

SIPNA COLLEGE OF ENGINEERING & TECHNOLOGY, AMRAVATI

An Autonomous Institute Affiliated to

Sant Gadge Baba Amravati University, Amravati, Maharashtra (India)

(Approved by AICTE, New Delhi and Recognized by DTE, Maharashtra)

(Accredited With 'A+' Grade by NAAC)



Bachelor of Technology (B. Tech.)

Second Year Syllabus: Semester III and IV

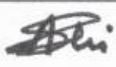
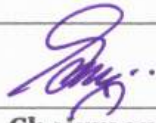
Department of Electronics and Telecommunication Engineering

(Semester Pattern)

Effective from Academic Year 2025-26

Prepared By: Boards of Studies-Electronics and Telecommunication Engineering

Approved By: Academic Council -Sipna COET, Amravati

			05/07/2025	1.00
Chairman Board of Studies	Dean Academics	Chairman Academic Council	Date of Release	Version





Scheme Semester -III

Scheme for Second Year B. Tech. In Electronics and Telecommunications Engineering (Semester-III)															
Sr No	Course Name	Course Code	Course Plan per Week (Hrs)				Credits	Theory Evaluation				Practical Evaluation		Total	ESE Time (Hrs)
			L	P	T	Hrs		MSE I	MSE II	TA	ESE	INT	EXT		
	Basic Science Courses (BSC)														
1	Engineering Mathematics -III	BTETBS07SH3T	3	0	0	3	3	15	15	10	60	-	-	100	2.5
	Program Course Courses (PCC)														
2	Electronics Devices & Circuits	BTETPC02ET3T	3	0	0	3	3	15	15	10	60	-	-	100	2.5
3	Electronics Devices & Circuits Lab	BTETPC03ET3P	0	2	0	2	1	-	-	-	-	30	20	50	-
4	Digital System Design	BTETPC04ET3T	3	0	0	3	3	15	15	10	60	-	-	100	2.5
5	Digital System Design Lab	BTETPC05ET3P	0	2	0	2	1	-	-	-	-	30	20	50	-
6	Electromagnetic Fields	BTETPC06ET3T	3	0	0	3	3	15	15	10	60	-	-	100	2.5
7	Object Oriented Programming Lab	BTETPC07ET3P	0	2	0	2	1	-	-	-	-	30	20	50	-
	Multidisciplinary Minor Courses (MDM)														
8	Multi-Disciplinary Minor-I	--	3	0	0	3	3	15	15	10	60	-	-	100	2.5
	Open Elective Courses (OEC)														
9	Open Elective- I	--	2	0	0	2	2	15	15	10	60	-	-	100	2.5
	HSSMC (Entrepreneurship/ Economics/ Management Course)														
10	Economics for Engineers	BTETEM01ET3T	2	0	0	2	2	15	15	10	60	-	-	100	2.5
TOTAL			19	06	0	25	22	105	105	70	420	90	60	850	-
L: Lecture P: Practical T : Tutorial MSE: Mid Semester Exam ESE: End Semester Exam TA: Teacher Assessment INT: Internal EXT: External															

Note: For Syllabus and Course Code of Multi-Disciplinary Minor-I(Semester-III), refer the departmental MDM Document.

Note : Six hours per weeks are allotted for continuous evaluation process of the above subjects
(Total contact hours per week =42 Hrs)

List of Open Elective (OE-I) Semester-III (Choose any one Course)

S. N	Open Elective-I	Course Code	Faculty	S. N	Open Elective-I	Course Code	Faculty
1	Digital Marketing	BTALOE01CS3T	Management and Finance	7	Green Building Design	BTALOE07CE3T	Science
2	Organization Behavior and Psychology	BTALOE02CS3T	Psychology	8	Architectural Graphics	BTALOE08CE3T	Architecture
3	Soft Skills and Presentation Skills	BTALOE03IT3T	Management	9	Introduction to History of Indian Architecture	BTALOE09CE3T	Architecture
4	Industry 4.0	BTALOE04IT3T	Management	10	Industrial Safety	BTALOE10ME3T	Health & Safety
5	E Waste Management	BTALOE05ET3T	Commerce	11	Quantitative Aptitude	BTALOE11SH3T	Science
6	Aptitude & Reasoning	BTALOE06ET3T	Humanities Science	12	Emotional Intelligence	BTALOE34AD3	Psychology

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Dated:-.....05/7/25.....



Scheme Semester -IV

Scheme for Second Year B. Tech. In Electronics and Telecommunications Engineering (Semester-IV)

Sr No	Course Name	Course Code	Course Plan per Week (Hrs)				Credits	Theory Evaluation				Practical Evaluation		Total	ESE Time (Hrs)
			L	P	T	Hrs		MSE I	MSE II	TA	ESE	INT	EXT		
	Program Course Courses (PCC)														
1	Analog Circuits	BTETPC08ET4T	3	0	0	3	3	15	15	10	60	-	-	100	2.5
2	Analog Circuits Lab	BTETPC09ET4P	0	2	0	2	1	-	-	-	-	30	20	50	-
3	Analog & Digital Communications	BTETPC10ET4T	3	0	0	3	3	15	15	10	60	-	-	100	2.5
4	Analog & Digital Communications Lab	BTETPC11ET4P	0	2	0	2	1	-	-	-	-	30	20	50	-
5	Signals & Systems	BTETPC12ET4T	2	0	0	2	2	15	15	10	60	-	-	100	2.5
6	Signals & Systems Lab	BTETPC29ET4P	0	2	0	2	1	-	-	-	-	30	20	50	-
7	Network Analysis	BTETPC13ET4T	3	0	0	3	3	15	15	10	60	-	-	100	2.5
	Multidisciplinary Minor Courses (MDM)														
8	Multi-Disciplinary Minor-II	--	3	0	0	3	3	15	15	10	60	-	-	100	2.5
	Vocational and Skill Enhancement Courses (VSEC)														
9	IOT Lab	BTETVS04ET4P	0	2	0	2	1	-	-	-	-	50	-	50	-
	Open Elective Courses (OEC)														
10	Open Elective- II	--	2	0	0	2	2	15	15	10	60	-	-	100	2.5
	HSSMC (Entrepreneurship/ Economics/ Management Course)														
11	Innovation, Creativity & Entrepreneurship	BTETEM02ET4T	2	0	0	2	2	15	15	10	60	-	-	100	2.5
TOTAL			18	08	0	26	22	105	105	70	420	140	60	900	-
L: Lecture P: Practical T : Tutorial MSE: Mid Semester Exam ESE: End Semester Exam TA: Teacher Assessment INT: Internal EXT: External															

