Department of Electronics & Communications Engineering

Andhra University College of Engineering

Visakhapatnam-530003

4 Years B.TECH
Programme Code: 3-1-12

and

B.TECH+M.TECH (DOUBLE DEGREE COURSE)
Programme Code: 3-5-07

Scheme of Instruction and Examination with effect from 2024-2025 admitted batch onwards

P.V. Sridevi

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam 530 003 (AP)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
A U COLLEGE OF ENGINEERING
ANDHRA UNIVERSITY
SCHEME AND SYLLABI
(with effect from 2024-25 admitted Batch)
B.Tech & B.Tech+M.Tech
I Year - I Semester

Course code	Category	Course Title	Hours per week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
EC1101	BS	Mathematics – I	4	0	30	70	100	3
EC1102	BS	Physics	4	0	30	70	100	3
EC1103	ES	Digital Logic Design	4	0	30	70	100	3
EC1104	ES	Electronic Devices and Circuits	4	0	30	70	100	3
EC1105	ES	Network Theory and Machines	4	0	30	70	100	3
EC1106	ES	Digital Logic Design Lab	0	3	50	50	100	1.5
EC1107	BS	Physics Lab	0	3	50	50	100	1.5
EC1108	ES	Electronic Devices and Circuits Lab	0	3	50	50	100	1.5
							Total Credits	**19.5**

P.V. Sridhar
Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Eng
College of Engineering, Andhra Universi
Visakhapatnam: 530 003 (AP)

B.Tech & B.Tech+M.Tech
I Year - II Semester
(with effect from 2024-25 admitted Batch)

Course code	Category	Course Title	Hours per week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
EC1201	BS	Mathematics – II	4	0	30	70	100	3
EC1202	BS	Green Chemistry	4	0	30	70	100	3
EC1203	HSS	English	4	0	30	70	100	3
EC1204	ES	Computer Programming and Numerical Methods	4	0	30	70	100	3
EC1205	ES	Electronic Circuit Analysis	4	0	30	70	100	3
EC1206	HSS	English Language Lab	0	3	50	50	100	1.5
EC1207	BS/ES	Electronic Circuit Analysis Lab	0	3	50	50	100	1.5
EC1208	ES	Computer Programming and Numerical Methods Lab	0	3	50	50	100	1.5
							Total Credits	**19.5**

EC1101- MATHEMATICS-I (BS)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC1101	Mathematics -I	4			30	70	100	3hrs	3

Course Objectives: The objectives of this course are

- To impart the knowledge on partial differentiation involving two or more variables, Euler's theorem, change of variables, Jacobins, Geometrical interpretation.
- To apply the concept of partial differentiation in finding the errors and approximations, maxima and minima of two variables, to introduce the Lagrange's method of undetermined constants and Leibnitz's rule.
- The main objective of Engineering Mathematics is to make the students familiar with mathematical thinking and realization of the background of their problems.
- Multiple Integral is a natural extension of a definite integral to a function of more than one real variable.
- The students should be able to evaluate Double and Triple Integrals, volumes of solids and area of curved surfaces, etc., Whereas in Fourier Series, Euler's Formula, Conditions for a Fourier Expansion, Functions having points of discontinuity, Expansions of Odd or Even Functions, Half-Range Series, Parseval's Formula are to be introduced.

Course Outcomes: At the completion of the course the student will be able to

CO1: Find the partial derivatives of functions of two or more variables.

CO2: Evaluate maxima and minima, errors and approximations.

CO3: Evaluate double and triple integrals, volumes of solids and area of curved surfaces.

CO4: To expand a periodical function as Fourier series and half-range Fourier series.

CO5: Have a fundamental understanding of Fourier series and be able to give Fourier expansions of a given function.

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College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

SYLLABUS

(with effect from 2024-25 admitted Batch)

UNIT-I: Partial Differentiation: Introduction - Functions of two or more variables - Partial derivatives - Homogeneous functions – Euler's theorem - Total derivative - Change of variables – Jacobins. Mean value Theorems (without proofs)

UNIT-II: Applications of Partial Differentiation: Geometrical interpretation -Tangent plane and Normal to a surface -Taylor's theorem for functions of two variables - Errors and approximations -Total differential, Maxima and Minima of functions of two variables - Lagrange's method of undetermined multipliers - Differentiation under the integral Sign- Leibnitz's rule.

UNIT-III: Multiple Integrals: Introduction - Double Integrals - Change of Order of Integration - Double Integrals in Polar Coordinates - Triple Integrals - Change of Variables.

UNIT-IV: Multiple Integrals-Applications: Area enclosed by plane curves - Volumes of solids - Area of a curved surface - Calculation of Mass - Center of gravity - Moment of inertia - product of inertia – principal axes- Beta Function - Gamma Function - Relation between Beta and Gamma Functions, Error Function or Probability Integral.

UNIT-V: Fourier series: Introduction - Euler's Formulae - Conditions for a Fourier Expansion - Functions having points of discontinuity - Change of Interval - Odd and Even Functions - Expansions of Odd or Even Periodic Functions, Half-Range Series - Parseval's Formula, Practical Harmonic analysis.

Text Books:

1. Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B.S. Grewal, 43rd Edition, Khanna publishers.

Reference Books:

1. Graduate Engineering Mathematics by V B Kumar Vatti., I.K.International publishing house Pvt. Ltd.
2. Advanced Engineering Mathematics by Erwin Kreyszig.
3. A text book of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal, Lakshmi Publications.
4. Advanced Engineering Mathematics by H.K. Dass. S. Chand Company.
5. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company.
6. Higher Engineering Mathematics by Dr. M.K.Venkataraman.

Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studi
Electronics and Communicatio
College of Engineering, Andhra Uni
Visakhapatnam: 530 003 (A

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EC1102- PHYSICS (BS)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC1102	Physics	4			30	70	100	3hrs	3

Course Objectives: The objectives of this course are

- To impart knowledge in basic concept of physics of Thermodynamics relevant to engineering applications.
- To grasp the concepts of physics for electromagnetism and its application to engineering. Learn production of Ultrasonic's and their applications in engineering.
- To Develop understanding of interference, diffraction and polarization: connect it to a few engineering applications.
- To learn basics of lasers and optical fibers and their use in some applications.
- To understand concepts and principles in quantum mechanics and Nanopahse Materials. Relate them to some applications.

Course Outcomes: At the completion of the course the student will be able to

CO1: Understand the fundamentals of Thermodynamics and Laws of thermodynamics.

CO2: Understand the concept of the electromagnetic waves, gain knowledge on electromagnetic induction and its applications.

CO3: Understand the Theory of Superposition of waves. Understand the formation of Newton's rings and the working of Michelson's interferometer. Remember the basics of diffraction, Evaluate the path difference. Analysis of Fraunhofer Diffraction due to a single slit.

CO4: Understand the interaction of matter with radiation, Characteristics of Lasers, Principle, working schemes of Laser and Principle of Optical Fiber. Realize their role in optical fiber communication.

CO5: Understand the intuitive ideas of the Quantum physics and understand dual nature of matter. Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent one-Dimensional Schrodinger's wave equation. Understand the fundamentals and synthesis processes of Nanophase materials.

P.V Sridevi
Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Adh
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication
College of Engineering, Andhra Univ
Visakhapatnam: 530 003 (AP)

SYLLABUS

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UNIT-I: Thermodynamics: Introduction, Heat and Work, First law of thermodynamics and applications, Reversible and Irreversible process, Carnot cycle and Efficiency, Second law of thermodynamics, Carnot's Theorem, Entropy, Second law in terms of entropy, Entropy and disorder, Third law of thermodynamics (statement only).

UNIT-II: Electromagnetism: Concept of electric flux, Gauss's law - some applications, Magnetic field - Magnetic force on current, torque on current loop, The Biot-Savart's Law, B near a long wire, B for a circular Current loop, Ampere's law, B for a solenoid, Hall effect, Faraday's law of induction, Lenz's law, Induced magnetic fields, Displacement current, Maxwell's equations (no derivation), Magnetic materials: Classification of magnetic materials and properties.

UNIT-III: Ultrasonic's: Introduction, Production of Ultrasonic's – Piezoelectric and Magnetostriction methods,acoustic grating, applications of ultrasonic.

UNIT-IV: Optics: Interference: Principles of superposition – Young's Experiment – Coherence - Interference in thin films (reflected light), Newton's Rings, Michelson Interferometer and its applications. Diffraction: Introduction, Differences between interference and diffraction, Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit (Qualitative and quantitative treatment). Polarization: Polarization by reflection, refraction and double refraction in uniaxial crystals, Nicol prism, Quarter and Half wave plate, circular and elliptical polarization.

UNIT-V: Lasers and Fiber Optics: Introduction, characteristics of a laser beam, spontaneous and stimulated emission of radiation, population inversion, Ruby laser, He-Ne laser, Semiconductor laser, applications of lasers. Introduction to optical fibers, principle of propagation of light in optical fibers, Acceptance Angle and cone of a fiber, Numerical aperture, Modes of propagations, classification of fibers, Fiber optics in communications, Application of optical fibers.

Prof. M.Satya Murthy
Chairperson, Board of Studies
of Engineering.

UNIT-VI: Modern Physics: Introduction, De Broglie concept of matter waves, Heisenberg uncertainty principle, Schrodinger time independent wave equation, application to a particle in a box. Free electron theory of metals, Kronig - Penney model (qualitative treatment), Origin of

Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

energy band formation in solids, Classification of materials into conductors, semiconductors and insulators.

UNIT-VII: Nano-phase Materials: Introduction, properties, Top-down and bottom-up approaches, Synthesis - Ball milling, Chemical vapor deposition method, sol-gel methods, Applications of Nano materials.

Text Books:

1. Physics by David Halliday and Robert Resnick – Part I and Part II - Wiley.
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand.
3. Engineering Physics by R.K. Gaur and S.L. Gupta –Dhanpat Rai.

Reference Books:

1. Modern Engineering Physics by A.S. Vadudeva.
2. University Physics by Young and Freedman.

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P.V. Sridhar
Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

EC1103- DIGITAL LOGIC DESIGN (ES)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC1103	Digital Logic Design	4			30	70	100	3hrs	3

Course Objectives: The objectives of this course are

- To understand Different number systems, digital logic, simplification and minimization of Boolean functions.
- To analyze logic processes and implement logical operations using combinational logic circuits.
- To analyze the characteristics of memory and their classification.
- To design combinational & sequential digital circuits and state machines.
- To understand about programmable logic devices.

Course Outcomes: At the completion of the course the student will be able to

CO1: Discuss the significance of number systems, conversions, binary codes.

CO2: Apply different simplification methods for minimizing Boolean functions.

CO3: Analyze the design concepts of various combinational circuits.

CO4: Analyze the concepts of sequential logic design.

CO5: Categorize Mealy & Moore models and Design Synchronous Sequential machines.

P.V. Sridevi
Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication
College of Engineering, Andhra Univ
Visakhapatnam: 530 003 (AP)

SYLLABUS

(With effect from 2024-25 admitted Batch)

UNIT-I: Number systems and codes: Number systems, Base conversion methods, Complement of numbers, Codes: Binary, Non-binary, Decimal, Alphanumeric, Gray, and Error detecting and error correcting codes. Logic Gates: AND, OR, NOT, NAND, NOR, XOR, EX-NOR and Universal Gates, Minimization of Boolean Functions: Fundamental postulates of Boolean algebra, Basic theorems, Simplification of Boolean equations, Min terms, Max terms, Standard form of Boolean functions. Simplification of functions: Karnaugh map method and Quine-McClusky methods (up to six variables), Multiple Output functions, and incomplete specified functions.

UNIT-II: Combinational Logic-Circuit Design-1: Logic design of combinational circuits: Adders and Subtractions: Binary, BCD, Excess -3 and Look –ahead-carry adder, Code

converters, Multiplexers, De multiplexers, Encoders, Decoders and priority encoders, Realization of Boolean functions using multiplexers, De multiplexers and Decoders.

UNIT-III: Combinational Logic-Circuit Design-I1: Design of 4-bit comparator, Parity checker/Generator, Seven segment decoders, Hazards in combinational circuits, Hazard free realizations. Basics of PLDs: Basic structure of PROM, PAL, PLA, CPLD, FPGAs, Realization of Boolean functions with PLDs and their merits and demerits.

UNIT-IV: Sequential circuits: Classification of sequential circuits, SR-latch, Gated latches, Flip flops: RS, JK, D, T and Master slave flip flops, Excitation tables, flip flop conversion from one type to another. Design of counters: Ripple counters, Synchronous counters, asynchronous counters, up-down counters, Johnson counter, ring counter. Design of registers: Buffer registers, Shift registers, Bi directional shift registers, Universal shift register.

UNIT-V: Analysis and design of finite state machines: State assignment, State tables, Equivalent states, Elimination of Redundant states, Determination of state equivalence, Reduction using implication table, and reducing incompletely specified state tables.

Text Books:

1. Switching and finite Automatic theory, ZuiKohari, TMH.

2. Switching theory and logic design by Frederick.J.Hill and Gerald.R.Peterson.

3. Switching theory and logic design, Ananda kumar, PHI.

Reference Books:

1. Fundamentals of Logic Design, Charles.R.Roth, Thomson Publications.

2. Digital Design by Morries Mono, PHI. ECE:

P.V. Sridevi
Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

*****

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

EC1104 - ELECTRONIC DEVICES AND CIRCUITS (ES)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC1104	Electronic Devices and Circuits	4			30	70	100	3hrs	3

Course Objectives: The objectives of this course are

- To understand the operation of semiconductor devices.
- To understand DC analysis and AC models of semiconductor devices.
- To apply concepts for the design of Filters, Regulators, Oscillators and Amplifiers for different applications.
- To analyze the theoretical concepts through laboratory and simulation experiments.
- To apply how to implement mini projects using electronic circuit concepts.

Course Outcomes: At the completion of the course the student will be able to

CO1: Illustrate fundamentals of semiconductor physics for active devices.

CO2: Demonstrate the characteristics of PN Junction diodes and illustrate the functional behavior of different types of special semiconductor devices.

CO3: Examine the V-I characteristics and different BJT amplifier configurations.

CO4: Analyze BJT biasing and low frequency response of the BJT amplifiers.

CO5: Understand the JFET operation and its small signal operation.

P.V. Sridevi
Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

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(with effect from 2024-25 admitted Batch)

M. Satya Sriramana
Prof. M.Satya Sriramana
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

UNIT-I: Energy band theory of solids and transport phenomenon in semiconductors: Energy Band Theory of Solids Intrinsic and Extrinsic Semiconductors Doping, Doping Materials, Carrier Mobility, Conductivity, Diffusion and continuity equation, Hall – Effect. Semiconductor Diodes Band structure of PN Junction, Quantitative Theory of PN Diode, and Volt – Amp, Characteristics, Temperature Dependence, Transition and Diffusion Capacitance of PN Junction.

UNIT-II: Rectifiers and special diodes: Diode Rectifiers: Half-wave, Full-wave and Bridge Rectifiers with and without Filters, Ripple Factor and Regulation Characteristics, Zener and Avalanche Breakdowns, Tunnel Diode, LED, Schottky Barrier Diode, Varactor Diode, Photo Diode, PIN Diode.

UNIT-III: Transistor Characteristics and Transistor Biasing: Bipolar Junction Transistor NPN and PNP junction Transistor, Characteristics of Current Flow across the Base Regions, Minority and Majority Carrier Profiles, CB, CE and CC Configurations and their Input and Output Characteristics, Comparison of CE, CB, and CC Configurations, Junction Biasing for Saturation, Cutoff and Active Region, α and β Parameters and the relation between them, Biasing circuits, thermal runaway, thermal stability, stabilizations circuits.

UNIT-IV: Transistor at Low Frequencies: Small Signal: Low Frequency Transistor Amplifier Circuits Transistor as an Amplifier, h – parameter model, Analysis of Transistor Amplifier Circuits using h –parameters, CB, CE and CC Amplifier configurations and performance factors, Analysis of Single Stage Amplifier, RC Coupled Amplifiers, Effects of Bypass and Coupling Capacitors. Frequency Response of CE Amplifier, Emitter – Follower, Cascaded Amplifier.

UNIT-V: Field Effect Transistors: JFET and its characteristics, Pinch off Voltage, Drain Saturation Current, MOSFET–Enhancement and Depletion Modes, JFET Configurations, JFET biasing, Small signal models of FET, JFET Common Source amplifier.

Text Books:

1. Integrated Electronics, Analog Digital Circuits and systems, Jacob Millmann and D. Halkias, McGraw Hill.

2. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.

Reference Books:

1. Adel S. Sedra, Kenneth C. Smith, Arun N. Chandorkar, Microelectronic Circuits, 6/e, Oxford University Press, 2013.

2. Electronic Devices and Circuits 2nd Edition, B. V. Rao and K. Raja Rajeswari, Pearson Education.

Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

3. Electronic Devices and Circuits, K. Venkat Rao, K. Rama Sudha, McGraw Hill education, Edition-2015.

4. Electronic Devices and Circuits Theory, Boylsted and Nashelsky, Prentice Hall Publications.

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P.V. Sridhar

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

EC1105 - NETWORK THEORY AND MACHINES (ES)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC1105	Network Theory and Machines	4			30	70	100	3hrs	3

Course Objectives:

The objectives of this course are

- Will be able to articulate in working of various components of an electrical circuit.
- Will be familiar with application of theorems to ac and dc circuits.
- Ability to Express given Electrical Circuit parameter and solve the circuits.
- Understand the operating principle of a DC motor and DC generator.
- Will know about construction features of dc and ac machines.
- Able to find the performance of a dc and ac machines for a given specification.

Course Outcomes:

Upon completion of the course the student should have the ability to

CO1: Analyze the Fundamentals of D.C circuits and the concept of Node and Mesh analysis.

CO2: Understand, analyze and application of Network theorems.

CO3: Analyze and determine Fundamentals of A.C circuits.

CO4: Analyze the working principles of DC machines.

CO5: Understand working of AC machines and synchronous motors.

SYLLABUS

(with effect from 2024-25 admitted Batch)

UNIT-I: Analysis of DC Circuits: Active elements, Passive elements, Reference directions for current and voltage, Kirchoffs Laws, Voltage and Current Division, Nodal Analysis, Mesh analysis, Linearity and superposition, Thevinin's theorem and Norton's theorem, star-delta transformations, Source Transformation, Maximum power transfer theorem, Reciprocity theorem, Z, Y, H, S parameters.

P.V. Sridevi
Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
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UNIT-II: DC transients: Inductor, Capacitor, source free RL, RC and RLC response, Evaluation of Initial conditions, Application of unit-step function to RL, RC and RLC circuits, concepts of Natural, Forced and Complete response.

UNIT-III: Introduction to AC circuits: The sinusoidal forcing function instantaneous, Phasor concept, Average and Effective value of Voltage and Current, instantaneous and Average Power, Complex Power steady state analysis using mesh and node analysis, application of network theorems to AC circuits, resonance, Concept of Duality.

UNIT-IV: DC Machines: Principle of operation of DC machines, Constructional Details, EMF equation, Types of DC machines, Torque Equation, Characteristics of DC Generators, necessity of starters, speed control methods, DC Motor Characteristics, applications of DC Machines, Swinburne's Test, Brake test on DC shunt motor.

UNIT-V: AC Machines: Transformer Principle of operation and construction Details, EMF equation, Open Circuit & Short Circuit Test, Principle of operation of Three Phase Induction Motors, Constructional Details, Principle of operation of Single Phase Motor, Double Revolving Field Theory, Universal Motor, Stepper Motor, Principle of operation of synchronous machines, Synchronous Condenser and Applications.

Text Books:

1. Electrical Circuits by A.Chakrabarthy- Dhanapat Raj and Sons.
2. Engineering Circuit analysis By William Hayt and JackE,kemmerly-TMH.
3. A Textbook of Electrical Technology : Ac and Dc Machines (volume - 2) by B L Theraja and A K Theraja.
4. A First Course In Electrical Engineering, S. M. Tiwari, A. S. Binsaroor, Wheeler Publications.

Reference Books:

1. Principles Of Electrical Engineering And Electronics by V.k. Mehta and Rohit Mehta, S.Chand.
2. Electrical Machines, S. K. Bhattacharya, TMH Publications N. Delhi.

