Course Type	Course Code	Name of Course	L	T	P	Credit
ESC	NEEE101	Electrical Devices and Circuits	3	0	0	3

Course Objective
The objective of the course is to provide knowledge of DC and AC circuits, Single-phase Transformers, DC Machines and Three-phase Induction Motor. Additionally, it aims to develop the ability to analyze circuits and machines for a variety of applications.
Learning Outcomes
Upon successful completion of this course, students will • be able to solve electric circuits. • have a knowledge of basic electrical machines.

Unit No.	Topics to be covered	Lecture Hours	Learning Outcome
1	**DC Circuits:** Circuit components, Nodal and mesh analysis, Dependent voltage and current sources, Linear circuits and Superposition theorem, Thevenin and Norton equivalent circuits, Maximum power transfer theorem. Ability enhancement through problem solving.	8	Knowledge of DC circuits and network theorems.
2	**AC Circuits:** Phasor diagram, R/RL/RC/R-L-C circuits, Power factor, three-phase AC circuits with balanced and unbalanced loads, Measurement of three-phase power by two-wattmeter method. Ability enhancement through problem solving.	8	Knowledge of single-phase and three-phase AC circuits, and their analysis with balanced and unbalanced loads.
3	**Single-phase Transformers:** Principle, Construction, Types, EMF equation, Equivalent circuit, Phasor diagram, Regulation, Efficiency, Applications. Ability enhancement through problem solving.	8	Understanding the operation of single-phase transformers and their applications.
4	**DC Machines:** Working principle of motor and generator, EMF Equations, Torque and speed equations, Types of excitations (separately excited, series, shunt, compound), Performance characteristics, Applications. Ability enhancement through problem solving.	9	Understanding the operation of different types of DC machines and their applications.
5	**Three-phase Induction Motor:** Construction, Types, Operation, Torque equation, Torque-slip characteristics, Starting Methods, Applications. Ability enhancement through problem solving.	9	Understanding the operation of three-phase induction motor and its applications.

Text Books:

1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", McGraw Hill publishers, 2013.
2. Electric Machines – D. P. Kothari and I. J. Nagrath (Tata McGraw Hill), 5th Edition, 2017.

Reference Books:

1. M.E. Van Valkenburg, 'Network Analysis', Pearson, 2015.
2. Electrical Machinery – P. S. Bimbhra (Khanna Publ.), 2021.
3. Electric Machinery – A. E. Fitzgerald, Charles Kingsley Jr., S. D. Umans (McGraw Hill).

NEEC101: Electrical Devices and Circuits (Monsoon Semester, 2025-26)

1. Course Instructor: Dr. Soumyabrata Barik

Office: Room No. 131-D
Tel: 5443 (Office)
Email: soumyabrata@iitism.ac.in

2. Venue: As announced by the Institute

3. Schedule: As announced by the Institute

4. Teaching Assistants (TAs):
    a. Suswagatha Satpaty
    b. Satadal Bhowmik

5. Evaluation:
    a. Assignment 1: 10 marks
    b. Mid-Semester examination: 30 marks
    c. Assignment 2: 10 marks
    d. End-Semester examination: 50 marks

6. Details of the evaluation components will be announced later through separate announcements in Google Classroom.

7. Bring calculator to every class. During exam no exchange of calculator or any materials.

8. Make sure get at least 75% attendance in the subject (lecture) as required by the institute. Any changes for the same will not be entertained.

9. The lecture slides will be uploaded on regular basis in the Google Classroom/MIS/Moodle. Please check your Google classroom/ MIS/Moodle for any updates about the course. Please be in contact with the CRs also to get updates of the course.

10. Use your institute email ID to access the google classroom.

11. Classroom etiquette and expectations:
    a. Please do not disturb others.
    b. Participate in classroom Q&A.
    c. Practice problems as much as possible.

12. **Make up policy**: Make up will be granted according to the institute norms. No make-up will be rewarded for any of the assignments.

13. **Makeup Class (if required)**: Will be announced later.

14. **Academic Integrity:** Do not cheat or use unfair means in exams. There will be zero tolerance towards any unethical means, such as cheating, and/or proxy attendance. Violations in this regard will be handled in accordance with the university's rules and regulations.

Feel free to contact for any questions or doubts regarding the course