L: Lecture P: Practical T: Tutorial MSE: Mid Semester Exam ESE: End Semester Exam TA: Teacher Assessment INT: Internal EXT: External

Note: For Syllabus and Course Code of Multi-Disciplinary Minor-II(Semester-IV), refer the departmental MDM Document.
Note : Six hours per weeks are allotted for continuous evaluation process of the above subjects (Total contact hours per week =42 Hrs)

List of Open Elective (OE-II) Semester-IV (Choose any one Course)

S. N	Open Elective-II	Course Code	Faculty	S. N	Open Elective-II	Course Code	Faculty
1	International Human Rights System	BTALOE12CS4T	Law	7	Industrial Pollution, Monitoring & Management	BTALOE18CE4T	Environmental Science
2	Numerical Methods and operational research Techniques	BTALOE13CS4T	Management	8	Air and Noise Pollution Control	BTALOE19CE4T	Environmental Science
3	Cyber Law	BTALOE14IT4T	Law	9	Disaster Management	BTALOE20CE4T	Environmental Science
4	Operations Research	BTALOE15IT4T	Management	10	Ergonomics	BTALOE21ME4T	Health & Safety
5	Non-Conventional Energy Sources	BTALOE16ET4T	Humanities Science	11	Industrial Costing	BTALOE22ME4T	Commerce
6	Consumer electronics	BTALOE17ET4T	Commerce	12	Personal Effectiveness	BTETOE23SH4T	Social Science

Scheme for Multiple Entry and Exit

Exit Option1 (L5.0): Award of Two Years UG Diploma in Major with 88 credits and additional 8 credits.

Exit Courses

Eight Credit Online Course from Swayam / NPTEL / Any Other Agency approved by the BoS, which provides Certification / Evaluation.	Online Certification Course	8
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Dated:- 05/7/24



Program:	B. Tech. (Electronics & Telecommunication Engineering)	Semester:	III
Course:	Maths-III	Code:	BTETBS07SH3T

Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	-	3	3	10	15	15	60	100

Methods of Teacher Assessment (TA): Assignments & Class Attendance

Course Objectives: To develop essential Mathematical & statistical skills.

Course Outcomes:

After completion of the course, the students will be able to:

CO	Course Outcomes	BT Level (L1 to L6)
CO-1	Solve the differential equation by various methods.	L3
CO-2	Apply properties to find the Laplace Transform of various functions.	L3
CO-3	Make use of concepts of Gradient, Divergence & Curl to understand vector Calculus.	L3
CO-4	Analyze the data to fit Curves Using Statistical Techniques.	L4
CO-5	Explain how to find Fourier Transform by using Formulae.	L2
CO-6	Find the solution of Partial Differential Equations by identifying its various types.	L1

Unit I: Ordinary Differential Equations:

(6 Hrs.)

Complete solution, Rules for finding complementary function, and the particular integral, Method of variations of parameters, Cauchy's linear differential equations.

Unit II: Laplace transforms:

(6 Hrs.)

Definition, standard forms, properties of Laplace transform, inverse Laplace transform, convolution theorem

Unit III: Vector Calculus:

(6 Hrs.)

Scalar and Vector point functions, Differentiation of vectors, Gradient of a scalar point function, Directional derivatives, Divergence and curl of a vector point function, irrotational and solenoidal vector fields.

Unit IV: a. Z-transform :

(6 Hrs.)

Definition, standard forms, Z-transform of impulse function, Unit step functions, Properties of Z transform, inverse Z-transforms by partial fraction.

b. Curve fitting: Method of Least Square: Fitting of Straight Line & Second-Degree parabola, Coefficient of Correlation, Line of Regression.

Unit V: Fourier transforms:

(6 Hrs.)

Definition, standard forms, inverse Fourier transform, properties of Fourier transforms, Fourier sine and Fourier cosine transforms and integrals.

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Unit VI: Partial differential equation:

(6 Hrs.)

Partial differential equation of first order of following types (i) $f(p,q)=0$; (ii) $f(p, q,z) =0$; (iii) $f(x, p) =g(y, q)$; (iv) $Pp + Qq=R$ (Lagranges Form); (v) $Z=px+qy+f(p, q)$

Total 36 Hours

Textbooks:

1. A Textbook of Applied Mathematics, Vol II by P N. Wartikar, J. N. Wartikar
2. Higher Engineering Mathematics by Dr. B.S. Grewal.

Reference Books:

1. Mathematical Statistics by J.N. Kapur & H.C. Saxena
2. Fundamentals of Mathematical statistics, S. C. Gupta, V. K. Kapoor

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Program:	B. Tech. (Electronics & Telecommunication Engineering)	Semester:	III
Course:	Electronics Devices & Circuits	Code:	BTETPC02ET3T

Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	-	3	3	10	15	15	60	100

Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance

Course Objectives: Develop practical skills in designing and analysing semiconductor-based analog Circuits.

Course Outcomes:

After completion of the course, the students will be able to:

CO	Course Outcomes	BT Level (L1 to L6)
CO-1	Explain PN junction diodes, rectifiers, filters, and applications.	L2, L4
CO-2	Analyze wave-shaping circuits using RC filters and diodes.	L4
CO-3	Explain BJTs, configurations, biasing, and characteristics.	L2
CO-4	Analyze feedback amplifiers and oscillators.	L4
CO-5	Understand and evaluate multistage amplifiers.	L2, L5
CO-6	Explain FETs, MOSFETs, and UJT with applications.	L2

Unit I: PN Junction Diode

(6 Hrs.)

PN Junction Diode: Formation, biasing, V-I characteristics, Rectifiers: Analysis of Half Wave (HWR) & Full Wave Rectifier (FWR), Filters: C, L, LC, CLC filters, Applications: Diode as a switch, Zener diode as a voltage regulator (Numerical)

Unit II: Wave shaping Circuits

(6 Hrs.)

RC Circuits: Low pass & high pass filters, Waveforms: Sinusoidal, Square signal. Clipping & Clamping circuits using diodes (positive & negative unbiased)

Unit III: Bipolar Junction Transistors (BJT)

(6 Hrs.)

