BVVS

Basaveshwar Engineering College, Bagalkote

Department of Electronics and Communication Engineering

Vision, Mission Statements and Values

Vision

To achieve excellence in electronics and communication engineering through quality education and research for developing competent professionals.

Mission

1. Foster a dynamic teaching and learning process.
2. Encourage research through innovation and collaboration.
3. Imbibe moral, ethical values and social responsibilities.

Values

The values of the department are

1. Work is Worship
2. Ethics and Integrity
3. Empathy and Compassion
4. Indian Ethos
5. Mutual Respect

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SWOC Analysis

S:Strength:

1. Infrastructure
   - (i.) ICT enabled classrooms/seminar hall with good ambience.
   - (ii.) Well equipped laboratories to cater curriculum requirements.
   - (iii.) Department library with good number of titles and volumes.
   - (iv.) Scope for academic extension programmes.
2. Faculty
   - (i.) 75% of faculty with Ph.D.
   - (ii.) Faculty with minimum of 12 years teaching experience.
   - (iii.) Faculty retention ratio is 100 %.
3. Students
   - (i.) Students with academic and competitive bent of mind.
   - (ii.) 75% of the students are placed in reputed industries.
   - (iii.) 10% to 15% of the students are registering for B.E. Honours Degree.
4. Curriculum
   - (i.) Research and industry oriented adaptive curriculum.
   - (ii.) Curriculum with integrated courses.
5. Alumni
   - (i.) Alumni works in reputed organizations across the world.
   - (ii.) Alumni interactions with students and faculty to bridge the gap between campus and corporate.

W:Weakness:

1. IPR competencies are inadequate.
2. Relatively less number of memberships in professional bodies.
3. Limited collaborative activities.
4. Less number of inter-disciplinary courses and projects.
5. Less number of industry supported laboratories/courses.
6. Inadequate number of funded projects.
7. Less scope for co-curricular and cultural activities.

O:Opportunities:

1. Establishment of Distant Learning Center (DLC) using existing resources.
2. Participation in collaborative projects/ research work with allied institutions.
3. Fostering alumni participation in academics and placement activities.
4. Establishment of Skilling Centers for students.
5. Faculty exchange programs with academia and industry.
6. Organizing conferences.
7. Facilitating incubation centers for alumni.
8. Scope for academic extension programmes
9. Training on computer usage/ programming languages for general public.
10. Enhancing consultancy activities.

C:Challenges:

1. To incorporate experiential teaching learning process.
2. Adapting curriculum to future industry needs.
3. Fostering collaboration to enhance research, innovation and entrepreneurship activities.
4. Attracting diversified students.
5. Strategies to strengthen the placement activities for higher packages and core companies.
6. Secure additional research grants and consultancy opportunities.
7. Enhance quality publications and file patents.

Programme Outcomes

a) **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

b) **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.

c) **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.

d) **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.

e) **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.

f) **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.

g) **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.

h) **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

i) **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

j) **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.

k) **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.

l) **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)

1. Analyze and design systems for electronics, communication, and signal processing applications.
2. Use domain specific tools for design, analysis, synthesis, and validation of VLSI and embeddedsystems
3. Demonstrate the conceptual knowledge with respect to architecture, design analysis and simulationof computer networking and applications

Programme Educational Objectives (PEOs)

PEO1: Our graduates will be able to lead a successful career by solving complex Engineering Problems of society/industry

PEO2: Enable graduates to excel in academia, industry, entrepreneurship and engage in research and lifelong learning

PEO3: Graduates will be able to work effectively as individuals in multidisciplinary environments with high integrity, ethics, human values and societal responsibilities

PEO4: Graduates will be able to exhibit strong leadership, communication, and teamwork skills to succeed in dynamic professional environments and contribute to the global challenges

Suggestive Break-up of Credits for B.E (Common to all Branches)
(For the Students admitted to first year from 2024-2025 onwards and to 2nd year lateral entry from 2025-2026 onwards)

Sem.	BSC	ESC/ETC	HSMC	AEC	PCC	PEC	OEC	Proj.	Int.	Total
1.	08	09	02	1(SFH)						**20**
2.	08	09	02	1(IDT)						**20**
3.	03				17					**20**
4.	03		01		16					**20**
5.			01	2 (SS)	09	03	03	02		**20**
6.				1(IKS)	13	03	03			**20**
7.			03		06	06		09		**24**
8.				3 (MOOCS)			3 (MOOCS)		10	**16**
Tot.	**22**	**18**	**09**	**08**	**61**	**12**	**09**	**11**	**10**	**160**

