



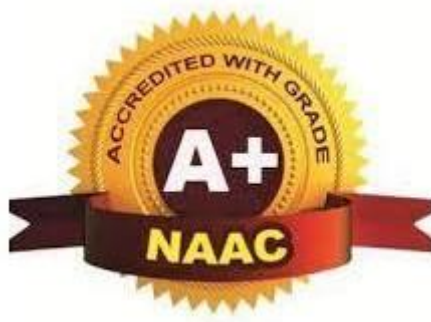
Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441108

NAAC Accredited with A+ Grade

(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Department of Electronics and Communication Engineering



Third Semester Bachelor of Technology
NEP 2020 Scheme 2024-25

DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING



Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441108
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Department of Electronics and Communication Engineering

Vision of Institute

“To emerge as a learning Center of Excellence in the National Ethos in domains of Science, Technology and Management”

Mission of Institute

[M1] To strive for rearing standard and stature of the students by practicing high standards of Professional ethics, transparency and accountability

[M2] To provide facilities and services to meet the challenges of Industry and Society

[M3] To facilitate socially responsive research, innovation and entrepreneurship

[M4] To ascertain holistic development of student and staff members by inculcating knowledge and profession as work practices

Vision of the Department:-

To emerge as a learning hub and center of excellence in the domain of Electronics and Communication Engineering.

Mission of the Department:-

M1: To impart quality technical education through effective teaching learning process.

M2: To provide a platform for addressing societal issues and challenges encountered by industries.

M3: To foster a culture of research and instill innovative and entrepreneurial skills.

M4: To promote lifelong learning in order to foster the holistic development of students and staff through the knowledge and professional ethics.

Program Education Objectives (PEO)

PEO 1: Demonstrate essential technical skills to identify, analyze and solve problems and design issues in Electronics and Communication Engineering.

PEO 2: Apply field knowledge, research and professional practices to meet the requirements of industries.

PEO 3: Imbibe lifelong learning practices and entrepreneurship skills in tune with emerging technologies.

PEO 4: Inculcate professional ethics and managerial skills to satisfy real life problems for serving the needs of society and environment.



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Program Outcomes (PO)

- 1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 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.
- 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.
- 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.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and software tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 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.
- 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.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 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.
- 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.
- 12. Lifelong learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.



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SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech Electronics and Communication Engineering

Scheme of Instructions: Second Year B. Tech. in Electronics and Communication Engineering

(As Per NEP 2020)

Semester – III

SN	Se m	Type	BoS/ Dept	Sub Code	Subject	T/P	Contact Hours			Cre dits	% Weightage			ESE Duration	Total Marks
							L	P	Hrs		CT/I A	CA	ESE		
1	III	PCC	EC	BEC32301	Digital System Design with HDL	T	3	-	3	3	30	10	60	3 Hrs	100
2	III	PCC	EC	BEC32303	Electronics Devices & Circuit	T	3	-	3	3	30	10	60	3 Hrs	100
3	III	OEC	SH	B\$323XX	Open Elective-I	T	4	-	4	4	30	10	60	3 Hrs	100
4	III	EEMC	BA	BBA32307	Industrial Relations	T	2	-	2	2	14	6	30	2 Hrs	50
5	III	VEC	SH	BSH32308	Ethics in Engineering Practices	T	2	-	2	2	14	6	30	2 Hrs	50
6	III	MDM	SH	BSH32305	Transformation and its series	T	2	-	2	2	14	6	30	2 Hrs	50
7	III	PCC	EC	BEC32302	Digital System Design with HDL Lab	P	-	2	2	1	-	25	25	2 Hrs	50
8	III	PCC	EC	BEC32304	Electronics Devices & Circuit	P	-	2	2	1	-	25	25	2 Hrs	50
9	III	CEP	EC	BEC32305	Community Engineering Project	P	-	4	4	2	-	50	-	2 Hrs	50
Total							16	08	24	20	132	148	320	21 Hrs	600
Course Category		BSC/ESC(Basic Science Course/Engineering Science Course.)		PCC (Programme Core Courses)	PEC (Programme Elective Courses)	MDM/OEC	VSEC/AEC (Skill Course)		Humanities Social Science & Management	Experiential Learning Courses	CC (Liberal Learning Courses)				
Credits		--		08	-	06	--		04	02	-		-		
Cumulative Sum		16/13		10	-	06	04		08	02	04				

PROGRESSIVE TOTAL CREDITS: 43+20=63

				June, 2024	1.00	Applicable for AY 2024-25 Onwards
Chairperson	Dean Academics	Vice Principal	Principal	Date of Release	Version	



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Department of Electronics and Communication Engineering



Programme : Electronics & Communication Engineering

List of Program Electives offered By Electronics & Communication Department

Program Elective-I	Program Elective-II	Program Elective-III	Program Elective-IV	Program Elective-V	Program Elective-VI
Semester V	Semester VI	Semester VI	Semester VII	Semester VII	
BEC33506- Microwave Engineering	BEC33605: Radar Engineering	BEC33608 :Waveguide & Antenna	BEC34702: Data Compression & Encryption	BEC34805 : Optical Fibre Communication	BEC34808: Satellite Communication
BEC3350: CMS VLSI Design	BEC33607: HDL using Verilog	BEC33609: VLSI Signal Processing	BEC34703: Robotics & Automation	BEC34806 : VLSI Testing	BEC34809: Nanotechnology
BEC33508: Instrumentation and Control System	BEC33607: Industry Automation	BEC33610: PLC SCADA	BEC34704 : Mixed Signal Design	BEC34807: Distributed Control System	BEC34810: System Security

Program: Electronics & Communication Engineering

List of Open Electives offered By Electronics & Communication Department

Open Elective-I	Open Elective-II	Open Elective-III
Semester-III	Semester-IV	Semester-V
BEC32306 : Basic Electronics and Communication	BEC32410 : Evolution in Communication Technologies	BEC32513 : ICT in Rural Sector

Course Category	BSC(Basic Science Course)	ESC (Enginee ring Science Course.)	PCC (Program me Core Courses	PEC (Program me Elective Courses)	MDM/ OEC	VSEC (Skill Cour ses)	Humanities Social Science & Manageme nt	Experiential Learning Courses	CC(Lib eral Learnin g Courses	Semester Wise Credit s
Semester-I	10	05	02	--	--	02	--	--	02	21
Semester-II	08	08	--	--	--	02	02	--	02	22
Semester-III	--	--	08	--	06	01	04	02	--	21
Semester-IV	--	--	10	--	04	02	06	--	--	22
Semester-V	--	--	11	04	06	--	--	--	--	21
Semester-VI	--	--	08	08	02	02	--	--	--	20
Semester-VII	--	--	04	02	02	--	--	12	--	20
Semester-VIII	--	--	04	06	02	--	--	08	--	20
Cumulative Sum	18	13	47	20	22	08	12	22	04	166

				June, 2024	1.00	Applicable for AY 2024-25 Onwards
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Program: B. Tech Second Year					
Semester-III		Digital System Design with HDL (BEC32301)			
Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory(Th)	3 Hrs/week	CT-I	15 Marks	-	-
Practical(P)		CT-II	15 Marks	-	-
Total Credits	3	CA	10 Marks	-	-
Duration of ESE : 3 Hrs		ESE	60 Marks	-	-
		Total Marks	100 Marks	-	-

Course Objectives	
1	Explain the organization of VHDL Program and write different styles of architecture.
2	Write the VHDL code for combinational & sequential logic circuits.
3	Write the VHDL code for finite state machines and implement the circuits using FPGA & CPLD.
Course Contents	
Unit I	Introduction to VHDL : Library units, package, entity, architecture, configuration, Statements: declaration, concurrent, sequential, process, data types, operators, signal assignment, event scheduling, process statements, configuration statements, package declaration, package body, subprograms.
Unit II	Types of architecture : Data flow, Behavioural, Structural, Delays : Inertial, Transport, Inertial, Simulation deltas, drivers, generic, block, design flow,
Unit III	VHDL implementation of combinational logic circuits : adders, subtractors, comparators, encoders, decoders. Sequential logic circuit : Flip flops, counters, shift registers..
Unit IV	VHDL implementation of Finite state machines (FSM). Registered and unregistered outputs, three ways of designing FSM, State vector encoding.
Unit V	Designing with Programmable Gate Arrays and Complex Programmable Logic Devices.

Text Books	
T.1	John F. Wakerly, "Digital Design Principles and Practices", Pearson Education, Fifth Edition (2018).
T.2	Morris Mano, Michael D. Ciletti, "Digital Design", Pearson Education, Fifth Edition (2013).
T.3	R.P. Jain, "Modern Digital Electronics", Tata McGraw Hill Education, Fourth Edition (2010).
Reference Books	
R.1	Thomas L. Floyd, "Digital Fundamentals", Pearson Prentice Hall, Eleventh Global Edition (2015).
R.2	Mandal, "Digital Electronics Principles and Applications", McGraw Hill Education, First Edition (2010).

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Course Code	Course Outcomes	CL	Class Session
BEC32303.1	Interpret the fundamentals of VHDL.	2	9
BEC32303.2	Explain VHDL programs using any of three architecture styles.	4	9
BEC32303.3	Implement combinational and sequential logic circuits using VHDL.	3	9
BEC32303.4	Implement finite state machines using VHDL.	3	9
BEC32303.5	Implement the circuits with CPLDs and programmable gate arrays.	3	9

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Program: B. Tech Second Year

Semester-III		Electronics Device and Circuit (BEC32303)			
Teaching Scheme		Examination Scheme (Th)		Examination Scheme(P)	
Theory(Th)	3 Hrs/week	CT-I	15 Marks	-	-
Practical(P)		CT-II	15 Marks	-	-
Total Credits	3	CA	10 Marks	-	-
Duration of ESE : 3 Hrs		ESE	60 Marks	-	-
		Total Marks	100 Marks	-	-

COURSE OBJECTIVE

- 1 Explain the working of diodes.
- 2 Interpret the configurations of BJT & its application as an amplifier & oscillator.
- 3 Summarize the operation of MOSFET.

COURSE OUTCOMES

Unit I	Semiconductor Diodes : PN junction diode and its application, Physics and structure of diodes, Characteristics, resistance, capacitance and its application, Diode small signal model, Rectifier circuits, Clipping and clamping circuits, Zener diode, voltage regulator, Schottky diode, Varactor Diode, Tunnel Diode.
Unit II	Bipolar Junction Transistors : Bipolar junction transistor (BJT), V-I characteristics, Biasing, Small signal low frequency amplifier. Physical structure and operation modes, Ebers-Moll model, Current voltage characteristics of CE, CB, CC configuration, Low frequency analysis of transistors, miller's theorem, load line, stability factors.
Unit III	Junction Field-effect Transistor : JFET parameters, V-I characteristics, Biasing of JFET, Low frequency model of JFET and its analysis, Power devices, power diode, IGBT, SCR, TRIAC, Switching Devices, DIAC, UJT characteristics and applications.
Unit IV	Power Amplifier : Class A, Class B, Class AB and Class C, Power Efficiency, Power Dissipation, Cross-Over Distortion in Class AB Circuits, negative and positive feedback, Barkhausen criteria, RC, LC, Crystal Oscillators.
Unit V	MOSFET : Device Structure and Physical Operation of MOSFET, Finite Output Resistance in Saturation, Current voltage characteristics of the MOSFET, Biasing in MOSFET Amplifier Circuits, Small Signal Operation and Models, Overview of Depletion type-MOSFET, Enhancement type-MOSFET.

TextBooks

- T.1 "Electronic Devices and Circuits", "Millman Halkias", "TMH", 2000
- T.2 "Electronic Devices and Circuits", "David A. Bell", "PHI", 4th Edition
- T.3 Electronics Devices and Circuit-Jimmie J. Cathey, McGraw – Hill Education

ReferenceBooks

- R.1 Electronic Devices and Theory - Boylestad, Nashelsky 9th. Edition May 2010 PHI
- R.2 Electronic Devices and Circuits - S Salivahanan, N Suresh Kumar 3rd Edition Tata McGraw Hills
- R.3 Electronic Devices and Theory – V.K. Mehta 3rd Edition McGraw – Hill

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Course Code	Course Outcomes	CL	Class Session
BEC32305.1	Interpret the applications and operating principles of the diode and Zener diode semiconductor devices.	2	9
BEC32305.2	Explain the operation and configuration of BJT transistors in CB, CE, and CC, biasing and stability concerns	4	9
BEC32305.3	Examine the characteristics of FET's and Power devices, and analysis of FET using small signal model	3	9
BEC32305.4	Design Power amplifier circuits using transistor, and operation principal of a Class A, Class B, Class AB, and Class C power amplifier circuits with cross over distortion.	4	9
BEC32305.5	Examine the operation and characteristics of Enhancement and Depletion type MOSFETs and their analysis using small signal model.	3	9