Transistor Basics: Transistor types & configurations (NPN transistor CB, CE configurations characteristics) DC Load line analysis, Transistor Biasing Methods (fixed & voltage divider) Derivation of Stability factor, Numerical on Current Amplification factor, Introduction to voltage divider biased CE amplifier using h-parameter model.

Unit IV: Feedback Amplifiers & Oscillators

(6 Hrs.)

Feedback Amplifiers: Concept, negative feedback, basic topologies & its comparison (Current Series, Current Shunt, Voltage series, Voltage Shunt). Oscillators: Barkhausen's criteria, Hartley, RC Phase shift (Numerical)

Unit V: Multistage Amplifiers

(6 Hrs.)

Need for Multistage Amplifiers, Multistage Amplifiers : RC Coupled, Direct Coupled, Emitter Follower, Darlington Emitter Follower, Bootstrapping Principle (Numerical on overall gain).

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Unit VI: Field Effect Transistors (FET) & UJT

(6 Hrs.)

JFET: Introduction, characteristics, parameters (μ , gm, rd) MOSFET: Enhancement & depletion type MOSFET UJT: Construction, UJT as relaxation oscillator

Total 36 Hours

Textbooks:

1. **Electronic Devices and Circuit Theory** – Robert L. Boylestad, Louis Nashelsky (Pearson)
2. **Integrated Electronics: Analog and Digital Circuits and Systems** – Jacob Millman, Christos C. Halkias (McGraw Hill)
3. **Microelectronic Circuits** – Adel S. Sedra, Kenneth C. Smith (Oxford University Press)
4. **Electronic Principles** – Albert Malvino, David Bates (McGraw Hill)
5. **Electronic Devices and Circuits** – Salivahanan, Suresh Kumar, Vallavaraj (McGraw Hill)

Reference Books:

1. **Solid State Electronic Devices** – Ben G. Streetman, Sanjay Banerjee (Pearson)
2. **Electronic Circuit Analysis and Design** – Donald A. Neamen (McGraw Hill)
3. **Principles of Electronics** – V.K. Mehta, Rohit Mehta (S. Chand Publishing)
4. **Fundamentals of Microelectronics** – Behzad Razavi (Wiley)
5. **Electronic Devices & Circuits** – David A. Bell (Oxford University Press)

MOOC Links:

- 1) **NPTEL - Electronic Devices and Circuits** – <https://nptel.ac.in/courses/108105158>
- 2) **NPTEL - Analog Electronic Circuits** – <https://nptel.ac.in/courses/108/102/108102112/>
- 3) **NPTEL - Semiconductor Devices & Circuits** – <https://archive.nptel.ac.in/courses/117/103/117103063/>
- 4) **MIT OpenCourseWare - Circuits and Electronics** – <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-002-circuits-and-electronics-spring-2007/>
- 5) **Coursera - Introduction to Electronics (Georgia Tech)** – <https://www.coursera.org/learn/electronics>

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Dated:-.....*05/7/25*.....



Program:	B. Tech. (Electronics Telecommunication Engineering)				Semester:	III
Course:	Electronics Devices & Circuits Lab				Code:	BTETPC03ET3P
Teaching Scheme				Evaluation Scheme		
Practical	Tutorial	Hours	Credit	INT	EXT	Total
2	0	2	1	30	20	50

Course Objectives: Develop hands-on expertise in designing, implementing, and analysing semiconductor and analog circuits through practical lab experiments.

Course Outcomes: After completion of the course, the students will be able to:

CO	Course Outcomes	BT Levels
CO1	Analyze the V-I characteristics of PN Junction Diode in forward and reverse bias to understand its conduction behavior.	L4
CO2	Implement rectifier circuits (Half-Wave & Full-Wave) and evaluate their performance in terms of efficiency and ripple factor.	L5
CO3	Design and verify diode-based clipping circuits and RC filters for signal conditioning applications.	L4
CO4	Interpret the input and output characteristics of BJT and JFET to determine their operating regions and amplifier behavior.	L5
CO5	Construct and test amplifier circuits (Single-Stage & Multistage) to measure gain and frequency response.	L5
CO6	Design and implement oscillator circuits (Colpitts/Hartley) and analyze their frequency stability and waveform generation.	L6

Experiment List

- 1) Study and plot V-I characteristics of PN Junction Diode (Forward & Reverse Bias)
- 2) Perform rectification using Half Wave Rectifier & Full Wave Rectifier
- 3) Verify Clipping circuits using diodes.
- 4) Study and analyse RC Low Pass & High Pass Filters for different waveforms
- 5) Plot Input & Output Characteristics of BJT in CE Configuration
- 6) Implement RC coupled multistage amplifier & calculate its overall gain.
- 7) Verify the amplification using Single-Stage CE Amplifier.
- 8) Design and implement Colpitts / Hartley Oscillator
- 9) Study and analyse characteristics of JFET.
- 10) Study & verify characteristics of UJT and observe waveform in relaxation oscillator

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Program:	B. Tech. (Electronics & Telecommunication Engineering)			Semester:		III		
Course:	Digital System Design			Code:		BTETPC04ET3T		
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	-	3	3	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance								
Course Objectives: To develop a comprehensive understanding of Boolean algebra, logic circuit design, and data conversion techniques for efficient digital system implementation.								
After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Levels
CO-1	Apply Boolean algebra and simplification techniques, including Karnaugh Maps (K-Map), for efficient logic circuit design.							L3
CO-2	Implement combinational logic circuits using multiplexers, demultiplexers, decoders, encoders, and magnitude comparators for digital applications.							L3
CO-3	Analyze the behaviour of sequential circuits, including different types of flip-flops and their conversions.							L4
CO-4	Design and differentiate various types of shift registers and their applications in data storage and transfer.							L4, L6
CO-5	Construct and evaluate synchronous and asynchronous counters, including up/down, MOD-N, ring, and Johnson counters.							L5, L6
CO-6	Understand and demonstrate the working of data converters (ADC/DAC) and different types of memories (RAM, ROM, PROM) in digital electronics.							L2, L3

Unit I: Boolean Algebra and Simplification Techniques

(6 Hrs.)

Sum-of-Products (SOP) and Product-of-Sums (POS) methods for logic simplification. Includes Karnaugh Maps (K-Map) for simplification (up to 5 variables), handling Don't-care conditions, and designing Converter (BCD, Binary, Gray Code).

Unit II: Combinational Logic Circuits

(6 Hrs.)

Implementation of logic expression by Multiplexers and Demultiplexers, Decoders: BCD-to-Dec Seven-segment Decoders, Encoders and Priority Encoders, Magnitude Comparator.

Unit-III: Sequential Circuits: Flip Flop

(6 Hrs.)

Introduction, Classification of sequential circuits, Latch, Flip-Flops: SR, JK, D, T Flip-Flops Master-Slave Flip-Flop, Flip Flop Excitation table, Conversions of Flip Flop.

Unit-IV: Sequential Circuits: Shift Registers

(6 Hrs.)

Introduction to Buffer Register, Serial-In Serial-Out Shift Registers, Serial-In Parallel-Out Shift Register, Parallel-In Serial-Out Shift Registers, Parallel-In Parallel-Out Shift Registers, Bidirectional Shift Register, Universal Shift Register.

Unit-V: Sequential Circuits: Counters

(6 Hrs.)

Introduction, Counters: Asynchronous Counter, Synchronous Counter, Up/Down counter, Modulo counter, Ring counter, Johnson counter.

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Unit-VI: Data Converter & Memories

(6 Hrs.)

Introduction, Digital-to-Analog (D-to-A) converter, parameter of DAC, DAC using BCD input code, An-to-Digital A-to-D converter, The flash type A/D Converter, Introduction of RAM, ROM, PROM.

Total 36 Hours

Textbooks:

1. **M. Morris Mano & Michael D. Ciletti** – Digital Design (Pearson)
2. **R. P. Jain** – Modern Digital Electronics (McGraw-Hill)
3. **Thomas L. Floyd** – Digital Fundamentals (Pearson)
4. **John F. Wakerly** – Digital Design: Principles and Practices (Pearson)
5. **Donald D. Givone** – Digital Principles and Design (McGraw-Hill)
6. **William I. Fletcher** – An Engineering Approach to Digital Design (Pearson)

Reference Books:

1. **Stephen Brown & Zvonko Vranesic** – Fundamentals of Digital Logic with Verilog Design (McGraw-Hill)
2. **Ronald J. Tocci, Neal S. Widmer & Gregory L. Moss** – Digital Systems: Principles and Applications (Pearson)
3. **Charles H. Roth & Larry L. Kinney** – Fundamentals of Logic Design (Cengage Learning)
4. **John M. Yarbrough** – Digital Logic: Applications and Design (Cengage Learning)
5. **S. Salivahanan & S. Arivazhagan** – Digital Circuits and Design (Vikas Publishing)
6. **Anand Kumar** – Fundamentals of Digital Circuits (PHI Learning)

MOOC Links:

- 1) NPTEL – Digital Circuits (IIT Kharagpur) <https://nptel.ac.in/courses/108/105/108105132/>
- 2) Coursera – Digital Systems: From Logic Gates to Processors (University of London) <https://www.coursera.org/learn/digital-systems>
- 3) Udemy – Digital Electronics and Logic Design: <https://www.udemy.com/course/digital-electronics-and-logic-design/>
- 4) edX – Digital Circuit Design (UC Santa Cruz): <https://www.edx.org/course/digital-circuit-design>
- 5) MIT OpenCourseWare – Digital Systems : <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-004-computation-structures-spring-2017/>
- 6) FutureLearn – Introduction to Digital Logic Design : <https://www.futurelearn.com/courses/digital-logic-design>

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Dated:-.....05/7/25.....



Program:	B. Tech. (Electronics Telecommunication Engineering)				Semester:	III
Course:	Digital System Design Lab				Code:	BTETPC03ET3P
Teaching Scheme				Evaluation Scheme		
Practical	Tutorial	Hours	Credit	INT	EXT	Total
2	0	2	1	30	20	50
Course Objectives: To design and verify digital logic circuits using gates, flip-flops, counters, and registers.						
Course Outcomes: After completion of the course, the students will be able to:						
CO	Course Outcomes					BT Level
CO1	Implement and verify Boolean expressions using SOP & POS methods.					L3
CO2	Design and construct BCD to Binary and Binary to Gray code converters.					L6
CO3	Demonstrate the working of multiplexers, demultiplexers, and logic functions					L4
CO4	Construct and test Flip-Flops, including SR and D Flip-Flops.					L5
CO5	Develop and implement synchronous counters and shift registers.					L6
CO6	Verify the functionality of an 8-bit parity checker/generator using IC 74180.					L4

Experiment List

- 1) Implementation of SOP Expressions: Verify the truth table for given Boolean expressions and implement them using logic gates.
- 2) Implementation of POS Expressions: Verify the truth table for given Boolean expressions and implement them using logic gates.
- 3) Design and implement BCD to Binary converters using logic gates.
- 4) Design and implement Binary to Gray code converters using logic gates.
- 5) Multiplexer & Demultiplexer Implementation: Implement logic functions using a multiplexer and demultiplexer.
- 6) Flip-Flop Implementation: Implement and test SR, JK and D Flip-Flops using logic gates.
- 7) Design and implementation of 3-bit synchronous up counter.
- 8) Design and implementation of 8-bit odd even parity checker generator using IC 74180.
- 9) Design and Implementation of 4-bit Johnson Counter
- 10) Implementation of Serial-In Serial-Out (SISO) Shift Register
Design and verify the working of a 4-bit Serial-In Serial-Out shift register using D Flip-Flops.

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Program:	B. Tech. (Electronics and Telecommunication Engineering)	Semester:	III
Course:	Electromagnetic Fields	Code:	BTETPC06ET3T
Teaching Scheme			
Lecture	Tutorial	Hours	Credit
3	-	3	3
Evaluation Scheme			
TA	MSE-I	MSE-II	ESE
10	15	15	60
Total			100

Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance

Course Objectives:

- 1.To understand the concept of vector analysis and co-ordinate system in electromagnetic theory.
- 2.To impart the knowledge of static electric field, static magnetic field and associated laws.
- 3.To understand the Maxwell's equation and EM wave propagation.

