



## 22. Course Specification of Machine Drawing

| <b>I. Course Identification and General Information:</b> |  |  |             |    |     |                      |
|--|--|--|-------------|----|-----|----------------------|
| 1.   | Course Title:  | Machine Drawing.                       |             |    |     |                      |
| 2.   | Course Code & Number:                                  | ME131.                                 |             |    |     |                      |
| 3.   | Credit hours:  | C.H                                    |             |    |     | TOTAL<br>CR.<br>HRS. |
|  |  | Th.                                    | Seminar/Tu. | Pr | Tr. |                      |
|  |  | 1                                      | -           | 4  | -   |                      |
| 4.   | Study level/ semester at which this course is offered: | Second Year - Second Semester.         |             |    |     |                      |
| 5.   | Pre –requisite (if any):                               | Engineering Drawing.                   |             |    |     |                      |
| 6.   | Co –requisite (if any):                                | None.                                  |             |    |     |                      |
| 7.   | Program (s) in which the course is offered:            | Mechanical Engineering Program.        |             |    |     |                      |
| 8.   | Language of teaching the course:                       | English Language.                      |             |    |     |                      |
| 9.   | Location of teaching the course:                       | Mechanical Engineering Department.     |             |    |     |                      |
| 10.  | Prepared By:   | Asst. Prof. Dr. Abdulsalam Almakhlafy. |             |    |     |                      |
| 11.  | Date of Approval:                                      |  |             |    |     |                      |

| <b>II. Course Description:</b>  |
|---|
| <p>Machine drawing is the indispensable communicating medium employed in industries, to furnish all the information required for the manufacture and assembly of the components of a machine. This course is designed to enable the students to draw an assembly drawing of Machines then draw the detail working drawing of any needed part to be manufactured in Production Work Shop. Also, <b>it is intended to teach students</b> how to use documents and International Standard. The course will cover assembly, detailed drawings, geometric dimensioning and tolerance. The Machine Drawing course will incorporate computer graphics to <b>help</b> the <b>students</b> in <b>designing</b> and presentation considerations of machine parts.</p> |

|    | <b>III. Alignments of the Course Intended learning outcomes (CILOs)</b>   | <b>Referenced PILOs</b> |
|----|---|-------------------------|
| a1 | Identify the necessary data for production (drawing of detailed drawing). | A1                      |

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|           |   |    |
|-----------|---|----|
| <b>a2</b> | Define the characteristics of engineering materials related to discipline.  | A2 |
| <b>a3</b> | Describe the basic concepts for generating commercial drawings using the well-known CAD packages.                   | A4 |
| <b>b1</b> | Create the intellectual abilities to imagine and deduce machine parts and a whole machine from the drawing's views. | B1 |
| <b>b2</b> | Explore assembly drawings from detail drawings.   | B2 |
| <b>c1</b> | Apply the standard drawing methods to generate both working and assembly mechanical drawings.                       | C1 |
| <b>c2</b> | Demonstrate using the well-known CAD packages to generate 3-D commercial drawings.                                  | C3 |
| <b>d1</b> | Cooperate to work in groups through small scale projects.   | D1 |
| <b>d2</b> | Assess graphically using the graphic language.  | D5 |

**(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:**

| Course Intended Learning Outcomes  | Teaching strategies                      | Assessment Strategies   |
|--|--|---|
| <b>a1.</b> Identify the necessary data for production (drawing of detailed drawing).                         | Lecture and Drawing Practice, Tutorials. | Weekly offered Exercises. Drawing Practice. Mid-Term Exams (two exams) CAD offered Exercises. Final Exam. |
| <b>a2.</b> Define the characteristics of engineering materials related to discipline.                        |  |   |
| <b>a3.</b> Describe the basic concepts for generating commercial drawings using the well-known CAD packages. |  |   |

**(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:**

| Course Intended Learning Outcomes  | Teaching strategies | Assessment Strategies                       |
|--|---------------------|---|
| <b>b1.</b> Create the intellectual abilities to imagine and deduce machine | Lecture and Drawing | Weekly offered Exercises. Drawing Practice. |

