Faculty of Engineering & Technology

Mechatronics

Information :

| Course Code : | MKT 411 | Level | : | Undergraduate | Course Hours : | 3.00- Hours |

| Department : | Specialization of Mechatronics Engineering |

Instructor Information :

Title	Name	Office hours
Lecturer	MOHAMED ABDELBAR SHAMSELDIN ALY	13
Teaching Assistant	Fady Ayman Mohamed Naguib Mahmoud Noah	4
Teaching Assistant	Osama Ahmed Ibrahim Mohamed Montaser	

Area Of Study :

Upon the completion of the course, students should be able to:
 Introduce Mechatronics specialization in general and the concept of Multidisciplinary
and synergistic integration of different engineering areas with emphasis
on Parallel design concept.
 Enrich the students basic knowledge about interfacing and data acquisition in
Mechatronics Systems.
 Train students to design, simulate, build, and test an elementary Mechatronics
Subsystem.

Description :

Mechatronics system configuration; Modeling of mechanical translational and
rotational systems; Mechanisms systems; Mechanical and electrical actuators;
Pneumatic and hydraulic systems; Sensors and encoders; Data acquisition
and signal conditioning; Computer-aided drawing (CAD) and interpretation
of 3-D technical drawings; Mini project to design, model, implement, and
test a mechatronics system.

Course outcomes :

a.Knowledge and Understanding: :

1 -	a1. Define Mechatronics systems, sensors, actuators, signal conditioning,
2 -	a2. List the different arrangements of the operational amplifier circuits
3 -	a3. Explain how to properly sample a signal for digital processing,
4 -	a4. Describe the analogue to digital (A/D) and digital to analogue

b.Intellectual Skills: :

1 -	b1. Analyse the different arrangements of operational amplifiers considering
2 -	b2. Calculate the proper sampling frequency and the resolution for
3 -	b3. Select the proper data acquisition card to solve a given signal processing
4 -	b4. Analyse the results of simulation models for a simple mechanical,

c.Professional and Practical Skills: :

1 -	c1. Analyse lab experimental results of sampling a signal with different
2 -	c2. Use the suitable hardware components and software for drafting and

d.General and Transferable Skills: :

1 -	d1. Work in stressful environment and within constraints through assignments
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: Course outlines &Information - Mechatronics . Mechatronics Engineer- Mechatronics system design approach-		2	0
Mechatronics system . Sensors-Actuators -Control unit- Signal Conditioning.		6	2
Analog Signal Processing Using Operational Amplifiers: Ideal model for Operational Amplifier (Different arrangements . Sample & Hold circuit- Comparator), Real OP Amp: Important Parameters from Data Sheets.		6	6
Data Acquisition: Quantization Theory- A/D Converters- D/A Converters- Virtual Instrumentation - Data Acquisition and Control.		10	8
Modelling of Mechatronics systems: Hard & Soft Models- Model validation and verification- Modelling of Mechanical, Electrical, and Electromechanical Systems. Simulation using MATLAB/SIMULINK		6	2
Lab Experiments: Use of a CAD software for PCB Design & Application- Basic circuits of amplifiers - Signal sampling using DAQ - Simulation of a simple Mechatronics System.		0	6
Project follow -up.		0	4
Midterm Exams		0	2

Teaching And Learning Methodologies :

Interactive Lecturing
Problem solving
Discussion
Experiential learning
Project
Research

http://www.fue.edu.eg

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignments, Participation, & Quizzes	20.00		
Final Exam	40.00		
First Midterm	15.00	5	
Project.	10.00	12	
Second Midterm	15.00	10	

Recommended books :

- Lecture notes on the course moodle page, FUE website.
- Recommended Readings:
Bolton, William; ‰Mechatronics: Electronic Control Systems in
Mechanical and Electrical Engineering ‡Prentice Hall, Latest
editions.