



Course Specification

— (Bachelor)

Electronic Circuits

Course Code: CEN1404

Program: Bachelor in Computer Engineering

Department: Computer Engineering

College: Faculty of Computers and Information Technology

Institution: University of Tabuk

Version: 1.0

Last Revision Date: 27 July 2022



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A. General information about the course:

1. Course Identification

1. Credit hours: (4)

2. Course type

- A. University College Department Track Others
- B. Required Elective

3. Level/year at which this course is offered: (7/4)

4. Course general Description:

This course explores the fundamental concepts of electronic circuits. Content includes Principles, analysis and applications of diodes, bipolar junction transistors and field-effect transistors. Amplifier concepts (types, equivalent circuit, gain, frequency response etc.). Review of op-amps and discussion of non-idealities. Introduction to active filters, resonant circuits, and other circuits.

5. Pre-requirements for this course (if any):

Electronic Devices CEN 1304

6. Co-requisites for this course (if any):

7. Course Main Objective(s):

1. Differentiate between the different types of transistor amplifiers
2. Define, analyze and solve problems related to transistor circuits.
3. Design electronic circuits and subsystems.
4. Describe the external characteristics of operation amplifiers (op-amps)
5. Design and analyze the operation of linear ICs and linear analog building blocks using op-amps.
6. Study and design the timing circuits, filters, and oscillators
7. Study and design the transistor circuits such as frequency response, multistage amplifiers, Darlington Pair Circuits, amplifier classes.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100%
2	E-learning		



No	Mode of Instruction	Contact Hours	Percentage
3	Hybrid <ul style="list-style-type: none"> • 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	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		75

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

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	State basics of electronic circuits and their engineering application	K1,K2	Lectures, sessions	Lab Class Works, Assignments, Exams, Lab work
1.2	Identify the fundamentals of analog and digital circuit design	K1,K3,K5	Lectures, sessions	Lab Class Works, Assignments, Exams, Lab work
1.3	Describe the basic structure of Op-Amp and the circuit applications using op-amp	K2,K3,K5	Lectures, sessions	Lab Class Works, Assignments, Exams, Lab work



Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies		Assessment Methods
1.4	Describe a complete electronic circuit system using a top-down approach which starts from system specifications	K1,K4	Lectures, sessions	Lab	Class Works, Assignments, Exams, Lab work
2.0	Skills				
2.1	Analyze models for electronic circuits	S3, S4	Lectures, sessions	Lab	Class Works, Assignments, Exams, Lab work
2.2	Interpret and summarize electronic circuits problems and search for optimized solutions	S4	Lectures, sessions	Lab	Class Works, Assignments, Exams, Lab work
2.3	Design and develop electronic circuits for engineering systems applications.	S2, S3	Lectures, sessions	Lab	Exams, Lab work
3.0	Values, autonomy, and responsibility				
3.1	Demonstrate the effectiveness of Teamwork	V2	Lectures, sessions	Lab	Class Works, Lab work.

C. Course Content

No	List of Topics	Contact Hours
1.	<ul style="list-style-type: none"> Bipolar Junction Transistor (Biasing) Biasing Review Lab: design of emitter bias, base bias, collector bias, voltage divider bias and feedback bias circuits 	5
2.	<ul style="list-style-type: none"> BJT Amplifier Circuits, single stage and multistage amplifiers Lab: design of common emitter, common base and common collector amplifier circuits 	5
3.	<ul style="list-style-type: none"> Amplifier classes and configurations Lab: design and study of class A, class B, class C and class AB amplifiers 	5
4.	<ul style="list-style-type: none"> Cascade and Cascode amplifiers Lab: design of Cascade and Cascode amplifiers 	5
5.	<ul style="list-style-type: none"> Differential amplifiers Lab: design of dual input-dual output, dual input-signal output, single input-dual output and single input- single output amplifiers 	5
6.	<ul style="list-style-type: none"> Amplifiers Frequency response curve (mid gain, 3dB, high and low cut off frequencies, centre and geometric frequencies Lab: Design of CE and CB frequency response curve 	5
7.	<ul style="list-style-type: none"> Amplifiers Frequency response curve (mid gain, 3dB, high and low cut off frequencies, centre and geometric frequencies 	5



	<ul style="list-style-type: none"> Lab: Design and study of CC frequency response curve and characteristics 	
8.	<ul style="list-style-type: none"> Junction Field-Effect Transistor (JFET) and MOSFET transistors Biasing, and configurations, Review Lab: Design and study the characteristics of CS, CG, and CD circuits 	5
9.	<ul style="list-style-type: none"> Introduction to operation amplifiers Lab: design of inverting, non-inverting and summing amplifier circuits 	5
10.	<ul style="list-style-type: none"> Analysis and Design of Op-Amp Circuits Lab: design of integrator, differentiator and logarithmic amplifiers 	5
11.	<ul style="list-style-type: none"> Op-Amps applications Lab: design of adders, subtractors and instrumentation amplifiers 	5
12.	<ul style="list-style-type: none"> Introduction to timing circuits and oscillators Lab: introduction to design of timing circuits using 555 timer and crystal oscillators 	5
13.	<ul style="list-style-type: none"> Design and applications of Monostable, a stable and Bistable Multivibrators Lab: Design and study the characteristics of multivibrators circuits 	5
14.	<ul style="list-style-type: none"> Introduction to Filters, Filters Application, Design, and Implementation Lab: Design and study the characteristics of LPF, HPF, BPF and BSF circuits 	5
15.	<ul style="list-style-type: none"> Introduction to Linear ICs design Lab: investigate the basic of Linear IC design (simulation) 	5
Total		75

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments, Quizzes, Lab work, Class Works	1-15	30%
2.	First Midterm Exams.	7 - 8	15%
3.	Second Midterm Exam	11-13	15%
4.	Final Semester Exam	14-16	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	<p>Thomas L. Floyd and David Buchla, Fundamentals of Analog Circuits, 2/E, Pearson India Education, 2012, ISBN-10: 9788131787960, ISBN-13: 978-8131787960.</p> <p>David Buchla, Laboratory Exercises for Fundamentals of Analog Circuits, 2/E, Pearson higher Education, 2002, ISBN-10: 0130606731, ISBN-13: 9780130606730</p>
Supportive References	<ul style="list-style-type: none"> · Won Y. Yang, MATLAB and Spice for Electronic Circuits by, 2/E, SURYA INFOTAINMENT PRODUCTS, 20142, ISBN-10: 9788192715957, ISBN-13: 978-8192715957. · LAB Manual.
Electronic Materials	<ul style="list-style-type: none"> · Faculty member's sites · http://www.freebookcentre.net/Electronics/Electronic-Circuits-Books.html. · http://www.mathworks.com/matlabcentral/fileexchange/40988-matlab-and-pspice-for-electronic-circuits
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom, laboratory
Technology equipment (projector, smart board, software)	White board, Data show projector
Other equipment (depending on the nature of the specialty)	TBA

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Teaching	Faculty, Program Leaders, and Advisory Board	Both Direct and Indirect
	Students	Indirect
Effectiveness of Students Assessment	Faculty, Program Leaders, Advisory Board, and Independent Opinion	Both Direct and Indirect
Quality of Learning Resources	Faculty, Students, and Advisory Board	Indirect





Assessment Areas/Issues	Assessor	Assessment Methods
The Extent to which CLOs have been Achieved	Faculty, Program Leaders, Advisory Board, and Independent Opinion	Direct (as in section B) and Indirect/Surveys
	Students	Indirect
Other	-	-

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

