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

(Common to CSE , CSM, CSD , CSC , CSO,EEE)							
Programme &Branch	**B.Tech. & CSE , CSM, CSD , CSC , CSO,EEE**		**Category**	**L**	**T**	**P**	**Credit**
Prerequisites	**Nil**		**Engineering Science**	**1**	**0**	**2**	**2**

Course Objectives :

The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation.

It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

Preamble :	The main objectives of the course is to make student	
Course Contents:		
Unit-1	Introduction to Design Thinking : Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.	Contact Hours: 9
Unit-2	Design Thinking Process : Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.	Contact Hours: 9
Unit-3	Innovation : Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations- Creativity to Innovation- Teams for innovation- Measuring the impact and value of creativity. Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.	Contact Hours: 9
Unit-4	Product Design : Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications- Innovation towards product design- Case studies Activity: Importance of modelling, how to set specifications, Explaining their own product design.	Contact Hours: 9
Unit-5	Design Thinking in Business Processes : Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs- Design thinking for Startups- Defining and testing Business Models and Business Cases- Developing & testing prototypes. Activity: How to market our own product, About maintenance, Reliability and plan for startup.	Contact Hours: 9

	Total Hours: 45	
	Text Books:	
	1	1. Tim Brown,Change by design, HarperBollins (2009)
	2	2. Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons.
	Reference Books:	
1		David Lee, Design Thinking in the Classroom, Ulysses press.
2		Shrutin N Shetty, Design the Future, Norton Press
3		William Lidwell,Universal Principles of Design- Kritinaholden, Jill Butter
4		Chesbrough.H, The Era of Open Innovation – 2013
	Web References :	
1		https://nptel.ac.in/courses/110/106/110106124/
2		https://nptel.ac.in/courses/109/104/109104109/
3		https://swayam.gov.in/nd1_noc19_mg60/preview
Preamble	**After completion of the course, students will be able to**	

After completion of the course, students will be able to		**BT Mapped** (Highest Level)
CO 1	Define the concepts related to design thinking. Explain the fundamentals of Design Thinking and innovation.	Remember
CO 2	Apply the design thinking techniques for solving problems in various sectors. (L3)	Apply
CO 3	Analyse to work in a multidisciplinary environment	Analyze
CO 4	Evaluate the value of creativity	Evaluate
CO 5	Formulate specific problem statements of real time issues	Evaluate

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**	**PSO-3**
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															

1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy

ASSESSMENT PATERN – THEORY							
TEST	**Remembering (K1)%**	**Understanding (K2)%**	**Applying (K3)%**	**Analyzing (K4)%**	**Evaluating (K5)%**	**Creating (K6)%**	**Total %**
MID-1	**6**	**9**	**85**				**100**
MID-2	**6**	**9**	**85**				**100**
SEE	**10**	**10**	**80**				**100**
***± 3% may be varied**							