

ATTACHMENT 5.

Kingdom of Saudi Arabia

**The National Commission for Academic Accreditation &
Assessment**

**T6. Course Specifications
(CS)**

Course Specifications

Institution	Date
Faculty of Engineering-Najran University	24-05-1438H
College/Department	

A. Course Identification and General Information

1. Course title and code: Automatic Control Laboratory		324EE-3
2. Credit hours: 3 (3 , 0 , 1)		
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Electrical Engineering Program		
4. Name of faculty member responsible for the course: Prof. Dr. A. M. Abdel-Hamid		
5. Level/year at which this course is offered: 08		
6. Pre-requisites for this course (if any): 323EE-3 Automatic Control Laboratory		
7. Co-requisites for this course (if any): None		
8. Location if not on main campus		
9. Mode of Instruction (mark all that apply)		
a. traditional classroom	<input type="checkbox"/>	What percentage? <input type="checkbox"/>
b. blended (traditional and online)	<input type="checkbox"/>	What percentage? <input type="checkbox"/>
c. e-learning	<input type="checkbox"/>	What percentage? <input type="checkbox"/>
d. correspondence	<input type="checkbox"/>	What percentage? <input type="checkbox"/>
f. other	<input type="checkbox"/> Yes	What percentage? <input type="checkbox"/> 100%
Comments: Automatic control Lab		

B Objectives

1. What is the main purpose for this course?

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

- 1. It is concerned with modern control techniques.*
- 2. Student learns how to run Experiments include system identification, dynamic analysis of control systems with application to level, temperature, flow and pressure controls, PID tuning, and typical process control systems.*

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

A development has been legalized such that an additional one hour is added to give chance for more experiments on the course topics.

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description:

Experiments to support control theory using physical processes (e.g. water level, temperature control, light intensity control, etc); Control system simulation using Matlab; Modeling of physical (experimental) equipment; Static performance; Transient analysis; Measuring devices; Two-position control; Proportional control; PID control;

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
<i>Introduction to the Computer-Aided Design Package MATLAB</i>	Week 1, 2 (4 hours)	(4 hours)
<i>Simulation of a Prototype Second Order System</i>	3 (2 hours)	(2 hours)
<i>Real-Time Simulation of the Second Order System using Cassy-Lab</i>	4, 5, 6 (6 hours)	(6 hours)
<i>Unit Step Response of Proportionate, Integrator and Differentiate Controller</i>	7, (2 hours)	(2 hours)
<i>PID Controller</i>	8, 9 (4 hours)	(4 hours)
<i>Air Flow Control</i>	10, 11 (4 hours)	(4 hours)
<i>Light Intensity Control</i>	12, (2 hours)	(2 hours)
<i>Temperature Control</i>	13 (2 hours)	(2 hours)
<i>Control water level and flow rate</i>	14 (2 hours)	(2 hours)

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	15	15	-	-	-	30
Credit	1	1	-	-	-	2/week

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

1

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Analyze the control system using MATLAB simulation tools.	Lab., tutorials	quiz, practice, final exam homework
1.2	Analyze the control system using Cassy-Lab real-time simulation tools.	Lab., homework, discussion, practice,	final exam, assignments
1.3	Analyze PID and two-position controller.	Lab.	quiz, practice, final exam, homework, assignments
1.4	Verify modern control concepts	Lab.	discussion, practice, final exam, homework, assignments
2.0	Cognitive Skills		
2.1	Analyze a control system in both Time domain and Frequency domain	Lectures, discussion rounds, homework, tutorials, assignments	Quizzes, Midterm Exams, Computer Homework, Final exam
2.2	Construct the state-space model	Lectures, discussion rounds, homework, tutorials, assignments	Quizzes, Midterm Exams, Computer Homework, Final exam
2.3	Evaluate the control system stability	Lectures, discussion rounds, homework, tutorials, assignments	Quizzes, Midterm Exams, Computer Homework, Final exam
3.0	Interpersonal Skills & Responsibility		

3.1	Conduct collaborative and peer-to-peer coaching sessions which enhance team work skills.	More tutorials to enhance the students hands – on experience related to solving lecture topic exercises.	Record the attendance of the students every lecture. Midterm and Final term exams Assess the group Assignment.
3.2	During the lab hours students has to act responsible and ethical behavior	More tutorials to enhance the students hands – on experience related to solving lecture topic exercises.	Record the attendance of the students every lecture. Midterm and Final term exams Assess the group Assignment.
4.0	Communication, Information Technology, Numerical		
4.1	Record the students' attendance. Quizzes, Mid Terms and final exams.	Invite the students to benefit from the office hours to ask more about their subject.	Ability to formulate different problems and provide solutions
4.2			
5.0	Psychomotor		
5.1			
5.2			

	5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)										
Course LOs #	Program Learning Outcomes (Use Program LO Code #s provided in the Program Specifications)										
	a	b	c	d	e	f	g	h	i	j	k
Analyze the control system using MATLAB simulation tools.	√	0	0	0	√	0	√	0	0	0	√
Analyze the control system using Cassy-Lab real-time simulation tools.	√	√	0	√	0	0	0	0	0	0	√
Analyze PID and two-position controller.	√	0	0	0	√	0	0	0	0	0	√
Verify modern control concepts	√	√	0	√	0	0	0	0	0	0	√

[illegible]

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Quizzes	Every two chapters	10 %
2	First Mid-Term exam	Week 6	20 %
3	Lab Reports	Week 12	20 %
4	Final Term exam	At the end of the semester as determined by the academic calendar	50 %
5			
6			
7			
8			

1. 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)

- **Teaching staff are available weekly for all the students and can answer any question that rises, besides, the students can email their enquiries to the main lecturer. Beside students have Open general discussions with other class mates.**
- **2 hours per week and can be arranged according to the student needs.**

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E Learning Resources

Modern Control Systems, by Richard C. Dorf and Robert H. Bishop, Pearson Education, 2008.
1.Modern Control System Theory and Design 2nd edition, Stanley Shinner, Interscience, 1998.
2. Automatic Control Systems, Benjamin Kuo, Prentice-Hall, 2002.
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
http://ctms.engin.umich.edu/CTMS/index.php?aux=Home
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.
Lab room hall for 15 students

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
Very efficient
2. Computing resources (AV, data show, Smart Board, software, etc.)
Cassy Lab beside Own Laptops if necessary
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
none

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
<i>After every assessment exam students will be informed about their scores and a feedback about their satisfactory and weaknesses is discussed.</i>
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department
<i>none</i>
3 Processes for Improvement of Teaching
<ul style="list-style-type: none"> • <i>Learning form students feedback</i> • <i>Learning from instructor and department feedback</i> • <i>Learning/Using various teaching methods (lecturing, discussions, workshops, exams...)</i> • <i>Learning/Using various teaching medias (projector, whiteboard, videos, educational visits)</i> <p>In case of student complaints more tutorials will be provided and re-explanations of difficult topics would be repeated.</p> <p><i>Checking students' results by another teaching staff member through reviewing the assessment samples during the semester in order to verify the students' results.</i></p>
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Name of Instructor: Prof. dr. a. M. Abdel-Hamid

Signature: _____ Date Report Completed: 24.05.1438H

Name of Course Instructor: Prof. dr. a. M. Abdel-Hamid

Program Coordinator: -----

Signature: _____ Date Received: _____