P.V. Sridevi
Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

*****

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Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

EC1106 - DIGITAL LOGIC DESIGN LAB (ES)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC1106	Digital Logic Design Lab			3	50	50	100	3hrs	1.5

Course Objectives:

The objectives of this course are

- To Verify Logic gates.
- To Verify Half adders and full adders.
- To Design ripple counter and synchronous counter.
- To Design shift registers and seven segment display.

Course Outcomes: At the end of the course the student will be able to

CO1: Implement logic gates, universal gates and their realization using ICs.

CO2: Able to realize SOP and POS forms and verifying Demorgan's laws.

CO3: Experimentally analyze combinational and sequential circuits using ICs.

CO4: Implement the logic gates, full Adder, Decoder, Encoder, MUX and DeMUX.

CO5: Implement and Analyze Flip-Flops, Shift Register and Counters.

SYLLABUS

(with effect from 2024-25 admitted Batch)

List of Hardware Experiments:

1. Experimentally verify truth tables of different Logic Gates.
2. Experimental realization of Gates by using universal building blocks.
3. Experimental realization of SOP and POS forms.
4. Experimental Verification of Demorgan's Laws.
5. Design and verify Half Adder & Full adder digital circuits for different bit lengths.
6. Function generation by using Decoders & Multiplexers.

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept. of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

Head of the Dept.
Dept. of Electronics & Commn. Engg
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Visakhapatnam-530 003

7. Experimental Realization of Flip – flops.

8. Experimental 4-bit Ripple counters.

9. Design and verify Mod-8 Synchronous counter.

10. Design and verify Up down counter.

11. Experimental verification of 4 - bit Shift-register.

12. Design and experimental verification of seven segment display.

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Head of the Department
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Visakhapatnam-530 003

Prof. M.Satya Anuradha
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College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

EC1107- PHYSICS LAB (BS)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC1107	Physics Lab			3	50	50	100	3hrs	1.5

Course Objectives:

At the completion of the course the student will be able to

- Ability to design and conduct experiments as well as to analyze and interpret.
- Ability to apply experimental skills to determine the physical quantities related to Heat, Electromagnetism and Optics.
- The student will learn to draw the relevance between theoretical knowledge and the means to imply it in a practical manner by performing various relative experiments.
- Determine the Thickness for given paper strip by wedge method.

Course Outcomes: The objectives of this course are

CO1: To enable the students to acquire skill, technique and utilization of the Instruments.

CO2: To draw the relevance between the theoretical knowledge and to imply it in a practical manner with respect to analyze various electronic circuits and its components.

CO3: To impart the practical knowledge in basic concepts of Wave optics, Lasers and Fiber optics.

CO4: To familiarize the handling of basic physical apparatus like Venire calipers, screw gauge.

CO5: To understand spectrometers, travelling microscope, laser device, optical fiber, etc.

Prof. M.Satya Murthy
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

SYLLABUS

(With effect from 2024-25 admitted Batch)

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List of Experiments:

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton's Rings.

2. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method.
3. Study the Intensity Variation of the Magnetic Field along axis of Current Carrying Circular Coil.
4. Determination of Cauchy's Constants of a Given Material of the Prism using Spectrometer.
5. Determination of Refractive Index of Ordinary ray μ_o and extraordinary μ_e ray.
6. Determination of Thickness Given Paper Strip by Wedge Method.
7. Calibration of Low Range Voltmeter.
8. Calibration of Low Range Ammeter.
9. Determination of Magnetic Moment and Horizontal Component of Earth's Magnetic Field.
10. Lees Method - Coefficient of thermal Conductivity of a Bad Conductor.
11. Carey Foster's Bridge – Verification of laws of Resistance and Determination of Specific Resistance.
12. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.
13. Photoelectric cell-Characteristics.
14. Planks Constants.
15. Laser- Diffraction.

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P.V. Sridhar

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M. Satya Anuradha
Chairperson, Board of Studies
Dept. of Electronics and Communication Engg.
College of Engineering, Andhra University
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EC1108 - ELECTRONIC DEVICES AND CIRCUITS LAB (BS)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC 1108	Electronic Devices and Circuits Lab			3	50	50	100	3hrs	1.5

Course Objectives: The objectives of this course are

- To Study semiconductor diodes; verify their characteristics and applications of diodes as regulators, rectifiers.
- To Measure the V-I characteristics of various devices that are used in the electronic equipment.
- To Verify functionality through V-I characteristics of active devices like BJT, JFET, MOSFETS and their applications.
- To Determine the gain of CE amplifier

Course Outcomes: At the completion of the course the student will be able to

CO1: Comprehend the depth of semiconductor devices like diodes, transistor, JFET, MOSFETs characteristics.

CO2: Measure voltage, frequency and phase of any waveform using CRO.

CO3: Generate sine, square and triangular waveforms with required frequency and amplitude using function generator.

CO4: Gain hands on experience in handling electronic components and devices.

CO5: Study and verify various amplifier designs with calculation of impedance and band width.

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Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
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Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

List of Experiments:

1. Study of CRO and its Applications.

2. Experimental verification of V-I Characteristics of PN Junction Diode and V-I Characteristics of LED.

3. Experimental verification of V-I Characteristics of Zener Diode and Zener Diode regulation characteristics.
4. Experimental verification of V-I characteristics of Photo diode.
5. Experimentally find DC voltage and ripple factor for Half-wave and full-wave rectifiers.
6. Experimentally find DC voltage and ripple factor for Half-wave and full-wave rectifiers with capacitor filter.
7. Experimentally find h-parameters of BJT in CE configuration from input and output characteristics.
8. Experimentally find h-parameters of BJT in CB configuration from input and output characteristics.
9. Experimentally find Voltage gain, input impedance and output impedance of emitter follower configuration.
10. Plot Drain and transfer characteristics of JFET.
11. Plot frequency response of CE amplifier to find input impedance, Bandwidth and gain.
12. Plot frequency response characteristics JFET in CS configuration.

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A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

EC1201 MATHEMATICS – II (BS)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC1201	Mathematics – II	4			30	70	100	3hrs	3

Course Objectives: The objectives of this course are

- The students are introduced with matrix algebra, differential equations and Laplace transforms to enable them to use in their further studies.
- In matrix algebra, Consistency and inconsistency of system of equations by the use of rank of a matrix, Obtaining Eigen values and Eigen vectors of a square matrix and application of Cayley- Hamilton's theorem, Quadratic and canonical forms, Properties of complex matrices, Solution of system of equations by direct methods are thoroughly discussed.
- To solve the ordinary differential equations of first order and first degree, Bernoulli's equation, exact differential equations, and equations reducible to exact equations.
- To get knowledge about the applications of differential equations of first order like orthogonal trajectories, simple electric circuits, law of natural growth and decay.
- To solve the linear differential equations of higher order and Simultaneous Differential Equations.
- In Laplace transforms, Properties of Laplace transforms, Properties of Inverse Laplace transforms and Applications of Laplace transforms are presented.

Course Outcomes: At the completion of the course the student will be able to

CO1: Find rank, Eigen values and Eigen vectors of a matrix and understand the importance of Cayley-Hamilton theorem.

CO2: Reduce quadratic form to canonical forms and solving linear systems by direct and indirect methods.

CO3: Demonstrate solutions to first order differential equations by various methods and solve basic applications problems related to electrical circuits, orthogonal trajectories and Newton's law of cooling.

CO4: Discriminate among the structure and procedure of solving higher order differential equations with constant and variable coefficients.

P.V. Sridhar
Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
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CO5: Understand Laplace transforms and its properties and finding the solution of ordinary differential equations.

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UNIT-I: Linear Algebra: Rank of a matrix- Echelon form, Normal Form - Solution of Linear System of Equations - Consistency of Linear System of Equations - Direct & Indirect Methods: Gauss elimination method, LU Factorization method, Gauss Seidal Method. Complex Matrices: Hermitian, Skew-Hermitian and Unitary Matrices and their Properties.

UNIT-II: Eigen Values and Eigen Vectors: Eigen Values and Eigen Vectors of a Matrix - Cayley-Hamilton theorem - Inverse and Powers of a Matrix using Cayley-Hamilton's theorem and its applications. Diagonalization of a Matrix - Quadratic Forms - Reduction of Quadratic Form to Canonical Form - Nature of a Quadratic Form.

UNIT-III: Ordinary Differential Equations of First Order and its Applications: Formation of ordinary differential equations (ODEs) - Solution of an ordinary differential equation - Equations of the first order and first degree - Linear differential equation - Bernoulli's equation - Exact differential equations - Equations reducible to exact equations - Orthogonal Trajectories - Simple Electric (LR & CR) Circuits - Newton's Law of Cooling - Law of Natural growth and decay.

UNIT-IV: Differential Equations of Higher Order: Solutions of Linear Ordinary Differential Equations with Constant Coefficients - Rules for finding the complimentary function - Rules for finding the particular integral - Method of variation of parameters - Cauchy's linear equation - Legendre's linear equation - Simultaneous linear differential equations.

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

P.V. Sridevi
Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

UNIT-V: Laplace Transforms: Introduction - Existence Conditions - Transforms of Elementary Functions - Properties of Laplace Transforms - Transforms of Derivatives - Transforms of Integrals - Multiplication by t^n - Division by t – Evaluation of integrals by Laplace Transforms - Inverse Laplace Transform - Applications of Laplace Transforms to Ordinary Differential Equations - Simultaneous Linear Differential Equations with Constant

Coefficients - Second Shifting Theorem - Laplace Transforms of Unit Step Function, Unit Impulse Function and Laplace Transforms of Periodic Functions.

Text Books:

1. Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B.S. Grewal, 43r^{d} edition, Khanna publishers.

Reference Books:

1. Graduate Engineering Mathematics by V B Kumar Vatti., I.K. International publishing house Pvt. Ltd.
2. Advanced Engineering Mathematics by Erwin Kreyszig.
3. A text book of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal. Lakshmi Publications.
4. Advanced Engineering Mathematics by H.K. Dass. S. Chand Company.
5. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company.

