

25UEEL306	ELECTRONICS CIRCUITS LAB	Category	L	T	P	R	Credit	Year of Introduction
		PCL	0	0	3	0	2	2025

Preamble: This laboratory course provides practical exposure to fundamental analog electronic circuits using discrete components and integrated circuits. Students construct, test and analyze waveform shaping circuits, amplifier circuits, Op-Amp applications, oscillators and timer IC circuits.

Prerequisite: 25UEET303 Electronic Devices and Circuits

Course Outcomes: After the completion of the course, the student will be able to:

CO	Course Outcomes	Knowledge Level
CO1	Perform waveform shaping and signal measurement using diode circuits and CRO	K3 Apply
CO2	Implement and demonstrate various op-amp based waveforms in linear applications	K3 Apply
CO3	Construct and demonstrate Op-Amp based nonlinear and oscillator circuits.	K3 Apply
CO4	Implement and examine timer-based multivibrator circuits using 555 IC	K3 Apply

Mapping of course outcomes with program outcomes and program specific outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	2	2	2	1	-	-	-	2	2	1	3	2
CO2	3	3	3	2	1	-	-	-	2	2	1	3	3
CO3	3	3	3	2	1	-	-	-	2	2	2	3	3
CO4	3	2	3	2	1	-	-	-	2	2	2	3	3
Avg	2.75	2.5	2.75	2	1	-	-	-	2	2	1.5	3	2.75

Mapping of course outcomes with Knowledge and Attitude Profile (WK)

	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
CO1	*	*	*	*	*	*	-	*	-
CO2	*	*	*	*	*	*	-	*	-
CO3	*	*	*	*	*	*	-	*	-
CO4	*	*	*	*	*	*	-	*	-

WKs Mapped with the course

WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
*	*	*	*	*	*	-	*	-

SYLLABUS EXPERIMENT LIST

(Any 10 experiments are mandatory)

FAMILIARISATION

Measurement of current, voltage, frequency and phase shift of signal in a RC network using oscilloscope.

1. Clipping circuit using diodes.
2. Clamping circuits using diodes.
3. Design and set up of inverting and non-inverting amplifier.
4. Op-amps circuits - integrator, and differentiator.
5. Summing and Difference amplifier using Op-amp.
6. Precision rectifier using Op-amp.
7. RC Phase shift Oscillator using Op-amp.
8. Wien Bridge Oscillator using Op-amp.
9. Square wave generation using OPAMPs.
10. Triangular wave generation using OPAMPs.
11. Basic comparator circuits using Op-amp
12. Basic Schmitt trigger circuits using Op-amp
13. Astable multivibrator using 555 IC.
14. Monostable multivibrator using 555 IC

Assessment Pattern

Continuous Assessment (25 Marks)

Continuous assessment evaluates the student's performance during the regular laboratory sessions, emphasizing practical skills, documentation, and conceptual understanding.

1. Conduct of Experiments (10 Marks)

Evaluation is based on the student's ability to perform experiments systematically and efficiently.

- Adherence to correct experimental procedures, systematic execution of experiments and compliance with laboratory safety guidelines.
- Ability to handle laboratory instruments and components accurately, precision in observations and effectiveness in troubleshooting during experimentation.
- Active involvement, collaboration, and contribution during group laboratory activities.

2. Lab Reports and Record Keeping (5 Marks)

Evaluation is based on the quality and maintenance of laboratory documentation.

- Clarity, completeness, and accuracy of experimental reports, including proper recording of observations, calculations, analysis, and conclusions.
- Submission of rough and fair records within the stipulated time and maintenance of a neat, well-structured laboratory record.

3. Viva Voce (10 Marks)

Evaluation of conceptual understanding and communication skills related to laboratory experiments.

- Ability to explain experimental procedure, working principle, and results.

- Understanding of theoretical concepts associated with the experiment.
- Ability to answer questions related to practical and analytical aspects of the experiment.

Evaluation Pattern for End Semester Examination (50 Marks)

End Semester Examination (50 Marks)

The end semester evaluation assesses the student's ability to independently perform experiments, interpret results, and demonstrate theoretical understanding.

1. Procedure / Preliminary Work / Design (10 Marks)

Evaluation is based on planning and conceptual clarity before performing the experiment.

- Ability to clearly explain the experimental procedure and understand each step involved.
- Preparation and organization of required components, instruments, and experimental setup.
- Logical approach in experimental design, circuit development, or algorithm formulation related to the experiment.

2. Conduct of Experiment / Execution of Work (15 Marks)

Evaluation is based on practical performance during the examination.

- Proper circuit setup and connection.
- Accurate execution of experimental procedure.
- Efficient handling of laboratory instruments and equipment.

3. Result with Valid Inference / Quality of Output (10 Marks)

Evaluation is based on correctness and interpretation of results.

- Precision and correctness of experimental observations and output.
- Ability to analyse results and draw valid technical conclusions.

4. Viva Voce (10 Marks)

Evaluation of student's understanding of experimental concepts.

- Ability to explain procedure, working principle, and results.
- Ability to answer theoretical and practical questions related to the experiment.

5. Record (5 Marks)

Evaluation is based on laboratory documentation submitted during the examination.

- Completeness and accuracy of recorded experiments.
- Clarity, neatness, and systematic presentation of laboratory records.

Total Marks	CIE Marks	ESE Marks	ESE Duration
100	50	50	3 Hours

Continuous Internal Evaluation Pattern:

Attendance	: 5 marks
Continuous Assessment Test	: 25 marks
Internal Lab exam	: 20 marks

Text Books:

1. Paynter, R. T. (2006). *Introductory electronic devices and circuits* (7th ed.). Pearson Education.
2. Boylestad, R. L., & Nashelsky, L. (2009). *Electronic devices and circuit theory* (10th ed.). Pearson Education.
3. Neamen, D. A. (2010). *Electronic circuits: Analysis and design* (3rd ed.). McGraw-Hill Education.

Reference Books:

1. Sedra, A. S., & Smith, K. C. (2015). *Microelectronic circuits* (7th ed.). Oxford University Press.
2. Gayakwad, R. A. (2015). *Op-amps and linear integrated circuits* (4th ed.). Pearson Education.
3. Horowitz, P., & Hill, W. (2015). *The art of electronics* (3rd ed.). Cambridge University Press.