Faculty of Engineering & Technology

Special Topics in Mechatronics

Information :

Course Code :	MKT 599	**Level :**	Undergraduate	**Course Hours :**	2.00- Hours

Department : Specialization of Mechatronics Engineering

Area Of Study :

1. This course aims to:
ÅFamiliarize students with automated assembly line system as a mechatronics application in industry.
ÅTrain the students to operate, maintain, analyze, design and test an automated assembly production line process.
ÅTo introduce Hand Shaking (HS) signals for multy-stations production lines

Description :

Selected topics that meet student interests and reflect recent trends in one of the fields of mechatronics engineering. This offering considers automation of a production line. The process details of each station in a typical automated assembly line are considered with emphasis on sensors, control unit, actuators and communications of different stations with others. For practical training, the AMATROL system available at FUE Mechatronics lab is considered.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	a1. List the process steps in the AMATROL automated assembly stations.
2 -	a2. Explain the principal operations of the mechatronic subsystems in a complex system.
3 -	a3. Explain how these subsystems work together.
4 -	a4. List safety regulations required for operation of a typical modern automated system.
b.Intellectual Skills: :	
1 -	b1. Select the suitable sensors and actuators for a given process.
2 -	b2. Analyse the control process of a control system.
3 -	b3. Program mechatronics modules, especially PLCs.
4 -	b4. Program Multiple station control (Discrete I/O Handshaking)
c.Professional and Practical Skills: :	
1 -	c1. Operate the different stations of the AMATROL system
2 -	c2. Troubleshoot problems of the AMATROL system.
3 -	c3. Replace the defective item.
4 -	c4. Utilize the related technical documentations, reports and datasheets specific to the system and subsystems.
5 -	c5. Implement safety regulations required for operating the system.

d.General and Transferable Skills: :	
1 -	d1. Manage tasks, time, and resources.
2 -	d2. Search for information and engage in life-long self-learning discipline
3 -	d3. Collaborate effectively within multidisciplinary team.
4 -	d4. Refer to relevant literatures

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction		1	3
Stations and overview		1	3
Interfacing		1	3
Sensors and identification		1	3
Operation of modules and safety		1	3
PLC control of stations		1	3
Identifying the ladder control of stations		1	3
Robot arm and its control		1	3
Robot arm structure and sensors		1	3
Torqueing and storage stations		1	3
Indexing station		1	3
Project discussion		1	3
Project Presentation		1	3

Teaching And Learning Methodologies :

Interactive Lecturing
Problem solving
Experiential learning
Discussion
Brain storming
Project
Search

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
1st Midterm	15.00	6	
2nd Midterm	15.00	11	
Assignments, Participation, & Quizzes	10.00		
Final Exam	40.00		
Project.	20.00	13	

Course Notes :

Notes and Amatrol catalogue

Recommended books :

ÅAlciatore, David G.& Histand, Michael B.; ñIntroduction to Mechatronics and Measurement Systemò, McGraw Hill, 4th Edition, 2012
ÅAMATROL Technical Manuals No. 87(MS1-MS7), AMATROL CORPORATION, 2012