

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 & 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

Understand and apply the fundamental concepts of Basic and Engineering Sciences for appropriate up-skilling in the fast-emerging fields of Signal Processing, Image Processing, Communication, Networking, VLSI, Embedded Systems, Analog and Digital Technologies to meet the futuristic industrial achievements.

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.

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

Mapping of PEOs with POs and PSOs

1-Slight, 2- Moderate, 3- Substantial

2304102– ELECTRONIC DEVICES AND CIRCUITS										
Programme &Branch	B. Tech & ECE	Sem	Category	L	T	P	Credits			
Prerequisites	BEEE	3	Professional Core	3	0	0 0				
Course Object1.To intro2.To learn3.To disc frequent4.To des high fre	tives: oduce the basics of Sp n the biasing and stab uss the working, analy cies. cribe the working, a	pecial Dio ilization co ysis and de analysis an	des, BJT, FET, MOSF oncepts of BJT and FE esign of transistor ampl nd design of transisto	ET an Γ. lifier c	nd othe circuit	er tra s at l	nsistors ow cuits at			
5. To ide	ntify the topologies	of feedb	ack amplifier circuits	and	desig	gn 8	z analysis			
Preamble: Electronics circuits are the nerves of all modern equipment's that makes our life sophisticated. Acquiring the basic knowledge about the principle of operation of semiconductor electronic devices like diodes, transistors and elementary circuits in the previous semester, this course will enable the students to learn about the use of transistors in analog circuits like single and multi-stage amplifier, feedback amplifier, Differential amplifier, power amplifier and oscillators. It also gives information about the biasing and analysis of Transistors, which are the essentials needed for Integrated Circuits and their applications in the field of electronics industry.										
Course Conter	nts:									
Unit-1	Special Diodes & T	ransistors			Con	tact I	Hours: 9			
Special Diode Schottky diode	s: Principle of Opera	tion - Tur	nnel diode, Varactor D	oiode,	Photo	o dio	de, LED,			
BJT : Transisto Model	r as an Amplifier, Tr	ansistor as	a switch, Transistor sw	vitchin	ıg time	es, El	pers-Moll			
FET : Constru	ction and operation c	of N- and Depletion	P-channel FETs, chara type Photo Transistor	acteris	stic pa	aram	eters and			
Unit-2Biasing and StabilizationContact Hours: 9										
BJT Biasing : N Stability factor Bias Compensa Stability, heat a FET Biasing : 1 and FET Comp	Need for Biasing, Ope s S, S' and S'', Biasing ation – Thermistor, Se sinks. Fixed method, self-bia parison between UFFT	rating Poir methods - nsistor, Di as method a	nt, Load Line Analysis - Fixed bias, Collector- ode Compensation, The and voltage divider met	– DC to-bas ermal thod, (and A e bias Runav	C Lo and way, ariso	oad Lines, Self bias, Thermal n of BJT			
anu FET, Com	parison between JFET	and MOS	ГСІ.							

Unit-	3 Small Signal Low Frequency Transistor Amplifie models	r Contact Hours: 9									
BJT:	BJT: Two port network, Transistor hybrid model, determination of h-parameters, conversion of										
h- pai	h-parameters, generalized analysis of transistor amplifier model using h-parameters, Analysis										
of CI	of CB, CE and CC amplifiers using exact and approximate analysis, comparison of transistor										
ampli	fiers.										
FET: comp	FET: Generalized analysis of small signal model of FET, Analysis of CG, CS and CD amplifiers, comparison of FET amplifiers.										
Unit-	4 High Frequency Transistor Amplifier models	Contact Hours: 9									
BJT:	Transistor at high frequencies, Hybrid- π common emitter transistor i	nodel, Hybrid-π									
condu	ictance, Hybrid- π capacitances, validity of hybrid π model, determination	tion of high-frequency									
paran	neters in terms of low-frequency parameters, CE short circuit current	gain, current gain with									
resist	ve load, cut-off frequencies, frequency response and gain bandwidth	product.									
FET:	Analysis of common Source and common drain Amplifier circuits	at high frequencies.									
Unit-	5 Feedback Amplifiers & Oscillators	Contact Hours: 9									
ampli Oscil and V Oscil Frequ	amplifiers, Oscillators: Oscillator principle, condition for oscillations, types of oscillators, RC-phase shift and Wein bridge oscillators with BJT and FET and their analysis, Generalized analysis of LC Oscillators, Hartley and Colpitt's oscillators with BJT and their analysis, Crystal Oscillator Frequency and amplitude stability of oscillators. Total Hours: 45										
Text	Books:										
1	Electronic Devices and Circuits – Millman & Halkias, Tata Mc-Graw 2007	Hill, Second Edition,									
2	Electronic Devices and Circuits – S. Salivahanan, N. Suresh Kumar, A,	Vallavaraj, Tata Mc-									
	Graw Hill, Third Edition.										
3	Electronic Devices and Circuits Theory - Robert L. Boylestad and	l Louis Nashelsky,									
	Pearson/Prentice Hall, Tenth Edition, 2009										
Reference Books:											
1	Electronic Circuit Analysis and Design – Donald A. Neaman, McGraw Hill										
2	Integrated Electronics - Millman & Halkias, Tata Mc-Graw Hill, Second	Edition, 2009									
3	Electronic Devices and Circuits – K. Lal Kishore, BS Publications, Fourt	h Edition, 2016.									

Web References :								
1	https://onlinecourses.nptel.ac.in/noc21_ee55/preview							
2	2 https://archive.nptel.ac.in/courses/108/108/108108112/							
3	http://www.digimat.in/nptel/courses/video/117101106/L01.html							
COU	RSE OUTCOMES:	BT Mapped						
Upon	completion of the course, students shall have ability to	(Highest Level)						
CO	Understand the construction, working and characteristics of special	L2						
	Diodes, BJT, FET, MOSFET and other transistors							
CO	Know the need of transistor biasing, various biasing techniques for	L2						
	BJT and FET, and stabilization concepts with necessary expressions.							
CO	Analyze small signal low frequency transistor amplifier circuits	L4						
	using BJT and FET in different configurations.							
CO	Derive the expressions for conductance and capacitances of the	L4						
	small signal high frequency transistor amplifier using BJT and FET.							
CO	Identify and analyze the topology of negative feedback amplifiers	L4						
	and construct different type of oscillators							

Mapping of Cos with POs and PSOs

COs/	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO
POs	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-1	-2
CO 1	2	2	-	-	-	-	-	-	-	-	-	-	2	-
CO 2	3	2	2	-	-	-	-	-	-	-	-	-	2	-
CO 3	3	3	2	-	-	-	-	-	-	-	-	-	3	-
CO 4	3	3	1	-	-	-	-	-	-	-	-	-	2	-
CO 5	3	3	3	-	-	-	-	-	-	-	-	-	3	-
1 - Slight,	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	30	40	20			100				
SEE	10	10	60	20			100				
*± 3% m	nay be varied										