After completion of the course, the students will be able to:

CO	Course Outcomes	BT Level
CO-1	Apply vector calculus for solution to electric and magnetic field problems..	L4
CO-2	Elaborate and analyse the concepts of Electrostatic fields.	L5
CO-3	Elaborate and analyse the concepts of static magnetic fields.	L4
CO-4	Describe and analyse Boundary conditions in electromagnetic and Maxwell's equations .	L4
CO-5	Describe the electromagnetic wave and its propagation in different homogeneous media .	L3
CO-6	Illustrate and analyse the concept of electromagnetic radiation .	L3

Unit I: Review of Vector Analysis

(6 Hrs.)

Cartesian, Cylindrical and Spherical Co-ordinate Systems, Vector products, Projection of Vectors, Gradient, Divergence and Curl, line, surface, volume integrals, Divergence Theorem and Stokes theorem.

Unit II: Electrostatics

(6 Hrs.)

Coulomb's Law, Electric field intensity, Evaluation of Electric field intensity due to line charge, and Surface charge distribution , Electric flux and Electric flux density, Gauss Law, Electrostatic potential, Potential gradient, Electric dipole and Polarization.

Unit III: Magnetostatics

(6 Hrs.)

Biot-Savart Law, Ampere's Circuital Law, Magnetic field intensity, Magnetic field intensity evaluation due to infinite, finite and circular current carrying conductors, Magnetic flux and Flux density, Magnetic dipole and Magnetization.

Unit IV: Boundary Conditions & Maxwell's Equations

(6 Hrs.)

Boundary condition at Dielectric - Dielectric interface , Dielectric - Conductor interface, Boundary conditions for Magnetic materials interface, Current continuity equation, Maxwell's equations.

Unit V: Electromagnetic wave propagation

(6 Hrs.)

Electromagnetic wave equation for free space, lossy dielectric material and perfect conductor, Propagation constant, Attenuation constant & Phase shift constant, Skin depth, Poynting Theorem, Reflection of a plain wave in a normal incidence at Dielectric - Dielectric interface

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dated:..... Programme Scheme of Examination (SoE) and Syllabus V 1.0



Unit VI: Radiation

(6 Hrs.)

Scalar and Vector magnetic potential, Retarded potential, Power radiated and Radiation resistance due to oscillating dipole, Quarter wave monopole & Half wave dipole.

Total 36 Hours

Textbooks:

1. Hayt W.H.: "Engineering Electromagnetic" Tata Mc Grawhill
2. Jordan E.C. and Balmain K.C.: "Electromagnetic Waves and Radiating System" Prentice Hall of India Private Limited

Reference Books:

1. Mathew N.O., Sadiku "Principles of Electromagnetics" (Fourth Edition), Oxford University Press
2. Kranss J.D.: "Electromagnetic" Mc Grawhill Books co. (Third Edition)
3. Ramo S. and Whinnery R.: "Fields and Waves in Communication Electronics" John Wiley and sons, New Delhi.
4. Dr. TVS Arun Murthy, "Electromagnetic Fields (Theory & Problems)" S. Chand & Company Ltd.

MOOC Links:

1. https://onlinecourses.nptel.ac.in/noc21_ee83/preview

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Program:	B. Tech. (Electronics Telecommunication Engineering)			Semester:	III	
Course:	Object Oriented Programming Lab			Code:	BTETPC07ET3P	
Teaching Scheme				Evaluation Scheme		
Practical	Tutorial	Hours	Credit	INT	EXT	Total
2	0	2	1	30	20	50
Course Objectives: To develop basic programming skills and logical problem-solving abilities using C++.						
Course Outcomes: After completion of the course, the students will be able to:						
CO	Course Outcomes					BT Level
CO1	Understand the basic syntax and structure of a C++ program.					L2
CO2	Implement simple mathematical operations using C++.					L3
CO3	Apply conditional statements and loops in problem-solving.					L3
CO4	Utilize functions for modular programming.					L3
CO5	Handle user input and output effectively.					L3
CO6	Develop basic logic-building skills in programming.					L4

Experiment List

- 1) Hello World– Print "Hello, World!" on the screen.
 - 2) Addition of Two Numbers – Take two numbers as input and print their sum.
 - 3) Swap Two Numbers – Swap two numbers using a temporary variable.
 - 4) Even or Odd Checker – Check if a number is even or odd.
 - 5) Largest of Two Numbers – Find the largest number between two inputs.
 - 6) Simple Calculator – Perform addition, subtraction, multiplication, and division.
 - 7) Reverse a Number – Reverse the digits of a number.
 - 8) Sum of Digits – Find the sum of all digits in a number.
 - 9) Find ASCII Value – Display the ASCII value of a character.
 - 10) Multiplication Table – Print the multiplication table of a given number.
 - 11) Vowel or Consonant Checker – Check whether a character is a vowel or consonant.
- Leap Year Checker – Determine if a year is a leap year.

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Program:	B. Tech. (Electronics and Telecommunication Engineering)	Semester:	III
Course:	Economics for Engineers	Code:	BTETEM01ET3T

Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
2	-	2	2	10	15	15	60	100

Methods of Teacher Assessment (TA): Assignments & Class Attendance

Course Objectives:

1. To familiarize the basic concepts and principles of Engineering Economics
2. To understand the concepts of theory of production in Economics
3. To learn different types of cash flow for evaluation
4. To learn depreciation analysis

Course Outcomes:

After completion of the course, the students will be able to:

CO	Course Outcomes	BT Level (L1 to L6)
CO-1	Learn basics concepts & principles of engineering economics	L2
CO-2	Understand and compute the production cost	L2
CO-3	Study different cash flow evaluation techniques	L1
CO-4	Understand depreciation analysis techniques	L2

Unit I:

(6 Hrs.)

Definition and Scope of Engineering Economics, Subject Matter of Economics, Principles of Engineering Economics, Micro-economics Vs Macro-economics, Utility Analysis, Laws of diminishing utility analysis, derivation of demand curve and law of Demand, Elasticity of demand

Unit II:

(6 Hrs.)

Theory of Production: Theory, Importance, Isoquants and its properties, Marginal rate of technical substitution, Law of variable proportions, Returns to Scale, Cost of Production and Cost of Curves, The law of supply, Price determination.

Unit III:

(6 Hrs.)

Time value of Money, Techniques for adjusting time value of money, Uniform Gradient series factor, annuity, annuity due, calculation of deferred annuity, Types and components of cash flow, cash flow diagrams, principles of equivalence, Uses, significance and limitation of Cash flow statement

Unit IV:

(6 Hrs.)

Depreciation Analysis causes of depreciation, Depreciable property, depreciation methods, Digit method, break even analysis, determination of breakeven point, Breakeven point in terms of quantity, sales and as percentage of capacity, Break even chart, Breakeven analysis assumptions, Managerial uses and limitations.

Total 24 Hours

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Textbooks:

1. Engineering Economics : Panneerselvam R

Reference Books:

1. Economics for Engineers (For MAKAUT), 3/e Dr H L Bhatia & Dr S N Maheshwari

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Program:	B. Tech. (Electronics and Telecommunication Engineering)				Semester:		IV	
Course:	Analog Circuits				Code:		BTETPC08ET4T	
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	-	3	3	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance								
Course Objectives: 1. To understand the basics and internal structure of Op-Amp 2. To analyze and design linear applications of Op-Amp 3. To analyze and design non-linear applications of Op-Amp 4. To understand and design concepts of voltage regulators 5. To study and synthesize the Timer IC 555 6. To study and synthesize the PLL IC 565								
Course Outcomes: After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Comprehend the basic concepts and performance parameters of Op-Amp							L2
CO-2	Use Op-Amp for implementation of linear applications							L3
CO-3	Use Op-Amp for implementation of non-linear applications							L3
CO-4	Design a Voltage regulator							L6
CO-5	Design an application of timer IC 555							L6
CO-6	Comprehend the knowledge of PLL and its applications							L2

Unit I: Operational amplifier

(6 Hrs.)

Block diagram of Op-Amp, differential amplifier configurations using BJT, constant current source (constant current bias circuit and current mirror circuit), level shifting, study of ICuA741, Op-Amp parameters, Inverting and non-inverting amplifiers.

Unit II: Linear applications of Op-Amp:

(6 Hrs.)

Summing, difference amplifier, integrator and differentiator, three op-amp instrumentation amplifier (no numerical) and sinusoidal RC oscillators: RC-phase shift, Wein bridge oscillator using IC 741.

Unit III: Non-Linear Applications of Op-Amp:

(6 Hrs.)

Introduction to Comparator, zero-crossing detector, window detectors, Schmitt trigger, astable multivibrator as square and triangular wave generator, bistable and monostable multivibrator, and design of Butterworth filters and notch filter.

Unit IV: Voltage Regulator

(6 Hrs.)

Introduction and design of Voltage regulators using IC 723 and LM 317, dual tracking regulators using 78XX and 79XX.

Unit V: Timer IC 555

(6 Hrs.)

Introduction to IC 555, IC 555 based design of Astable, Monostable, multivibrator and their applications

Unit VI: Phase Lock Loop:

(6 Hrs.)

Operation of phase lock loop system, transfer characteristics, lock range and capture range, study of PLL IC LM 565 and its applications as AM detector, FM detector.

Total 36 Hours

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Text Books:

1. R.A. Gayakwad, "OP-AMP and Linear Integrated Circuits", Prentice Hall/ Pearson Education Publications.
2. K R Botkar "Integrated Circuits" Khanna Publications.
3. Sergio Franco, "Design with Linear Integrated Circuits & Op-Amps", TMH

Reference Books:

1. Gray and Meyer, "Analysis and Design of Analog Integrated Circuits", Wiley Intl. Publication.
2. Paul Horowitz, W. Hill, "The art of Electronics", Cambridge Publications.

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Program:	B. Tech. (Electronics & Telecommunication Engineering)				Semester:		IV	
Course:	Analog & Digital Communications				Code:		BTETPC10ET4T	
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	-	3	3	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance								
Course Objectives: To understand the basic concepts of Differential calculus and Complex numbers.								
After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Understand and apply various Amplitude Modulation (AM) techniques, their mathematical principles, and practical applications in communication							L2
CO-2	Gain knowledge of Frequency Modulation (FM) and design FM transmitters for communication systems.							L3
CO-3	Analyse the characteristics of radio receivers and evaluate detection techniques for AM and FM signals.							L4
CO-4	Assess the impact of noise and random processes on communication systems and their effect on signal integrity and performance.							L2
CO-5	Apply pulse modulation techniques (PAM, PWM, PPM) in digital communication systems.							L3
CO-6	Understand digital communication concepts and apply digital modulation techniques (PSK, FSK, QAM) in real-world systems.							L2

Unit I: AM Transmitters:

(6 Hrs.)

Modulation, need of modulation, AM Modulation with mathematical expression and numerical, Principles of DSB-FC, DSBSC, SSB-SC modulation and their comparison, DSBFC Transmitter.

Unit II: FM Transmitters:

(6 Hrs.)

FM Modulation, Circuits & Analysis for direct FM generation using FET and varactor diode. Circuit & analysis of Indirect FM generation, Narrow Band and Wide Band FM, their comparison, pre-emphasis and De-emphasis. Stereo FM Transmitter, Compare AM & FM systems.

Unit III: Radio Receivers:

(6 Hrs.)

Characteristics of Radio Receivers: Sensitivity, Selectivity, and Fidelity, TRF receiver and its drawbacks, Superheterodyne Receiver: Working and Block Diagram, Detection Techniques for AM (diode detector) and FM (slope detectors, Foster Seeley discriminator) Signals.

Unit IV: Random Process and Noise:

(6 Hrs.)

Classification of Noise, Concept of Random Variables, Ensemble, Mean, Moments, Probability Density Function Sources (PDF), Cumulative Distribution Function (CDF), Random process: Ensemble Average, Time Average, Stationarity, Ergodic process.

Unit V: Pulse Modulation:

(6 Hrs.)

Concept of Sampling Theorem, Types of Sampling: Natural and Flat-top Sampling, Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM), Introduction to Pulse Code Modulation (PCM), Differential Pulse Code Modulation, Delta Modulation (DM), Adaptive Delta Modulation (ADM)



Unit VI: Basics of Digital Communication System:

(6 Hrs.)

Functional Blocks of Digital Communication System, Line Coding: Need for Line coding, Properties of Line Coding, Types of Line Coding, Scrambler and Unscrambler, Digital Modulation Techniques: ASK, FSK, PSK, QPSK, DPSK, Comparison of Digital modulation systems.