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Program: B.Tech Second Year(ECE/EE)					
Semester-III		Transformation & Its Series (BSH32305)			
Teaching Scheme		Examination Scheme(Th)		Examination Scheme(P)	
Theory(Th)	2 Hrs/week	CT-I	7 Marks	-	-
Practical(P)		CT-II	7 Marks	-	-
Total Credits	2	CA	6 Marks	-	-
Duration of ESE: 2 Hrs		ESE	30 Marks	-	-
		Total Marks	50 Marks	-	-
Course Objective					
1	Apply the laplace transform				
2	Interpret the fourier transform of different functions.				
3	Perform Z-transform on different signals.				
Course Contents					
Unit I	Laplace transform : Definition, Standard form, properties of Laplace transform ,inverse Laplace transform of unit step Function , Laplace Transform of periodic function , application of Laplace transformation to linear differential equation with constant coefficient.				
Unit II	Fourier Series and Fourier Transform (FT): Introduction of Fourier Series, Even and Odd functions, change of interval, Half Range Expansions, Fourier transform, Fourier Sine & Cosine transforms, Application of Fourier Transform to solve Integral equation.				
Unit III	A) Difference Equation :,solution of difference equation of higher order with constant equation B) Z-transform: definition, standard form, Z- transform of impulse FN,Z –transform with FN, properties of Z – transform (linearly ,shifting , multiplication by K change of scale) inverse Z- transform(by direct division and partial fraction),solution of difference equation by Z- transform .				
Text Books					
T.1	Higher Engineering Mathematics by B.S.Grewal, 40 th Edition, Khanna Publication				
T.2	Advanced Engineering Mathematics by Erwin Kreyszig, 8 th Edition, Wiley India				
T.3	Applied Mathematics for Engineers & Physicist by L.R.Pipes and Harville				
Reference Books					
R.1	A Text Book of applied Mathematics, Volume I&II, by P.N.Wartikar & J.N.Wartikar, Poona Vidyarthi Griha Prakashan				
R.2	Introductory methods of Numerical Analysis, by S.S.Sastry, PHI				
R.3	Mathematics for Engineers by Chandrika Prasad				


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Program: B.Tech Second Year					
Semester-III		Industrial Relation (BBA32307)			
Teaching Scheme		Examination Scheme(Th)		Examination Scheme(P)	
Theory (Th)	2 Hrs/week	CT-I	7 Marks	-	-
Practical (P)		CT-II	7 Marks	-	-
Total Credits	2	CA	6 Marks	-	-
Duration of ESE:2Hrs		ESE	30 Marks	-	-
		Total Marks	50 Marks	-	-
	Course Objective				
1	Interpret the importance of industrial relations & its approaches.				
2	Summarize the grievances of employees.				
3	Express the importance of trade unions.				
Course Contents					
Unit I	INTRODUCTION: Industry and Industrial Relations. Development of Industry and Industrial Relations. Meaning of Employee Relations and its difference with Industrial Relations. Nature and Scope of Industrial Relations as an inter-disciplinary subject. Tripartite Scheme of Industrial Relations. Approaches to Industrial Relations -Sociological Approach - Psychological Approach -Marxian Approach -				
Unit II	State of Industrial Relations (10 hours): Meaning of Good and Poor Industrial Relations Causes for poor industrial relations. Indicators of Poor Industrial Relations a. Absenteeism b. Labour Turn Over c. Industrial Indiscipline d. Grievances [with special reference to women employees in India] e. Strikes f. Lock outs.				
Unit III	TRADE UNIONS AS AN ESSENTIAL COMPONENT OF INDUSTRIAL RELATIONS (08 hours) : Definitions Trade unions. Reasons for formation of trade unions. Characteristics of Trade Unions. Functions of Trade Unions Problems faced by Trade unions and future of trade unions				
Text Books					
T.1	Arun Monappa: Industrial Relations.				
T.2	Sharma A M : Industrial Relations.				
T.3	Ahuja K K : Industrial Relations Theory and Practice.				
Reference Books					
R.1	Schneider, Eugene V, Industrial Sociology, Tata McGraw Hill, New Delhi				
R.2	Lenin, V.I., On Trade Unions, Progress Publishers, Moscow				
R.3	Pylee M.V.,George Simon A, Industrial Relations And Personnel Management, Vikas Publishing House, New Delhi				


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	Course Outcomes	CL	Class Sessions
CO1	Analyze concept of Industry and Industrial Relations	3	8
CO2	Illustrate good & poor industrial relations	3	8
CO3	Summarize characteristics of trade unions	1	8

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Program: B.Tech Second Year					
Semester-III		Ethics in Engineering Practices (BSH32308)			
Teaching Scheme		Examination Scheme(Th)		Examination Scheme(P)	
Theory (Th)	2 Hrs/week	CT-I	7 Marks	-	-
Practical (P)		CT-II	7 Marks	-	-
Total Credits	2	CA	6 Marks	-	-
Duration of ESE:2Hrs		ESE	30 Marks	-	-
		Total Marks	50 Marks	-	-
Course Objective					
1	Express the Human Values and Engineering Ethics.				
2	Interpret professional practices in Engineering for Engineers.				
3	Summarize the types of ethical violations and consequence of their influence on business practices, economy and society in general.				
Course Contents					
Unit I	Introduction to Engineering Ethics: Morals, Values, Integrity & Ethics, What is Engineering Ethics, Importance of Engineering Ethics, Code of Ethics, Potential Moral Problems of Engineering Ethics.				
Unit II	Professional Practices in Engineering: Happiness, Prosperity & Harmony, Professional Ethics, Engineering Ethics, Principles of Engineering Ethics, Environmental Ethics, Public Interest Litigation (PIL), Intellectual property Rights (IPR).				
Unit III	An Overview of Engineering Ethics: Ethics in Industry, Professional Practices in Engineering, Ethical behavior, Industry professional malpractices, Workplace Safety, Responsibility and Rights, Basics of business ethics - Corporate Social Responsibility – Issues of Management – Crisis Management.				
Text Books					
T.1	A New Look into Social Science : Shabbir, Sheikh and Dwadashiwar, S. Chand Publisher				
T.2	Constitution of India and Professional Ethics: Reddy, G.B. and Mohd. Suhaib, IK International Publishing House. 2006				
T.3	Introduction to Engineering Ethics : Martin, Mik, Roland Schinzinger, 2 nd edition (16 February 2009) McGraw-Hill Education;				
Reference Books					
R.1	Human Resource Development and Management : A. M. Sheikh, 3 rd Revised Edition, S Chand & Co Ltd.				
R.2	“A Gift of Fire: Social, Legal and Ethical Issues, for Computing and the Internet”: Sara Baase, 3 rd Edition PHI Publications.				
R.3	“Case study in Information Technology Ethics” :Richard A. Spinello, 2 nd Edition PHI Publications.				
R.4	“Internet Ethics”: Duncan Lanford, Macmillan Education UK.				
R.5	“Computer and Ethics in the Cyber age”: D. Micah Hester and Paul J. Ford.				
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	Useful Links
1	https://nptel.ac.in/courses/110/105/110105079/
2	https://nptel/courses/video/1101323279/L54.html
3	https://nptel/courses/video/110105079/L54.html

Course Code	Course Outcomes	CL	Class Session
BSH32308.1	Interpret the concept of Industry and Industrial Relations	4	9
BSH32308.2	Illustrate good & poor industrial relations.	4	9
SH32308	Summarize the need, and role of trade unions.	2	9