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P.V. Sridevi

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam

M. Satya Anuradha

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg.
College of Engineering, Andhra University
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EC1202 - GREEN CHEMISTRY (BS)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC 1202	Green Chemistry	4			30	70	100	3hrs	3

COURSE OBJECTIVES:

- To apply the basic knowledge of Green Chemistry to the Engineering Discipline.
- To develop knowledge about water and its treatment for industrial and potable purposes.
- To develop understanding in the areas of Batteries, Fuels Mechanism of Corrosion of Metals and Corrosion Control Methods, Green Chemistry and Technology and Processes involving Green Chemistry and apply the knowledge for solving existing challenges faced in various engineering and societal areas.
- To analyse and apply the water purification and corrosion controlling methods and advancements in batteries and fuel cells to daily situations
- To apply the principles of Green Chemistry to all the advancements in human enterprise

Course outcomes: The students are able to

CO1: The students are able to apply the basic concepts and principles studied in Chemistry to the field of Engineering.

CO 2: The students are able to apply chemistry to different branches of engineering

CO 3: The students are able to acquire the knowledge in the areas of Water Chemistry, Mechanism of Corrosion of Metals and Corrosion Control Methods for existing challenges in these areas.

CO 4: The students are able to observe the advancements in Batteries and Fuel Cells and look forward for novel materials to development

CO 5: The students are able to apply Green Chemistry and Technology and Processes involving Green Chemistry and suggest innovative solutions for existing challenges in these areas.

P.V. Sridu
Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Eng
College of Engineering, Andhra Universi
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SYLLABUS
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UNIT-I: Water Technology

Sources of Water – Impurities and their influence of living systems – WHO Limits – Hardness and its Determination – Boiler Troubles and their removal – Water Softening Methods – Lime-Soda, Zeolite and Ion Exchange - Municipal Water Treatment-Break Point Chlorination – Desalination of Sea Water – Reverse Osmosis Method, Electro-dialysis.

UNIT-II: Batteries

Primary batteries: The chemistry - Types: Zinc-carbon (Leclanche type), zinc alkaline (Duracell), zinc/air batteries; Lithium primary cells – liquid cathode, solid cathode and lithium-ferrous sulphide cells. Secondary batteries: Lead acid and VRLA (valve regulated (sealed) lead acid), nickel-cadmium, nickel-zinc, nickel-metal hydride batteries, lithium ion batteries, ultrathin lithium polymer cells. Advanced Batteries for electric vehicles, requirements of the battery – sodium-beta and redox batteries.

UNIT-III: Fuel Cells

Fuel Cells: Description, working principle, anodic, cathodic and cell reactions, fabrication of electrodes and other components, applications, advantages, disadvantages and environmental aspects of the following types of fuel cells: Proton Exchange Membrane Fuel Cells, alkaline fuel cells, phosphoric acid, solid oxide, molten carbonate, direct methanol fuel cells-Membranes and Fuels

UNIT-IV: Corrosion

Corrosion: Origin and Theory – Types of Corrosion: Chemical and Electrochemical; Pitting, Inter granular, Waterline, Stress – Galvanic Series – Factors Effecting Corrosion, Corrosion Controlling Methods, Protective Coatings, Metallic Coatings, Electroplating and Electroless Plating.

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication En
College of Engineering, Andhra Universi
Visakhapatnam: 530 003 (AP)

P.V. Sudha
Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam

UNIT-V: Green Chemistry and Technology

Introduction and significance of green chemistry, Goals of green chemistry, 12 principles of green chemistry, toxicity of chemicals, material safety data sheet (MSDS), concept of zero pollution technologies, atom economy, functional toxicity vs non-functional toxicity, functional group approaches to green chemistry, Elimination of toxic functional group,

optimization of frameworks for the design of greener synthetic pathways, Applications of green chemistry - Green solvents, green fuels and propellants, biocatalysis.

Text Books

1. Engineering Chemistry – PC Jain and M. Jain – Dhanpath Rai and Sons, New Delhi.
2. A Text book of Engineering Chemistry – S. S. Dara – S. Chand & Co. New Delhi.
3. Dell, Ronald M Rand, David A J, 'Understanding Batteries', Royal Society of Chemistry, (2001).
4. M. Aulice Scibioh and B. Viswanathan 'Fuel Cells – principles and applications', University Press, India (2006).
5. Hand Book of Green Chemistry and Technology; by James Clarke and Duncan Macquarrie; Blakwell Publishing.
6. Anastas, P. T., Warner, J. C. Green Chemistry: Theory and Practice, Oxford University Press Inc., New York, 1998.

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P.V. Sridevi

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M. Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

EC1203- ENGLISH (HSS)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC1203	English	4			30	70	100	3hrs	3

Course Objectives:

- To enhance understanding of explicit and implicit meanings of a text.
- To introduce new words for diverse context usage.
- To teach writing formats for essays, letters, and presentations.
- To cultivate adaptability and problem-solving for real-world scenarios.

Course Outcomes: At the completion of the course the student will be able to

CO1: Analyze a given text and discover the various aspects related to language and literature.

CO2: Learn the various language structures, parts of speech and figures of speech.

CO3: Learn time management, ethics and its values.

CO4: Develop one's reading and writing abilities for enhanced communication.

CO5: To apply the topics in real-life situations for creative and critical use.

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication En
College of Engineering, Andhra Univers
Visakhapatnam: 530 003 (AP)

Textbook:

English for Engineers: Theory to Practice. Board of Editors, Orient Blackswan Publishers India. 2024.

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Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Topics:

	PROSE	POETRY
UNIT 1	Swami Vivekananda: **The Secret of Work**	Grenville Kleiser: **Stay Calm**
UNIT 2	Katherine Mansfield: ***The Doll's House***	Rabindranath Tagore: **Where the Mind Is Without Fear**
UNIT 3	O. Henry: **The Last Leaf**	Rudyard Kipling: **If**
UNIT 4	Francis Bacon: **Of Studies**	Toru Dutt: **Our Casuarina Tree**
UNIT 5	Mark Twain: **Whitewashing the Fence**	William Ernest Henley: **Invictus**

GRAMMAR, VOCABULARY LISTENING, SPEAKING AND WRITING

	GRAMMAR & VOCABULARY	LISTENING	SPEAKING	WRITING
1	Synonyms & Antonyms	Listening for Context and Specific Information	Introducing Oneself and Others	Punctuation
2	Phrasal Verbs	Listening for Main Idea and Supporting Ideas	Getting Someone's Attention and Interrupting	Formal Letters
3	Idiomatic Expressions	Listening for Global Comprehension	Asking for Information and Giving Information	Note-Making
4	Common Errors I	Listening to Make Inferences	Expressing Opinions, and Agreeing and Disagreeing with Opinions	Essay Writing
5	Common Errors II	Listening for Key Ideas	Telephone Etiquette	E-mail Etiquette

Reference Books:

1. English Grammar in Use by Raymond Murphy
2. Oxford English Grammar Course by Michael Swan
3. Word Power Made Easy by Norman Lewis
4. Cambridge Vocabulary for IELTS by Pauline Cullen
5. The Elements of Style by William Strunk Jr. and E.B. White
6. English Vocabulary in Use by Michael McCarthy and Felicity O'Dell
7. Practical English Usage by Michael Swan
8. The Only Grammar Book You'll Ever Need by Susan Thurman
9. Advanced English Grammar: A Linguistic Approach by Ilse Depraetere and Chad Langford

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Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (A.P.)

EC1204 - COMPUTER PROGRAMMING AND NUMERICAL METHODS (ES)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC 1204	Computer Programming and Numerical Methods	4			30	70	100	3hrs	3

Course Objectives: The objectives of this course are

- To provide complete knowledge of C language.
- To provide students with understanding of code organization and functional hierarchical decomposition with using complex data types.
- To provide knowledge to the Students to develop logics this will help them to create programs, applications in C.
- This course aims to identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.
- This course provides the fundamental knowledge which is useful in understanding the other programming languages.

Course Outcomes: At the completion of the course the student will be able to

CO1: Identify basic elements of C programming structures like data types, expressions, control statements, various simple functions and apply them in problem solving.

CO2: Apply various operations on derived data types like arrays and strings in problem solving.

CO3: Design and implement of modular Programming and memory management using Functions, pointers.

CO4: Apply Structure, Unions and File handling techniques to Design and Solve different engineering programs with minimal complexity.

CO5: Apply Numerical methods to solve the complex Engineering problems.

P.V. Sridhar
Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M. Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg.
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

SYLLABUS
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UNIT-I: Introduction to C: Basic structure of C program, Constants, Variables and data types, Operators and Expressions, Arithmetic Precedence and associativity, Type Conversions. Managing Input and Output Operations Formatted Input, Formatted Output.

UNIT-II: Decision Making, Branching, Looping, Arrays & Strings: Decision making with if statement, Simple if statement, The if...else statement, Nesting of if...else statement, the else..if ladder, switch statement, the (?:) operator, the GOTO statement., The while statement, the do statement, The for statement, Jumps in Loops, One, Two-dimensional Arrays, Character Arrays. Declaration and initialization of Strings, reading and writing of strings, String handling functions, Table of strings.

UNIT-III: Functions: Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions: No Arguments and no Return Values, Arguments but no Return Values, Arguments with Return Values, No Argument but Returns a Value, Functions that Return Multiple Values, Nesting of functions, recursion, passing arrays to functions, passing strings to functions, the scope, visibility and lifetime of variables.

UNIT-IV: Pointers: Accessing the address of a variable, declaring pointer variables, initializing of pointer variables, accessing variables using pointers, chain of pointers, pointer expressions, pointers and arrays, pointers and character strings, array of pointes, pointers as function arguments, functions returning pointers, pointers to functions, pointers to structures- Program Applications.

UNIT-V: Structure and Unions: Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, arrays of structures, arrays within structures, structures within structures, structures and functions and unions, size of structures and bit-fields- Program applications.

UNIT-VI: File handling: Defining and opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, random access to files and Command Line Arguments- Program Applications

P.V. Sridhar
Head of the Department
Dept of Electronics & Communication Engg.
A.U. College of Engg.
Visakhapatnam-530 003

Prof. M Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Eng
College of Engineering, Andhra Universi
Visakhapatnam-530 003 (AP)

UNIT-VII: Numerical Methods: Solutions of Algebraic and Transcendental Equations, Bisection Method, Newton Raphson Method. Newton's forward and backward Interpolation, Lagrange's Interpolation in unequal intervals. Numerical Integration: Trapezoidal rule, Simpson's 1/3 rules. Solutions of Ordinary First Order Differential Equations: Euler's Method, Modified Euler's Method and Runge-Kutta Method.

