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
Professor	Osama Esmail Mahmoud Esmail	1

Area Of Study :

This courseaims to:
  Introduce different methods for path planning for robot manipulators.
  Explain different methods for controlling robot manipulators, including Fuzzy
Logic Control.
  Enrich the student$s 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-to-date
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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 -	Analyse 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 -	Analyse the results of different controllers for manipulators.
c.Professional and Practical Skills: :	
1 -	Analyse 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.

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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 and present technical reports.

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
Assignments, Participation, & Quizzes	20.00		
Final Exam	40.00	16	
First Midterm Exam	15.00	6	
Project.	10.00		
Second Midterm Exam	15.00	11	

Recommended books :

S. B. Niku, "Intruduction to Robotics, analysis, control, applications".
John Wily and Son, 2nd edition