Total 36 Hours

Textbooks:

1. Kennedy G. "Electronic Communication System" Tata Mc-Graw Hill Co., New Delhi (Third Ed).
2. Taub and Schilling D.L., "Principles of Communication Systems", Mc-Graw Hill Co., New Delhi (Second Ed.).
3. Shanmugam K.S., "Digital & Analog Communication Systems", John Wiley & Sons, New York, 1996.
4. Lathi B. P., "Modern Digital and Communication Systems", Holt Rinchart and Winston Inc., New York, 1993.
5. Simon Haykin, "Digital Communication", John Wiley and Sons, Pvt. Ltd., Singapore..

Reference Books:

1. Proakis J. K., "Digital Communication", Mc-Graw Hill Book Co., London (Second Edition).
2. Glover and Grant, "Digital Communication", Prentice Hall Publication
3. Collins Dennis, Collins John, "Electronic Communications" PHI.
4. Wayne Tomasi, "Electronic Communication Systems" Pearson Education, (Fifth Edition).
5. Wozencraft J. M. and Jacobs I. M., "Principles of Communication Engineering", John Wiley, 1965.
6. Barry J. R., Lee E. A. and Messerschmitt D. G., "Digital Communication", Kluwer Academic Publishers, 2004.

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Programme Scheme of Examination (SoE) and Syllabus V 1.0



Sipna College of Engineering & Technology, Amravati

(An Autonomous Institution affiliated to Sant Gadge Baba Amravati University, Amravati)

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www.sipnaengg.ac.in

SoE No.

24BTET-01

Program:	B. Tech. (Electronics and Telecommunication Engineering)				Semester:		IV	
Course:	Signals & Systems				Code:		BTETPC12ET4T	
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
2	-	2	2	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance								
Course Objectives:								
• Knowledge of basic elementary signals and its representation and analysis concepts • Knowledge of frequency-domain representation and analysis concepts using Fourier analysis tools. • Concepts of the sampling process. • Mathematical and computational skills needed to understand the principal of LTI Systems. • Mathematical and computational skills needed to understand the principal of convolution & correlation.								
Course Outcomes: After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Understand the continuous time signals and systems mathematically and their classification along with the mathematical operations that can be performed on them.							L2
CO-2	Understand the spectral characteristics of continuous-time periodic signals using Fourier series.							L2
CO-3	Analyze the spectral characteristics of continuous-time aperiodic signals and systems using Fourier Transform.							L3
CO-4	Apply the Laplace transform for analysis of continuous-time systems							L3

Unit I: Continuous time signals and systems:		(6 Hrs.)
Signal: Signal Classification, Energy and Power Signal, Even and Odd functions, Signal Operations, Signal models, System: System Classification. system models: input-output description		
Unit II: Continuous-Time Signal Analysis -The Fourier Series:		(6 Hrs.)
Fourier Series Representation of Periodic Signals, Existence and Convergence of Fourier Series, Trigonometric Fourier Series, Exponential Fourier Series.		
Unit III: Continuous-Time Signal Analysis-The Fourier Transform:		(6 Hrs.)
Define: Fourier Transform of Continuous-Time Signals, Aperiodic signal representation by Fourier Integral, Properties of Fourier Transform.		
Unit IV: Laplace Transform		(6 Hrs.)
Definition and Properties of Laplace Transform, Region of Convergence (ROC), Inverse Laplace Transform. Sampling: Sampling Theorem, Nyquist Rate and Aliasing, Reconstruction of Signals from Samples, Ideal and Practical Sampling Techniques.		
Total		24 Hours

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Text Books:

1. A Signals & Systems, Book by A. Nagoor Kani
2. Signals and Systems – A. Anand Kumar, PHI Publications, 3rd edition

Reference Books:

1. 1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. 2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.

MOOC Links:

https://onlinecourses.nptel.ac.in/noc21_ee28/preview

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Academic Council Meeting
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Program:		B. Tech. (Electronics and Telecommunication Engineering)			Semester:	IV
Course:		Signals and System Lab			Code:	BTETPC29ET4P
Teaching Scheme				Evaluation Scheme		
Practical	Tutorial	Hours	Credit	INT	EXT	Total
1	-	2	1	30	20	50
Course Objectives:						
1. To use software to visualize analysis of Signals and System.						
2. To manipulate the time signals and identify the type of given system.						
Course Outcomes: After completion of the course, the students will be able to:						
CO	Course Outcomes					BT Level (L1 to L6)
CO1	Illustrate different types of standard Continuous Time Signals.					L2
CO2	Demonstrate the concepts of sampling.					L3
CO3	Justify different types of System by using simulation tools.					L2
CO4	Solve basic mathematical operations on continuous time signal					L3

General Guidelines: Example: - Minimum 8 practical's are to be conducted covering entire syllabus

Experiment List

EXPT. NO	Name of the Experiment
01	To study the basic functions related to Signal Processing Toolbox in MATLAB.
02	To generate standard continuous Time Signals using MATLAB.
03	To perform basic operations over different continuous sequences using MATLAB
04	To verify Sampling Theorem.
05	To perform and find Even and Odd parts of a signal.
06	To perform Linear Convolution using function
07	To Verify the Linearity of a given Continuous System
08	Write a MATLAB program to perform Amplitude scaling, Time scaling, and Time shift on the signal.

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Programme Scheme of Examination (SoE) and Syllabus V 1.0

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Program:	B. Tech. (Electronics and Telecommunication Engineering)			Semester:		IV		
Course:	Network Analysis			Code:		BTETPC13ET4T		
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	-	3	3	10	15	15	60	100

Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance

Course Objectives:

1. Understand fundamental concepts of Node and Mesh analysis for linear circuits.
2. Apply network theorems to simplify and analyze electrical circuits.
3. Analyze and apply graph theory and network topology in network analysis.
4. To apply the Laplace Transform Technique for the analysis of linear circuits.
5. Apply and analyze two-port network parameters to solve network problems.
6. Understand network functions and create time-domain behaviour analysis from pole-zero plots.

After completion of the course, the students will be able to:

CO	Course Outcomes	BT Level
CO-1	Analyze electrical circuits using Mesh and Node analysis.	L4
CO-2	Apply a suitable Network Theorem to analyze electrical circuits.	L3
CO-3	Transform and analyze the network using graph theory.	L5
CO-4	Implement the concept of Laplace Transform for electrical circuit analysis.	L3
CO-5	Apply Two-Port network parameters for electrical network analysis	L3
CO-6	Evaluate the time domain behaviour of the network function.	L5

Unit I: Node and Mesh analysis

(6 Hrs.)

