



Arab Academy for Science, Technology & Maritime Transport  
College of Engineering & Technology  
Mechanical Engineering (Mechatronics) Program

**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 455</b>	Course Title: <b>Computer Aided Design</b>	Academic Year/Level: <b>4th year / 8th semester</b>
Specialization: <b>Mechanical</b>	No. of Instructional Units <b>3 credits</b>	Lecture <b>2 hrs.</b>
		Practical <b>4 hrs.</b>

**2- 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

**3- Intended Learning Outcomes**

<b>a- Knowledge and Understanding</b>	<p><b>Through knowledge and understanding, students will be able to:</b></p> <p>K1) Concepts and theories of mathematics and sciences, appropriate to the discipline</p> <p>K4) Principles of design including elements design, process and/or a system related to specific disciplines.</p> <p>K5) Methodologies of solving engineering problems, data collection and interpretation</p>
<b>b- Intellectual Skills</b>	<p><b>Through intellectual skills, students will be able to:</b></p> <p>I7) Solve engineering problems, often on the basis of limited and possibly contradictory information</p> <p>I8) Select and appraise appropriate ICT tools to a variety of engineering problems</p>
<b>c- Professional Skills</b>	<p><b>Through professional and practical skills, students will be able to:</b></p> <p>P2) Professionally merge the engineering knowledge, understanding, and feedback to improve design, Products and/or services</p> <p>P5) Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results</p> <p>P7) Apply numerical modeling methods to engineering problems</p>
<b>d- General Skills</b>	<p><b>Through general and transferable skills, students will be able to:</b></p> <p>G4) Demonstrate efficient IT capabilities.</p>

#### 4- Course Content

<b>Week No.1</b>	Introduction to computer aided design.
<b>Week No.2</b>	Introduction to the software "Solid Edge"
<b>Week No.3</b>	Basics of solid 2D and 3D parametric modeling using Solid Edge
<b>Week No.4</b>	Solid Edge profile environment
<b>Week No.5</b>	Primary and treatment features with Solid Edge
<b>Week No.6</b>	Introduction to finite element analysis
<b>Week No.7</b>	The finite element software "FEMAP" / 7th week evaluation
<b>Week No.8</b>	"FEMAP" model and mesh generation
<b>Week No.9</b>	Application to different machine element problems
<b>Week No.10</b>	MATLAB analysis and graphics
<b>Week No.11</b>	MATLAB analysis and graphics
<b>Week No.12</b>	Simulation of dynamic systems / 12th week evaluation
<b>Week No.13</b>	Application to different Mechanical, Hydraulic and Thermal systems (MATLAB 'Simulink').
<b>Week No.14</b>	Introduction to Optimization
<b>Week No.15</b>	System and element optimum design problems
<b>Week No.16</b>	Final Examination

#### 5- Teaching and Learning Methods

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

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

<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Tutorials</li> <li>• Reports &amp; sheets</li> <li>• Laboratories</li> <li>• Seminars</li> </ul> <p><b>Academic Support:</b></p> <ul style="list-style-type: none"> <li>• The general academic advisor appoints an academic supervisor for handicapped students.</li> <li>• Continuous follow ups are made for handicapped students after each assessment to evaluate their academic level of achievement</li> </ul>
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**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 and general Skills.	
<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 (Textbooks)</b>	• CAD lecture notes
<b>c- Recommended Books</b>	• Sham Tickoo. "Solid edge V20 for designers", 2008, Cadcim Technologies. Chandrakant S. Desai & Tribikram Kundu, "Introductory finite element method", 2001, CRC Pub., 1st edition. I. Zeid ,“CAD/ CAM Theory and practice “, McGrow Hill, 1994, 4th edition
<b>d- Periodicals, Web Sites, etc.</b>	N/A

**Course coordinator:**

**Program Manager:**