Text Books:

1. Programming in ANSI C, E Balagurusamy, 6th Edition. McGraw Hill Education (India) Private Limited.
2. Introduction to Numerical Methods, SS Sastry, Prentice Hall.

Reference Books:

1. Let Us C, YashwantKanetkar, BPB Publications, 5th Edition.
2. Computer Science, A structured programming approach using C", B.A.Forouzan and R.F.Gilberg, " 3rd Edition, Thomson, 2007.
3. The C –Programming Language' B.W. Kernighan, Dennis M. Ritchie, PHI.
4. Scientific Programming: C-Language, Algorithms and Models in Science, Luciano M. Barone (Author), Enzo Marinari (Author), Giovanni Organtini, World Scientific.

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P.V. Sridhar

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam

M. Satya Anuradha

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

EC1205 - ELECTRONIC CIRCUIT ANALYSIS (ES)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC 1205	Electronic Circuit Analysis	4			30	70	100	3hrs	3

Course Objectives: The objectives of this course are

- To prepare students to perform the analysis of any Analog electronics circuit.
- To empower students to understand the design and working of BJT /FET.
- To empower students to understand the design and working of amplifiers and oscillators.
- To empower students to understand the design and working of Operational Amplifier.
- To prepare the students for advanced courses in Communication system Circuit Design.

Course Outcomes: At the end of the course the student will be able to

CO1: Acquire knowledge of small signal and high frequency analysis of BJT.

CO2: Ability to design and analyze multistage amplifiers.

CO3: Understand the concepts of positive feedback and negative feedback on different amplifier configurations.

CO4: Develop the ability to design different types of oscillator circuits

CO5: Acquire knowledge about tuned amplifiers and its importance in different communication applications.

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg.
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A.U. College of Engg.
Andhra University
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UNIT-I: Small Signal High Frequency Transistor Amplifier models: BJT: Transistor at high frequencies, Hybrid- common emitter transistor model, Hybrid-conductance's, Hybrid- capacitances, validity of Hybrid- model, determination of high frequency parameters in terms of low frequency parameters, CE short circuit current gain, current gain with resistive load, cut-off frequencies, frequency response and gain bandwidth product. FET: Analysis of common source and common drain amplifier circuits at high frequencies.

UNIT-II: Multistage Amplifiers: BJT and FET RC Coupled Amplifiers – Frequency Response, Cascaded Amplifiers, Calculation of Band Width of Single and Multistage Amplifiers, Concept of Gain Bandwidth Product.

UNIT-III: Feedback Amplifiers: Concept of Feedback Amplifiers – Effect of Negative feedback on the amplifier Characteristics, Different Feedback Amplifier Topologies, Method of Analysis of Voltage Series, Current Series, Voltage Shunt and Current Shunt feedback Amplifiers.

UNIT-IV: Sinusoidal Oscillators: Condition for oscillations –LC Oscillators – Hartley, Colpitts, Clapp and Tuned Collector Oscillators, Frequency and amplitude Stability of Oscillators – Crystal Oscillators – RC Oscillators -- RC Phase Shift and Wein bridge Oscillators (BJT and JFET models)

UNIT-V: Tuned Voltage Amplifiers and Power Amplifiers: Single Tuned and Stagger Tuned Amplifiers – Analysis, Double Tuned Amplifier, Bandwidth Calculation, Classification of Power Amplifiers–Class A, Class B and Class AB power Amplifiers, Series Fed, Single Ended Transformer Coupled and Push Pull Class A and Class B Power Amplifiers. Cross-over Distortion in Pure Class B Power Amplifier, Class AB Power Amplifier – Complementary Push Pull Amplifier, Derating Factor – HeatSinks.

Text Books:

1. Integrated Electronics, Analog Digital Circuits and systems, Jacob Millman and D. Halkias, McGraw Hill, 1972.
2. Electronic Devices, G.S.N. Raju, IK International Publications, New Delhi, 2006.
3. Adel S. Sedra, Kenneth C. Smith, Arun N. Chandorkar, Microelectronic Circuits, 6/e, Oxford University Press, 2013.

Reference Books:

1. Electronic Circuit Analysis, B. V. Rao, K. Raja Rajeswari et.al, Pearson Publishers.
2. Electronic Devices and Circuits by Salivahanan, N. Suresh Kumar and A. Vallava Raj TMH, 2nd Edition, 1998.
3. Electronic Devices and Circuits – G. K. Mithal, Khanna Publishers, 23rd Edition;2004.

*****

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

EC1206 - ENGLISH LANGUAGE LAB (HSS)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC1206	English Language Lab			3	50	50	100	3hrs	1.5

Course Objectives: The objectives of this course are

- To make students recognize the sounds of English through Audio-Visual aids.
- To help students build their confidence and help them to overcome their inhibitions and self-consciousness while speaking in English.
- To familiarize the students with stress and intonation and enable them to speak English effectively.
- To give learners exposure to and practice in speaking in both formal and informal contexts.

Course Outcomes: At the completion of the course the student will be able to

CO1: Students will be sensitized towards recognition of English sound patterns and the fluency in their speech will be enhanced.

CO2: A student is able to inculcate the habit of good reading and writing skills.

CO3: A study of the communicative items in the laboratory will help students become successful in the competitive world.

CO4: Students will be able to participate in group activities like roleplays, group discussions and debates.

CO5: Students will be able to express themselves fluently and accurately in social as well professional context.

P.V. Sridevi
Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University

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M. Satya Anuradha
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

UNIT-I: Introduction to Phonetics: The Sounds of English (Speech sound – vowels and consonants) - Stress and Intonation - Accent and Rhythm.

UNIT-II: Listening Skills: Listening for gist and specific information - listening for Note taking, summarizing and for opinions - Listening to the speeches of eminent personalities.

UNIT-III: Speaking Skills: Self-introduction - Conversation Skills (Introducing and taking leave) - Giving and asking for information - Role Play - Just A Minute (JAM) session - Telephone etiquette.

UNIT-IV: Reading and Writing skills: Reading Comprehension – Précis Writing - E-Mail writing - Punctuation.

UNIT-V: Presentation skills: Verbal and non-verbal communication - Body Language - Making a Presentation.

Reference Books:

1. Ashraf Rizvi. Effective Technical Communication. Tata McGraw Hill Education Private Limited, New Delhi.
2. Speak Well. Orient Blackswan Publishers, Hyderabad.
3. Allan Pease. Body Language. Manjul Publishing House, New Delhi.

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P.V. Sridhar
Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept. of Electronics and Communication Engg.
A.U. College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

EC1207- ELECTRONIC CIRCUIT ANALYSIS LAB (BS/ES)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC1207	Electronic Circuit Analysis Lab			3	50	50	100	3hrs	1.5

Course Objectives: The objectives of this course are

- To Design feedback amplifiers.
- To generate a sinusoidal signal using oscillators.
- To simulate oscillators and power amplifiers.
- To determine the frequency response of op-amp.

Course Outcomes: At the end of the course the student will be able to

CO1: Determine the frequency response of BJT and JFET multistage amplifiers.

CO2: Design different types of feedback amplifiers and understands its applications.

CO3: Design LC oscillators to generate sinusoidal signal of desired frequency.

CO4: Design RC oscillators to generate sinusoidal signal of desired frequency.

CO5: Design the power amplifier and able to differentiate between different power amplifier configurations.

SYLLABUS

(with effect from 2024-25 admitted Batch)

List of Experiments:

1. Design two stage RC-Coupled Amplifier to find frequency response characteristics.
2. Design JFET common source amplifier to find its input impedance and frequency response characteristics.
3. Design Voltage series feedback Amplifier.
4. Design Current series feedback Amplifier
5. Design Voltage shunt feedback amplifier.
6. Design RC-Phase shift oscillator.
7. Design Wein bridge oscillator.
8. Design Hartley Oscillator.
9. Design Colpitts oscillator.

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

10. Design Class-A power amplifier.

11. Design Class-B Push-pull Amplifier.

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Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg.
College of Engineering, Andhra University
Visakhapatnam: 530 003 (A.P.)

EC1208 - COMPUTER PROGRAMMING AND NUMERICAL METHODS LAB (ES)

(Effective from Admitted Batch of 2024-25)

Code	Title	L	T	P	Allotment of Marks		Total Marks	Ext. Exam Time	C
					Int.	Ext.			
EC1208	Computer Programming and Numerical Methods Lab			3	50	50	100	3hrs	1.5

Course Objectives: The objectives of this course are

- To impart writing skill of C programming to the students and solving problems.
- To write and execute programs in C to solve problems such as Modularize the problems into small modules and then convert them into programs.
- To write and execute programs in C to solve problems such as arrays, files, strings structures and different numerical methods.
- This reference has been prepared for the beginners to help them understand the basic to advanced concepts related to Objective-C Programming languages.

Course Outcomes: At the completion of the course the student will be able to

CO1: Understand various computer components, Installation of software, C programming development environment, compiling, debugging, and linking and executing a program using the development environment.

CO2: Analyzing the complexity of problems, modularize the problems into small modules and then convert them into programs.

CO3: Construct programs that demonstrate effective use of C features including arrays, strings, structures, pointers and files.

CO4: Apply and practice logical ability to solve the real world problems.

CO5: Apply Numerical methods to solve the complex Engineering problems.

P.V. Sridevi
Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satyanarayana
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam-530 003 (AP)

SYLLABUS

(with effect from 2024-25 admitted Batch)

1. Write a program to read x, y coordinates of 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What will be the output from your program if the three given points are in a straight line?

2. Write a program, which generates 100 random integers in the range of 1 to 100. Store them in an array and then print the arrays. Write 3 versions of the program using different loop constructs. (e.g. for, while, and do while).
3. Write a set of string manipulation functions e.g. for getting a sub-string from a given position, copying one string to another, reversing a string, adding one string to another.
4. Write a program which determines the largest and the smallest number that can be stored in different data types like short, int, long, float, and double. What happens when you add 1 to the largest possible integer number that can be stored?
5. Write a program, which generates 100 random real numbers in the range of 10.0 to 20.0, and sort them in descending order.
6. Write a function for transposing a square matrix in place (in place means that you are not allowed to have full temporary matrix).
7. First use an editor to create a file with some integer numbers. Now write a program, which reads these numbers and determines their mean and standard deviation.
8. Given two points on the surface of the sphere, write a program to determine the smallest arc length between them.
9. Implement bisection method to find the square root of a given number to a given accuracy.
10. Implement Newton Raphson method to det. a root of polynomial equation.
11. Given table of x and corresponding f(x) values, write a program which will determine f(x) value at an intermediate x value by using Lagrange's interpolation/
12. Write a function which will invert a matrix.
13. Implement Simpson's rule for numerical integration.
14. Write a program to solve a set of linear algebraic equations.

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Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

MODEL QUESTION PAPER

I/IV B.Tech & I/VI B.Tech + M.Tech First Semester Degree Examination

Electronics and Communication Engineering

MATHEMATICS-I

(Common for Group-A and Group-B branches)

(Effective from Admitted Batch 2024-25)

Subject Code: EC1101 **Max Marks: 70M**

Question 1 is compulsory
Answer any other FOUR questions
All questions carry equal marks

1. (a) If $u=\sin^{-1}(x-y), x=3t$ and $y=4t^2$ find $\frac{du}{dt}$.

   (b) State Lagrange's mean value theorem.

   (c) Find the equation of the tangent plane to the surface $z^2=4\left(1+x^2+y^2\right)$ at (2,2,6).

   (d) Find the value of $\int_0^2\int_1^3\int_1^2 xy^2z\ dzdydx$.

   (e) Write the relation between Beta and Gamma functions.

   (f) Write the conditions for the expansions of the function in Fourier series.

   (g) Write the Parseval's formula for the Fourier series.

2. (a) If $x^xy^yz^z=c$, show that at $x=y=z$, $\frac{\partial^2 z}{\partial x\partial y}=-(x\log ex)^{-1}$.

   (b) If $u=\cos^{-1}\left(\frac{x+y}{\sqrt{x}+\sqrt{y}}\right)$ Prove that $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=-\frac{1}{2}\cot u$.

3. (a) If $u=\frac{x+y}{1-xy}$ and $v=\tan^{-1}x+\tan^{-1}y$ then find $\frac{\partial(u,v)}{\partial(x,y)}$. Are u and v functionally related? If so, find the relationship.

P.V. Sridevi
Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M. Satya Anuradha
Chairperson, Board of Studies
Dept. of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

(b) Expand $e^x \sin y$ at $\left(-1, \frac{\pi}{4}\right)$ upto the terms of third degree.

4. (a) Find the maximum and minimum values of the function x^2+y^2-2x.

(b) A rectangular open box of capacity 32 cubic units is to be prepared. Find the dimensions of the box to minimize the cost of painting outside of the box.

5. (a) Evaluate $\int_0^{3}\int_1^{\sqrt{4-y}} (x+y)dxdy$ by changing the order of integration.

(b) Calculate $\iint r^3 dr d\theta$ over the area included between the circles $r = 2\sin\theta$ and $r = 4\sin\theta$.

6. (a) Find the volume bounded by the xy-plane, the paraboloid $2z = x^2+y^2$ and the cylinder $x^2+y^2 = 4$.

(b) Find by triple integrals, the volume of the sphere $x^2+y^2+z^2 = a^2$.

7. (a) Find the centre of gravity of the area of the cardioid $r = a(1+\cos\theta)$.

(b) Express $\int_0^1 x^m \left(1-x^n\right)^p dx$ in terms of Gamma function and hence evaluate $\int_1^5 x^5\left(1-x^3\right)^{10} dx$.

8. (a) Find a Fourier series to represent the function $f(x) = x - x^2$ from $x = -\pi$ to $x = \pi$.

(b) Obtain cosine and sine series for $f(x) = x$ in $0 \le x \le \pi$. Hence show that

$$\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\cdots = \frac{\pi^2}{8}.$$

P. V. Sridhar

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg.
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

MODEL QUESTION PAPER

I/IV B.Tech & I/VI B.Tech + M.Tech First Semester Degree Examination

Electronics and Communication Engineering

PHYSICS

(Common for Group-B Branches: Civil, Environmental, ECE, EEE, Mechanical, Naval Arch & Marine, Metallurgy, Geo-informatics, Chemical, Biotechnology and Instrumentation Engineering)

(Effective from Admitted Batch 2024-25)

Subject Code: EC1102 **Max Marks: 70M**

Question 1 is compulsory
Answer any other FOUR questions
All questions carry equal marks

1. Answer the following:
   (a) What is a reversed heat engine?
   (b) Write Maxwell equations.
   (c) Mention few applications of Lasers.
   (d) What are matter waves?

2. (a) Explain Heat and work.
   (b) Describe different operations involved in a Carnot's cycle. Derive the efficiency of a Carnot's engine.

3. (a) State and explain Ampere's law.
   (b) Derive an expression for magnetic field due to a Jong solenoid carrying current.

4. (a) Obtain an expression for the torque acting on a current loop.
   (b) What is piezoelectric effect? Explain how Ultrasonics can be generated by piezoelectric phenomena.

5. (a) Explain the phenomenon of interference in a thin film of uniform thickness due to reflected light.
   (b) Explain diffraction of light. Give the difference between interference and diffraction.

6. (a) Explain Huygen's theory of double refraction in uniaxial crystals.

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

(b) Describe the construction and working of Nicol prism. Mention its use.

7. (a) Explain the terms: stimulated emission, population inversion and pumping.

(b) Derive an expression for acceptance angle and numerical aperture for an optical fibre.

8. (a) Explain how solids are classified on the basis of energy band gap.

(b) Explain Sol-gel synthesis for producing nanomaterials.

P.V.Sridhar

Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

MODEL QUESTION PAPER

I/IV B.Tech & I/VI B.Tech + M.Tech First Semester Degree Examination

Electronics and Communication Engineering

DIGITAL LOGIC DESIGN

(Group-B: Departmental Subject)

(Effective from Admitted Batch 2024-25)

Subject Code: EC1103 **Max Marks: 70M**

Question 1 is compulsory
Answer any other FOUR questions
All questions carry equal marks

1. (a) Convert: (i) 1011 (ii) 1101101 to decimal

   (b) Why NAND, NOR gates are universal gates

   (c) Explain RS flip-flop truth table

   (d) Compare decoder with demultiplexer

   (e) What is PROM?

   (f) Draw the block diagram of 4-bit serial in, serial-out shift register

   (g) What is an ASM chart?

2. (a) Explain the following logic operations with truth table and timing diagrams

   (i) NOR (ii) NAND

   (b) Perform the subtraction using 2's complement method

   (i) 11010-10100

   (ii) 11010-1101.10

   (iii) 110-110000

3. (a) Simplify each of the following expressions:

   (i) B+BC (ii) C (iii) A

   (b) Find both the minterm expansion and maxterm expansion for the following function using algebraic manipulations

   f (X, Y, Z, W) = XY + X'ZW

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra U...
Visakhapatnam: 530 0...

4. (a) Reduce the following expression using K-map and implement them in NAND gates

$\sum m\ (0,1,2,3,4,6,8,9,10,11)$

(b) Obtain the minimal expressions using tabular method and implement it in universal gates

$\sum m\ (0,1,3,4,5,7,10,13,14,15)$

5. (a) Design a full-adder with two half-adders and basic gates

(b) Convert Excess-3 code to BCD using Full-adder circuits

6. (a) Design a synchronous mod-6 counter D- flip flop

(b) Design parallel-in parallel-out shift register

7. (a) Design JK Master Slave Flip-flop and explain it with timing diagrams.

(b) Convert a SR flip-flop into JK flip-flop and T flip-flop

8. (a) Explain salient features of ASM charts?

(b) Draw the ASM Chart for a sequence detector to detect the sequences 1011 and 1101 overlapping is not permitted.

P.V. Sridhar
Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

MODEL QUESTION PAPER

I/IV B.Tech & I/VI B.Tech + M.Tech First Semester Degree Examination

Electronics and Communication Engineering

ELECTRONIC DEVICES AND CIRCUITS

(Group-B: Departmental Subject)

(Effective from Admitted Batch 2024-25)

Subject Code: EC1104 **Max Marks: 70M**

Question 1 is compulsory
Answer any other FOUR questions
All questions carry equal marks

1. (a) Draw the energy band diagram of the Intrinsic semiconducting material

   (b) Define mass action law

   (c) What is Zener break down voltage

   (d) Explain LED Characteristics

   (e) What is the major difference between unipolar and bipolar devices

   (f) Explain the application of CE amplifier

   (g) Explain the terms channel and drain of JFET.

2. (a) Explain how P type and N type materials can be made using intrinsic semiconducting materials

   (b) Derive an expression for current density of semiconductor and explain mass action law.

3. (a) Explain and derive fermi energy level in an intrinsic semiconductor

   (b) Calculate the wavelength λ of electron with KE of 300 ev mass of electron is 9.108×10^{-31} kg charge 1.602×100^{-19} C Planks constant $h=6.626 \times 10^{-34}$ j.s

4. (a) Draw the center tap full wave rectifier diagram and explain rectifier efficiency.

   (b) A sample full wave Bridge rectifier circuit has an input voltage of 230v ac rms. Assume diodes to be ideal findout the DC current dc voltage rms value of output current and voltage. Assume load resistor of 10 K ohms.

5. (a) Explain transistor AC and DC load line and obtain Quiscient point.

   (b) Draw and explain CE amplifier with its current components.

P.V. Sridhar
Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Eng
College of Engineering, Andhra Universi
Visakhapatnam: 530 003 (AP)

6. (a) Explain hybrid parameters of CE amplifier with its current components.

(b) A junction transistor has the following h parameters h_{ie}=2 K ohms , h_{fe} = 50, h_{re}= $1.6x10^{-4}$, h_{oe}=50μA/V and load resistance RL=12 K ohms, Rs=500 ohms, determine current gain, voltage gain, input resistance, output resistance.

7. (a) Draw the self bias circuit and explain why such circuit is an improvement over fixed circuit.

(b) Explain and derive stability factor of self bias circuit

8. (a) Define four JFET parameters and how they are related?

