RAGHU ENGINEERING COLLEGE (Autonomous)

(Approved by AICTE, New Delhi & Permanently Affiliated to JNTUGV, Vizianagaram) NBA and NAAC 'A+' grade accredited Institute.

Dakamarri, Bheemili Mandal, Visakhapatnam – 531162,A.P. Phone: 08922-248001

www.raghuenggcollege.com

INSTITUTE VISION

"Envisioning to be a world class technical institution by synergizing quality education with ethical values"

INSTITUTE MISSION

- To encourage training and research in cutting-edge technologies.
- To develop and strengthen strategic links with the industry.
- To kindle the zeal among the students and promote their quest for academic excellence.
- To encourage extra-curricular activities along with good communication skills.

QUALITY POLICY

"RAGHU Engineering College underscores ethical values along with innovative teaching through an interactive, activity-based pedagogy; establishes the best of infrastructural facilities, inculcates engineering temper among the students through the use of the latest Information and Communication Technologies, and strives for an efficient, responsive and transparent administration in all areas"

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

"To produce Electrical and Electronics Engineers through quality education with exposure to state of art technology and innovation with ethical values"

MISSION

- M1 : Empowering students and professionals with state-of-art knowledge and Technological skills.
- M2 : To prepare students for higher studies and entrepreneurship.
- M3 : To impart essential skills of leadership, teamwork, communication and ethics among the students.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- **PEO 1:**
  Domain Knowledge:
  Graduates will have knowledge in basic science, mathematical tools and fundamental engineering stream with contemporary problem solving, critical analysis in Electrical and Electronics Engineering and its allied areas.

- **PEO 2:**
  Communication Skills & Employability:
  Graduates will have careers in the diversified sectors of electrical power industry, software industries and also encouraged for higher education and research.

- **PEO 3:**
  Life Long Learning & Social Concern:
  Graduates will be able to communicate effectively, adopt lifelong learning act with integrity and have inter personal skills needed to engage in, lead and nurture diverse teams with commitment to their ethical and social responsibilities.

MAPPING OF MISSION STATEMENTS WITH PEOs

MS/PEO	PEO 1	PEO 2	PEO 3
M1	3	3	2
M2	2	2	3
M3	2	3	2

1-Slight, **2**- Moderate, **3**- Substantial

PROGRAMME OUTCOMES

Graduates of Electrical and Electronics Engineering Will:

PO 1	**Engineering knowledge :** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO 6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO 1: On successful completion of the B. Tech. (EEE) Program, the graduates will be able to apply technical knowledge and usage of modern hardware & software tools related to Electrical and Electronics Engineering for solving real world problems.

PSO 2: On successful completion of the B. Tech. (EEE) Program, the graduates will be able to analyse, comprehend, design & develop Electrical subsystems/systems for a variety of engineering applications and thus demonstrating professional ethics and concern for societal wellbeing.

MAPPING OF PEOS WITH POS AND PSOS:

PEO/POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
PEO 1	3	3	3	3									3	3
PEO 2						3	3	3	3	3	3		2	2
PEO 3									3	3		3	2	2

1-Slight**, 2-** Moderate**, 3-** Substantial

2302202 - DC MACHINES & TRANSFORMERS LAB

(For EEE Only)

Programme & Branch	B.Tech & EEE	Sem	Category	L	T	P	Credit
Prerequisites	23ES104: Basic Electrical and Electronics Engineering. 23ES204: Electrical and Electronics Engineering Workshop Lab 23ES2101: Electrical Circuits Analysis – I 23ES2201: Electrical Circuits Lab	**3**	**PC**	**0**	**0**	**3**	**1.5**

Course Objectives:

- To conduct the experiment and plot the characteristics and applications of DC machines.
- To perform the starting, speed control and testing methods of DC Machines.
- To determine/Predetermine efficiency and regulation of the transformer through equivalent circuit.

Preamble:

DC Machines and Transformers Laboratory provide the essential facilities to the students to augment their concepts about the fundamentals of transformers and DC rotating machines. The lab is equipped with DC Shunt and compound motor, single-phase transformer, Main and Teaser Transformer set. The lab is equipped with various tests and monitoring equipment also.

Note: Conduct any 10 Experiments Only.

List of Experiments

1	Speed control of DC Shunt Motor by Field Current and Armature Voltage Control.
2	Magnetization characteristics of DC Shunt Generator. Determination of critical field resistance and critical speed.
3	Brake test on DC Shunt Motor. Determination of performance curves.
4	Brake test on DC Compound Motor-Determination of performance curves.
5	Swinburne's test - Predetermination of efficiencies as DC Generator and Motor.
6	Load test on DC Shunt Generator. Determination of characteristics.
7	Load test on DC Series Generator. Determination of characteristics.
8	Load test on DC Compound Generator. Determination of characteristics.
9	Hopkinson's Test on DC Shunt Machines
10	Fields test on DC series machines-Determination of Efficiency.
11	OC & SC Tests on Single Phase Transformer.
12	Sumpner's test on Single Phase Transformer
13	Scott Connection of Transformers.
14	Parallel operation of Single-Phase Transformers.
15	Separation of core losses of a Single-Phase Transformer.

Total: 30hrs

References/Manuals/Software:	
1	**Text Book:** Electrical Machinery by Dr. P S Bimbhra, Fully Revised edition, Khanna Publishers, New Delhi, 2021.
2	**Laboratory Manual:** DC Machines and Transformers Lab Manual
3	**Virtual Labs link:** 1. https://ems-iitr.vlabs.ac.in/List%20of%20experiments.html

Course Outcomes:		BT Mapped (Highest Level)
CO 1	Student will be able to acquire hands on experience of conducting various tests on DC Machines and Transformers	L3
CO 2	Student will be able to compute losses and Efficiency of DC Machines at different load conditions.	L3
CO 3	Student will be able to compute losses, Efficiency and Voltage Regulation of Transformers at different load conditions and power factors.	L3
CO 4	Student will be able to verify the characteristics of DC Machines and Transformers and predict specific applications of those machines accordingly.	L3
CO 5	Student will be able to acquire hands on experience to obtain Two Single Phase power supply from a Three-Phase Power Supply by using Scott-T connection between Main and Teaser Transformers with 86.6% Tapping	L3

Mapping of COs with POs and PSOs

COs/Pos	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2
CO 1	1	1	2	2		2			1	1			2	2
CO 2	1	1	2	2		2			1	1			2	2
CO 3	1	1	2	2		2			1	1			2	2
CO 4	1	1	2	2		2			1	1			2	2
CO 5	1	1	2	2		2			1	1			2	2
1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy														