

**Faculty of Engineering & Technology**

**Sensors and Signal Conditioning**

**Information :**

**Course Code :** MKT 505

**Level :** Undergraduate

**Course Hours :** 2.00- Hours

**Department :** Specialization of Mechatronics Engineering

**Instructor Information :**

Title	Name	Office hours
Lecturer	Mohamed Ali Mohamed Elsayed Torad	2
Teaching Assistant	Osama Ahmed Ibrahim Mohamed Montaser	

**Area Of Study :**

This course aims to:

• Introduce sensors and transducers as main elements in Mechatronics systems.

• Enrich the student's basic knowledge about signal conditioning units to prepare signals to be suitable for next stage.

• Train students to calibrate, select, and use sensors in Mechatronics, systems.

**Description :**

Analog Signal Conditioning, Digital Signal Conditioning, Temperature Sensors. Mechanical Sensors, Optical Sensors, Ultrasonic Sensors, Fiber Optic Sensors.

**Course outcomes :**

**a. Knowledge and Understanding: :**

1 -	a1. Define sensors and transducers.
2 -	a2. Explain the principals of different sensors including: position,
3 -	a3. Explain the principals of analog signal conditioning using
4 -	a4. Describe the function of the different types of A/D & D/A
5 -	a5. Discuss the modern trends in sensors( fiber optics, mems

**b. Intellectual Skills: :**

1 -	b1. Select suitable sensors based on function, performance
2 -	b2. Select the suitable A/D and D/A converters.

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

1 -	c1. Use sensors and signal conditioning in mechatronics systems.
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**d. General and Transferable Skills: :**

1 -	d1. Collaborate effectively within multidisciplinary team
2 -	d2. Effectively manage tasks, time, and resources.

3 - d3. Search for information and engage in life-long self-learning discipline

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction		2	1
Position & speed measurements		2	1
Stress and strain measurements		2	1
Temperature measurements		2	1
Vibration and Acceleration Measurement		2	1
Pressure and flow Measurements		2	1
Semiconductor sensors and Microelectromechanical devices.		4	2
Analog interfacing		5	3
Data Acquisition Systems		5	2
New trends		4	2

**Teaching And Learning Methodologies :**

Interactive Lecturing
Brain Storming
Discussion
Experiential learning
Project
Research

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
1st Midterm	15.00	6	
2nd Midterm	15.00	11	
Assignments, Participation, & Quizzes	20.00		
Course Project	10.00	12	
Final Exam	40.00		

**Recommended books :**

- Text Book:
  - Alciatore, David G. & Hystand, Michael B.; Introduction to Mechatronics and Measurement Systems - McGraw Hill, 4th Edition, 2012
  - Bolton, William; Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering - Prentice Hall, 4th Edition, 2008
- Lecture notes and videos on the course Moodle page, FUE website.

