



**University/Academy:** Arab Academy for Science and Technology & Maritime Transport  
**Faculty/Institute:** College of Engineering & Technology  
**Program:** Industrial Engineering

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

**1- Course Data**

<b>Course Code:</b> EE 326	<b>Course Title:</b> Electrical Engineering (2)	<b>Academic Year/Level:</b> 3
<b>Specialization:</b> Industrial	<b>No. of Instructional Units:</b> 3	<b>Lecture</b> 2 <b>Practical</b> 2

<b>2- Course Aim</b>	<ul style="list-style-type: none"><li>-To investigate the different types of instrument devices.</li><li>-To study the basic concepts of transformers, DC and AC electrical machines.</li><li>-To study the basics of control systems.</li></ul>
----------------------	--

<b>3- Intended Learning Outcome</b>
-------------------------------------

<b>a- Knowledge and Understanding</b>	<p>Students should be able to:</p> <p><b>1.a Concepts and theories of mathematics and sciences, appropriate to the discipline</b></p> <ul style="list-style-type: none"><li>• interpret different instruments theory and operational characteristics</li><li>• Describe DC machines and transformer</li><li>• Describe Special type motors</li><li>• Describe Transient response</li><li>• Define PID controller</li></ul> <p><b>1.e Methodologies of solving engineering problems, data collection and interpretation</b></p> <ul style="list-style-type: none"><li>• Distinguish between Induction motors and Synchronous generators</li><li>• Distinguish between Open &amp; closed loop control systems</li></ul>
---------------------------------------	---

<p><b>b- Intellectual Skills</b></p>	<p>Students should be able to</p> <p><b>2.b Select appropriate solutions for engineering problems based on analytical thinking</b></p> <ul style="list-style-type: none"> <li>• Demonstrate system transient performance and determine the effect of PID control technique</li> </ul> <p><b>2.g Solve engineering problems, often on the basis of limited and possibly contradicting information</b></p> <p><b>I2 Identify and formulate engineering problems and apply their knowledge of mathematics, science and engineering tools along with creativity skills to solve problems in the field of electric power, machines and control Engineering:</b></p> <ul style="list-style-type: none"> <li>• Classify different instruments and their operation.</li> <li>• Examine operational characteristics of various types of instruments.</li> </ul> <p><b>I3 1-Analyze complex electrical power, machines, electric drives and automatic control systems</b></p> <ul style="list-style-type: none"> <li>• Classify performance of DC and AC machines and transformers.</li> <li>• Show basic concepts of control systems.</li> </ul>
<p><b>c- Professional Skills</b></p>	<p>Students should be able to</p> <p><b>3.a Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems</b></p> <ul style="list-style-type: none"> <li>• Perform different measurements with different instrument devices</li> </ul> <p><b>3.f Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs</b></p> <ul style="list-style-type: none"> <li>• Perform laboratory experimental on DC and AC machines and transformers</li> </ul> <p><b>P1 Design and perform experiments as well as analyze and interpret experimental results related to electrical power and machines and control system:</b></p> <ul style="list-style-type: none"> <li>• Prepare effective and informative technical reports and present results concerning instrument devices, electrical machines and control system</li> </ul> <p><b>P21- Use laboratory equipment to obtain data</b></p> <ul style="list-style-type: none"> <li>• Perform laboratory experimental tests on three-phase AC synchronous machine to obtain operational characteristics in addition to performing synchronization procedure.</li> <li>• Perform laboratory experimental tests to evaluate the effect of controller parameters on system response.</li> </ul>

<p><b>d- General Skills</b></p>	<p>Students should be able to</p> <p><b>4.a Collaborate effectively within multidisciplinary team</b></p> <ul style="list-style-type: none"> <li>• Communicate effectively with colleagues and others to interchange knowledge and information about instruments, electrical machines and control system.</li> <li>• Practice individually in small group to perform laboratory experiments and tutorial exercises on instrument devices, electrical machines and control system.</li> </ul>
<p><b>4- Course Content</b></p>	<p><i>Week Number 1:</i> Moving coil instrument.</p> <p><i>Week Number 2:</i> Moving iron instrument.</p> <p><i>Week Number 3:</i> Dynamometer type instruments.</p> <p><i>Week Number 4:</i> Induction type instruments.</p> <p><i>Week Number 5:</i> Watt-meters and power factor meter.</p> <p><i>Week Number 6:</i> DC Machines.</p> <p><i>Week Number 7:</i> 7th week exam + Transformers.</p> <p><i>Week Number 8:</i> Induction motors.</p> <p><i>Week Number 9:</i> Synchronous generators.</p> <p><i>Week Number 10:</i> Special type motors.</p> <p><i>Week Number 11:</i> Control systems.</p> <p><i>Week Number 12:</i> 12<sup>th</sup> week + Open loop &amp; closed loop systems.</p> <p><i>Week Number 13:</i> Control system components.</p> <p><i>Week Number 14:</i> Transient response.</p> <p><i>Week Number 15:</i> PID controllers.</p> <p><i>Week Number 16:</i> Final Exam.</p>

<b>5- Teaching and Learning Methods</b>	<ul style="list-style-type: none"> <li>- Lectures</li> <li>- Tutorials</li> <li>- Reports &amp; sheets</li> <li>- Laboratories</li> </ul>														
<b>6- Teaching and Learning Methods for Students with Special Needs</b>	<ul style="list-style-type: none"> <li>- Lectures</li> <li>- Tutorials</li> <li>- Reports &amp; sheets</li> <li>- Laboratories</li> </ul>														
<b>7- Student Assessment:</b>	<p>Written Examinations to assess The Intended Learning Outcomes</p> <p>Class Activities (Reports, Discussions, -----) to assess The Intellectual Skills</p>														
<b>a- Procedures used:</b>	<p>Quizzes to assess 7<sup>th</sup> week and 12 week evaluation</p> <p>Class Activities (Reports, Discussions, -----) to assess continuous assessments</p>														
<b>b- Schedule:</b>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Assessment 1</td> <td style="width: 40%;">4<sup>th</sup> Week</td> </tr> <tr> <td>Assessment 2</td> <td>5<sup>th</sup> week</td> </tr> <tr> <td>Assessment 3</td> <td>7<sup>th</sup> Week (7<sup>th</sup> week evaluation)</td> </tr> <tr> <td>Assessment 4</td> <td>10<sup>th</sup> week</td> </tr> <tr> <td>Assessment 5</td> <td>12<sup>th</sup> Week (12<sup>th</sup> week evaluation)</td> </tr> <tr> <td>Assessment 6</td> <td>Continuous Assessments</td> </tr> <tr> <td>Assessment 7</td> <td>16<sup>th</sup> Week Final Written Exam</td> </tr> </table>	Assessment 1	4 <sup>th</sup> Week	Assessment 2	5 <sup>th</sup> week	Assessment 3	7 <sup>th</sup> Week (7 <sup>th</sup> week evaluation)	Assessment 4	10 <sup>th</sup> week	Assessment 5	12 <sup>th</sup> Week (12 <sup>th</sup> week evaluation)	Assessment 6	Continuous Assessments	Assessment 7	16 <sup>th</sup> Week Final Written Exam
Assessment 1	4 <sup>th</sup> Week														
Assessment 2	5 <sup>th</sup> week														
Assessment 3	7 <sup>th</sup> Week (7 <sup>th</sup> week evaluation)														
Assessment 4	10 <sup>th</sup> week														
Assessment 5	12 <sup>th</sup> Week (12 <sup>th</sup> week evaluation)														
Assessment 6	Continuous Assessments														
Assessment 7	16 <sup>th</sup> Week Final Written Exam														
<b>c- Weighing of Assessment:</b>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">7<sup>th</sup> Week Examination</td> <td style="width: 40%;">30%</td> </tr> <tr> <td>12<sup>th</sup> Week Examination</td> <td>20%</td> </tr> <tr> <td>Final-term Examination</td> <td>40%</td> </tr> <tr> <td>Oral Examination</td> <td>0%</td> </tr> <tr> <td>Practical Examination</td> <td>0%</td> </tr> <tr> <td>Semester Work</td> <td>10%</td> </tr> <tr> <td>Total</td> <td>100%</td> </tr> </table>	7 <sup>th</sup> Week Examination	30%	12 <sup>th</sup> Week Examination	20%	Final-term Examination	40%	Oral Examination	0%	Practical Examination	0%	Semester Work	10%	Total	100%
7 <sup>th</sup> Week Examination	30%														
12 <sup>th</sup> Week Examination	20%														
Final-term Examination	40%														
Oral Examination	0%														
Practical Examination	0%														
Semester Work	10%														
Total	100%														
<b>8- List of References:</b>	R .C. Dorf, "Modern Control System", Addison Wisley, N.Y., 1992														
<b>a- Course Notes</b>	Lecturer note														
<b>b- Required Books (Textbooks)</b>	Lecturer note														
<b>c- Recommended Books</b>															
<b>d- Periodicals, Web Sites, ..., etc.</b>															

**Course Instructor:**

**Head of Department:**

**Program Manager:**