Circuit components, assumptions for circuit analysis, Sources of electrical energy, Source transformation, Kirchoff's laws, Node and Mesh analysis for AC and DC circuits.

Unit II: Network Theorems

(6 Hrs.)

Superposition theorem, Reciprocity theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem as applied to AC circuits.

Unit III: Graph theory and network equations

(6 Hrs.)

Graph of a network, Trees, cotrees and loops, Incidence matrix, Tie set and Cut set of a network, Analysis of a network using Tie set and Cut set matrix, Network equilibrium equations (without magnetic coupling), Duality.

Unit IV: Network Analysis using Laplace Transform:

(6 Hrs.)

Laplace transforms of specific functions such as impulse, step, ramp, parabolic, waveform synthesis, analysis of RC, RL and RLC networks with and without initial conditions. Initial and Final value theorems.

Unit V: Two port networks

(6 Hrs.)

Open circuit impedance parameters, short circuit admittance parameters, Transmission parameters, Hybrid parameters, Condition for reciprocity and symmetry of a two-port network, Introduction to interconnection of two port networks.

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Unit VI: Network functions

(6 Hrs.)

Network functions, poles and zeros, Necessary conditions for driving point function, Necessary conditions for transfer function, driving point functions and Transfer impedance function of LC networks, Time domain behaviour from pole-zero plot.

Total 36 Hours

Text Books:

1. D. Roy Choudhary, "Networks and Systems", New Age International.
2. Ravish R. Singh, "Network Analysis and Synthesis", McGraw Hill Publication

Reference Books:

1. M. E. Van Valkenburg, "Network Analysis", Prentice Hall, 3rd Edition.
2. Sudhakar A., Shyammoohan S. P. "Circuits and Network"; Tata McGraw-Hill New Delhi, 1994
3. W. H. Hayt, J. E. Kemmerly and S. M. Durbin, "Engineering Circuit Analysis", 7th Edition, Tata McGraw-Hill education private Limited, New Delhi.
4. Abhijit Chakrabarti, "Circuit theory, Analysis and Synthesis", Dhanpat Rai and Co. Publications.

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Program	B. Tech in Electronics and Telecommunication				Semester:	IV
Course:	IOT Lab				Code:	BTETVS04ET4P
Teaching Scheme				Evaluation Scheme		
Practical	Tutorial	Hours	Credit	INT	EXT	Total
2	0	2	1	50		50
Course Objectives: To Get Exposure regarding the current trend in Industry						
Course Outcomes: After completion of the course, the students will be able to:						
CO	Course Outcomes					BT Level (L1 to L6)
C01	Design and implement basic electronic circuits using Arduino microcontrollers.					L6
C02	Interface various sensors and actuators with Arduino for data acquisition and control.					L3
C03	Develop programs in Arduino IDE to process sensor data and control actuators.					L3
C04	Understand and apply communication protocols for data exchange in IoT systems.					L2
C05	Build and test simple IoT systems for real-world applications.					L3
C06	Design, develop, and evaluate an innovative IoT project that demonstrates creativity and addresses a specific need or challenge.					L6

General Guidelines: Example:- Minimum 8 practical's are to be conducted covering entire syllabus.

Experiment List

- 1) Interfacing the RGB LED with the Arduino.
- 2) Controlling the LED blink rate with the potentiometer interfacing with Arduino
- 3) Calculate the distance to an object with the help of an ultrasonic sensor and display it on an LCD
- 4) Displaying humidity and temperature values on LCD
- 5) Advanced burglar alarm security system with the help of PIR sensor, buzzer and keypad.
- 6) Interfacing of the Relay with Arduino.
- 7) Detection of the light using photo resistor
- 8) Interfacing Servo Motor with the Arduino
- 9) Upload humidity & temperature data to Thing Speak, periodically logging ambient light level to Thing Speak
- 10) Controlling LEDs, relay & buzzer using Blynk app

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Dated:- 05/7/25



Program:	B. Tech. (Electronics and Telecommunication Engineering)			Semester:		IV		
Course:	Innovation, Creativity & Entrepreneurship			Code:		BTETEM02ET4T		
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
2	-	2	2	10	15	15	60	100

Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance

Course Objectives:

1. Develop a fundamental understanding of innovation and creativity in engineering.
2. Foster problem-solving and design-thinking skills.
3. Introduce students to entrepreneurship principles and startup ecosystems.
4. Enable students to identify and develop innovative business opportunities.

Course Outcomes: After completion of the course, the students will be able to:

CO	Course Outcomes	BT Level
CO-1	Understand the role of creativity and innovation in engineering.	L2
CO-2	Apply design thinking and idea-generation techniques to solve technical challenges.	L3
CO-3	Develop a business model and value proposition for a tech-based startup.	L3
CO-4	Analyze funding opportunities and entrepreneurial strategies for technology ventures	L3

Unit I: Introduction to Innovation and Creativity

(6 Hrs.)

Definition & Importance: Creativity, Innovation, and their role in Engineering. Types of Innovation: Product, Process, Business Model, and System Innovation. Creativity Techniques: Brainstorming, Mind Mapping, Lateral Thinking. Barriers to Innovation.

Unit II: Design Thinking and Problem Solving

(6 Hrs.)

Introduction to design thinking and Problem definition. Design Thinking Approach: Empathy, Need finding, Ideation, Prototyping, and Testing.

Unit III: Introduction to Entrepreneurship

(6 Hrs.)

Fundamentals of Entrepreneurship: Entrepreneurial Mindset & Skills. Types of Entrepreneurship: Startup, Social, Intrapreneurship, Tech-Based Ventures. Market Research & Opportunity Identification: Understanding Customers & Market Trends.

Unit IV: Startup Ecosystem & Funding Strategies

(6 Hrs.)

Startup Ecosystem: Incubators, Accelerators, Angel Investors, Venture Capital. Funding Strategies: Bootstrapping, Crowdfunding, Government Grants.

Total 24 Hours

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Text Books:

1. Design Thinking by Anuja Agarwal, Cengage Publication.
2. "Design Thinking for Entrepreneurs and Small Businesses" – Beverly Rudkin Ingle, Apress Publication

MOOC Links:

1. https://onlinecourses.swayam2.ac.in/aic25_ge11/preview
2. https://onlinecourses.swayam2.ac.in/imb25_mg26/preview

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Dated:- 05/12/25