



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: ME 595	Course Title: Automation of Mechanical Systems	Academic Year/Level: 5th year / 9th semester
Specialization: Mechanical	No. of Instructional Units 3 credits	Lecture 2 hrs.
		Practical 2 hrs.

2- Course Aim

<ul style="list-style-type: none"> • Provide an overview of Automation, Relay Logic, PLCs, analog and digital Interface of sensors, and actuators to PLC. • Introduce digital and analog control using PLC and industrial automation concept. • Programming of the PLC • Introduction of human-machine interface. • Introduction of the SCADA system

3- Intended Learning Outcomes

II- Knowledge and Understanding	Through knowledge and understanding, students will be able to: K15 _{ME}) The principles of sustainable design and development.
mm- Intellectual Skills	Through intellectual skills, students will be able to: I13 _{ME}) Identify at an appropriate level the design, production, interfacing and software needs of different parts of Mechatronics systems.
nn- Professional Skills	Through professional and practical skills, students will be able to: 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 P5) Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results P13 _{ME}) Compete, in-depth, in at least one engineering discipline, namely mechanics, electronics or Interfacing and software P16 _{ME}) Apply the principles of sustainable design and development
oo-General Skills	Through general and transferable skills, students will be able to:

4- Course Content

Week No.1	Introduction to Programmable Logic Controllers
Week No.2	Relay Logic
Week No.3	PLC Basics - Hardware Architectures
Week No.4	Bit Logic
Week No.5	Ladder Diagram
Week No.6	Application – 1
Week No.7	Application – 2 / 7th week evaluation
Week No.8	7th week examination
Week No.9	Timers/Counters
Week No.10	Flow chart and state diagram conversion to Ladder Diagram
Week No.11	Application – 3
Week No.12	12th week exam / 12 th week evaluation
Week No.13	Application – 4.
Week No.14	SCADA and HMI interfaces
Week No.15	DCS Systems
Week No.16	Final examination

5- Teaching and Learning Methods

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

6-Teaching and Learning Methods for Students with Special Needs

<ul style="list-style-type: none"> • Lectures • Tutorials • Reports & sheets • Laboratories • Seminars <p><u>Academic Support:</u></p> <ul style="list-style-type: none"> • 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
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7- Student Assessment

a-Procedures used	1-Written Examinations to assess The Intended Learning Outcomes.	
	2-Class Activities (Reports, Discussions, -----) to assess The Intellectual Skills.	
b- Schedule:	Assessment 1	7 th Week Assessment
	Assessment 2	12 th Week Assessment
	Assessment 3	Continuous Assessments
	Assessment 4	16 th Week Final Written Exam
c- Weighing of Assessment	7 th Week Evaluation	30 %
	12 th Week Evaluation	20 %
	Final-term Examination	40 %
	Oral Examination	00 %
	Practical Examination	00 %
	Semester Work	10 %
	Total	100%

8- List of References:

a- Course Notes	N/A
b- Required Books (Textbooks)	• PETRUZELLA, FRANK " A TEXT BOOK OF AUTOMOBILE ENGINEERING (Part 2)"
c- Recommended Books	<ul style="list-style-type: none"> • John R. Hackworth and Frederick D. Hackworth, Jr., "Programmable Logic Controllers: Programming Methods and Applications," Latest Edition • Siemens PLC S7-200 Reference Manual • PLC Start-up and Maintenance, Industrial Text and Video Company
d- Periodicals, Web Sites, etc.	N/A

Course coordinator:

Program Manager: