



**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**

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| <b>Course Code:</b><br>EE 413                                | <b>Course Title:</b><br>Microprocessor Based Process Control | <b>Academic Year/Level:</b><br>4 |
| <b>Specialization:</b><br>Electrical and Control Engineering | <b>No. of Instructional Units:</b><br>3                      |                                  |
|  | <b>Lecture</b> 2   | <b>Tutorial/Practical</b> 2      |

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| <b>2- Course Aim</b> | Covering the measurement and signal conditioning interfacing and data acquisition continuous and discrete state control and microprocessor |
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**3- Intended Learning Outcome**

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| <b>a- Knowledge and Understanding</b> | A.2 Basics of information and communication technology (ICT)<br><br>A.4 Principles of design including elements design, process and/or a system related to specific disciplines<br><br>A.5 Methodologies of solving engineering problems, data collection and interpretation<br><br>A.8 Current engineering technologies as related to disciplines<br><br>A.12 Contemporary engineering topics<br><br>A.15 Principles of operation and performance specifications of electrical and electromechanical engineering systems<br><br>A.20 Logic circuits<br><br>A.27 Analysis, design and implementation of various methods of control using analogue and digital control systems<br><br>A.31 Formulate the problem, realizing the requirements and identifying the constraints |
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| <p><b>b- Intellectual Skills</b></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.19 Design computer programs to analyze and simulate different electrical systems components and control applications</p> |
| <p><b>c- Professional Skills</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, 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</p>   |

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|                                 | <p>interpret experimental results related to electrical power and machines systems</p> <p>C.14 Use laboratory and field equipment competently and safely</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.18 Test and examine components, equipment and systems of electrical power and machines and control engineering</p> <p>C.19 Implement hardware and interface circuit for digital control and electrical drives system.</p> <p>C.20 Evaluate different techniques and strategies for solving electrical engineering problems</p>  |
| <p><b>d- General Skills</b></p> | <p>D.1 Collaborate effectively within multidisciplinary team</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.11 Plan and undertake a major individual project</p>   |
| <p><b>4- Course Content</b></p> | <p><i>Week Number 1:</i> Types of Process Control Strategy.</p> <p><i>Week Number 2:</i> Type of Signal and Signal Conditioning</p> <p><i>Week Number 3:</i> Analogue Signal Conditioning.</p> <p><i>Week Number 4:</i> Digital Signal Conditioning.</p> <p><i>Week Number 5:</i> Discrete State Process Control.</p> <p><i>Week Number 6:</i> A/D and D/A Conversion.</p> <p><i>Week Number 7:</i> Digital Control System Fundamentals.</p> <p><i>Week Number 8:</i> Data Acquisition Systems.</p> <p><i>Week Number 9:</i> Characteristics of Control System.</p> <p><i>Week Number 10:</i> Microprocessor and Microcontroller as digital control.</p> <p><i>Week Number 11:</i> Microcontroller Principles and Configurations.</p> <p><i>Week Number 12:</i> Microcontroller Programming.</p> <p><i>Week Number 13:</i> Special Instructions of Microcontrollers.</p> <p><i>Week Number 14:</i> Applications 1.</p> <p><i>Week Number 15:</i> Applications 2.</p> <p><i>Week Number 16:</i> Final Exam.</p> |



**Course Instructor**

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**Head of Department**

Name: **Prof. Hamdy Ashour**

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**Dean of College of Engineering and Technology of  
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**Executive Manager of Quality Assurance  
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Name: **Prof. Aziz Ezzat**

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