Module (Course Syllabus) Catalogue

2023-2024

College/ Institute	Erbil Technology College	
Department	Petroleum Technology	
Module Name	Measurement & Process Control II	
Module Code	MPC403	
Degree	Technical Diploma [x] Bachelor [ ] High Diploma [ ] Master [ ] PhD [ ]	
Semester	Third	
Qualification	MSc Electronic & control Engineering	
Scientific Title	Lecturer	
ECTS (Credits)	6	
Module type	Prerequisite [ ] Core [x] Assist. [ ]	
Weekly hours	4	
Weekly hours (Theory)	(2)hr Class	(64)Total hrs Workload
Weekly hours (Practical)	(2)hr Class	(98)Total hrs Workload
Number of Weeks	12	
Lecturer (Theory)	Brzo Aziz Qadir	
E-Mail & Mobile NO.	Brzo.qadir@epu.edu.iq	
Lecturer (Practical)	Abdulstar ahamad and Belan Nasradeen	
E-Mail & Mobile NO.		
Websites	www.Epu.edu.iq	

Course Book

Course Description	This course offers a more advanced discussion of control systems, introducing many modern control techniques, and implementation issues. In particular, students who successfully complete this course should have: • an exposure to modern control tools (e.g., observers, state variable feedback, internal model control) • a basic understanding of various factors which limit the achievable control system performance (e.g., time delays, non-minimum phase zeros) • experience in several lab implementations of control systems • initial exposure to various control implementation issues (e.g. Sampled data systems, Actuator saturation, Anti-windup schemes) • an initial exposure to more advanced topics (e.g., multivariable systems, pole assignment) • some knowledge of various case studies of successful modern control implementations • introduction to empirical modelling and system identification.				
Course objectives	The aim of the course is to give an introduction to the control system analysis and design. The purpose of the course is to introduce the nature of nonlinearities found in control systems both in the forward path and in the feedback path. Some times nonlinearities may be used to adjust the performance of the system. Students are expected to learn why standard methods of analysis and design in linear systems are not applicable in nonlinear system. Methods suitable for nonlinear systems are introduced and their applications are explored. An ability to apply knowledge of mathematics, science, and engineering An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.				
Student's obligation	The presence of students in both lectures and Lab will have additional credit .He /She is required to continuously follow the lectures ,Submits homework and reports .Anticipate Tests or quizzes any time in Class or Lab				
Required Learning Materials	Psychics ,Chemistry and Mat				
Evaluation	**Task**		**Weight (Marks)**	**Due Week**	**Relevant Learning Outcome**
	Paper Review				
	A	Homework	10		

		Class Activity			
		Report	10		
		Seminar	4		
		Essay			
		Project			
	Quiz		10		
	Lab.		10		
	Midterm Exam		16		
	Final Exam		40		
	Total				
Specific learning outcome:	1-Understanding of the essentials of Control system. 2- Understanding of the essentials of using Mtlab program in Control System. 3- Understanding of the essentials of Modeling and design of Control System. 4- The ability of a student use simulation program. 5-Using simulation program for experiment will be done in Lab.				
Course References:	R.C. Dorf, Modern Control Systems, Addison-Wesley, 5th (1989) or any later edition. J.J. D'Azzo and C.H. Houpis, Linear Control System Analysis and Design, McGraw-Hill, 3rd (1988) or any later edition. Ogata, K., Modern Control Engineering, Prentice-Hall, [2002] Hsu, J. C. & A. U. Meyer, Modern Control Principles and Applications, McGraw-Hill, [1968]				

Course topics (Theory)	**Week**	**Learning Outcome**
Introduction: definition and classification of systems, control systems.	1	Define control system
Transfer Function for second order control system	2	
Study of Stability of control system	3	
Time Response for second order control system	4	

Solve the practical examples for second order control system	5	
Study of Kp proportional controller	6	
Solve the practical examples for second order control system With Kp controller	7	Solve the practical examples
Study of PD proportional Derivative controller	8	
Solve the practical examples for second order control system With PD controller	9	
Study of PI proportional control	10	
Solve the practical examples for second order control system With PI controller	11	
Solve the practical examples for second order control system With PID controller	12	

Practical Topics	**Week**	**Learning Outcome**
Introduction and Control Basics Matlab software	1	Introduction of Matalb
Pole & Zeros	2	.
Time Response Second Order Control System	3	
Study Time Response Second Order Control System effect of increasing Wn	4	
Study Time Response Second Order Control System effect of increasing damping ratio	5	
Study Time Response Second Order Control System effect of connecting with Kp controller	6	
Study Time Response Second Order Control System effect of connecting with KD controller	7	
Study Time Response Second Order Control System effect of connecting with Ki controller	8	

Study Time Response Second Order Control System effect of connecting with Kp+KD controller	9	
Study Time Response Second Order Control System effect of connecting with Kp+KD+Ki controller	10	
Study Time Response Second Order Control System effect of connecting with PID controller	11	

Extra notes:

I will assess the students continuously through their activities in the class. Any student with thoughts about learning, and suggestions of different way of dealing with difficulties and problems will be very welcomed.
Showing relevant laboratory equipment, technical videos, and other academic activities are part of the course model.

External Evaluator

General evaluation of course objectives and content.

General evaluation of lectures/ Practical sessions.

General evaluation of lecturer.