هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Instrumentation & Control Lab
Course Code:	EE 1463
Program:	Electrical Engineering
Department:	Electrical Engineering
College:	College of Engineering
Institution:	Imam Mohammad Ibn Saud Islamic University
Version:	V5
Last Revision Date:	01-01-2025

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (1)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (8th level, 4th year)					
4. Course general Description:					
An introduction to Lab View, Tutorials and Programing aspect from control systems view point. Linear Time-invariant Systems and Representation, Block Diagram Reduction, performance characteristics of first and second order systems, Effect of Feedback on disturbance and Control System Design, Building a VI and modifying signals in Lab View, Exercises in Lab View, Use The NI USB-6009 for data acquisition and Digital Input / Output.					
5. Pre-requirements for this course (if any)**:**					
EE 1461, EE1231					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
Upon completion of this course, the student will: • be able to Build a virtual instrument and modify signals using Labview • be able to use Labview to simulate basic control system • be able to use The NI USB-6009 Device for data acquisition • be able to use commands in Labview and study the performance characteristics of first and second order systems • be able to analyze and simulate feedback control systems.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%
2	E-learning	-	-
3	Hybrid	-	-

No	Mode of Instruction	Contact Hours	Percentage
	• Traditional classroom • E-learning		
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	-
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		30

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
K1	Apply Mathematical and scientific principles to apply for control systems and Labview experiments	1.1	Delivering Lectures Reading Manual Performing Experiments	Quizzes in class Midterm exam Final exam
2.0	**Skills**			
S1	Labview Software Operation	2.3	Performing During Experiment.	Final practical Exam Mid Practical Exam
S2	Lab procedure with correct methods	6.2	Performing During Experiment.	Final practical Exam Mid Practical Exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
S2	Select appropriate instruments	6.4	Delivering Lectures Reading Manual Performing Experiments	Midterm exam Final exam
S2	Labview is a Simulation of real time system	6.6	Applying During Experiment Writing in report	Report Writing
3.0	**Values, autonomy, and responsibility**			
V1	Put results as graphs or tabular forms	3.3	Report writing	Report Evaluation

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Lab View	2
2	Building a virtual instrument in LabVIEW	2
3	Using loops and Modifying Signals	2
4	Waveform graphs and Error clusters	2
5	State Machine	2
6	Data Acquisition using NI LEVIS 5	2
7	Traffic Light and control Tank Level	2
8	Digital Input / Output through LabVIEW	2
9	Temperature measurement using NI LEVIS 5 and Thermistor	2
10	Introduction to Control Design and Simulation	2
11	Construction of Open-loop Block diagram	2
12	Construction of Closed-loop Block diagram	2
13	Closed-loop Control with DC motor	2
14	Proportional–integral–derivative controller	2
15	Review of experiments	2
16	Final Exam	2
Total		**34**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm 1	8th week	20%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
2.	Reports	Every week	20%
3.	PreLab Quiz	Weekly	10%
4.	Quiz	6th Week	10%
5.	Final Exam	Final Exam week	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Lab manual Given by University 1. LabView 2009 Student Edition Robert Bishop Prentice Hall 2010. 2. Automatic Control Systems Farid Golnaraghi, Benjamin C. Kuo
Supportive References	Given by teacher at different time during the course.
Electronic Materials	Computer animations supplied by the instructor.
Other Learning Materials	Using Softwares is Encouraged for Simulation Purpose other than that of Lab.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	SR 136 in Lab Room with 10-15 Students per Section
Technology equipment (projector, smart board, software)	Lab Equipment, Computers, Internet connection, Blackboard LMS software, data-show, and white board.
Other equipment (depending on the nature of the specialty)	Provided in the lab.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect
Effectiveness of Students assessment	Students	Indirect
Quality of learning resources	Relevant Focus Group	Indirect
The extent to which CLOs have been achieved	Dept. Quality Committee	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	