



**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:<br><b>ME 357</b>        | Course Title:<br><b>Machine Design II</b>      | Academic Year/Level:<br><b>3rd year / 6th semester</b> |
| Specialization:<br><b>Mechanical</b> | No. of Instructional Units<br><b>3 credits</b> | Lecture<br><input type="checkbox"/> hrs.               |
|                                      |  | Practical<br><input type="checkbox"/> hrs.             |

#### 2- Course Aim

- As a continuation to the course of machine design (1), the aim is to provide sufficient and advanced understanding of machine design concept.

#### 3- Intended Learning Outcomes

|                                       |   |
|---------------------------------------|---|
| <b>a- Knowledge and Understanding</b> | <b>Through knowledge and understanding, students will be able to:</b><br>a.1) Concepts and theories of mathematics and sciences, appropriate to the discipline<br>a.3) Characteristics of engineering materials related to the discipline<br>a.4) Principles of design including elements design, process and/or a system related to specific disciplines.<br>a.10) Technical language and report writing<br>a.p.4) The constraints which mechanical power and energy engineers have to judge to reach at an optimum solution<br>a.p.7) Basic theories and principles of some other engineering and mechanical engineering disciplines providing support to mechanical power and energy disciplines.                  |
| <b>b- Intellectual Skills</b>         | <b>Through intellectual skills, students will be able to:</b><br>b.5) Assess and evaluate the characteristics and performance of components, systems and processes<br>b.6) Investigate the failure of components, systems, and processes.<br>b.12) Create systematic and methodic approaches when dealing with new and advancing technology.<br>b.p.1) Evaluate mechanical power and energy engineering designs, processes and performances and propose improvements  |
| <b>c- Professional Skills</b>         | <b>Through professional and practical skills, students will be able to:</b><br>c.2) Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services<br>c.3) Create and/or re-design a process, component or system, and carry out specialized engineering designs<br>c.5) Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results<br>c.6) Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.<br>c.12) Prepare and present technical reports |

|                          |  |
|--------------------------|--|
|                          | c.p.2) Prepare engineering drawings, computer graphics and specialized technical reports   |
| <b>d- General Skills</b> | <p><b>Through general and transferable skills, students will be able to:</b></p> <p>d.1) Collaborate effectively within multidisciplinary team.</p> <p>d.2) Work in stressful environment and within constraints.</p> <p>d.7) Search for information and engage in life-long self learning discipline</p> <p>d.9) Refer to relevant literature</p> |

#### 4- Course Content

|                   |  |
|-------------------|--|
| <b>Week No.1</b>  | Power transmission systems, Specifications of differed types of belts (belt selection) |
| <b>Week No.2</b>  | Belt selection (contd.), chains, types and selection                                   |
| <b>Week No.3</b>  | Wire ropes selection   |
| <b>Week No.4</b>  | Gear types and spur gear force analysis  |
| <b>Week No.5</b>  | Design of spur gears   |
| <b>Week No.6</b>  | Helical gear force analysis  |
| <b>Week No.7</b>  | Bevel and Worm Gears / 7th week evaluation   |
| <b>Week No.8</b>  | Introduction to Anti-Friction Bearings   |
| <b>Week No.9</b>  | Selection of Ball and Roller Bearings  |
| <b>Week No.10</b> | Introduction to sliding bearings   |
| <b>Week No.11</b> | Design and Selection of Sliding Bearings   |
| <b>Week No.12</b> | Design of shafts based on strength and rigidity / 12th week evaluation                 |
| <b>Week No.13</b> | Design of shafts based on strength and rigidity.                                       |
| <b>Week No.14</b> | Clutches and Brakes  |
| <b>Week No.15</b> | Clutches and Brakes (contd.)   |
| <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> |
|---|

#### 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   |
| <b>b- Required Books (Textbooks)</b> | • Shigley & Mischke "Mechanical Engineering design" , McGraw Hill, latest edition.  |
| <b>c- Recommended Books</b>          | • Deutschman "Machine design " , Macmillan, latest edition.<br>Black & Adams "Machine design" , McGraw Hill, latest edition |

|  |     |
|--|-----|
| <b>d- Periodicals,<br/>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:**

