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 / 221122/9963981111, 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 Electronics & 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

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

PROGRAMME EDUCTIONAL OBJECTIVES (PEOs)

- PEO 1: To have the knowledge and technical skills required to be and to remain productive
- PEO 2: To apply technical knowledge and skills as electronics and communication engineers to provide effective solutions in industrial and governmental organizations.

- PEO 3: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 to have a successful career.

MAPPING OF MISSION STATEMENTS WITH PEOs

MS/PEOs	PEO 1	PEO 2	PEO 3
MS 1	3	2	2
MS 2	3	3	2
MS 3	3	2	3

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

PROGRAM OUTCOMES	
Graduates of Electronics & Communication 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 modeling 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.

PROGRAM SPECIFIC OUTCOMES (PSOs)
PSO 1 Apply the knowledge of Electronics and Communications in analyzing problems related to Electronics, Communications, Signal processing, VLSI and Embedded systems.
PSO 2 Use modern tools and techniques to solve contemporary problems in the field of Electronics and Communication Engineering.

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	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

2304104-ANALOG ELECTRONIC CIRCUITS							
Programme &Branch	**B. Tech & ECE**	**Sem**	**Category**	**L**	**T**	**P**	**Credits**
Prerequisites	**Electronic Devices and Circuits**	**4**	**Professional Core**	**3**	**0**	**0**	**3**

Course Objectives :

1. To understand and analyze cascading of single stage amplifiers.
2. To design and analyze different types of Power amplifiers and tuned amplifier circuits.
3. To perform the analysis of different Multivibrator circuits.
4. To learn the functioning of different types of time-base Generators and Sampling Gates.
5. To analyze differential amplifiers and illustration of Op-Amp.

Preamble :	This course on Analog Electronic Circuits has been designed primarily as a core course for undergraduate students and, as a refresher course for master level students and circuit designers working in industry. It starts with basic circuit components and circuit concepts and then, gradually moves to practical building blocks of analog electronic systems.
Course Contents:	

Unit-1	**Multistage Amplifiers**	Contact Hours: 9

Classification of amplifiers, Methods of coupling**, c**ascaded transistor amplifier and its analysis, analysis of two stage RC coupled amplifier, CE-CC Amplifier, Cascade amplifier, High input resistance transistor amplifier circuits and their analysis-Darlington pair amplifier, Boot-strap emitter follower, Analysis of multi stage amplifiers using FET.

Unit-2	**Power Amplifiers and Tuned Amplifiers**	Contact Hours: 9

Power Amplifiers: Classification of amplifiers, Class-A power Amplifiers and their analysis, Harmonic Distortions, Class-B Push-pull amplifiers, Complementary symmetry push pull amplifier, Class AB power amplifier, Class-C power amplifier, Thermal stability and Heat sinks.

Tuned Amplifiers: Introduction, Q-Factor, capacitance single tuned amplifier, double tuned amplifiers, effect of cascading single tuned amplifiers on band width, effect of cascading double tuned amplifiers on band width, staggered tuned amplifiers, stability of tuned amplifiers.

Unit-3	**Pulse Switching Circuits**	Contact Hours: 9

Wave shaping circuits: High pass, low pass RC circuits, their response for square Input. Diode Clippers and Clampers.

Bistable Multivibrator: Analysis and Design of Fixed Bias, Collector Catching Diodes, Commutating Capacitors, Triggering methods, Emitter Coupled Bistable Multivibrator (Schmitt Trigger).

Unit-4	**Multivibrators & Time base Generators**	Contact Hours: 9
Monostable Multivibrator: Analysis and Design of Collector Coupled Monostable Multivibrator, Applications of Monostable Multivibrator. **Astable Multivibrator:** Analysis and Design of Collector Coupled Astable Multivibrator, Application of Astable Multivibrator. **Time base Generators:** General features of a time base signal, Methods of generating time base waveform, Exponential Sweep Circuits, Negative Resistance Switches, Basic principles in Miller and Bootstrap time base generators, Transistor Miller time base generator, Transistor Bootstrap time base generator.		
Unit-5	**Differential Amplifier Analysis**	Contact Hours: 9
Differential Amplifier – DC and AC analysis of Dual input Balanced output Configuration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single Ended Input – Balanced/ Unbalanced Output), DC Coupling and Cascade Differential Amplifier Stages, Level translator.		
		Total Hours: 45

Text Books:	
1	Integrated Electronics– Millman & Halkias, Tata Mc-Graw Hill, Second Edition, 2009.
2	Electronic Devices and Circuits – S. Salivahanan, N. Suresh Kumar, A. Vllavaraj, Tata Mc-Graw Hill, Third Edition, 2013.
3	Linear Integrated Circuits–D. Roy Choudhury, New Age International(P)Ltd, Second Edition, 2003.
Reference Books:	
1	Electronic Devices and Circuits Theory– Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, Tenth Edition, 2009.
2	Electronic Circuit Analysis– K. Lal Kishore, B S Publications, Fourth Edition,2016
3	Op-Amps &Linear ICs–Ramakanth A. Gayakwad, Pearson/Prentice Hall, 1987.
Web References :	
1	https://archive.nptel.ac.in/courses/108/105/108105158/
2	https://onlinecourses.nptel.ac.in/noc23_ee77/preview
3	https://nptel.ac.in/courses/108102112

COURSE OUTCOMES: Upon completion of the course, students shall have ability to		**BT Mapped** (Highest Level)
CO 1	Analyse multistage amplifiers using BJT and FET.	L4
CO 2	Classify the power and tuned amplifiers and perform comparative analysis.	L4
CO 3	Design and analyse different wave shaping circuits and multivibrator circuits.	L5
CO 4	Understand the basic concepts of Time base generators.	L2
CO 5	Analyse differential amplifier circuits using BJT.	L4

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

ASSESSMENT PATERN – THEORY							
TEST	**Remembering (K1)%**	**Understanding (K2)%**	**Applying (K3)%**	**Analyzing (K4)%**	**Evaluating (K5)%**	**Creating (K6)%**	**Total%**
MID-1	20	40	40				100
MID-2	10	20	30	40			100
SEE	20	20	30	30			100
*± 3% may be varied							