

## Faculty of Engineering & Technology

### Graduation Project I

**Information :**

**Course Code :** MKT 500

**Level :** Undergraduate

**Course Hours :** 2.00- Hours

**Department :** Specialization of Mechatronics Engineering

**Instructor Information :**

Title	Name	Office hours
Teaching Assistant	Donia Waheed Mohamed Abdelmonem Saleem	

**Area Of Study :**

- Introduce critical thinking and scientific methodology in problem solving.
- Train student to focus on problem analysis, make wide review of previous art, and evaluate previous solutions.
- Train students to design and simulate a new Mechatronics system.

**Description :**

Conceptual Design: Students follow systematic design approach, apply project planning and scheduling techniques, devise analytical, computational and/or experimental solutions, and design and build their own test-rig. Students attend technical seminars and learn to interact with speakers and at the end of the semester; they are required to present a seminar on the project status, progress and future work.

**Course outcomes :**

**a. Knowledge and Understanding: :**

1 -	a1. Demonstrate a technique for a computer aided graphical representation for the project topics considered.
2 -	a2. Tell topics related to humanitarian interests, moral issues, respect for diversity and general knowledge from other disciplines.
3 -	a3. Identify basics of information and communication technology (ICT).
4 -	a4. Describe basics of English technical language.
5 -	a5. Describe fundamentals of technical report writing considering one of the standard format.
6 -	a6. Define characteristics of engineering materials including material structure and properties.
7 -	a7. Quote principles of design including elements design, process and/or a system related to Mechatronics.
8 -	a8. Describe quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.
9 -	a9. Describe current engineering technologies as related to Mechatronics including modern techniques in sensors, actuators, control units and their interfaces.
10 -	a10. Identify the professional ethics and impacts of engineering solutions on society and environment
11 -	a11. Describe the contemporary engineering topics.

12 -	a12. Define fundamentals of problem identification, formulation and solution in the inter-disciplinary fields of Mechatronics
13 -	a13. Describe the principles of sustainable design and development
<b>b.Intellectual Skills: :</b>	
1 -	b1. Solve engineering problems, often on the basis of limited and possibly contradicting information.
2 -	b2. Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.
3 -	b3. Incorporate economic, societal, environmental dimensions and risk management in design.
4 -	b4. Analyse results of numerical models and assess their limitations.
5 -	b5. Create systematic and methodical approaches when dealing with new and advanced technology.
6 -	b6. Design Mechanical systems considering modern techniques including modern CAD tools.
7 -	b7. Analyse electrical and electronics including logic circuits, and microprocessor based systems.
8 -	b8. Identify at an appropriate level the design, production, interfacing and software needs of different parts of Mechatronics systems.
9 -	b9. Create solutions to mechatronics systems especially to manufacturing, maintenance and interfacing problems in a creative way, taking account of industrial and commercial constraints.
<b>c.Professional and Practical Skills: :</b>	
1 -	c1. Construct engineering graphics to visualize various engineering applications including computer aided drafting.
2 -	c2. Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to identify, formulate and solve engineering and field problems related to Mechatronics.
3 -	c3. Carry out specialized engineering designs for a process, component or system
4 -	c4. Apply the principles of sustainable design and development.
<b>d.General and Transferable Skills: :</b>	
1 -	d1. Work in stressful environment and within constraints
2 -	d2. Communicate effectively.
3 -	d3. Demonstrate efficient IT capabilities
4 -	d4. Lead and motivate individuals
5 -	d5. Effectively manage tasks, time, and resources
6 -	d6. Search for information and engage in life-long self-learning discipline
7 -	d7. Acquire entrepreneurial skills
8 -	d8. Refer to relevant literatures

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to project steps (Planning- Designing- Making- Finishing & Testing-Documentations) - Mechatronics system design process	6	0	6
Teams & project task selection.	2	0	2
Proposal with time plan	4	0	4
Literature survey of previous work - brain storming.	18	0	18
Alternative solutions evaluation	4	0	4

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

<b>Topic</b>	<b>No. of hours</b>	<b>Lecture</b>	<b>Tutorial / Practical</b>
Design & analysis.	18	0	18
Report writing & Poster design.	4	0	4
Presentation	4	0	4

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

Interactive Lecturing

Problem solving

Discussion ( Brain storming)

Experiential learning

Project

Collaborative Research

### **Course Assessment :**

<b>Methods of assessment</b>	<b>Relative weight %</b>	<b>Week No</b>	<b>Assess What</b>
1st mid term	10.00	6	
2nd mid term	10.00	11	
Final Exam	40.00	16	
Oral Exam	25.00	16	
Participation and presentations	15.00		

### **Course Notes :**

Lecture notes on the course Moodle page, FUE website

### **Recommended books :**

1. Text Book:

MIT Guide for Science and Engineering Communication, Zimmerman and Paradise, MIT press. Second edition.

2- Recommended Readings:

Critical Thinking and Innovation

Mechatronics Handbook.