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|  |                      |   |
|--|----------------------|---|
| parts and a whole machine from the drawings views.         | Practice, Tutorials. | Mid-Term Exams (two exams)<br>CAD offered Exercises.<br>Final Exam. |
| <b>b2.</b> Explore assembly drawings from detail drawings. |                      |   |

| © Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies: |   |   |
|--|---|---|
| Course Intended Learning Outcomes  | Teaching strategies   | Assessment Strategies   |
| <b>c1.</b> Apply the standard drawing methods to generate both working and assembly mechanical drawings.                             | Computer Software (CAD, Solid Work), Lecture and Drawing Practice, Tutorials. | Weekly offered Exercises. Drawing Practice/Quizzes. Mid-Term Exam. CAD offered Exercises. Final Exam Homework |
| <b>c2.</b> Demonstrate using the well-known CAD packages to generate 3-D commercial drawings.  |   |   |

| (D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies: |  |  |
|--|--|--|
| Course Intended Learning Outcomes  | Teaching strategies  | Assessment Strategies  |
| <b>d1.</b> Cooperate to work in groups through small-scale projects.   | Lecture and Drawing Practice, Tutorials. Computer Software (CAD, Solid Work) | Weekly offered Exercises. Drawing Practice/Quizzes. Mid-Term Exam. CAD offered Exercises. Final Exam Homework. |
| <b>d2.</b> Assess graphically using the graphic language.  |  |  |

| IV. Course Content:     |                   |                   |  |                 |               |
|-------------------------|-------------------|-------------------|--|-----------------|---------------|
| A – Theoretical Aspect: |                   |                   |  |                 |               |
| Order                   | Units/Topics List | Learning Outcomes | Sub Topics List  | Number of Weeks | Contact hours |
| 1.                      | Introduction.     | a1,a2,a3          | <ul style="list-style-type: none"> <li>Classification of Drawings.</li> <li>Machine Drawing.</li> <li>Production Drawing.</li> </ul> | 1               | 1             |

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|    |                               |          |   |   |   |
|----|-------------------------------|----------|---|---|---|
|    |                               |          | <ul style="list-style-type: none"> <li>• Part Drawing.</li> <li>• Assembly Drawing.</li> </ul>  |   |   |
| 2. | Computer Aided Design.        | a1,a2,a3 | <ul style="list-style-type: none"> <li>• The basic methods for generating commercial drawings using AutoCAD.</li> <li>• Exercises for CAD Systems.</li> </ul>   | 1 | 1 |
| 3. | Screwed, Fasteners.           | a1,a2,a3 | <ul style="list-style-type: none"> <li>• Screw Thread Nomenclature.</li> <li>• Forms of Threads.</li> <li>• Thread Series.</li> <li>• Thread Designation.</li> <li>• Multi-Start Threads.</li> <li>• Right Hand and Left-Hand Threads.</li> <li>• Representation of Threads.</li> <li>• Bolted Joint.</li> <li>• Locking Arrangements for Nuts.</li> <li>• Foundation Bolts.</li> </ul> | 1 | 1 |
| 4. | Keys, Cotter, and Pin Joints. | a1,a2,a3 | <ul style="list-style-type: none"> <li>• Types.</li> <li>• Cotter.</li> <li>• Pin.</li> <li>• Joints.</li> </ul>  | 1 | 1 |
| 5. | Shafts and Couplings.         | a1,a2,a3 | <ul style="list-style-type: none"> <li>• Rigid Couplings</li> <li>• Flexible Couplings</li> <li>• Dis-Engaging Couplings.</li> <li>• Non-Aligned Couplings.</li> </ul>  | 1 | 1 |
| 6. | Bearings.                     | a1,a2,a3 | <ul style="list-style-type: none"> <li>• Sliding Contact Bearings.</li> <li>• Journal Bearings.</li> <li>• Rolling Contact (Anti-friction) Bearings.</li> <li>• Radial Bearings.</li> <li>• Thrust Bearings.</li> </ul>   | 1 | 1 |

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|     |                              |                            |   |   |   |
|-----|------------------------------|----------------------------|---|---|---|
| 7.  | Pulleys.                     | a1,a2,a3                   | <ul style="list-style-type: none"> <li>Belt Driven Pulleys.</li> </ul>  | 1 | 1 |
| 8.  | Mid Term Exam.               | a1, a2, a3, b1, b2, c1, c2 | <ul style="list-style-type: none"> <li>The First 7 Chapters.</li> </ul>   | 1 | 1 |
| 9.  | Pipes Joints.                | a1,a2,a3                   | <ul style="list-style-type: none"> <li>Joints for Steam Pipes.</li> <li>Joints for Hydraulic Pipes.</li> <li>Special Pipe Joints.</li> <li>Pipe Fittings.</li> <li>Pipe Layout.</li> </ul>  | 1 | 1 |
| 10. | Limits, Tolerances and Fits. | a1,a2,a3                   | <ul style="list-style-type: none"> <li>Limit System.</li> <li>Tolerances.</li> <li>Fits.</li> <li>Tolerances of Form and Position.</li> </ul>   | 2 | 2 |
| 11. | Surface Roughness.           | a1,a2,a3                   | <ul style="list-style-type: none"> <li>Surface Roughness.</li> <li>Machining Symbols.</li> <li>Indication of Surface Roughness.</li> </ul>  | 1 | 1 |
| 12. | Chains and Gears.            | a1,a2,a3                   | <ul style="list-style-type: none"> <li>Chain Drives.</li> <li>Roller Chains.</li> <li>Inverted Tooth or Silent Chains.</li> <li>Gears.</li> <li>Types of Gears.</li> <li>Gear Nomenclature.</li> <li>Tooth Profiles.</li> <li>Gears and Gearing.</li> </ul> | 1 | 1 |
| 13. | Jigs and Fixtures.           | a1,a2,a3,b1,b2             | <ul style="list-style-type: none"> <li>Introduction</li> <li>Presentation of Work Piece.</li> <li>Jig Components.</li> <li>Various Types of Jigs.</li> <li>Fixture Components.</li> <li>Types of Fixtures.</li> </ul>                                       | 1 | 1 |

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|  |               |                            |  |           |           |
|--|---------------|----------------------------|--|-----------|-----------|
| 14.  | Welded joints | a1,a2,a3                   | <ul style="list-style-type: none"> <li>Welded Joints and Symbols</li> <li>Dimensioning of Welds</li> <li>Edge Preparation of Welds</li> <li>Surface Finish</li> <li>Rules to be Observed while Applying Symbols</li> <li>Welding Process Designations</li> </ul> | 1         | 1         |
| 15.  | Final Exam.   | a1, a2, a3, b1, b2, c1, c2 | <ul style="list-style-type: none"> <li>All the Chapters.</li> </ul>  | 1         | 1         |
| <b>Number of Weeks /and Units Per Semester</b> |               |                            |  | <b>16</b> | <b>32</b> |

| <b>B - Practical Aspect:</b> |  |                 |               |                   |
|------------------------------|--|-----------------|---------------|-------------------|
| Order                        | Tasks/ Experiments                             | Number of Weeks | Contact hours | Learning Outcomes |
| 1.                           | Guide Roller Assembly.                         | 1               | 4             | b1,b2,c1,c2,d2    |
| 2.                           | C-Clamp Assembly.                              | 1               | 4             | b1,b2,c1,c2,d2    |
| 3.                           | Control Lever Assembly.                        | 1               | 4             | b1,b2,c1,c2,d2    |
| 4.                           | Crankshaft and Connecting Rod Assembly.        | 1               | 4             | b1,b2,c1,c2,d2    |
| 5.                           | Eccentric Assembly and Filter Assembly.        | 1               | 4             | b1,b2,c1,c2,d2    |
| 6.                           | Journal Bearing Assembly.                      | 1               | 4             | b1,b2,c1,c2,d2    |
| 7.                           | Knuckle Assembly.                              | 1               | 4             | b1,b2,c1,c2,d2    |
| 8.                           | Non- Return Valve Assembly.                    | 1               | 4             | b1,b2,c1,c2,d2    |
| 9.                           | Oil Burner Assembly.                           | 1               | 4             | b1,b2,c1,c2,d2    |
| 10.                          | Pulleys Assembly.                              | 1               | 4             | b1,b2,c1,c2,d2    |
| 11.                          | Safety Valve Assembly.                         | 1               | 4             | b1,b2,c1,c2,d2    |
| 12.                          | Screw Jack Assembly and Stuffing Box Assembly. | 1               | 4             | b1,b2,c1,c2,d2    |
| 13.                          | Vice Assembly.                                 | 1               | 4             | b1,b2,c1,c2,d2    |

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|  |  |           |           |                |
|--|--|-----------|-----------|----------------|
| 14.  | Belt Drives and Ball Bearing Assembly. | 1         | 4         | b1,b2,c1,c2,d2 |
| <b>Number of Weeks /and Units Per Semester</b> |  | <b>14</b> | <b>56</b> |                |

### V. Teaching Strategies of the course:

Lecture and Drawing Practice, Tutorials, Computer Software (CAD, Solid Work)

### VI. Assignments:

| No           | Assignments   | Aligned CILOs(symbols) | Week Due | Mark      |
|--------------|---|------------------------|----------|-----------|
| 1.           | Assignment: Problem Based on Weekly Drawing. Assignments and Homework.                                | b1,b2,c1,c2,d2,d1,d2   | 2-14     | 20        |
| 2.           | Assignment: Problem based on Existing Products measurements and drawing:<br>1. Pad Lock.<br>2. Valve. | b1,b2,c1,c2, d1,d2     | 8-14     | 20        |
| <b>Total</b> |   |                        |          | <b>40</b> |

### VII. Schedule of Assessment Tasks for Students During the Semester:

| No. | Assessment Method  | Week Due | Mark | Proportion of Final Assessment | Aligned Course Learning Outcomes |
|-----|--|----------|------|--------------------------------|----------------------------------|
| 1.  | Assignment: Problem Based on Weekly Drawing Assignments and Homework.    | 2-14     | 20   | 13.3%                          | b1,b2,c1,c2,d2,d1, d2            |
| 2.  | Excises Class-CAD Drawing (Solid Work).                                  | 2-14     | 30   | 20%                            | a1,a2,a3, b1,b2, ,c1,c2, d1,d2   |
| 3.  | Assignment: Problem based on Existing Products measurements and drawing: | 8-14     | 20   | 13.3%                          | b1,b2,c1,c2, d1,d2               |

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|               |                           |    |            |             |                          |
|---------------|---------------------------|----|------------|-------------|--------------------------|
|               | 1. Pad Lock.<br>2. Valve. |    |            |             |                          |
| 4.            | Mid-Term Exam.            | 8  | 20         | 31.3%       | a1,a2,a3,<br>b1,b2,c1,c2 |
| 5.            | Final Exam.               | 16 | 60         | 40%         | a1,a2,a3,<br>b1,b2,c1,c2 |
| <b>Total:</b> |                           |    | <b>150</b> | <b>100%</b> |                          |

| <b>VIII. Learning Resources:</b>  |   |
|---|---|
| <i>Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).</i> |   |
| <b>1- Required Textbook(s) (maximum two ).</b>  |   |
|   | 1- Dr.K.L.Narayana, Dr.P.Kannaiah, K.Venkata Reddy. 2006. “Machine Drawing”. Edition. New Age International (P) Ltd., Publishers.<br>2- Bertoline–Wiebe.2007.” Fundamentals of Graphics Communication”, Fifth Edition’ McGraw–Hill Companies, 2007  |
| <b>2- Essential References.</b>   |   |
|   | 1- Hart, K.R., “Engineering Drawing”, The English Universities Press Ltd, 2003<br>2- Bertoline–Wiebe “Engineering Graphics” McGraw–Hill Primis, 2006<br>3- ENGINEERING GRAPHICS FOR First Year Student Specialized Scientific Prog (SSP) Faculty of Engineering Alexandria University, Prepared By Assoc. Prof. / R El sayed Shaker Ismail.   |
| <b>3- Electronic Materials and Web Sites etc.</b>   |   |
|   | 1. <a href="http://www.mhhe.com/primis/online/">http://www.mhhe.com/primis/online/</a><br>2. <a href="http://www.howstuffworks.com">www.howstuffworks.com</a><br>3. <a href="http://www.purdue.edu/discoverypark/PLM/SME/Tutorial_6_Crank_Slider.zip">http://www.purdue.edu/discoverypark/PLM/SME/Tutorial_6_Crank_Slider.zip</a><br>4. <a href="http://www.purdue.edu/discoverypark/PLM/SME/Cams_Design.bin">http://www.purdue.edu/discoverypark/PLM/SME/Cams_Design.bin</a> |

| <b>IX. Course Policies:</b> |  |
|-----------------------------|--|
| 1.                          | <b>Class Attendance:</b><br>-A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring <b>an approved</b> statement from university Clinic |
| 2.                          | <b>Tardy:</b><br>- For late in attending the class, the student will be initially notified. If he repeated lateness in attending class he will be considered as absent.  |
| 3.                          | <b>Exam Attendance/Punctuality:</b>  |

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|----|--|
|    | - A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam.   |
| 4. | <b>Assignments &amp; Projects:</b><br>- The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.  |
| 5. | <b>Cheating:</b><br>- For cheating in exam, a student will be considered as <b>failure</b> . In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty.  |
| 6. | <b>Plagiarism:</b><br>Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee <b>proved</b> a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university. |
| 7. | <b>Other policies:</b><br>- Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room.<br>- Mobile phones are not allowed in class during the examination.<br>- Lecture notes and assignments my given directly to students using soft or hard copy.                     |

|                    |   |
|--------------------|---|
| <b>Reviewed By</b> | <b><u>Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek A. Barakat</u></b><br><b><u>President of Quality Assurance Unit: Assoc. Prof. Dr. Mohammed Algorafi</u></b><br><b><u>Name of Reviewer from the Department: Assoc. Prof. Abdul-Malik Momin</u></b> |
|                    | <b><u>Deputy Rector for Academic Affairs Asst. Prof. Dr. Ibrahim AlMutaa</u></b><br><b><u>Assoc. Prof. Dr. Ahmed Mujahed</u></b><br><b><u>Asst. Prof. Dr. Munasar Alsubri</u></b>   |

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## Course Plan of Machine Drawing

| <b>I. Information about Faculty Member Responsible for the Course:</b> |  |                     |     |     |     |     |     |
|--|--|---------------------|-----|-----|-----|-----|-----|
| <b>Name of Faculty Member</b>  | Asst. Prof. Dr. Abdulsalam Almakhlafy. | <b>Office Hours</b> |     |     |     |     |     |
| <b>Location &amp; Telephone No.</b>                                    |  | SAT                 | SUN | MON | TUE | WED | THU |
| <b>E-mail</b>  |  |                     |     |     |     |     |     |

| <b>II. Course Identification and General Information:</b> |   |                                    |                   |    |     |                |
|---|---|------------------------------------|-------------------|----|-----|----------------|
| <b>1.</b>   | Course Title:                                     | Machine Drawing.                   |                   |    |     |                |
| <b>2.</b>   | Course Number & Code:                             | ME131.                             |                   |    |     |                |
| <b>3.</b>   | Credit Hours:                                     | C.H                                |                   |    |     | Total Cr. Hrs. |
|   |   | Th.                                | Seminar/Tr.<br>u. | Pr | Tr. |                |
|   |   | 1                                  | -                 | 4  | -   |                |
| <b>4.</b>   | Study level/year at which this course is offered: | Second Year - Second Semester.     |                   |    |     |                |
| <b>5.</b>   | Pre –requisite (if any):                          | Engineering Drawing.               |                   |    |     |                |
| <b>6.</b>   | Co –requisite (if any):                           | None.                              |                   |    |     |                |
| <b>7.</b>   | Program (s) in which the course is offered        | Mechanical Engineering Program.    |                   |    |     |                |
| <b>8.</b>   | Language of teaching the course:                  | English Language.                  |                   |    |     |                |
| <b>9.</b>   | System of Study:                                  | Semesters                          |                   |    |     |                |
| <b>10.</b>  | Mode of delivery:                                 | Lecture and Practical Drawing.     |                   |    |     |                |
| <b>11.</b>  | Location of teaching the course:                  | Mechanical Engineering Department. |                   |    |     |                |

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### III. Course Description:

Machine drawing is the indispensable communicating medium employed in industries, to furnish all the information required for the manufacture and assembly of the components of a machine. This course is designed to enable the students to draw an assembly drawing of Machines then draw the detail working drawing of any needed part to be manufactured in Production Work Shop. Also, **it is intended to teach students** how to use documents and International Standard. The course will cover assembly, detailed drawings, geometric dimensioning and tolerance. The Machine Drawing course will incorporate computer graphics to **help** the **students** in **designing** and presentation considerations of machine parts.

### IV. Intended learning outcomes (ILOs) of the course:

Brief summary of the knowledge or skill the course is intended to develop:

1. Identify the necessary data for production (drawing of detailed drawing).
2. Define the characteristics of engineering materials related to discipline.
3. Describe the basic concepts for generating commercial drawings using the well-known CAD packages.
4. Create the intellectual abilities to imagine and deduce machine parts and a whole machine from the drawings views.
5. Explore assembly drawings from detail drawings.
6. Apply the standard drawing methods to generate both working and assembly mechanical drawings.
7. Demonstrate using the well-known CAD packages to generate 3-D commercial drawings.
8. Cooperate to work in groups through small scale projects.
9. Assess graphically using the graphic language.

### V. Course Content:

- Distribution of Semester Weekly Plan Of course Topics/Items and Activities.

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 Al-Shakiri

Quality Assurance  
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 Assoc. Prof. Dr.  
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Academic  
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 University  
 Prof. Dr. Al-Qassim  
 Mohammed Abbas



| Order | Units/Topics List             | Sub Topics List   | Week Due             | Contact Hours |
|-------|-------------------------------|---|----------------------|---------------|
| 1.    | Introduction.                 | <ul style="list-style-type: none"> <li>• Classification of Drawings.</li> <li>• Machine Drawing.</li> <li>• Production Drawing.</li> <li>• Part Drawing.</li> <li>• Assembly Drawing.</li> </ul>  | 1 <sup>st</sup> Week | 1             |
| 2.    | Computer Aided Design.        | <ul style="list-style-type: none"> <li>• The basic methods for generating commercial drawings using AutoCAD.</li> <li>• Exercises for CAD Systems.</li> </ul>   | 2 <sup>nd</sup> Week | 1             |
| 3.    | Screwed, Fasteners.           | <ul style="list-style-type: none"> <li>• Screw Thread Nomenclature.</li> <li>• Forms of Threads.</li> <li>• Thread Series.</li> <li>• Thread Designation.</li> <li>• Multi-Start Threads.</li> <li>• Right Hand and Left-Hand Threads.</li> <li>• Representation of Threads.</li> <li>• Bolted Joint.</li> <li>• Locking Arrangements for Nuts.</li> <li>• Foundation Bolts.</li> </ul> | 3 <sup>rd</sup> Week | 1             |
| 4.    | Keys, Cotter, and Pin Joints. | <ul style="list-style-type: none"> <li>• Types.</li> <li>• Cotter.</li> <li>• Pin.</li> <li>• Joints.</li> </ul>  | 4 <sup>th</sup> Week | 1             |
| 5.    | Shafts and Couplings.         | <ul style="list-style-type: none"> <li>• Rigid Couplings</li> <li>• Flexible Couplings</li> <li>• Dis-Engaging Couplings.</li> <li>• Non-Aligned Couplings.</li> </ul>  | 5 <sup>th</sup> Week | 1             |
| 6.    | Bearings.                     | <ul style="list-style-type: none"> <li>• Sliding Contact Bearings.</li> <li>• Journal Bearings.</li> <li>• Rolling Contact (Anti-friction) Bearings.</li> <li>• Radial Bearings.</li> <li>• Thrust Bearings.</li> </ul>   | 6 <sup>th</sup> Week | 1             |

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|     |                              |   |   |   |
|-----|------------------------------|---|---|---|
| 7.  | Pulleys.                     | <ul style="list-style-type: none"> <li>Belt Driven Pulleys.</li> </ul>  | 7 <sup>th</sup> Week                        | 1 |
| 8.  | Mid Term Exam.               | <ul style="list-style-type: none"> <li>The First 7 Chapters.</li> </ul>   | 8 <sup>th</sup> Week                        | 1 |
| 9.  | Pipes Joints.                | <ul style="list-style-type: none"> <li>Joints for Steam Pipes.</li> <li>Joints for Hydraulic Pipes.</li> <li>Special Pipe Joints.</li> <li>Pipe Fittings.</li> <li>Pipe Layout.</li> </ul>  | 9 <sup>th</sup> Week                        | 1 |
| 10. | Limits, Tolerances and Fits. | <ul style="list-style-type: none"> <li>Limit System.</li> <li>Tolerances.</li> <li>Fits.</li> <li>Tolerances of Form and Position.</li> </ul>   | 10 <sup>th</sup> and 11 <sup>th</sup> Weeks | 2 |
| 11. | Surface Roughness.           | <ul style="list-style-type: none"> <li>Surface Roughness.</li> <li>Machining Symbols.</li> <li>Indication of Surface Roughness.</li> </ul>  | 12 <sup>th</sup> Week                       | 1 |
| 12. | Chains and Gears.            | <ul style="list-style-type: none"> <li>Chain Drives.</li> <li>Roller Chains.</li> <li>Inverted Tooth or Silent Chains.</li> <li>Gears.</li> <li>Types of Gears.</li> <li>Gear Nomenclature.</li> <li>Tooth Profiles.</li> <li>Gears and Gearing.</li> </ul> | 13 <sup>th</sup> Week                       | 1 |
| 13. | Jigs and Fixtures.           | <ul style="list-style-type: none"> <li>Introduction</li> <li>Presentation of Work Piece.</li> <li>Jig Components.</li> <li>Various Types of Jigs.</li> <li>Fixture Components.</li> <li>Types of Fixtures.</li> </ul>                                       | 14 <sup>th</sup> Week                       | 1 |
| 14. | Welded joints                | <ul style="list-style-type: none"> <li>Welded Joints and Symbols</li> <li>Dimensioning of Welds</li> <li>Edge Preparation of Welds</li> <li>Surface Finish</li> </ul>   | 15 <sup>th</sup> Week                       | 1 |

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|  |             |   |                       |           |
|--|-------------|---|-----------------------|-----------|
|  |             | <ul style="list-style-type: none"> <li>Rules to be Observed while Applying Symbols</li> <li>Welding Process Designations</li> </ul> |                       |           |
| 15.  | Final Exam. | <ul style="list-style-type: none"> <li>All the Chapters.</li> </ul>   | 16 <sup>th</sup> Week | 1         |
| <b>Number of Weeks /and Units Per Semester</b> |             |   | <b>16</b>             | <b>32</b> |

| <b>B – Practical Aspect:</b>                   |  |                       |               |
|--|--|-----------------------|---------------|
| Order  | Tasks/ Experiments                             | Week Due              | Contact hours |
| 1.   | Guide Roller Assembly.                         | 1 <sup>st</sup> Week  | 4             |
| 2.   | C-Clamp Assembly.                              | 2 <sup>nd</sup> Week  | 4             |
| 3.   | Control Lever Assembly.                        | 3 <sup>rd</sup> Week  | 4             |
| 4.   | Crankshaft and Connecting Rod Assembly.        | 4 <sup>th</sup> Week  | 4             |
| 5.   | Eccentric Assembly and Filter Assembly.        | 5 <sup>th</sup> Week  | 4             |
| 6.   | Journal Bearing Assembly.                      | 6 <sup>th</sup> Week  | 4             |
| 7.   | Knuckle Assembly.                              | 7 <sup>th</sup> Week  | 4             |
| 8.   | Non- Return Valve Assembly.                    | 8 <sup>th</sup> Week  | 4             |
| 9.   | Oil Burner Assembly.                           | 9 <sup>th</sup> Week  | 4             |
| 10.  | Pulleys Assembly.                              | 10 <sup>th</sup> Week | 4             |
| 11.  | Safety Valve Assembly.                         | 11 <sup>th</sup> Week | 4             |
| 12.  | Screw Jack Assembly and Stuffing Box Assembly. | 12 <sup>th</sup> Week | 4             |
| 13.  | Vice Assembly.                                 | 13 <sup>th</sup> Week | 4             |
| 14.  | Belt Drives and Ball Bearing Assembly.         | 14 <sup>th</sup> Week | 4             |
| <b>Number of Weeks /and Units Per Semester</b> |  | <b>14</b>             | <b>56</b>     |

| <b>VI. Teaching strategies of the course:</b>                                |
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| Lecture and Drawing Practice, Tutorials, Computer Software (CAD, Solid Work) |

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| <b>VII. Assignments:</b> |   |                        |          |           |
|--------------------------|---|------------------------|----------|-----------|
| No                       | Assignments   | Aligned CILOs(symbols) | Week Due | Mark      |
| 1.                       | Assignment: Problem Based on Weekly Drawing. Assignments and Homework.                                | b1,b2,c1,c2,d2,d1,d2   | 2-14     | 20        |
| 2.                       | Assignment: Problem based on Existing Products measurements and drawing:<br>1. Pad Lock.<br>2. Valve. | b1,b2,c1,c2, d1,d2     | 8-14     | 20        |
| <b>Total</b>             |   |                        |          | <b>40</b> |