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Program: B.Tech. Second Year (ECE)					
Semester-III		Basic Electronics and Communication (BEC32306)			
Teaching Scheme		Examination Scheme (Th)		Examination Scheme (P)	
Theory (Th)	4 Hrs/week	CT-I	15 Marks	-	-
Practical (P)		CT-II	15Marks	-	-
Total Credits	4	CA	10 Marks	-	-
Duration of ESE: 3 Hrs		ESE	60 Marks	-	-
		Total Marks	100 Marks	-	-
Course Contents					
Unit I	Semiconductor Diodes and Applications - p-n junction diode, Characteristics and Parameters, Diode approximations, DC load line analysis, Half-wave rectifier, Two-diode Full-wave rectifier, Bridge rectifier, Capacitor filter circuit, Zener diode voltage regulators: Regulator circuit with no load, and with load.				
Unit II	Bipolar Junction Transistors: Types of transistors, BJT operation, BJT Voltages and Currents, BJT amplification, Common Base, Common Emitter and Common Collector Characteristics. Comparison between CC,CE,CB configurations, RC and LC Oscillators.				
Unit III	Introduction to Operational Amplifiers (Op Amp): Ideal OPAMP characteristics, Inverting and Non Inverting OPAMP circuits,OPAMP applications: voltage follower, addition, subtraction, integration, differentiation;				
Unit IV	Elements of basic electronic communication system, Need of modulation, transmission modes- simplex, half duplex full duplex, synchronous and asynchronous, sources of noise (internal and external) signal to noise ratio Types of modulation AM,FM,PM.				
Unit V	Generation of AM, Modulation Index, percentage of modulation SSB-FC,DSB-SC,AM Radio Receiver TRF and super heterodyne radio receiver, Block diagram and working of FM Transmitter and radio receiver, Narrowband FM and Wideband FM.				
Text Books					
T.1	THERAJA B.L: "BASIC ELECTRONICS SOLID STATE", S.CHAND AND CO.				
T.2	GAYAKWAD RAMAKANT A: "OP-AMPS AND LINEAR INTEGRATED CIRCUITS", PRENTICE HALL OF INDIA				
R3	CHITODE J.S. "ANALOG AND DIGITAL COMMUNICATION" TECHNICAL PUBLICATIONS				
Reference Books					
R.1	BHARGAVA N.N. KULSHRESHTHA D.C.GUPTA S.C. "BASIC ELECTRONICS AND LINEAR CIRCUITS", TATA MCGRAW HILL				
R.2	SALIVAHANAN,S;BHAASKARAN,V.S.KANCHANA "LINEAR INTEGRATED CIRCUITS" TATA MCGRAW HILL				
R.3	"BASICS OF ELECTRONICS COMMUNICATION" TATA MCGRAW HILL				


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Course Code	Course Outcome	CL	Class Session
BEC32306.1	Examine the fundamentals behavior of diode in rectifiers, filter circuits.	3	9
BEC32306.2	Illustrate I/O characteristics of CE, CB, CC bipolar junction transistor.	4	9
BEC32306.3	Apply Operational amplifiers for the application of arithmetic operations.	3	9
BEC32306.4	Infer the basic fundamentals of communication system.	2	9
BEC32306.5	Integrate modulation technics in communication of AM FM radio receiver.	4	9


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Program B.Tech Second Year (ECE)					
Semester – III		DSD Using HDL (BEC30302)			
Teaching Scheme		Examination Scheme (Th)		Examination Scheme (P)	
Theory (Th)				Internal	External
Practical (P)	2 Hrs/week			25	25
Total Credits	1			-	-
Duration of ESE: 2 Hrs				-	-
				Total Marks	50
List of Experiments					
1	VHDL implementation of Logic gates.				
2	VHDL implementation of combinational logic circuits.				
3	VHDL implementation of arithmetic circuits.				
4	VHDL implementation of flip flops.				
5	VHDL implementation of Counters.				
6	VHDL implementation of sequence detectors.				
7	VHDL implementation of shift registers.				
8	VHDL implementation of finite state machines (FSMs).				
9	VHDL implementation of circuits using FPGA.				
10	VHDL implementation of circuits using CPLD.				
Text Books					
T.1	John F. Wakerly, “Digital Design Principles and Practices”, Pearson Education, Fifth Edition (2018).				
T.2	Morris Mano, Michael D. Ciletti “Digital Design”, Pearson Education, Fifth Edition (2013).				
T.3	R.P. Jain, “Modern Digital Electronics”, Tata McGraw Hill Education, Fourth Edition (2010).				
Reference Books					
R.1	Thomas L Floyd, “Digital Fundamentals”, Pearson Prentice Hall, Eleventh Global Edition (2015).				
R.2	Mandal, “Digital Electronics Principles and Applications”, McGraw Hill Education, First Edition (2010).				


