COURSE CONTENT

ELEMENTS OF ELECTRICAL AND ELECTROINCS ENGINEERING LAB								
II Semester: CE/MECH								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
2520272	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		0	0	2	1	40	60	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes:30**				**Total Classes:30**		
Prerequisites: Elements of electrical and electronic engineering.								

Course Overview: This lab introduces basic electrical circuit analysis and electronic devices, covering circuit laws, RLC circuits, measuring instruments, diodes, transistors, rectifiers, and logic gates through simulation and practical experiments.

Course Objectives: Students will learn

1. To acquire fundamental knowledge of electrical and electronic circuit components and their measurement techniques.
2. To understand the operating principles and performance characteristics of electrical machines and transformers.
3. To analyze the behavior of semiconductor devices and their applications in basic electronic circuits.
4. To explore the working of rectifiers, voltage regulators, and test instruments used in electronic measurements.
5. To develop practical skills in conducting experiments, interpreting results, and correlating theoretical concepts with real-time applications.

Course Outcomes: After Completion of the Course, Students should be able to

1. Demonstrate the verification of basic electrical laws and characteristics of DC and AC circuits.
2. Determine the performance parameters of electrical machines and transformers through experimental analysis.
3. Examine the characteristics of semiconductor devices and their operation in various configurations.
4. Evaluate the performance of rectifiers and voltage regulators using appropriate test equipment.
5. Construct and test electrical and electronic circuits to interpret practical results and validate theoretical concepts.

List of Experiments:

PART A: ELECTRICAL

1. Verification of KVL by using digital simulation.
2. Verification of KCL by using digital simulation.
3. Verification of Ohm's law by using digital simulation.

4. Verification of voltage division in circuits by using digital simulation.
5. Verification of mesh analysis in circuits by using digital simulation.
6. Verification of impedance in series RLC circuits by using digital simulation.

PART B: ELECTRONICS

1. Study and operation of (i) Multi-meters (ii) Function Generator (iii) Regulated Power Supplies (iv) CRO.
2. PN Junction diode characteristics.
3. Zener diode characteristics and Zener as voltage Regulator.
4. Input & Output characteristics of Transistor in CB / CE configuration.
5. Full Wave Rectifier with & without filters.
   Realization of Boolean expressions using Logic Gates.

Proposed open ended experiments:

1. Verification of current division in circuits by using digital simulation.
2. Verification of Impedance in Series RL Circuits by using digital simulation.

TEXT BOOKS:

1. Basic Electrical and electronics Engineering, M.S. Sukija and T.K. Nagasarkar, Oxford University press, 1stEdition, 2012.
2. Basic Electrical and electronics Engineering, D.P. Kothari and I.J. Nagarath, McGraw Hill
   Education, 2nd Edition,2020.

REFERENCE BOOKS:

1. Electronic Devices and Circuits, R. L. Boylestad and Louis Nashelsky, PEI and PHI, 9th Edition,2006.
2. Millman's Electronic Devices and Circuits, J. Millman,C. C. Halkias and Satyabrata Jit, TMH, 2nd Edition, 1998.
3. Engineering Circuit Analysis, William Hayt and Jack E. Kemmerly, McGraw Hill, 6th Edition, 1971.
4. Linear circuit analysis, Raymond A. De Carlo and Pen, Min, Lin, Oxford University Press 2nd Edition, 2004.
5. Network Theory, N. C. Jagan and C. Lakshminarayana, Mc Graw Hill, 2nd Edition, 2005.
6. Network Theory, Sudhakar and Shyam Mohan Palli, Tata McGraw Hill, 2nd Edition, 2011.
7. Fundamentals of Electrical Engineering, L. S. Bobrow, Oxford University Press, 12th Edition 2003.
8. Electrical and Electronic Technology, E. Hughes, Pearson Education, 10th Edition, 2010.
9. Electrical Engineering Fundamentals, V. D. Toro, Prentice Hall India, 2nd Edition, 1989.

ELECTRONIC RESOURCES:

1. https://www.allaboutcircuits.com/textbook/
2. https://www.electrical4u.com/basic-electrical-engineering/
3. https://www.electronics-tutorials.ws/
4. https://www.electricaltechnology.org/
5. https://archive.nptel.ac.in/courses/108/105/108105066/

MATERIALS ONLINE:

1. Lab Manual
2. Open-ended experiments