

Faculty of Engineering & Technology

Robot Control

Information :

Course Code : MKT 472 **Level :** Undergraduate **Course Hours :** 3.00- Hours

Department : Specialization of Mechatronics Engineering

Instructor Information :

Title	Name	Office hours
Lecturer	MOHAMED ABDELBAR SHAMSELDIN ALY	7
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Teaching Assistant	Fady Ayman Mohamed Naguib Mahmoud Noah	3
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Area Of Study :

- Develop the students knowledge about different methods for path planning for robot manipulators.
- Prepare students to apply different methods for controlling robot manipulators, including Fuzzy Logic Control.
- Develop the students knowledge about control of manipulators.
- Train students to design, simulate, build, and test a robot manipulator.

Description :

Path and trajectory planning; Manipulator dynamics; Independent joint control; Force control; Geometric nonlinear control; Computer vision; Visual servo control; Fuzzy control; Robot control system design; Problem solving using up-

Course outcomes :

a. Knowledge and Understanding: :

1 -	Define different terms used in classic and Fuzzy Logic Control.
2 -	List different methods for path planning of manipulators.
3 -	Explain Different methods for control robot manipulators.
4 -	Describe manipulator dynamics and computer vision.

b. Intellectual Skills: :

1 -	Analyze manipulators' dynamics.
2 -	Calculate parameters for a smooth trajectory, and optimum parameters for classic and fuzzy controllers of manipulators.
3 -	Select suitable parameters for robot controllers.
4 -	Analyze the results of different controllers for manipulators.

c. Professional and Practical Skills: :

1 -	Analyze lab experimental results of control manipulators with different control methods.
2 -	Use the suitable hardware components and software for drafting and implementing a simple manipulator.

3 -	Apply knowledge of mathematics, science, information technology, design and engineering practice integrally to identify, formulate and solve engineering and field problems related to Robot manipulators.
4 -	Prepare technical reports and presentations.
d.General and Transferable Skills :	
1 -	Search for information and engage in life-long self-learning.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Path and trajectory planning	10	4	6
Manipulator dynamics; Independent joint control	8	4	4
Force control	8	4	4
Geometric nonlinear control	8	4	4
Computer vision; Visual servo control	10	6	4
Fuzzy control	8	4	4
Robot control system design	8	4	4

Teaching And Learning Methodologies :

Interactive Lecturing
Problem solving
Experiential learning
Discussion
Project
Research

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignment	5.00		
Final Exam	40.00		
Mid- Exam 1I	15.00		
Mid- Exam I	15.00		
Project	10.00		
Quizzes	10.00		
Research	5.00		

Course Notes :

2. Lecture notes on the course Moodle page, FUE website.

Recommended books :

3. Recommended Readings: S. B. Niku, "Introduction to Robotics, analysis, control, applications". John Wiley and Son, 2nd edition