(b) A JFET drain current of 15 mA. If I_{DSS} = 25 mA and V_{DS}=5 V, find V_P

P.V. Sridhar
Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

MODEL QUESTION PAPER

I/IV B.Tech & I/VI B.Tech + M.Tech First Semester Degree Examination

Electronics and Communication Engineering

NETWORK THEORY AND MACHINE

(Group-B: Departmental Subject)

(Effective from Admitted Batch 2024-25)

Subject Code: EC1105 **Max Marks: 70M**

Question 1 is compulsory
Answer any other FOUR questions
All questions carry equal marks

1. (a) Explain the terms active and passive elements.

   (b) State and explain the superposition theorem.

   (c) Explain source free response of RL circuit.

   (d) Explain concept of Duality.

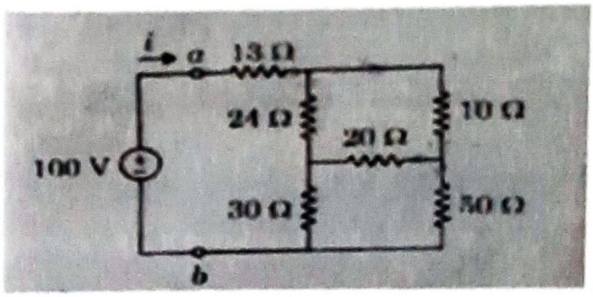
   (e) List out the speed control methods of DC motors.

   (f) Explain the principle of operation of single phase transformers,

   (g) Explain how synchronous condenser helps to improve power factor.

2. (a) State and explain Kirchoff's laws.

   (b) For the bridge network, find the resistor R_{th} and I

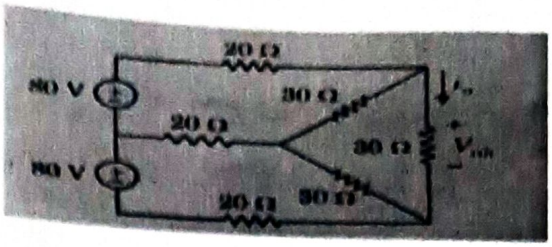


3. (a) Explain reciprocity theorem. What is its importance with reference to a two-port network?

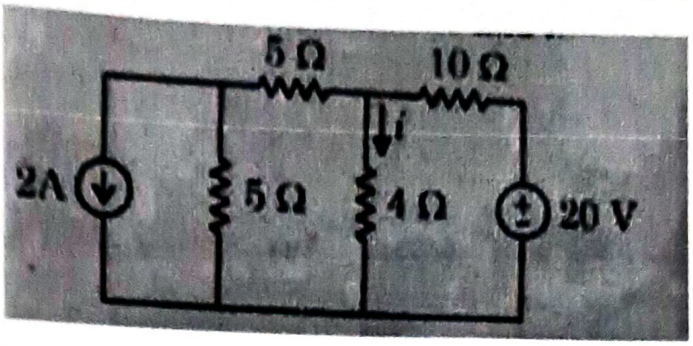
   (b) Use mesh analysis to find V_{ab} and i_o in the circuit.

Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

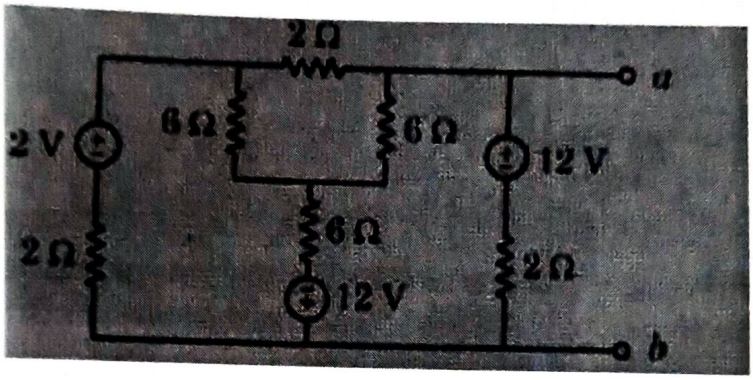
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg.
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)



4. (a) For the circuit shown in the below figure, use source transformation to find i.



(b) Obtain the Norton equivalent circuits at terminals a-b of the circuit



5. (a) Obtain the response of R-L-C series circuit for different excitation.

(b) A constant voltage at a frequency of 1 MHz is applied to an inductor in series with a variable capacitor when the capacitor value while it is reduced to one half when the capacitance is 600 pF find:

(i) the resistance

(ii) the inductance

(iii) the Q factor of the inductor

6. (a) Explain the characteristics of different types of DC generators.

(b) A 50 KW, 250 V short shunt compound generator has the following data R_a=0.06 ohm, and R_{se} = 0.045 ohm and R_f = 125 ohms. Determine the induced armature voltage at rated load and terminal voltage. Take 2V as the total brush contact drop.

7. (a) Derive the torque equation of a DC motor

Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

(b) A 220 V DC series motor runs at 800 rpm and draws at 100 A. Determine at what speed the motor will run when developing half torque. The total resistance of the armature and field is 0.1 ohm. Assume that the magnetic circuit is unsaturated.

8. (a) Explain the principle of operation of a three-phase induction motor.

(b) Explain the principle of operation of a universal motor and stepper motor.

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

MODEL QUESTION PAPER

I/IV B.Tech & I/VI B.Tech + M. Tech Second Semester Degree Examination

Electronics and Communication Engineering

MATHEMATICS -II

(Common for Group-A & Group-B branches)

(Effective from the Admitted Batch 2024-25)

Subject Code: EC1201 **Max Marks: 70M**

Question 1 is compulsory
Answer any other FOUR questions
All questions carry equal marks

1. (a) Define Hermitian and Skew-Hermitian matrices.

   (b) Write any two properties of Eigen vectors.

   (c) Discuss the nature of the Quadratic form $x^2+2y^2-3z^2$.

   (d) Form the differential equation from the relation $y=e^x\left(A\cos x+B\sin x\right)$.

   (e) Find the particular integral of $\left(D+1\right)^2 y=e^{-x}$.

   (f) Find $L\left\{t^2e^{-2t}\right\}$.

   (g) Define unit step function and write its Laplace transform.

2. (a) Reduce the matrix $\begin{bmatrix}2 & 3 & -2 & 5 & 1\\ 3 & -1 & 2 & 0 & 4\\ 4 & -5 & 6 & -5 & 7\end{bmatrix}$ into normal form and hence find its rank

   (b) Investigate for what values of λ and μ of the equations

   $$2x+3y+5z=9$$
   $$7x+3y-2z=8$$
   $$2x+3y+\lambda z=\mu$$

   have i) no solution ii) a unique solution iii) an infinite number of solutions.

3. (a) Solve the system of equations: $2x+y+6z=9,\ 8x+3y+2z=13,\ x+3y+z=7$ using Gauss-Seidel method.

P. V. Srd
Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

(b) Apply Cayley-Hamilton theorem to find the inverse of the matrix

$$A=\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}.$$

Also express $A^6-6A^5+9A^4-2A^3-12A^2+23A-9I$ as a linear polynomial in

4. (a) Reduce the Quadratic Form $2xy+2xz-2yz$ to a Canonical form by orthogonal reduction. Also find the modal matrix.

(b) Solve $\left(1+y^2\right)dx=\left(\tan^{-1}y-x\right)dy.$

5. (a) Solve $\left(y\log y\right)dx+\left(x-\log y\right)dy=0.$

(b) If the temperature of the air is $30^\circ C$ and the substance cools from $100^\circ C$ to $70^\circ C$ in 15 min, find when the temperature will be $40^\circ C$.

6. (a) Solve $\frac{d^2y}{dx^2}-2\frac{dy}{dx}+y=xe^x\sin x.$

(b) Solve $\frac{d^2y}{dx^2}+a^2y=\sec ax$ by the method of variation of parameters

7. (a) Solve the simultaneous equations $\frac{dx}{dt}+2y=e^t,\ \frac{dy}{dt}-2x=e^{-t}.$

(b) Find the Laplace transform of the triangular wave equation of period $2a$ given by $f(t)=\begin{cases} t, & 0<t<a \\ 2a-t, & a<t<2a \end{cases}$.

8. (a) Evaluate $L\left\{e^{-t}\int_0^t\frac{\sin t}{t}\,dt\right\}.$

(b) Solve $y''-3y'+2y=4t+e^{3t}$, when $y(0)=1, y'(0)=-1$, by the method of Laplace transforms.

P. V. Sridevi
Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

MODEL QUESTION PAPER

I/IV B.Tech & I/VI B.Tech + M. Tech Second Semester Degree Examination

Electronics and Communication Engineering

GREEN CHEMISTRY

(Common for Group-B Branches: Civil, Environmental, ECE, EEE, Mechanical, Naval Arch & Marine, Metallurgy, Geo-informatics, Chemical, Biotechnology and Instrumentation Engineering)

(Effective from Admitted Batch 2024-25)

Subject Code: EC1202 **Max Marks: 70M**

Question 1 is compulsory
Answer any other FOUR questions
All questions carry equal marks

1. Write brief Answers for the following:

(a) WHO limits of drinking water

(b) Reverse Osmosis

(c) Primary Batteries

(d) Alkaline fuel cell

(e) Intergranular corrosion

(f) Electroplating

(g) Zero pollution technologies

2. (a) Explain Boiler troubles and their removal

(b) Explain Lime-Soda Process

3. (a) Explain Disinfection Methods of Potable Water

(b) Briefly explain the method of determination of hardness of water

4. (a) Explain the components and functioning of lithium primary cells

(b) Explain the functioning and advantages of Valve Regulated Lead Acid Batteries

5. (a) Explain components and functioning of ultrathin lithium polymer cells

(b) Explain the working principle and components of a fuel-cell

6. (a) Briefly explain the functioning of Proton Exchange Membrane fuel-cells

Prof. M.Satya Kiran
Chairperson, Board of Studies
Dept of Electronics and Communication Eng
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

