2023
TP-153

Course Specification
(Bachelor)

Course Title:	Electronic Devices and Applications
Course Code:	EE1321
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: (3)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (5th level, 3rd year)					
4. Course general Description:					
Multistage amplifiers. Differential Amplifiers. Digital logic families (ECL, and CMOS circuits). Operational Amplifiers. Linear and nonlinear op amp applications. Non-ideal characteristics of Op Amps., Amplifier frequency Response, Oscillators. Active filters.					
5. Pre-requirements for this course (if any)**:**					
EE1224					
6. Co-requisites for this course (if any)**:**					
--					
7. Course Main Objective(s):					
• Analyze and design ECL and CMOS logic gates. • Analyze and determine the characteristics of the basic differential and multistage amplifiers. • Design several ideal op-amp circuits with given design specifications. • Analyze and understand the characteristics of the inverting, summing, and noninverting operational amplifier, including the voltage follower or buffer. • Analyze non-ideal properties such as common-mode rejection effects. • Analyze the frequency response of amplifiers. • Analyze and design active filters and oscillators.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	-
3.	**Field**	-
4.	**Tutorial**	15
5.	**Others (specify)**	-
Total		60

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	Calculate correctly different parameters for various op-amp circuits	1.3	Lectures and tutorials	Quiz and exams
K1	Develop the general frequency response characteristics of amplifiers	1.5	Lectures and tutorials	Quiz and exams
K1	Analyze differential amplifier circuits	1.6	Lectures and tutorials	Quiz and exams
2.0	**Skills**			
S1	Analyze and design active filters, oscillators, and Schmitt trigger circuits	2.5	Lectures and tutorials	Quiz and exams
S1	Analyze and design CMOS logic gates, ECL circuits, and multistage amplifiers	2.2	Lectures and tutorials	Quiz and exams
3.0	**Values, autonomy, and responsibility**			
V1 / V3	Illustrate using new technologies: - Word / Power point in preparing their reports / oral presentation	3.4 / 5.3	Prepare report / presentation using computer	Report / presentation

C. Course Content

No	List of Topics	Contact Hours
1	Course description, objectives, and content – Textbook and extra useful resources – Marks distribution – Policy	2
2	Digital logic families	8
3	Differential and multistage amplifiers	5
4	Operational Amplifiers (ideal/non-ideal – applications – differential stage– output stages)	15
5	Op Amp frequency response	10
6	Active filters	10
7	Oscillators	10
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Exam	6th week	30%
2.	Homework / Exercises / Class Attendance	All semester	5%
3.	Quizzes	All semester	10%
4.	Project (Report) / Oral presentation	Week 10	15%
5.	Final Exam	As per University schedule	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	1- A. S. Sedra and K. C. Smith, Microelectronic Circuits, 7th Ed., Oxford University, 2015.
Supportive References	2- D. A. Neamen, Microelectronics: Circuit Analysis and Design, 4th Ed., Mc Graw Hill, 2010. 3- T. L. Floyd, Electronic Devices: Electron Flow Version, 9th Ed., Prentice Hall (Pearson Education Inc.), 2012. 4- R. C. Jaeger and T. N. Blalock, Microelectronic Circuit Design, 4th Ed., Mc Graw Hill, 2011. 5- R. Boylestad and L. Nashelsky, Electronic Devices and Circuit Theory, 7th Ed., Prentice Hall. 6- M. Tooley, Electronic Circuits: Fundamentals and Applications, 3rd Ed., Elsevier Ltd., 2006.

Electronic Materials	Computer animations and online resources supplied by the instructor.
Other Learning Materials	Different Online sites.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	One classroom: fits up to 25 students with white board.
Technology equipment (projector, smart board, software)	A laptop computer connected to a projector to display PowerPoint presentations
Other equipment (depending on the nature of the specialty)	N/A

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	