



Arab Academy for Science, Technology & Maritime Transport  
 College of Engineering & Technology  
 Mechanical Engineering Department

**University/Academy:** Arab Academy for Science, Technology & Maritime Transport  
**Faculty/Institute:** College of Engineering & Technology  
**Program:** B.Sc. Mechanical Engineering

Form no. (12): **Course Specification**

**1- Course Data**

Course Code: <b>ME 522</b>	Course Title: <b>Power Plant Analysis &amp; Design</b>	Academic Year/Level: <b>5th year / 9th semester</b>	
Specialization: <b>Mechanical</b>	No. of Instructional Units <b>3 credits</b>	Lecture <b>2 hrs.</b>	Practical <b>2 hrs.</b>

**2- Course Aim**

- Design of steam generators, condensers, evaporators, dearators economizers, air preheats. Air, feed water and drain system.
- Design of gas turbine combustion chambers, intake and exhaust system.

**3- Intended Learning Outcomes**

<b>a- Knowledge and Understanding</b>	<p><b>Through knowledge and understanding, students will be able to:</b></p> <p>a.4) Principles of design including elements design, process and/or a system related to specific disciplines.</p> <p>a.5) Methodologies of solving engineering problems, data collection and interpretation</p> <p>a.p.1) Fundamentals of thermal and fluid processes</p> <p>a.p.4) The constraints which mechanical power and energy engineers have to judge to reach at an Optimum solution</p>
<b>b- Intellectual Skills</b>	<p><b>Through intellectual skills, students will be able to:</b></p> <p>b.2) Select appropriate solutions for engineering problems based on analytical thinking.</p> <p>b.3) Think in a creative and innovative way in problem solving and design</p> <p>b.11) Analyze results of numerical models and assess their limitations.</p> <p>b.12) Create systematic and methodic approaches when dealing with new and advancing technology.</p> <p>b.p.2) Analyze and interpret data, and design experiments to obtain new data</p>

<b>c- Professional Skills</b>	<p><b>Through professional and practical skills, students will be able to:</b></p> <p>c.6) Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.</p> <p>c.p.3) Write computer programs pertaining to mechanical power and energy engineering</p>
<b>d- General Skills</b>	<p><b>Through general and transferable skills, students will be able to:</b></p> <p>d.9) Refer to relevant literature</p>

#### 4- Course Content

<b>Week No.1</b>	Design of Steam Generator
<b>Week No.2</b>	Design of Steam Generator
<b>Week No.3</b>	Design of Condenser
<b>Week No.4</b>	Design of Condenser
<b>Week No.5</b>	Design of an Evaporative Cooling Towers
<b>Week No.6</b>	Design of an Evaporative Cooling Towers
<b>Week No.7</b>	Design of Gas Turbine, Combined Cycle and Cogeneration-7th week evaluation / 7th week evaluation
<b>Week No.8</b>	Design of Gas Turbine, Combined Cycle and Cogeneration
<b>Week No.9</b>	Simulation of Components and Systems
<b>Week No.10</b>	Simulation of Components and Systems
<b>Week No.11</b>	Optimization
<b>Week No.12</b>	Air Feed Water and Drain system- 12th week evaluation / 12 <sup>th</sup> week evaluation
<b>Week No.13</b>	Generalized Heat Balance Computer Program.
<b>Week No.14</b>	Generalized Heat Balance Computer Program
<b>Week No.15</b>	General Comments on Power Plant Design
<b>Week No.16</b>	Final exam

## 5- Teaching and Learning Methods

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

## 6-Teaching and Learning Methods for Students with Special Needs

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

### Engineering Requirements and Design Considerations in college Buildings and its Leading Passages

- The design of college buildings and pedestrian passages leading to it are sloppy to allow the transportation of the handicapped;
- Doors are wide enough to let wheel chairs pass through easily and conveniently.
- Lifts are provided for movement between floors.
- Doors are made from light weight materials to make it easy for the handicapped suffering from weakness in limb muscles or those handicapped using prosthetic limbs to deal with them with the least muscular effort.
- Class floors are made from non-slippery materials to prevent falls on the part of the handicapped.
- Sudden changes in the floor level are prevented.

### Design Considerations of the Classes

- Class boards are placed at 60 cm high to allow wheeled chair users or those suffering from limited arm mobility use them.
- Enough spaces are left between seats and benches to prevent hindering the movement of wheeled chairs between them.
- Handicapped students sit among normal people in class to be able to interact with them. Nevertheless, in urgent cases according to the nature of the disability, the handicapped students sit in fixed suitable places whether at the front or the back of the class.
- Handicapped students sit close to the main exits of the class to be able to evacuate in case of emergencies.

### Academic Support:

- The general academic advisor appoints an academic supervisor for handicapped students.
- Continuous follow ups are made for handicapped students after each assessment to evaluate their academic level of achievement

## 7- Student Assessment

<b>a-Procedures used</b>	1-Written Examinations to assess The Intended Learning Outcomes. 2-Class Activities (Reports, Discussions, -----) to assess The Intellectual Skills.
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<b>b- Schedule:</b>	Assessment 1	7 <sup>th</sup> Week Assessment
	Assessment 2	12 <sup>th</sup> Week Assessment
	Assessment 3	Continuous Assessments
	Assessment 4	16 <sup>th</sup> Week Final Written Exam
<b>c- Weighing of Assessment</b>	7 <sup>th</sup> Week Evaluation	30 %
	12 <sup>th</sup> Week Evaluation	20 %
	Final-term Examination	40 %
	Oral Examination	00 %
	Practical Examination	00 %
	Semester Work	10 %
	Total	100%

#### 8- List of References:

<b>a- Course Notes</b>	N/A
<b>b- Required Books</b> (Textbooks)	• Lecture notes
<b>c- Recommended Books</b>	• H. Cohen, and G. F. C. Rogers, "Gas Turbine Theory", Longman Scientific and Technical, 1974.
<b>d- Periodicals, Web Sites, etc.</b>	N/A

**Course Instructor: Prof. Mohamed Teamah**

**Head of Department: Prof. El-Sayed Saber**

**Program Manager: Prof. El-Sayed Saber**

**Dean of College of Engineering and Technology of AASTMT**

Name: **Prof. Moustafa Hussein Aly**  
Signature:

**Executive Manager of Quality Assurance Center of AASTMT**

Name: **Prof. Aziz Ezzat**  
Signature: