



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

Form no. (12)
Course Specification

1- Course Data

Course Code: EE 512	Course Title: Automated Industrial Systems I	Academic Year/Level: 5/9
Specialization: Electrical and Control Engineering	No. of Instructional Units: 3	Lecture 2 Tutorial/Practical 2

2- Course Aim	<p>Investigate the different topics and structures of automated systems</p> <p>Understanding relay logic circuits and industrial motor control center</p> <p>Provide the basics of programmable logic controllers</p> <p>Study behavior of PLC in industrial applications</p>
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3- Intended Learning Outcome

a- Knowledge and Understanding	<p>A.2 Basics of information and communication technology (ICT)</p> <p>A.4 Principles of design including elements design, process and/or a system related to specific disciplines</p> <p>A.5 Methodologies of solving engineering problems, data collection and interpretation</p> <p>A.8 Current engineering technologies as related to disciplines</p> <p>A.12 Contemporary engineering topics</p> <p>A.15 Principles of operation and performance specifications of electrical and electromechanical engineering systems</p> <p>A.20 Logic circuits</p> <p>A.27 Analysis, design and implementation of various methods of control using analogue and digital control systems</p> <p>A.28 Applications of industrial automated systems for electrical and control engineering</p>
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	A.31 Formulate the problem, realizing the requirements and identifying the constraints
b- Intellectual Skills	<p>B.1 Select appropriate mathematical and computer-based methods for modeling and analyzing problems</p> <p>B.2 Select appropriate solutions for engineering problems based on analytical thinking</p> <p>B.3 Think in a creative and innovative way in problem solving and design</p> <p>B.4 Combine, exchange, and assess different ideas, views, and knowledge from a range of sources</p> <p>B.5 Assess and evaluate the characteristics and performance of components, systems and processes</p> <p>B.7 Solve engineering problems, often on the basis of limited and possibly contradicting information</p> <p>B.8 Select and appraise appropriate ICT tools to a variety of engineering problems</p> <p>B.9 Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact</p> <p>B.10 Incorporate economic, societal, environmental dimensions and risk management in design</p> <p>B.12 Create systematic and methodic approaches when dealing with new and advancing technology</p> <p>B.15 Integrate electrical, electronic and mechanical components and equipment with transducers, actuators and controllers in creatively computer controlled systems</p> <p>B.17 Analyze power system behavior and suggest appropriate protection scheme</p> <p>B.19 Design computer programs to analyze and simulate different electrical systems components and control applications</p>
c- Professional Skills	<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, components 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.9 Demonstrate basic organizational and project management skills</p> <p>C.12 Prepare and present technical reports</p> <p>C.13 Design and perform experiments, as well as analyze and interpret experimental results related to electrical power and machines systems</p> <p>C.15 Integrate electrical, electronic and mechanical components and equipment with transducers, actuators and controllers in creatively computer controlled systems</p> <p>C.16 Specify and evaluate manufacturing of components and equipment related to electrical power and machines</p> <p>C.17 Apply modern techniques, skills and engineering tools to electrical power and machines engineering systems</p> <p>C.18 Test and examine components, equipment and systems of electrical power and machines and control engineering</p> <p>C.20 Evaluate different techniques and strategies for solving electrical engineering problems</p>
<p>d- General Skills</p>	<p>D.1 Collaborate effectively within multidisciplinary team</p> <p>D.2 Work in stressful environment and within constraints</p> <p>D.3 Communicate effectively</p> <p>D.4 Demonstrate efficient IT capabilities</p> <p>D.5 Lead and motivate individuals</p> <p>D.6 Effectively manage tasks, time, and resources</p> <p>D.7 Search for information and engage in life-long self learning discipline</p> <p>D.9 Refer to relevant literatures</p> <p>D.11 Plan and undertake a major individual project</p>
<p>4- Course Content</p>	<p><i>Week Number 1:</i> Introduction to Automation.</p> <p><i>Week Number 2:</i> Building blocks of automation.</p> <p><i>Week Number 3:</i> Motor Control Center (MCC).</p> <p><i>Week Number 4:</i> Relay logic.</p> <p><i>Week Number 5:</i> Programmable Logic Controller (PLC) hardware.</p> <p><i>Week Number 6:</i> PLC Programming Languages</p>

	<p><i>Week Number 7:</i> 7th week exam + Programming With Logic Functions</p> <p><i>Week Number 8:</i> Timers Operation.</p> <p><i>Week Number 9:</i> Counters Operation</p> <p><i>Week Number 10:</i> Advanced programming techniques.</p> <p><i>Week Number 11:</i> Control Application Examples.</p> <p><i>Week Number 12:</i> 12th week exam + Industrial Application Examples.</p> <p><i>Week Number 13:</i> Practical Case Studies.</p> <p><i>Week Number 14:</i> Application project.</p> <p><i>Week Number 15:</i> Advanced PLC And Automated Systems.</p> <p><i>Week Number 16:</i> Final Exam.</p>												
5- Teaching and Learning Methods	<ul style="list-style-type: none"> - Lectures - Tutorials - Discussion papers - Focus group 												
6- Teaching and Learning Methods for Students with Special Needs	<ul style="list-style-type: none"> - Lectures - Tutorials - Discussion papers - Focus group 												
7- Student Assessment:													
a- Procedures used:	<p>Quizzes to asses part of the 7th week evaluation</p> <p>Quizzes to asses part of the 7th week evaluation</p> <p>Report to asses the 7th week practical evaluation</p> <p>Quizzes and reports to asses part of the 12th week evaluation</p> <p>Reports and practical exam to access continuous assesment</p> <p>Written exam to assess the Final term exam</p>												
b- Schedule:	<table> <tr> <td>Assessment 1 (Quiz)</td> <td>5rd Week</td> </tr> <tr> <td>Assessment 2 (Quiz)</td> <td>7th Week</td> </tr> <tr> <td>Assessment 3 (Report)</td> <td>7th Week</td> </tr> <tr> <td>Assessment 4 (Quiz)</td> <td>11th Week</td> </tr> <tr> <td>Assessment 5 (Report)</td> <td>12th Week</td> </tr> <tr> <td>Assessment 6 (Report &practical)</td> <td>15th Week</td> </tr> </table>	Assessment 1 (Quiz)	5 rd Week	Assessment 2 (Quiz)	7 th Week	Assessment 3 (Report)	7 th Week	Assessment 4 (Quiz)	11 th Week	Assessment 5 (Report)	12 th Week	Assessment 6 (Report &practical)	15 th Week
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c- Weighing of Assessment:	<table> <tr> <td>7th Week Examination</td> <td>20%+10%(Practical)</td> </tr> <tr> <td>12th Week Examination</td> <td>10%+10% (Practical)</td> </tr> <tr> <td>Final-term Examination</td> <td>40%</td> </tr> <tr> <td>Oral 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 th Week Examination	20%+10%(Practical)	12 th Week Examination	10%+10% (Practical)	Final-term Examination	40%	Oral Examination	0%	Semester Work	10%	Total	100%
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Final-term Examination	40%												
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Total	100%												
8- List of References:	<p>John W. Webb, “Programmable logic controllers, Principles and applications”, 2nd Edition, 1992</p> <p>E.A. Parr, “Programmable Controllers – An Engineer’s Guide”, Newness Heinman Butterworth</p>												
a- Course Notes													
b- Required Books (Textbooks)	J.R. Hackworth and F.D. Hackworth, " Programmable logic controllers, programming methods and applications", prentice hall, 2004												

c- Recommended Books	
d- Periodicals, Web Sites, ..., etc.	

Course Instructor

Name: **Prof. Hamdy Ashour**

Signature:

Head of Department

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**Dean of College of Engineering and Technology of
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