| <b>VIII. Schedule of Assessment Tasks for Students During the Semester:</b> |   |          |            |                                |                                  |
|---|---|----------|------------|--------------------------------|----------------------------------|
| No.   | Assessment Method   | Week Due | Mark       | Proportion of Final Assessment | Aligned Course Learning Outcomes |
| 1.  | Assignment: Problem Based on Weekly Drawing Assignments and Homework.                                 | 2-14     | 20         | 13.3%                          | b1,b2,c1,c2,d2,d1,d2             |
| 2.  | Excises Class-CAD Drawing (Solid Work).   | 2-14     | 30         | 20%                            | a1,a2,a3, b1,b2, ,c1,c2, d1,d2   |
| 3.  | Assignment: Problem based on Existing Products measurements and drawing:<br>1. Pad Lock.<br>2. Valve. | 8-14     | 20         | 13.3%                          | b1,b2,c1,c2, d1,d2               |
| 4.  | Mid-Term Exam.  | 8        | 20         | 31.3%                          | a1,a2,a3, b1,b2,c1,c2            |
| 5.  | Final Exam.   | 16       | 60         | 40%                            | a1,a2,a3, b1,b2,c1,c2            |
| <b>Total:</b>   |   |          | <b>150</b> | <b>100%</b>                    |                                  |

| <b>IX. Learning Resources:</b>  |
|---|
| • <i>Written in the following order: (Author – Year of publication – Title – Edition – Place of publication – Publisher).</i> |
| <b>1- Required Textbook(s) (maximum two ).</b>  |

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|---|
| <p>1- Dr.K.L.Narayana, Dr.P.Kannaiah, K.Venkata Reddy. 2006. “Machine Drawing”. Third Edition. New Age International (P) Ltd., Publishers.</p> <p>2- Bertoline–Wiebe.2007.” Fundamentals of Graphics Communication”, Fifth Edition”. The McGraw–Hill Companies, 2007</p>  |
| <p><b>2- Essential References.</b></p> <p>1- Hart, K.R., “Engineering Drawing”, The English Universities Press Ltd, 2003</p> <p>2- Bertoline–Wiebe “Engineering Graphics” McGraw–Hill Primis, 2006</p> <p>3- ENGINEERING GRAPHICS FOR First Year Student Specialized Scientific Programs (SSP) Faculty of Engineering Alexandria University, Prepared by Assoc. Prof. / Raafat El sayed Shaker Ismail.</p>  |
| <p><b>3- Electronic Materials and Web Sites etc.</b></p> <p>1. <a href="http://www.mhhe.com/primis/online/">http://www.mhhe.com/primis/online/</a></p> <p>1. <a href="http://www.howstuffworks.com">www.howstuffworks.com</a></p> <p>2. <a href="http://www.purdue.edu/discoverypark/PLM/SME/Tutorial_6_Crank_Slider.zip">http://www.purdue.edu/discoverypark/PLM/SME/Tutorial_6_Crank_Slider.zip</a></p> <p>3. <a href="http://www.purdue.edu/discoverypark/PLM/SME/Cams_Design.bin">http://www.purdue.edu/discoverypark/PLM/SME/Cams_Design.bin</a></p> |

| X. Course Policies: |   |
|---------------------|---|
| 1.                  | <p><b>Class Attendance:</b></p> <p>-A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring <b>an approved</b> statement from university Clinic</p> |
| 2.                  | <p><b>Tardy:</b></p> <p>- For late in attending the class, the student will be initially notified. If he repeated lateness in attending class he will be considered as absent.</p>  |
| 3.                  | <p><b>Exam Attendance/Punctuality:</b></p> <p>- A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam.</p>  |
| 4.                  | <p><b>Assignments &amp; Projects:</b></p> <p>- The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.</p>  |
| 5.                  | <p><b>Cheating:</b></p> <p>- For cheating in exam, a student will be considered as <b>failure</b>. In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty.</p>   |

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| 6. | <p><b>Plagiarism:</b><br/>         Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee <b>proved</b> a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university.</p>                              |
| 7. | <p><b>Other policies:</b></p> <ul style="list-style-type: none"> <li>- Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room.</li> <li>- Mobile phones are not allowed in class during the examination.</li> <li>- Lecture notes and assignments my given directly to students using soft or hard copy.</li> </ul> |

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