P.V. Sridevi

Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

(b) Explain the functioning of direct methanol fuel-cells

7. (a) Compare chemical and electrochemical corrosions with suitable examples

(b) Explain the control of corrosion by coating with metals and metal oxides

8. (a) Briefly explain any six principles of green chemistry

(b) Explain green fuels and green propellants with suitable examples

P.V. Sridhar

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M. Satya Murali

Prof. M.Satya Murali
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

MODEL QUESTION PAPER

I/IV B.Tech & I/VI B.Tech + M. Tech Second Semester Degree Examination

Electronics and Communication Engineering

ENGLISH

(Common for Group-B Branches: Civil, Environmental, ECE, EEE, Mechanical, Naval Arch & Marine, Metallurgy, Geo-informatics, Chemical, Biotechnology and Instrumentation Engineering)

(Effective from Admitted Batch 2024-25)

Subject Code: EC1203

Max Marks: 70M

Question 1 is compulsory
Answer any other FOUR questions from the remaining
All questions carry equal marks

1. (a) Read the passage and answer the questions that follow:

Political education has many connotations. It may be defined as the preparation of a citizen to take well-informed, responsible, and sustained action for participating in the national struggle to achieve the country's socio-economic objectives. The predominant socio-economic objectives in India are the abolition of poverty and the creation of a moderndemocratic, secular, and socialist society in place of the present traditional, feudal, hierarchical, and egalitarian one. Under colonial rule, the Congress leaders argued that political education was essential and refused to accept the officialview that education and politics should not be mixed. But when they came to power in 1947, they almost adopted Britishpolicy and began to talk about education being defiled by politics. 'Hands off education' was the call to political parties.But despite this, political infiltration into the education system has greatly increased because different political parties vie with each other to capture the minds of teachers and students. The wise academicians wanted political support without political interference. What we have received is infinite political interference with little genuine political support. Political parties' interference with the educational system for their ulterior motives means that there is no political education at all. With the all-round growth of elitism, it is hardly a matter of surprise that real political education withinthe school system (which means creating a commitment to social transformation) has been even weaker than in the pre-independence period. During that time, the struggle for freedom only ended, and the major non-formal agency of political education disappeared. The press played a significant role by providing some political education. However, it did not utilize the opportunity to the full, and the stranglehold of vested interests continued to dominate it. The same can be said of political parties and other institutions and agencies outside the school system, which can be expected to provide political education. After analyzing all these

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Chairperson
Board of Studies
College of Engineering
Andhra University
Visakhapatnam: 530 003 (AP)

things, it appears that we have made no progress in genuine political education in the post-education period and have even slide back in some respects. For instance, the education system has become even more elite-oriented. Patriotism has become the first casualty. The father of the nation gave us the courageto oppose the government when it was wrong, in a disciplined fashion and on basic principles. Today, we have even lostthe courage to fight on basic issues in a disciplined manner because agitational and anarchic politics for individual, group, or party aggrandizement have become common. In recent times, the education system continues to support the domination of the privileged groups and domestication of the under-privileged ones. The situation will not change unlesswe take vigorous steps to provide genuine political education on an adequate scale. This is one of the major educational reforms we need. If it is not carried out, mere linear expansion of the existing formal education system will only supportthe status quo and hamper radical social transformation.

i. According to the passage, what should be the main purpose of political education?

ii. What would be the appropriate Title of the passage, state reason/s?

iii. How has politics been related to educational institutions after independence?

iv. Based on the passage, which is the major drawback of the present education system?

(b) Correct errors, if any, in the following sentences and rewrite them.

i. They discussed about the whole matter.

ii. I have just a little more pages to read.

(c) Write the meanings of the following phrasal verbs.

i. Back out ii. Stand by

(d) Write the meanings of the following idiomatic expressions.

i. Black sheep ii. Feel blue

2. (a) Write an essay on Swami Vivekananda's 'The Secret of Work'

(b) What does Kleiser suggest in the poem, 'Stay Calm'?

3. (a) How does Mansfield use the doll's house symbol in 'The Doll's House'?

Prof. M Satya Apuradha
Chairperson, BoS
Dept. of Electronics and Communication Engg.
College of Engineering
Andhra University
Visakhapatnam-530 003 (AP)

Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

(b) How does Tagore envision an ideal society in 'Where the Mind Is Without Fear'.

4. (a) How does Behrman show selflessness in 'The Last Leaf'?

(b) What values does Kipling advocate in 'If.'

5. (a) How does Bacon argue about the benefits of academics in 'Of Studies'.

(b) How does Toru Dutt use metaphor in 'Our Casuarina Tree'.

6. (a) Bring out the humour in Mark Twain's Whitewashing the Fence?

(b) What message about resilience is in Invictus by Henley?

7. (a) Write an exchange of dialogues between you and your colleague about your future plans.

(b) Read the following passage and make notes on it, using headings and sub-headings:

India is a secular, democratic nation. This implies that every religion is treated equally and at par with every other. No religion is accorded any preferential treatment of any kind. All citizens can also practice, preach, or profess any religion. The state does not have a unified or homogeneous religion, and following this unique characteristic of Indiaensures its unity in diversity. India has been the birthplace of several religions. It is the land where all these religions - such as Hinduism, Christianity, Buddhism, Sikhism, Zoroastrianism, Jainism, and so on exist simultaneously, peacefully, and harmoniously. However, some anti-social elements have interpreted the sanctity of religion in a twisted way. No religion preaches violence or rioting. All religions are but various ways to reach the Supreme Being; they are paths thatlead to the ultimate truth and salvation, though we refer to the destination by various names such as Jesus, Krishna, andBuddha. Allah and so on. It is essential to realize that to ensure a peaceful mosaic of cultural distinctness, the path of non-violence or ahimsa, as given by the Father of the nation, must be followed unwaveringly. God created man in his image. Hence, it follows naturally that there is some divinity within all human beings. Thus, to kill and murder in the name of religion is blasphemy. Only once the religious fanatics understand this will there be perpetual peace in the land.

8. (a) Write an essay on 'Artificial Intelligence (AI) in 21st Century.'

(b) Write an email to Student Coordinator, IIT Hyderabad, requesting for permission to participate in a Technical Fest.

P. V. Sridevi
Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

M. Satya Anuradha
Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (A.P.)

MODEL QUESTION PAPER

I/IV B.Tech & I/VI B.Tech + M. Tech Second Semester Degree Examination

Electronics and Communication Engineering

COMPUTER PROGRAMMING AND NUMERICAL METHODS

(Common for Group-B Branches: Civil, Environmental, ECE, EEE, Mechanical, Naval Arch & Marine, Metallurgy, Geo-informatics, Chemical, Biotechnology and Instrumentation Engineering)

(Effective from Admitted Batch 2024-25)

Subject Code: EC1204 **Max Marks: 70M**

Question No.1 is compulsory
Answer any other FOUR questions
All questions carry equal marks

1. (a) What is an identifier
   (b) Compare while and do-while statements.
   (c) What are library functions?
   (d) Write the advantages of pointer
   (e) How to declare a members in structure?
   (f) Distinguish between Trapezoidal and Simpson's rules of integration.
   (g) Explain the importance of numerical method.
2. (a) Explain the structure of C program.
   (b) Explain various data types in C programming.
3. (a) Define control statements. Explain all control statements with examples.
   (b) Write a C program to print days of week in words using switch case statement.
4. (a) What is function? Explain the need of function
   (b) Explain various categories of function in C.
5. (a) Explain the process of declaring and initializing pointers. Give an example.
   (b) What is pointer to pointer? Write syntax and explain with an example program.
6. (a) Why are we use structure? How can access member variable and member function of a structure?

(b) Write C program to demonstrate the use of union.

7. (a) How do we declare a file in C? Explain various opening modes of file.

(b) Explain the following file function with example.

8. (a) Solve by modified Euler method, $\frac{dy}{dx} = 1 - y \; for$ x=0.2, given y(0) = 0, h(0) = 0.1

(b) Evaluate using Lagrange's interpolation formula for the value of f(7) from the following table:

x	2	5	8	11
f(x)	94.8	87.9	81.3	75.1

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530 003

Prof. M.Satyanuradha
Chairperson, Board of Studies
Dept. of Electronics and Communication
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

MODEL QUESTION PAPER

I/IV B.Tech & I/VI B.Tech + M. Tech Second Semester Degree Examination

Electronics and Communication Engineering

ELECTRONIC CIRCUIT ANALYSIS

(Group-B: Departmental Subject)

(Effective from Admitted Batch 2024-25)

Subject Code: EC1205 **Max Marks: 70M**

Question 1 is compulsory

Answer any other FOUR questions

All questions carry equal marks

1. (a) What is an amplifier?

   (b) Why do you need more than one stage of amplifiers in practical circuits?

   (c) How do you define the cut-off frequencies of an amplifier?

   (d) Calculate the gain of a negative feedback amplifier with an internal gain A=100 and feedback factor β=1/10.

   (e) State the merits of negative feedback in amplifiers.

   (f) What do you understand by an electronic oscillator?

   (g) What is crossover distortion?

2. (a) Obtain the expression for higher cutoff frequencies of BJT amplifier.

   (b) Derive the components of hybrid π model in terms of h parameters in CE configuration.

3. (a) Explain the analysis of common source amplifier circuit at high frequency in FET.

   (b) Explain the analysis of common drain amplifier circuit at high frequency in FET.

4. (a) Draw the circuit diagram of two stage RC coupled amplifier.

   (b) "In a multistage amplifier, the input impedance of an amplifier stage should be very high and output impedance must be very low". Justify this statement.

5. (a) Draw the block representation of four types of negative feedback circuits.

   (b) Which one of the four negative feedback circuits is employed to get greater input impedance and lower output impedance in an amplifier circuit?

Head of the Department
Dept. of Electronics & Commn. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam

Prof. M.Satya Anuradha
Chairperson, Board of Studies
Dept. of Electronics and Communication Engg.
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)

6. (a) State the conditions under which a feedback amplifier works as an oscillator.

(b) Explain the principle of working of the Wein bridge oscillator with a neat circuit diagram

7. (a) Explain the working of Hartley colpitts oscillator with a neat circuit diagram

(b) Discuss Clapp and tuned collector oscillator with necessary mathematical calculations.

8. Write short notes on

(a) Single tuned amplifiers

(b) Miller theorem

Head of the Department
Dept. of Electronics & Comm. Engg.
A.U. College of Engg.
Andhra University
Visakhapatnam-530003

Prof. M.Satyanarayana
Chairperson, Board of Studies
Dept of Electronics and Communication Engg
College of Engineering, Andhra University
Visakhapatnam: 530 003 (AP)