



Arab Academy for Science, Technology & Maritime Transport  
College of Engineering & Technology  
Mechanical Engineering (Mechatronics) Program

**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: <b>ME 591</b>	Course Title: <b>Mechatronics</b>	Academic Year/Level: <b>4th year / 7th semester</b>
Specialization: <b>Mechanical</b>	No. of Instructional Units <b>3 credits</b>	Lecture <b>2 hrs.</b>
		Practical <b>2 hrs.</b>

**2- Course Aim**

<ul style="list-style-type: none"> <li>• Understand the basic principles of Mechatronics and Measurement systems,</li> <li>• Provide a review of basic electrical relations, circuit element and circuit analysis,</li> <li>• Provide an overview of the sensors, amplifiers, conditioning circuits, and actuators, and</li> <li>• Understand the Data Acquisition Systems (DAS).</li> </ul>
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**3- Intended Learning Outcomes**

<b>i- Knowledge and Understanding</b>	<b>Through knowledge and understanding, students will be able to:</b> K13 <sub>ME</sub> ) Basic science and engineering fundamentals in mechanics, electronics and software in their interfacing.
<b>j- Intellectual Skills</b>	<b>Through intellectual skills, students will be able to:</b> I11 <sub>ME</sub> ) Identify at an appropriate level the design, production, interfacing and software needs of different parts of Mechatronics systems.
<b>k- Professional Skills</b>	<b>Through professional and practical skills, students will be able to:</b> P2) Professionally merge the engineering knowledge, understanding, and feedback to improve design, Products and/or services P3) Create and/or re-design a process, component or system, and carry out specialized engineering designs P7) Apply numerical modeling methods to engineering problems P11 <sub>ME</sub> ) Compete, in-depth, in at least one engineering discipline, namely mechanics, electronics or Interfacing and software P16 <sub>ME</sub> ) Apply the principles of sustainable design and development
<b>l- General Skills</b>	<b>Through general and transferable skills, students will be able to:</b>

**4- Course Content**

<b>Week No.1</b>	Introduction to Mechatronics and Measurement Systems
<b>Week No.2</b>	Mechatronics Key Elements
<b>Week No.3</b>	Introduction to Sensors and Transducers

<b>Week No.4</b>	Position and Motion Sensors
<b>Week No.5</b>	Temperature Sensing Devices
<b>Week No.6</b>	Pressure, Flow, Stress, and Strain Sensors
<b>Week No.7</b>	7th week Exam / 7th week evaluation
<b>Week No.8</b>	Actuating Devices
<b>Week No.9</b>	Analog Signal Processing
<b>Week No.10</b>	Digital Circuits and Systems
<b>Week No.11</b>	Analog to Digital and Digital to Analog Conversion
<b>Week No.12</b>	12th week / 12 <sup>th</sup> week evaluation
<b>Week No.13</b>	Data Acquisition Systems.
<b>Week No.14</b>	Case Studies I
<b>Week No.15</b>	Case study II
<b>Week No.16</b>	Final examination

**5- Teaching and Learning Methods**

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

**6-Teaching and Learning Methods for Students with Special Needs**

- Lectures
  - Tutorials
  - Reports & sheets
  - Laboratories
  - Seminars
- 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 Skills.	
<b>b- Schedule:</b>	Assessment 1 Assessment 2 Assessment 3 Assessment 4	7 <sup>th</sup> Week Assessment 12 <sup>th</sup> Week Assessment Continuous Assessments 16 <sup>th</sup> Week Final Written Exam
<b>c- Weighing of Assessment</b>	7 <sup>th</sup> Week Evaluation 12 <sup>th</sup> Week Evaluation Final-term Examination Oral Examination Practical Examination Semester Work Total	30 % 20 % 40 % 00 % 00 % 10 % 100%

**8- List of References:**

<b>a- Course Notes</b>	N/A
<b>b- Required Books (Textbooks)</b>	• RANACGABDRAB, K.P.,VIJAYARAGHAVAN, G.K. & BALASUNDRAM, M.S. ” MECHATRONICS: INTEGRATED MECHANICAL ELECTRONIC SYSTEMS”, PWS Publishing Company, Latest Edition.
<b>c- Recommended Books</b>	• J.E.Carryer, R.M.Ohline, and T.W.Kenny, ” Introduction to Mechatronic design”, Latest Edition, PEARSON Publishing Company • C.W. deSilva, " Mechatronics; An Integrated Approach," Latest Edition, CRC Press • M.B.Histand & D. G. Alciatore” Introduction to Mechatronics and Measurement Systems”, McGraw-Hill, Latest Edition
<b>d- Periodicals, Web Sites, etc.</b>	N/A

**Course coordinator:**

**Program Manager:**