

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 |
|--------------------|--|--------------|
| Lecturer | Mohamed Ali Mohamed Elsayed Torad | |
| Lecturer | Amr Mohamed Metwally Ismaiel | |
| Lecturer | Hassan Mohamed Shams Eldin Elsayed Eleashy | |
| Lecturer | Mohamed Fathy Abdel Rahman Badran | 4 |
| Lecturer | MOHAMED ABDELBAR SHAMSELDIN ALY | 5 |
| Lecturer | Mohamed Ahmed Mahmoud Karali | |
| Lecturer | Abdel Moneim Mohamed El Mahdi Ismail | |
| Lecturer | Anas Mohamed Abdelrahman Ali | |
| Lecturer | SAMAH ELSAYED ELMETWALLY ELKHATIB | |
| Assistant Lecturer | Zakaria Mostafa Abdo Salim Marouf | |
| Assistant Lecturer | Moustafa Raafat Aziz Shousha | |
| Teaching Assistant | Amira Khaled Hasan Mohamed Elkodama | |
| Teaching Assistant | Mohamed Samir Ahmed Mohamed | 2 |
| Teaching Assistant | Osama Ahmed Ibrahim Mohamed Montaser | |

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: :

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| 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. Intellectual Skills: :

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| 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. |

c. Professional and Practical Skills: :

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| 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. |

d. General and Transferable Skills: :

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| 1 - | d1. Work in stressful environment and within constraints |
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| 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 |
| Design & analysis. | 18 | 0 | 18 |
| Report writing & Poster design. | 4 | 0 | 4 |
| Presentation | 4 | 0 | 4 |

Teaching And Learning Methodologies :

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| Interactive Lecturing |
| Problem solving |
| Discussion (Brain storming) |
| Experiential learning |
| Project |
| Collaborative Research |

Course Assessment :

| Methods of assessment | Relative weight % | Week No | Assess What |
|---------------------------------|-------------------|---------|-------------|
| 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.