

# 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.

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## 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 Electronics and Communication Engineering**

## VISION

To grow into a premier engineering department with excellence in teaching, research, and innovation in the field of electronics and communication engineering at par with the global industrial standards catering to the needs of the stakeholders while keeping up with the advancing technology.

#### MISSION

- M1: To provide excellence in education, research and public services.
- M2: To provide a creative environment through structured teaching and learning process.
- M3:To impart employability-focused education while imbibing the spirit of entrepreneurship.
- M4: To inculcate self-learning attitude, management skills and professional ethics.

# PROGRAMME EDUCTIONAL OBJECTIVES (PEOs)

- **PEO 1: Domain Knowledge:** To have the knowledge and technical skills required to remain productive.
- **PEO 2: Communication Skills & Employability:** To apply technical knowledge and skills as electronics and communication engineers to provide practical solutions in industrial and governmental organizations.
- **PEO 3: Life Long Learning & Social Concern:** To achieve success with awareness of entrepreneurship skills and have the ability for lifelong learning by pursuing professional development to meet the emerging and evolving demands for a successful career.

#### MAPPING OF MISSION STATEMENTS WITH PEOS

MS/PEO	PEO 1	PEO 2	PEO 3
MS 1	3	2	2
MS 2	3	3	2
MS 3	3	2	3
MS 4	2	3	3

1-Slight, 2-Moderate, 3-Substantial

	PROGRAM OUTCOMES
	Graduates of Electrical and Electronics Engineering Will:
PO 1	<b>Engineering knowledge</b> : Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	<b>Problem analysis:</b> 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	<b>Design/development of solutions:</b> 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	<b>Conduct investigations of complex problems</b> : 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	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

<b>PO 6</b>	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.									
<b>PO 7</b>	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.									
<b>PO 8</b>	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.									
	PROGRAM SPECIFIC OUTCOMES (PSOs)									
<b>PSO 1</b> : U	Inderstand and apply the fundamental concepts of Basic and Engineering Sciences for									
appropria	te up-skilling in the fast-emerging fields of Signal Processing, Image Processing,									
Commun	ication, Networking, VLSI, Embedded Systems, Analog and Digital Technologies to									
meet the	futuristic industrial achievements.									
<b>PSO 2</b> : A	pply latest hardware and software tools to solve complex electronics and communication									

**PSO 2**: Apply latest hardware and software tools to solve complex electronics and communication engineering problems along with analytical skills to derive appropriate solutions in the real time applications across varied business and administrative functions.

#### Mapping of PEOs with POs and PSOs

PEO/ PO	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	2	2						1	1	3	1
PEO 2	2	3	3	2			2	2		3			3	3
PEO 3						1	1	1	1	2	1	3	3	1

1-Slight, 2-Moderate, 3-Substantial

23ES214– Design Thinking & Innovation											
Programme &Branch	B.Tech & ECE	Sem	Category	L	Т	Р	Credits				
Prerequisites	Nil	4	Engineering Science	1	0	2	2				
Course Objecti 1. To fam innovatio 2. To equip ideas, de	<ul> <li>Course Objectives:</li> <li>1. To familiarize students with design thinking process as a tool for breakthrough innovation.</li> <li>2. To equip students with design thinking skills and ignite the minds to create innovative ideas develop colutions for moletime problems.</li> </ul>										
Preamble:	Preamble:       The aim of this course is to give knowledge about design and innovation and best solutions of a given problem by an appropriate and innovative design through the best investigation and design protocol for the particular problem in practical aspects.										
Unit-1	Introduction (	to Desig	n Thinking		Con	tact Ho	ours: 3				
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.Unit-2Design Thinking ProcessContact Hours: 3Design 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.											
Unit-3	Innovation				Con	lact Ho	ours: 5				
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. <b>Activity:</b> Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation											
Unit-4	Product Design     Contact Hours: 3										
Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications- Innovation towards product design- Case studies <b>Activity:</b> Importance of modelling, how to set specifications, Explaining their own product design.											

Unit	-5	Design Thinking in Business Processes	Contact Hours: 3						
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. Total Hours: 15									
Text	Books:								
1	Tim Brow	n, Change by design, Harper Bollins (2009).							
2	Idris Moo	tee, Design Thinking for Strategic Innovation, 2013, John	Wiley & Sons.						
Refe	erence Bool	κς:							
1	David Lee	e, Design Thinking in the Classroom, Ulysses press							
2	Shrutin N	Shetty, Design the Future, Norton Press							
3	William L	idwell, Universal Principles of Design- Kritinaholden, Jil	l Butter.						
4	Chesbroug	gh. H, The Era of Open Innovation – 2013							
Web	Reference	s:							
1	https://npt	el ac in/courses/110/106/110106124/							
2	https://npt	el.ac.in/courses/109/104/109104109/							
3	https://swa	avam.gov.in/nd1_noc19_mg60/preview							
COU	URSE OUT	COMES:	BT Mapped						
Upo	n completio	n of the course, students shall have ability to	(Highest Level)						
CO	1 Explain	the fundamentals of Design Thinking and innovation.	L2						
CO	Apply the design thinking techniques for solving problems in L3								
COS	3 Analyze	e to work in a multidisciplinary environment.	L4						
CO	04   Evaluate the value of creativity.								
CO5	Formula	ate specific problem statements of real time issues.	L6						

#### 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	2	-	1	-	-	-	-	1	-	-	-	2	-
CO 2	2	2	2	3	-	-	-	-	2	-	-	-	2	-
CO 3	1	3	1	3	-	-	-	-	2	-	-	-	2	-
CO 4	2	2	2	3	-	-	-	-	3	-	-	2	2	-
CO 5	2	2	-	1	-	-	-	-	3	3	3	3	2	-
1 – Slight	1 – Slight, 2 – Moderate, 3 – Substantial													