KU3DSCELE204: Analog Circuits

Semester	Course Type	Course Level	Course Code		Credits (L+T+P)	Total Hours (L+T+P)
3	Minor	200	KU3DSCELE204		3+0+1	45+0+30
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical	Tutorial	CE	ESE	Total	
3	2	0	35	65	100	2

Course Description:

This course aims to develop knowledge about analog circuits. The course covers BJTs, FETs, MOSFETs, amplifiers, and oscillators. Practical sessions are also included in this course.

Course Prerequisite: Understanding of fundamental electronic components and concepts, familiarity with circuit analysis techniques.

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Explain the working of BJTs, FETs, Amplifiers and oscillators	U
2	Design biasing circuits for BJT	C
3	Design single stage BJT amplifier	C
4	Comparison of positive feedback and negative feedback	U
5	Design and develop oscillator circuits	C

****Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create ©***

Mapping of Course Outcomes to PSOs							
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3						
CO 2		**3**		**3**			
CO 3		**3**		**3**			
CO 4	3						
CO 5		3		**3**			3

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	**UNIT**	**DESCRIPTION**	**HOURS**
1	**Module I**		**10**
	1.1	Bipolar Junction Transistor (BJT) symbol, types (NPN and PNP), construction, working principle,parameters	
	1.2	BJTamplification,BJT switching, Transistor configurations- CB, CE and CC , characteristics	
	1.3	DC load line (CE), Q point, factors affecting the stability	
	1.4	Biasing circuits-fixed bias, emitter feedback bias , voltage divider, thermal stability	
2	**Module II**		**10**
	2.1	AC analysis, Coupling and byepass capacitors, AC load line and equivalent circuits	
	2.2	Transistor models – RE model Hybrid equivalent circuits	
	2.3	CE circuit analysis, - Small signal amplifier, Design of single stage RC Coupled amplifier	
	2.4	Comparison of small signal and large signal amplifiers	

3	**Module III**		**10**
	3.1	Construction, working principle,Symbol, types, V-I characteristics, Specifications and parameters of Junction Field Effect Transistor (JFET)	
	3.2	Construction, working principle,Symbol, types, V-I characteristics, Specifications and parameters of Metal Oxide Semiconductor FET (MOSFET)	
	3.3	MOSFET Based practical switching circuits	
	3.4	Comparison of JFET, MOSFET and BJT, Applications	
4	**Module IV**		**10**
	4.1	Concept of negative and positive feedback	
	4.2	Comparison and applications	
	4.3	Effect of negative feedback: on amplifier performance	
	4.4	Positive feedback: oscillator circuits -Wien bridge , Phase Shift	
5	**Teacher Specific Module**		**5**
	Directions: Teacher can design this module based on their expertise and demand from the students		

Space to fill the selected

Essential Readings:

1. Electronic Devices and Circuits: David A Bell, Oxford University Press 5th edition

2. A text book of Applied Electronics : R. S. Sedha, S Chand Company Ltd

Suggested Readings:

· Basic Electronics Solid state : B. L. Theraja, S Chand Company Ltd, 5 th edition

- A text book of Electrical Technology: B.L.Theraja, S.Chand and Co.
- Basic Electronics and Linear Circuits: Bhargava N.N., Kulshreshtha D.C., TMH
- Electronic Devices and Circuits: Bolyestad, TataMcGraw Hill.
- Electronic Principles: Albert Malvino, David J Bates, McGraw Hill 7th Edition.

Laboratory Sessions : Practical sessions to reinforce theoretical concepts

1 : V-I Characteristics of the CE configuration of BJT

2 : Design Transistor Biasing circuits (Fixed and voltage divider bias) for a given specification

3: Design a single stage CE amplifier for a given gain

4: Design BJT as switch

5: Design a FET based switching circuit

6 : Design phase shift oscillator

7: Design Wein bridge oscillator

Each laboratory experiment should be accompanied by a detailed lab note containing theoretical background, experimental procedures, circuit diagrams, program listings, and expected outcomes.

Assessment Rubrics:

	Marks
End Semester Evaluation	**65**
Continuous Evaluation	**35**