB keyboard an, optical mouse and LCD 19’’ monitor

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 236</td>
<td>Electrical Engineering (1)</td>
<td>4</td>
</tr>
<tr>
<td>EE 326</td>
<td>Electrical Engineering (2)</td>
<td>6</td>
</tr>
<tr>
<td>EE 441</td>
<td>Power Systems (1)</td>
<td>6</td>
</tr>
</tbody>
</table>
Analogue Automatic Control Laboratory

LABORATORY INFORMATION

Room No. : 103
Capacity: 20 students

MAJOR EQUIPMENT

- Speed & Position Control Process.
- Induction Motor 3-pH Speed Control Trainer.
- Process Control Simulator.
- Light Control process Simulator.
- Temperature Process Trainer T-3.
- Level & Flow Trainer LF-1.
- Computer Control Process Trainer.
- Valve Calibration Trainer.
- Analogue training System.
- F.B. Modular Servo System.
- 3 Oscilloscopes.
- 3 Function Generators.
- Frequency Sweeper.
- Dead Weight Tester.
- Programmable logic Controller “Siemens S-5 100U”.
- 3 Digital Multimeters.
- 4 Air Compressors.
- Mini Workshop.

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course title</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 236</td>
<td>Electrical Engineering (1)</td>
<td>4</td>
</tr>
<tr>
<td>EE 326</td>
<td>Electrical Engineering (2)</td>
<td>6</td>
</tr>
</tbody>
</table>
Microprocessor Laboratory

LABORATORY INFORMATION

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 442</td>
<td>Digital and microprocessor</td>
<td>7</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>
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 106
Room no.: College Engineering & Technology - 106
Capacity: 25 students

WORKSHOP 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>
Physics Laboratory (1)

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 (2)

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.: 150 & 214
Capacity: 25

MAJOR EQUIPMENT

- Glass wear
- Flash point meter
- Digital balance
- Oil test Kits
- Spectrophotometer
- Water distillator
- Digital Conductivity meter
- PH meter (digital)
- COD digester
- BOD meter and BOD indicator

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course No.</th>
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<th>Semester/Certificate</th>
<th>Hours/ Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA118</td>
<td>Chemistry</td>
<td>1&quot;Term</td>
<td>2 hours</td>
</tr>
</tbody>
</table>
Marine Engineering Simulator

LABORATORY INFORMATION

Lab Name: Marine Engineering Simulator

Room No.: 

Capacity: 25

MAJOR EQUIPMENT

- Student Workstations containing:
- Marine Engineering Training Software.
- 17 PC with Monitor, 17” LCD

LABORATORY SERVES THE FOLLOWING COURSES

<table>
<thead>
<tr>
<th>Course No.</th>
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<th>Semester / Certificate</th>
<th>Hours/Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>MM 211</td>
<td>Marine Engineering 1</td>
<td>3th MM Term</td>
<td>2</td>
</tr>
<tr>
<td>MM 312</td>
<td>Marine Engineering 2</td>
<td>4th MM Term</td>
<td>2</td>
</tr>
<tr>
<td>MM 415</td>
<td>Marine Engineering 3</td>
<td>8th MM Term</td>
<td>2</td>
</tr>
<tr>
<td>MM 516</td>
<td>Marine Engineering 4</td>
<td>10th MM Term</td>
<td>2</td>
</tr>
</tbody>
</table>
Engineering Workshop

LABORATORY INFORMATION

The workshop comprises a representative sample of most of the basic machine tools, welding and casting equipment. Its functions include the following:

- Teaching experimental manufacturing courses.
- Supporting students’ senior project work.
- Fabricating specialized apparatus and equipment.
- Training purposes and imparting of skills.
- Extending services to other departments within the college.
- Serve maintaining the various technical units within the Academy.

Room no.: Industrial services centre (ISC)

Capacity: 50 students

WORKSHOP EQUIPMENT

- Turning machines (engine lathes)
- Milling machines.
- Drilling machines.
- Grinding machines.
- Tool grinder.
- Shaper.
- Sawing machines.
- Broaching machine.
- Honing machine.
- Welding equipment.(Arc, Gas, Mig)
- Hand tools and measuring equipment.
- Educational casting kits.
- Lathe dynamometers and twist drill dynamometer.

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>IM 112</td>
<td>Manufacturing Technology</td>
<td>2</td>
</tr>
<tr>
<td>IM 212</td>
<td>Manufacturing Processes</td>
<td>4</td>
</tr>
</tbody>
</table>