

**Faculty of Engineering & Technology**

**Mechatronics System Design**

**Information :**

**Course Code :** MKT 412

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Specialization of Mechatronics Engineering

**Instructor Information :**

Title	Name	Office hours
Lecturer	MOHAMED ABDELBAR SHAMSELDIN ALY	3
Teaching Assistant	Osama Ahmed Ibrahim Mohamed Montaser	
Teaching Assistant	Fady Ayman Mohamed Naguib Mahmoud Noah	2

**Area Of Study :**

- Introduce mechatronic system design methodology and evaluation.
- Comparison for mechatronics design elements including computing, sensors and actuators.
- Train students to design and evaluate complete Mechatronics systems.

**Description :**

Introduction to Mechatronics system design; VDI design guideline for mechatronics system design; Basic control logic; Controller design for mechatronics systems using logic controllers, microcontrollers, PC-based controller, and PLCs; Embedded microprocessor system and control; Design of sensors and power transmission systems; Two projects to design a prototype mechatronic device.

**Course outcomes :**

**a. Knowledge and Understanding: :**

1 -	Define Mechatronics design procedure.
2 -	List the different types of computing devices, actuation systems and sensing elements.
3 -	Explain the design rules of man-machine interface design.

**b. Intellectual Skills: :**

1 -	Calculate suitable motor size for mechatronics system.
2 -	Select the proper computing device, sensors and actuators for a mechatronics system among several alternatives.
3 -	Design a user interface for a mechatronic system to satisfy user requirements.

**c. Professional and Practical Skills: :**

1 -	Analyse lab experimental results for running project and program arduino or other microcontroller.
2 -	Prepare and present a technical report for course project.

**d. General and Transferable Skills: :**

1 -	Work in stressful environment and within constraints through assignments and course project
-----	---

2 -	Communicate effectively through presentation and discussion of the course project.
3 -	Effectively manage tasks, time, and resources.
4 -	Search for information and engage in life-long self-learning discipline through self-learning assignments

### **Course Topic And Contents :**

<b>Topic</b>	<b>No. of hours</b>	<b>Lecture</b>	<b>Tutorial / Practical</b>
Introduction: Mechatronics system design procedure	4	2	2
Critical thinking and system evaluation	6	4	2
Computing devices, types of computing devices, comparison	14	8	6
Actuation types, how to select type, and size the actuator	18	10	8
Sensor types and rules for comparison and selection.	6	4	2
Design rules of user interface for systems	4	0	4
Project proposal	6	2	4
Project follow -up	2	0	2

### **Teaching And Learning Methodologies :**

Interactive Lecturing
Problem solving
Experiential learning
Discussion
Assignment
Project
Research

### **Course Assessment :**

<b>Methods of assessment</b>	<b>Relative weight %</b>	<b>Week No</b>	<b>Assess What</b>
Assignments, Participation, & Quizzes	25.00		
Final Exam	40.00	16	
Midterm	15.00	5	
Project.	20.00		

### **Recommended books :**

Bolton, William %Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering+P  
Prentice Hall, 2003.  
Alciatore, David G.& Hstand, Michael B.; %Introduction to  
Mechatronics and Measurement System+M  
McGraw Hill.

