جامعة المجمعة
Majmaah University

Course Specifications

Muharram 1437 H

Institution:	College of Engineering
Academic Department:	Electrical Engineering
Programme:	Electrical Engineering
Course:	Automatic Control Systems
Course Coordinator:	Dr. Abdullah Al-Ahmadi
Programme Coordinator:	Dr. Abdullah Almohaisen
Course Specification Approved Date:	…./ … / …… H

This form compatible with NCAAA 2013 Edition

A. Course Identification and General Information

1 - Course title:	Automatic Control Systems	Course Code:	EE 341
2. Credit hours:	(3,1,0)		
3 - Program(s) in which the course is offered:	Electrical Engineering		
4 – Course Language:	English		
5 - Name of faculty member responsible for the course:	Dr. Abdullah Al-Ahmadi		
6 - Level/year at which this course is offered:	Fall semester - Junior year		
7 - Pre-requisites for this course (if any): • Signals and Systems Analysis EE 221			
8 - Co-requisites for this course (if any): • None			
9 - Location if not on main campus: (.....)			

10 - Mode of Instruction (mark all that apply)

A - Traditional classroom	■	What percentage?	**100 %**
B - Blended (traditional and online)		What percentage?	**……. %**
D - e-learning		What percentage?	**……. %**
E - Correspondence		What percentage?	**……. %**
F - Other		What percentage?	**……. %**

Comments:

.....

B Objectives

What is the main purpose for this course?

This course is intended to lay a foundation for designing advanced control system. This course will help the students to understand mathematical modeling of physical systems, be able to understand time domain specification and steady state error and get familiar with the concept of Frequency domain analysis tool.

Briefly describe any plans for developing and improving the course that are being implemented:

There is no proposed text book in the course descriptions. I would like to propose following text book for EE341 course:
Modern Control Engineering by Ogata, 5th Edition, Prentice Hall

C. Course Description

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Control Systems- Closed-Loop Control versus Open-Loop Control, Modeling of Dynamic Systems: Transfer Function and Impulse Response Function	1	4
Modeling of Mechanical and Electrical, Fluid and Thermal Systems	3	12
Signal Flow Graphs	1	4
Transient and Steady-State Response Analyses: First, Second and Higher-Order Systems	2	8
Routh's Stability Criterion	1	4
Root-Locus Analysis: Root-Locus Plots- Positive-Feedback Systems- Conditionally Stable Systems- Control Systems Design by the Root-Locus Method	2	8
Frequency-Response Analysis: Bode Diagrams- Polar Plots Nyquist Stability Criterion- Stability Analysis- Closed-Loop Frequency Response	3	12
Control Systems Design by Frequency Response: Lead Compensation- Lag Compensation- Lag-Lead Compensation	2	8

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	**45**	**15**	**0**	**0**	**0**	**60**
Credit	**3**	**0**	**0**	**0**	**0**	**3**

3. Additional private study/learning hours expected for students per week.

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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	**.....**	.....	.....
2.0	**Cognitive Skills**		
2.1	**Use models of physical systems in forms suitable for use in the analysis and design of control systems**	**Lecture, small group work, research activities, lab demonstrations, projects and individual presentation**	**Standardized exams, Oral exams, Micro projects**
2.2	**Determine the time and frequency-domain responses of first and second-order systems.**		
2.3	**Determine the stability of control system**		
2.4	**Apply root-locus technique to analyze and design control systems.**		
3.0	**Interpersonal Skills & Responsibility**		
3.1			
4.0	**Communication, Information Technology, Numerical**		
4.1	**Demonstrate the fundamentals of feedback control systems.**	**Lecture, small group work, research activities, lab demonstrations, projects and individual presentation**	**Standardized exams, Oral exams, Micro projects**
4.2	**Solve system equations in state-variable form Determine the time and frequency-domain responses of first and second-order systems.**		
4.3	**Determine the stability of control system**		
4.4	**Apply root-locus technique to analyze and design control systems.**		
5.0	**Psychomotor**		
5.1	**.....**	.....	.....

5. Schedule of Assessment Tasks for Students During the Semester:

	Assessment task	Week Due	Proportion of Total Assessment
1	**First Exam**	7	20%
2	**Second Exam**	12	20%
3	**Final Exam**	15	40%
4	**Quizzes and Homework**	During Semester	20%
5	.....	.....	.....
6	.....	.....	.....
7	.....	.....	.....
8	.....	.....	.....

D. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

1. All students are distributed among academic advisors.
2. Advising Information are included in the student Guide and in the college website.
3. Every Advisor assignees 3 office hours for supporting the student academic counselling.

E. Learning Resources

1. List Required Textbooks:

- Katsuhiko Ogata. Modern Control Engineering 5th edition
- Benjamin C. Kuo. Automatic Control System 9th edition

2. List Essential References Materials:

- .....
- .....
- .....

3. List Recommended Textbooks and Reference Material:

- Norman S. Nise Control Systems Engineering 4th edition.
- .....
- .....

4. List Electronic Materials:

- .....
- .....
- .....

5. Other learning material:

- .....
- .....
- .....

F. Facilities Required

1. Accommodation • 25 seats in the classroom. • .....
2. Computing resources • Laptop • .....
3. Other resources • ..... • ..... • .....

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching: • Completion course evaluation questionnaire. • Classroom observations to measure student behavior through how well the student groups are interacting in-class activity and how well the in-class activity went.
2. Other Strategies for Evaluation of Teaching by the Program/Department Instructor: • Faculty Peer Assessment. • .....
3. Processes for Improvement of Teaching: • Plan: The instructor will develop a strategy for teaching • Do: The strategy will be implemented for one semester. • Study: The experiences of the students will be collected through a survey. • Act: Effective teaching strategies will be implemented and revised as more experiences are gained.
4. Processes for Verifying Standards of Student Achievement • Check marking of a sample of examination papers.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement: • Continuous improvement is a circular process, encompassing student assessment, course planning and design, implementation, evaluation, and revision. • A feedback from all relevant assessment tools must be considered in the continuous process of course objectives refinement and assessment.

- Continuous process for reviewing feedback from student on the quality of the course and
- planning for improvement.

Course Specification Approved
Department Official Meeting No (…..) Date … / …. / ….. *H*

Course's Coordinator		Department Head	
Name :	.....	***Name :***	.....
Signature :	.....	***Signature :***	.....
Date :	…./ … / …… *H*	***Date :***	…./ … / …… *H*