

Course Title:	Analog Electronic
Course Code:	CSE121
Program:	Master Degree In Computer Engineering
Department:	Computer Engineering
Course coordinator:	Dr. Slim AWALI
Institution:	Private Higher School of Engineers of Gafsa (ESIP)

A. Course Identification

1. Credit hours:	1.5(1-0.5-0)
2. Course type	
a. College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>	
b. Fundamental <input checked="" type="checkbox"/> Transversal <input type="checkbox"/> Optional <input type="checkbox"/>	
3. Level/year at which this course is offered:	1.1/3
4. Pre-requisites for this course:	Master the manipulation of complex numbers, Basic electrical circuits, Mathematics

1. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Self-study	Total workload
1	Traditional classroom	14.5	37
2	Blended	22.5		
3	E-learning		
4	Distance learning		
5	Other ()		

2. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	15
2	Laboratory/Studio	-
3	Tutorial	7,5
4	Others (specify)	-
	Total	22,5

B. Course Objectives and Learning Outcomes

Course Description

This course introduces the fundamentals of analog electronics, focusing on essential components and circuit behavior. Topics include quadrupoles, electrical filters, P-N junction diodes, bipolar transistors, and operational amplifiers. Students will learn to analyze, design, and troubleshoot analog circuits, gaining a strong foundation for applications in signal processing, communication, and control systems.

Course Main Objective

This course aims to:

- ✓ Introduce the fundamental principles of analog electronics, including basic electronic components and circuit behavior.
- ✓ Explain the operation of P-N junction diodes and bipolar transistors, focusing on their applications in rectifiers, amplifiers, and switching circuits.
- ✓ Analyze and design electrical filters and quadrupole networks for signal processing and frequency selection.
- ✓ Understand the characteristics and functions of operational amplifiers (Op-Amps) in linear and non-linear circuit applications.
- ✓ Develop problem-solving skills by applying circuit analysis techniques to real-world analog electronic systems

1. Course Learning Outcomes

CLOs		Aligned PLOs
	Knowledge and understanding	
1.1	✓ Understand the fundamental principles of analog electronics, including circuit components and behavior.	PLO.K1
1.2	✓ Explain the operation and applications of P-N junction diodes and bipolar transistors.	
	Skills	
2.1	✓ Apply critical thinking to solve complex problems in analog circuit analysis and design.	PLO.S1
2.2	<ul style="list-style-type: none"> ✓ Evaluate the performance and efficiency of analog circuits in real-world applications. ✓ Analyze and design electrical filters and quadrupole networks for signal processing. 	PLO.S5

C. Course Content

No	List of Topics	Contact Hours
Module 1	Basics of electronics	5
Module 2	Quadrupoles and electrical filters	5
Module 3	The P-N junction and the diode	4.5

Module 4	Bipolar transistors	4
Module 5	Operational amplifier	4
Total		22,5

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding		
PLO.K1	<ul style="list-style-type: none"> ✓ Understand the fundamental principles of analog electronics, including circuit components and behavior. ✓ Explain the operation and applications of P-N junction diodes and bipolar transistors. 	<ul style="list-style-type: none"> - Lecturing - Group work - discussion 	Exams
2.0	Explain the operation and applications of P-N junction diodes and bipolar transistors.		
PLO.S1	<ul style="list-style-type: none"> ✓ Apply critical thinking to solve complex problems in analog circuit analysis and design. 	<ul style="list-style-type: none"> - Lecturing - Group work - discussion 	Exams,
PLO.S5	<ul style="list-style-type: none"> ✓ Evaluate the performance and efficiency of analog circuits in real-world applications. 	<ul style="list-style-type: none"> - Lecturing - Group work - discussion 	Exam
PLO.K1, PLO.S5	<ul style="list-style-type: none"> ✓ Analyze and design electrical filters and quadrupole networks for signal processing. 		

2. Assessment Tasks for Students

	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Practical Work (written or oral)	Weekly	00 %
2	Quizzes, Homework assignments	Random	00 %
3	First mid Term	8	00%
4	Final Exam	16th	100 %

E. Student Academic Counselling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:
1- Office hours 2- Blackboard interface

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ol style="list-style-type: none"> 1) Albert Paul Malvino & David J. Bates – <i>Principles of Electronics : Courses and Corrected Exercises</i>, Sciences Sup Collection - Engineering Sciences, Dunod Edition, 2016 (8th Edition). 2) Gilles Choisy – <i>Electronics: Course Summary and Corrected Problems</i>, Edition Ellipses, 2003. 3) Sedra & Smith – <i>Microelectronic Circuits</i>, Oxford University Press, 2003 (5th Edition). 4) Sergio Franco – <i>Design with Operational Amplifiers and Analog Integrated Circuits</i>, ISBN: 0-07-120703-1.
Essential References Materials	N/A
Electronic Materials	<ul style="list-style-type: none"> ▪ MIT OpenCourseWare (OCW) – <i>Analog Circuits & Electronics Courses</i> <ul style="list-style-type: none"> • https://ocw.mit.edu ▪ All About Circuits – <i>Online Tutorials & Simulation Tools for Analog Electronics</i> <ul style="list-style-type: none"> • https://www.allaboutcircuits.com ▪ Texas Instruments (TI) Learning Center – <i>Operational Amplifiers and Analog IC Design Resources</i> <ul style="list-style-type: none"> • https://www.ti.com ▪ Electronics Tutorials – <i>Concepts of Filters, Amplifiers, and Circuit Design</i> <ul style="list-style-type: none"> • https://www.electronics-tutorials.ws
Other Learning Materials	<ul style="list-style-type: none"> ▪ Horowitz, P. & Hill, W. – <i>The Art of Electronics</i>, Cambridge University Press, 2015 (3rd Edition). ▪ Rashid, M. H. – <i>Microelectronics Circuits: Analysis and Design</i>, Cengage Learning, 2016 (2nd Edition).

2. Facilities Required

Item	Resources
Accommodation	Classroom board
Technology Resources	Data projector

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment.	Students, course coordinator, Alumni, Employers	Direct/Indirect
Extent of achievement of course learning outcomes.	Faculty, Program Leaders, quality department	Direct
Quality of Learning resources	Faculty, Program Leaders,	Direct, Indirect

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Teaching and learning quality and effectiveness.	Students, Faculty Program Leaders,	Direct, Indirect

H. Specification Approval Data

Council / Committee	Computer Engineering Council
Date	11/09/2023

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