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Course Code	Course Outcome	CL	Class Session
BEC323204.1	Demonstrate the organization of VHDL Program.	3	2
BEC323204.2	Verify the usage of packages, subprogram, and configuration in VHDL Program.	4	2
BEC323204.3	Implement the design of combinational logic circuits using VHDL.	3	2
BEC323204.4	Implement the design of sequential logic circuits using VHDL.	3	2
BEC323204.5	Implement the design of circuits using FPGA and CPLD using VHDL.	3	2


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Program B.Tech Second Year (ECE)					
Semester – III		Electronics Devices and Circuit Lab (BEC32304)			
Teaching Scheme		Examination Scheme (Th)		Examination Scheme (P)	
Theory(Th)				Internal	External
Practical(P)	2Hrs/week			25	25
Total Credits	1				
				Total Marks	50 MARKS
Course Contents					
Sr. No.	List of Experiment				CO
1	Examine the V- I characteristics of PN junction diode (Silicon) and Zener diode.				CO1
2	Evaluate Voltage regulation of a Zener diode voltage regulator.				CO 1
3	Verify the operation of Full Wave Rectifier with filters.				CO1
4	Verify I/P & O/P Characteristics of BJT Common Base Transistor Configuration.				CO2
5	Verify I/P & O/P Characteristics of BJT Common Emitter Transistor Configuration.				CO2
6	Verify I/O characteristics of Junction Field Effect Transistor.				CO3
7	Verify the Class B Power Amplifier and observe Cross Over Distortion.				CO4
8	Verify the operation of Class C Power Amplifier and observe crossover Distortion.				CO4
9	Verify the operation of the LC, RC phase shift and Crystal Oscillators.				CO5
10	Verify the Transfer characteristics of Metal Oxide Semiconductor Field Effect Transistor (MOSFET).				CO5
TextBooks					
T.1	Electronic Devices and Circuits – Jacob Millman, Christos C Halkias, Satyabrata Jit, McGraw – Hill Publication				
T.2	Electronic Devices and Circuits : An Introduction – Allen Mottershead				
ReferenceBooks					
R.1	Electronic Devices and Theory – Boyle Stad, Nashelsky 9th. Edition May 2010 PHI				
R.2	Electronic Devices and Circuits - S Salivahanan, N Suresh Kumar 3rd Edition Tata McGraw Hills				


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Course Code	Course Outcome	CL	Class Session
BEC32306.1	Examine the V-I characteristics of PN Junction and Zener Diode	2	2
BEC32306.2	Evaluate the V-I Characteristics of Transistor and its modes of operation. For configuration CE, CB, CC	4	2
BEC32306.3	Evaluate the response of transistors at low and high frequency.	3	2
BEC32306.4	Construct the circuit of Power amplifiers and oscillators using transistor	4	2
BEC32306.5	Analyze the operation and V-I characteristics of MOSFET in Enhancement and Depletion Modes.	3	2


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Program: B. Tech Second Year ECE						
Semester	Course Code	Name of Course	L	T	P	Credits
III	BEC32305	Community Engineering Project	-	-	4	2
Total Marks :						50

Pre-Requisites: --

Course Objectives:

1. Work in a team of 4 students to complete the project work.
2. Perform the experimentation and/or computational work ethically.
3. Complete the works within the deadline.
4. Prepare neat and neat project report without any errors.
5. Communicate effectively in English during project demonstration, orals and viva-voce.

Instructions

Instructions:

- The objective of the project work is to enable the students in convenient groups of not more than 4 members on a project involving theoretical and experimental studies related to the branch of study.
- Every project work shall have a guide who is the member of the faculty of the institution.
- Sixteen periods per week shall be allotted in the time table and this time shall be utilized by the students to receive the directions from the guide, on library reading, laboratory work, computer analysis or field work as assigned by the guide and also to present in periodical seminars on the progress made in the project.
- Each student shall finally produce a comprehensive report covering back ground information, literature survey, problem statement, project work details and conclusion.
- This final report shall be typewritten form as specified in the guidelines.
- The continuous assessment shall be made as prescribed by the regulation TGPECT, Nagpur.



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Course Code	Course Outcome	CL	Class Session
BEC32307.1	Learn to work in a team.	3	9
BEC32307.2	Follow the ethics in completing the project.	5	9
BEC32307.3	Follow the deadline in executing the project.	5	9
BEC32307.4	Write neat, effective and correct project report.	6	9
BEC32307.5	Communicate effectively in English during project demonstration, execution, orals and viva-voce.	4	9


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