MUTAH UNIVERSITY
Faculty of Engineering
Department of Electrical Engineering

Course Syllabus

Course Code	Course Name	Credits	Contact Hours
0401441	Automatic Control	3	3 T

INSTRUCTOR/COORDINATOR	
Name	Dr. Ziyad S. Almajali
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Office Hours	9:00-10:00 (Sun, Tues, Thurs)

TEXTBOOK	
Title	Modern Control Engineering
Author/Year/Edition	K. Ogata, 3rd Edition, Prentice Hall, 1997
Other Supplemental Materials	
Title	Control Systems Engineering
Author/Year/Edition	N.S. Nise, 6th Edition, John Wiley & Sons Inc., 2011

SPECIFIC COURSE INFORMATION

A. Brief Description of the Content of the Course (Catalog Description)

Introduction to control system terminology; mathematical modeling of physical systems; block diagram and signal flow diagram; performance of control systems; steady state error and basic control actions; stability analysis: Routh-Herwtiz criterion, root locus; frequency response stability methods: Bode plots Nyquist plots; stability analysis in frequency domain; compensation; analogue computer. ; Matlab and Simulink application in control.

B. Pre-requisites (P) or Co-requisites (C)

Signals and Systems (0401208) **(P)**

C. Course Type (Required or Elective)

Required

SPECIFIC GOALS

A. Course Learning Outcomes (CLOs)

By the end of this course, the student should be able to:

CLO1: Recognize and explain the difference between open-loop and closed-loop control systems [1].

CLO2: Derive input/output signal relationships in control systems using block diagrams [1].

CLO3: Analyze control systems in time and frequency domains [1].

CLO4: Check the stability of linear control systems [1].

CLO5: Design feedback control systems [2].

CLO6: Improve the performance of a control system through using methods learned in the course [1].

B. Student Learning Outcomes (SOs) Addressed by the Course

1	2	3	4	5	6	7
✓	✓					

BRIEF LIST OF TOPICS TO BE COVERED

List of Topics	No. of Weeks	Contact Hours
Course Introduction, and Introduction to Control Systems: History, system configurations, analysis and design objectives and design process	1	3
Modeling of Physical Systems	2	6
Reduction of Multiple Subsystem Block diagrams, signal flow graphs and Mason‘s law	1	3
Time Response Poles, zeros, and system response; First and second order system	2	6
Stability Routh-Hurwitz criterion	2	6
Steady-State Error Steady-state error and system type	2	6
Root Locus Techniques Sketching the root locus	2	6
PID Controller design and tunning	1	3
Frequency Response Techniques Bode plots, Nyquist diagram, Nyquist criterion, gain margin and phase margin	1	3
Total	*14*	*42*

EVALUATION		
Assessment Tool	**Due Date**	**Weight (%)**
Mid Exam	According to the university calendar	30
Course Work (Homeworks, Quizzes, Projects, …etc.)	One week after being assigned	20
Final Exam	According to the university calendar	50

ABET's Students Learning Outcomes (Criterion # 3)		
	Relationship to program outcomes	
ABET 1-7		**Engineering Student Outcomes**
1	√	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	√	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3		an ability to communicate effectively with a range of audiences.
4		an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5		an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6		an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7		an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.