III SEMESTER													
Sl. No	Course	Course Code	Course Title	Teaching Department and Question Paper Setting Board	Teaching Hours/Week				Examination				Credits
					Lecture	Tutorial	Practical	SDA	Duration In hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1.	BSC	BMAE301C	Mathematics – III for Electrical Science Stream	MATHEMATICS	3	0	0		03	50	50	100	3
2.	PCC	BECA301C	Digital System Design using Verilog	ECE DEPT.	3	0	0		03	50	50	100	3
3.	PCC	BECA302C	Electronic Circuits	ECE DEPT.	3	0	0		03	50	50	100	3
4.	PCC	BECA303C	Network Analysis	ECE DEPT.	3	0	0		03	50	50	100	3
5.	PCC	BECA304C	Data Structures using C++	ECE DEPT.	3	0	0		03	50	50	100	3
6.	PCC	BECA305C	Basics of AI&ML	ECE Dept	3	0	0		03	50	50	100	3
7.	PCCL	BECA306L	Digital System Design using Verilog Laboratory	ECE Dept	0	0	2		03	50	50	100	1
8.	PCCL	BEC307L	Electronic Devices and Circuits Laboratory	ECE DEPT.	0	0	2		03	50	50	100	1
9.	MC	BHSA360M	Yoga	Yoga Teacher	0	0	2		03	100	---	100	0
		BHSB360M	National Service Scheme (NSS)	NSS Coordinator									
		BHSC360M	Physical Education (PE) (Sport sand Athletics)	Physical Education Director									
				Total	**18**	**0**	**6**		**24**	**425**	**400**	**825**	**20**

PCC: Professional Core Course, **PCCL**: Professional Core Course Laboratory, **MC**: Mandatory Course (Non-credit), **AEC**: Ability Enhancement Course, **L:** Lecture, **T**: Tutorial, **P**: Practical, **CIE**: Continuous Internal Evaluation, **SEE**: Semester End Examination, **SDA**: Self Study

IVSEMESTER													
Sl. No	Course	Course Code	Course Title	Teaching Department and Question Paper Setting Board	Teaching Hours/Week				Examination				Credits
					Lecture	Tutorial	Practical	SDA	DurationIn hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1.	PCC	BECA401C	Signals and Systems	ECE DEPT.	3	0	0	0	03	50	50	100	3
2.	PCC	BECA402C	Analog and Digital Communication	ECE DEPT.	3	0	0	0	03	50	50	100	3
3.	PCC	BECA403C	Linear Integrated Circuits	ECE DEPT.	3	0	0	0	03	50	50	100	3
4.	PCC	BECA404C	ARM Processors	ECE DEPT.	3	0	0	0	03	50	50	100	3
5.	BSC	BBTA405C	Biology for Engineers	BT DEPT.	3	0	0	0	03	50	50	100	3
6.	HSMC	BHSA424C	Universal human values	ECE DEPT.	1	0	0	0	01	50	50	100	1
7.	PCCL	BECA405L	Communication Engineering Laboratory	ECE DEPT.	0	0	3	0	03	50	50	100	1.5
8.	PCCL	BECA406L	Linear Integrated Circuits Laboratory	ECE DEPT.	0	0	3	0	03	50	50	100	1.5
9.	PCCL	BECA407L	ARM Microcontroller Laboratory	ECE DEPT	00	0	2	0	03	50	50	100	1
10.	MC	BHSA460M	Yoga	Yoga Teacher	0	0	2		03	100	---	100	0
		BHSB460M	National Service Scheme (NSS)	NSS COORDINATOR									
		BHSC460M	Physical Education (PE) (Sport sand Athletics)	PHYSICAL EDUCATION DIRECTOR									
				Total	**16**	**0**	**08**	00	**25**	**475**	**450**	**925**	**20**

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V SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department and Question Paper Setting Board	Teaching Hours/Week				Examination				Credits
					Lecture	Tutorial	Practical	SDA	DurationIn hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1.	PCC	BECA501C	Digital Signal Processing	ECE DEPT.	3	0	0	0	03	50	50	100	3
2.	PCC	BECA502C	Computer Networks	ECE DEPT.	3	0	0	0	03	50	50	100	3
3.	PEC	BECX503E	Professional Elective Course	ECE DEPT.	3	0	0	0	03	50	50	100	3
4.	OEC	BECXXXXN	Open Elective Course	Other Dept	3	0	0	0	03	50	50	100	3
5.	AC	BHSXXXXC	Qualitative Aptitude and Soft Skills	TPC	1	3	0	0	02	50	50	100	2
6.	PROJ	BECA504P	Mini Project	ECE DEPT.	0	0	4	0	03	100	00	100	2
7.	HSMC	BBTAXXXC	Environmental Studies	BT DEPT.	1	0	0	0	03	50	50	100	1
8.	PCCL	BECA505L	Computer Networks Laboratory	ECE DEPT.	0	0	3	0	03	50	50	100	1
9.	PCCL	BECA506L	Digital Signal Processing Laboratory	ECE DEPT.	0	0	3	0	03	50	50	100	1
10.	PCCL	BECA507L	Data Structures Using C++										1
11.	MC	BHSA560M	Yoga	Yoga Teacher	0	0	2	0	0	25	0	25	0
		BHSB560M	National Service Scheme (NSS)	NSS Coordinator									
		BHSC506M	Physical Education (Sports and Athletics)	PE Director									
				Total	**14**	**03**	**12**	00	**26**	**525**	**400**	**925**	**20**

Professional Elective Course (PEC)			Open Elective Course (OEC)	
1	Java Programming	BECA503E	Communication Systems	
2	Mobile Communication	BECB503E	Fuzzy Logic	
3	Speech Processing	BECC503E	Micro Electro Mechanical Systems	
4	CMOS Analog VLSI Design	BECD503E		
5	Advanced Python Programming	BECE503E		

PCC: Professional Core Course, **PCCL**: Professional Core Course Laboratory, **UHV**: Universal Human Value, **MC**: Mandatory Course (Non-credit), **L:** Lecture,**OEC**: Open Elective Course, **PEC**: Professional Elective Course, Tutorial, P: Practical **S= SDA**: Skill Development Activity, AC: Audit Course, HSMC:

VI SEMESTER

Sl.No	CourseandCourseCode		CourseTitle	TeachingDepartment(TD)andQuestionPaperSettingBoard(PSB)	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Durationin hours	CIEMarks	SEEMarks	Total Marks	
					L	T	P	S					
1.	PCC	BECA601C	Electromagnetic Theory	ECE DEPT	3	0	0	0	03	50	50	100	3
2.	PCC	BECA602C	Control Systems	ECE Dept	3	0	0	0	03	50	50	100	3
3.	PCC	BECA603C	CMOS Digital VLSI Design	ECE DEPT	3	0	0	0	03	50	50	100	3
4.	PCC	BECA604C	Multimedia Communication	ECE Dept	2	0	0	0	03	50	50	100	2
5.	PEC	BECX605E	ProfessionalElectiveCourse	ECE DEPT	3	0	0	0	03	50	50	100	3
6.	OEC	BECXXXN	Open Elective Course	RESPECTIVEDEPT	3	0	0	0	03	50	50	100	3
7.	AEC	BECA606C	IndianKnowledge System	ECE DEPT	1	0	0	0	03	50	50	100	1
8.	PCCL	BECA607L	Robotics Laboratory		0	0	2	0	03	50	50	100	1
9.	PCCL	BECA608L	CMOS VLSIDesignLaboratory	ECE DEPT	0	0	2	0	03	50	50	100	1
10.	MC	BHSA660M	Yoga	YOGATEACHER	0	0	2			25	---	25	0
		BHSB660M	NationalServiceScheme(NSS)	NSSCOORDINATOR									
		BHSC660M	PhysicalEducation(PE) (Sports andAthletics)	PHYSICALEDUCATION DIRECTOR									
Total					**18**	**0**	**06**	**00**	**27**	**525**	**400**	**925**	**20**

Sl. No.	ProfessionalElectiveCourse (PEC)	SubjectCode	OpenElectiveCourse (OE)	SubjectCode
1.	Robotics and Automation	BECA605E	Sensor Technology	
2.	Digital Image Processing	BECB605E	Wireless Networks and Mobile Architecture	
3.	Nanotechnology	BECC605E		
4.	Embedded System Design using Embedded C	BECD605E		
5.	Micro Electro Mechanical Systems	BECE605E		

PCC: Professional Core Course, **PCCL**: Professional Core Course Laboratory, **UHV**: Universal Human Value,**MC**: Mandatory Course (Non-credit), **L:** Lecture,**T**: Tutorial, P: Practical **S= SDA**: Skill Development Activity,

VII SEMESTER (Swappable VII and VIII SEMESTER)

Sl.No	CourseandCourseCode		CourseTitle	TeachingDepartment(TD)andQuestionPaperSettingBoard(PSB)	TeachingHours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Durationinhours	CIEMarks	SEEMarks	TotalMarks	
					L	T	P	S					
1.	PCC	BECA701C	Microwave Engineering and AntennaTheory	ECEDEPT	3	0	0	0	03	50	50	100	3
2.	PCC	BECA702C	Information Theory and Coding	ECEDEPT	3	0	0	0	03	50	50	100	3
3.	HSMC	BHSXXXXC	Research Methodology & IPR	ECEDEPT	2	0	0	0	03	50	50	100	2
4.	PEC	BECX703E	**Professional Elective Course – I**	RESPTIVEDEPT	3	0	0	0	03	50	50	100	3
5.	OEC	BECX704E	**Professional Elective Course - II**	ECEDEPT	3	0	0	0	03	50	50	100	3
6.	PCCL	BECA705L	Advanced Communication Laboratory	ECE DEPT	0	0	2	0	03	50	50	100	1
7.	PROJ	BECA706P	**Major Project**	ECEDEPT	0	0	18	0	03	100	100	200	9
					14	0	20	0	21	**400**	**400**	**800**	**24**

Sl. No.	ProfessionalElectiveCourse (PEC)	SubjectCode	ProfessionalElectiveCourse (PEC)	SubjectCode
1.	Application Specific Integrated Circuit	BECA703E	Automotive Electronics	BECA704E
2.	Wireless AdHoc Networks (AVS)	BECB703E	Sensors and Actuators	BECB704E
3.	Cyber Security	BECC703E	Satellite Communication	BECB703E
4.	Fiber Optics and Networks	BECD703E	Wireless Sensor Networks (AVS)	
	Digital Verification	BECE703E		

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VIII SEMESTER (Swappable VII and VIII SEMESTER)														
Sl.No	**CourseandCourseCode**		**CourseTitle**	**TeachingDepartment(TD)and Question PaperSettingBoard(PSB)**	**TeachingHours/Week**				**Examination**				**Credits**
					Theory Lecture	**Tutorial**	**Practical/ Drawing**	**SDA**	**Durationin hours**	**CIE Marks**	**SEEMarks**	**TotalMarks**	
					L	**T**	**P**	**S**					
1	PEC		**Professional Elective (Online Courses) MOOCS**		3	0	0	0	03	50	50	100	3
2	OEC		**Open Elective (Online Courses) MOOCS**		3	0	0	0	01	50	50	100	3
3	INT		**Internship (Industry/Research) (14-20weeks)**		0	0	12	0	03	100	100	200	10
			Total		6	0	14	0	10	**300**	**200**	**600**	**16**
Professional Elective Course													
	BOS Recommended Course					BOS Recommended Course							
	BOS Recommended Course					BOS Recommended Course							
Open Elective Courses													
	BOS Recommended Course					BOS Recommended Course							
	BOS Recommended Course					BOS Recommended Course							

PCC: Professional Core Course, **PCCL**: Professional Core Course Laboratory, **UHV**: Universal Human Value,**MC**: Mandatory Course (Non-credit), **L:** Lecture,**T**: Tutorial, P: Practical **S= SDA**: Skill Development Activity, AC: Audit Course

1St Year Syllabus

Course Code: BECAXXXC	Fundamentals of Electronics and Communication	Credits: 03
L:T:P - 3 : 0: 0		CIEMarks:50
Total Hours/Week: 03		SEEMarks:50

UNIT-I	10 Hrs.

Construction, operation and characteristics of PN junction diode, zener diode, varactor diode, Schottky diode and tunnel diode. Applications of diodes: Half wave rectifier, full wave rectifier, Bridge rectifier, rectifier parameters and derivation, rectifier with capacitor filter. Zener diode voltage regulator.

UNIT–II	10 Hrs.

Bipolar Junction Transistors: Introduction, BJT Voltages & Currents, Common Base Characteristics, Common Emitter Characteristics, Single stage amplifier, RC phase shift oscillator. Field Effect Transistor: Junction Field Effect Transistor (N-Channel), JFET Characteristics, MOSFETs: Enhancement MOSFETs, Depletion Enhancement MOSFETs. Construction, operation and characteristics of UJT.

UNIT–III	10 Hrs.

Operational Amplifiers: Introduction, The Operational Amplifier, Block Diagram Representation of Typical Op-Amp, Schematic Symbol. Op-Amp Parameters: Gain, Input Resistance, Output Resistance, CMRR, Slew Rate, Bandwidth, Input Offset Voltage, Input Bias Current and Input Offset Current, The Ideal Op-Amp, Equivalent Circuit of Op-Amp, Open Loop Op-Amp Configurations, Differential Amplifier, Inverting & Non Inverting Amplifier. Op-Amp Applications: Inverting Configuration, Non-Inverting Configuration, Differential Configuration, Voltage Follower, Integrator, Differentiator.

UNIT–IV	10 Hrs.

Number Systems: Introduction, Decimal, Binary, Octal and Hexadecimal Number Systems. Conversion between number systems. Addition and subtraction. Digital Logic: Basic Theorems and Properties of Boolean Algebra, Logic Gates, Universal Gates implementation, Half and Full Adder, Parallel Adder. Fundamentals of Communication: Elements of a Communication System, Modulation: Need for Modulation, Amplitude Modulation, Frequency Modulation, Waveforms. (Excluding Derivation and Spectral Diagrams)

Reference Books

1. David A. Bell, “Electronic Devices and Circuits”, 5th edition, Oxford University Press, 30th Impression, 2025.
2. Robert L. Boylestad, Louis Nashelsky, "Electronic Devices and Circuit Theory", Prentice Hall, 2006.
3. Ramakanth A Gayakwad, Op-amps and Linear Integrated Circuits, 4th Edition, Pearson Education, 2015.
4. M. Morris Mano, "Digital Logic and Computer Design", PHI Learning, 2008
5. Floyd and Jain, “Digital fundamentals”, 8th edition, Pearson, 2006.
6. Jacob Milliman, Christos C. Halkies, “Electronics Devices and Circuits”, TMH, 2001
7. A.P. Malvino, “Electronic Principles”, TMH, 2003.

Course Outcomes

After completion of the course student will be able to

1. Apply the working principles, fundamental characteristics of various semiconductor diodes in basic electronic circuits..
2. Analyze the working principles and characteristics of BJT, FET and
3. Illustrate the fundamental concepts of operational amplifiers their configurations.
4. Design basic combinational circuits using the fundamental principles of digital systems and Analyze the fundamental concepts of communication systems.

Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**	**3**
CO1	3	3	2	-	2	2	-	-	-	-	-	-	-	-
CO2	3	2	1	1	1	-	-	-	-	-	2	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	3	1	1	-	-	-	-	-	2	-	-	-

Course Code: BECAXXXL	Fundamentals of Electronics and Communicaiton Laboratory	Credits: 01
L:T:P - 0 : 0: 2		CIE Marks:50
Total Hours/Week: 02		SEE Marks:50

List of Experiments

1. Measurement of cut in and reverse breakdown voltage of a PN junction diode.
2. Analysis of a diode as half-wave and full-wave rectifier (with and without capacitor filter).
3. Measurement of cut in and reverse breakdown voltage of Zener diode.
4. Zener diode as voltage regulator.
5. Study of input and output characteristics of BJT in CE configuration.
6. Transistor as a switch.
7. V-I characteristics and analysis of UJT.
8. Truth table verification of logic gates.
9. Implementation of boolean expression using logic gates.
10. Implementation of half adder and full adder.

Course Outcomes

After completion of the course student will be able to

1. Demonstrate the ability to construct and analyze the V-I characteristics of diodes, BJT and FET.
2. Design and evaluate diode-based and transistor-based circuits and measure output parameters.
3. Verify the truth tables of logic gates.
4. Design and implement the adder circuits.

Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3	2	1	2	1	-	-	-	-	-	2	-	-	-
CO2	3	2	3	2	2	-	-	-	-	-	2	-	-	-
CO3	3	2	3	2	2	-	-	-	-	-	1	-	-	-
CO4	3	2	3	2	1	-	-	-	-	-	2	-	-	-

ESC-I/II

Course Code: BECAXXXN	**Introduction to Electronics & Communication**	**Credits: 03**
Hours/Week (L:T:P) : L-T-P: 3-0-0		**CIE Marks: 50**
Total Hours of Pedagogy (Theory + Lab): 40hrs		**SEE Marks: 50**
Course Type: Theory		

Course Objectives:

1. **Understand the operation of semiconductor devices and their applications.**
2. **Study Oscillators, Op-Amps and its applications.**
3. **Understand the embedded systems, logic circuits and their optimization.**
4. **Understand the analog and digital communication schemes.**

UNIT-I	**10Hrs.**

Power Supplies: Block diagram, PN junction diode characteristics, half-wave rectifier, full-wave rectifiers and filters, voltage regulators, voltage multipliers.

BJT Characteristics: Introduction, Common base and common emitter Characteristics

Self-study component: Switched mode power supply.

UNIT-II	**10Hrs.**

Amplifier and Oscillators: Single stage CE amplifier, Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator, (Only Concepts, working, and waveforms. No mathematical derivations)

Operational amplifiers: Ideal op-amp; characteristics of ideal and practical op-amp; Practical op-amp circuits: Inverting and non-inverting amplifiers, voltage follower, summer, integrator, differentiator.

Self-study component: Op-amp as zero crossing detector.

UNIT-III	**10 Hrs.**

Boolean Algebra and Logic Circuits: Binary numbers, number base conversion, octal & hexa decimal numbers, complements, basic definitions, axiomatic definition of Boolean algebra, basic theorems and properties of Boolean algebra, digital logic gates. **Combinational logic**: Introduction, design procedure, Adders- Half adder, Full adder, Parallel adder.

Embedded Systems: Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC.

Self-study component: Half subtractor and full subtractor.

UNIT-IV	**10Hrs.**

Communication System: Modern communication system, types of communication systems.

Analog Modulation Schemes: Amplitude Modulation, Frequency Modulation.(only concepts)

Digital Modulation Schemes: Advantages of digital communication over analog communication, ASK, FSK, PSK, radio signal transmission multiple access techniques.

Self-study component: Opto-couplers.

Suggested Learning resources

1. Mike Tooley, “Electronic Circuits, Fundamentals & Applications”, 4th Edition, Elsevier, 2015
2. M. Morris Mano, “Digital Logic and Computer Design”, PHI Learning, 2008 ISBN-978-81-203- 0417-84
3. D. P. Kothari, I. J. Nagrath, “Basic Electronics”, 2nd edition, McGraw Hill Education (India), 2018
4. K V Shibu, ‘Introduction to Embedded Systems’, 2nd Edition, McGraw Hill Education (India), Private Limited, 2016
5. S L Kakani and Priyanka Punglia, ‘Communication Systems’, New Age International Publisher, 2017.

Course Outcomes:

A student who successfully completes this course should be able to

1. Differentiate and analyze the applications of electronic devices and circuits.
2. Analyze the operation of oscillators, op amps and its applications.
3. Analyze different number systems , logic circuits and embedded systems
4. Describe communication system and modulation techniques.

Course Outcomes	PSOs													
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
1. Differentiate and analyze the applications of electronic devices and circuits.	3	3	2	-	2	2	-	-	-	-	-	3	-	-
2. Analyze the operation of oscillators, op amps and its applications.	3	2	3	-	2	1	-	-	-	-	-	3	-	-
3. Analyze different number systems , logic circuits and embedded systems	3	2	3	-	3	-	-	-	1	-	-	3	-	-
4.Describe communication system and modulation techniques.	3	1	1	-	2	1	-	-	1	-	1	3	-	-
Course Contribution to POs and PSOs	**3**	**2**	**2.25**	**-**	**2.25**	**1**	**-**	**-**	**0.5**	**-**	**0.25**	**3**	**-**	**-**