



**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 356</b>	Course Title: <b>Machine Design I</b>	Academic Year/Level: <b>3rd year / 5th 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**

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

**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.1) Concepts and theories of mathematics and sciences, appropriate to the discipline</p> <p>a.3) Characteristics of engineering materials related to the discipline</p> <p>a.4) Principles of design including elements design, process and/or a system related to specific disciplines.</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.6) Investigate the failure of components, systems, and processes.</p> <p>b.12) Create systematic and methodic approaches when dealing with new and advancing technology.</p>
<b>c- Professional Skills</b>	<p><b>Through professional and practical skills, students will be able to:</b></p> <p>c.2) Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services</p> <p>c.3) Create and/or re-design a process, component or system, and carry out specialized engineering designs</p> <p>c.5) Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results</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.2) Prepare engineering drawings, computer graphics and specialized</p>

	technical reports
<b>d- General Skills</b>	<b>Through general and transferable skills, students will be able to:</b> d.7) Search for information and engage in life-long self learning discipline d.9) Refer to relevant literature

#### 4- Course Content

<b>Week No.1</b>	Introduction
<b>Week No.2</b>	Stress in machine parts
<b>Week No.3</b>	Stress, material selection and factor of safety
<b>Week No.4</b>	Applications to design of machine elements
<b>Week No.5</b>	Introduction to fatigue in metals.
<b>Week No.6</b>	Stress concentration and design of members subject to fatigue loading
<b>Week No.7</b>	Power screws types and applications / 7th week evaluation
<b>Week No.8</b>	Bolted joints, brackets, and pressure vessel
<b>Week No.9</b>	Welded and adhesive joints
<b>Week No.10</b>	Welded joints specifications
<b>Week No.11</b>	Spring types and applications – helical compression springs
<b>Week No.12</b>	Design of different of springs / 12th week evaluation
<b>Week No.13</b>	Miscellaneous design problem.
<b>Week No.14</b>	Miscellaneous design problem
<b>Week No.15</b>	Miscellaneous design problem
<b>Week No.16</b>	Final Examination

#### 5- Teaching and Learning Methods

<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Tutorials</li> <li>• Reports &amp; sheets</li> <li>• Laboratories</li> <li>• Seminars</li> </ul>
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## 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 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
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<b>b- Required Books</b> (Textbooks)	• Shigley & Mischke, "Mechanical Engineering Design", latest Edition, McGraw – Hill Book.
<b>c- Recommended Books</b>	• Paul H. Black, "Machine Design", Latest edition, McGraw – Hill co. A.D. Deutschman, "Machine Design", latest Edition, Macmillan Publishing Co., Inc.
<b>d- Periodicals, Web Sites, etc.</b>	N/A

**Course Instructor: Prof. El-Sayed Saber      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:**