Mount Carmel College, Autonomous, Bengaluru
Teaching Plan for 2024-25
Programme: BSc (CME): Subject: Electronics
Total Teaching Hours: 4 Hours/Week / Credits: 4
I Semester: Electronic Devices and Circuit Analysis

WEEK	HOURS	MODULE I – TOPIC	MODULE III – TOPIC	ACTIVITIES
1	4	Resistors – Specifications, Types: wire wound, carbon, film, variable	Review of Semiconductors, PN Junction Diode	Component demo (Module I) Diode testing using multimeter (Module III)
2	4	Thermistors, Varistors, Capacitors – Mica, Ceramic	Rectifiers – HWR & FWR, Ripple Factor, Efficiency	Classification and observation of passive components (Module I) CRO waveform analysis, efficiency calculation (Module III)
3	4	Capacitors – Electrolytic, Paper; Inductors – Air core, Ferrite core	Filters – Capacitor, Inductor, LC, π-section	Component identification, classification (Module I) Block diagram drawing and simulation (Module III)
4	4	Variable Inductors, RF Choke – Specifications and Applications	Clippers and Clampers	Lab demo with trainer kit (Module I) Clipping/clamping circuit setup and observation (Module III)
5	4	Transient Analysis – RL Circuits (Time Constant)	Voltage Multipliers – Half and Full Wave	RL circuit simulation and time constant analysis (Module I) Circuit explanation using diagrams (Module III)
6	4	Transient Analysis – RC Circuits (Time Constant)	Zener Diode – Characteristics and Zener Regulator	Problem-solving with RC circuit examples (Module I) Zener regulator design & working (Module III)
7	4	Series & Parallel Resonance – Current and Impedance Curves	Special Diodes – LED, Varactor, Tunnel, Photodiode	Resonance waveform observation using CRO (Module I) Application-based discussion, diode comparison table (Module III)
8	4	Quality Factor (Q), Recap & Test	Displays – LCD, Seven Segment, LDR; Recap & Test	Q-factor calculation and worksheet (Module I) Display demo, short quiz/test (Module III)

WEEK	HOURS	MODULE II – TOPIC	MODULE IV – TOPIC	ACTIVITIES
1	4	Ideal and Practical Voltage & Current Sources, Interconversions	NPN and PNP BJT – Construction and Working	Circuit element demo, multimeter testing (Module II)) Transistor kit demo, structure explanation (Module IV))
2	4	Kirchhoff's Laws – KVL & KCL, Branch Current Method	BJT Configurations – CB, CC, CE; Current Gains (α, β, γ)	KVL/KCL problem-solving (Module II))Plotting I/P-O/P curves, gain calculations (Module IV))
3	4	Mesh Analysis and Node Voltage Method	Biasing – Need, Thermal Runaway, Stabilization	Mesh/node worksheet (Module II) Video demo, biasing need discussion (Module IV)
4	4	Star-Delta Transformations	Biasing Circuits – Fixed, Emitter, Voltage Divider	Star-delta derivation, MCQs (Module II) Bias circuit analysis and stability factor (Module IV)
5	4	Superposition Theorem – Statement, Application, Problems	JFET – Construction, Characteristics, Comparison	Source superposition circuit solving (Module II)JFET graph plotting, BJT comparison table (MIV)
6	4	Thevenin's and Norton's Theorems – Statement, Explanation	MOSFET – Depletion & Enhancement Modes	Circuit trainer demo for theorems (Module II) MOSFET simulation and use case discussion (Module IV)
7	4	Maximum Power Transfer, Reciprocity Theorem	Power Devices – SCR, TRIAC, DIAC, UJT	Calculation tasks and applications (Module II) Component identification and triggering logic (Module IV)
8	4	Millman's Theorem (Statement), Recap & Test	Applications Recap & Test	Quick theory recap, 1-mark test (Module II) MCQs, concept test (Module IV)

Signature of the Faculty Member

Signature of HOD

Head of the Department
Department of Electronics
Mount Carmel College, Autonomous
58, Palace Road, Bengaluru - 560 052.

III Semester: Electronic Communication

WEEK	HOURS	MODULATION MODULE – TOPIC	DATA COMM MODULE – TOPIC	ACTIVITIES
1	4	Need for Modulation, Analog Communication (AM, FM, PM)	Information Theory, Digital Codes (ASCII, BCD, Gray, Excess-3)	Waveform demo with AM/FM/PM (Module 1) Code conversion worksheet, binary exercises ((Module 3)
2	4	Sampling, Nyquist Theorem, Types of Sampling, Aliasing	Error Detection & Correction – Parity, CRC, Hamming	Sampling demo, signal reconstruction ((Module 1) Bit error check, Hamming code solving ((Module 3)
3	4	Quantization, Quantization Error, Companding	Transmission Circuit Characteristics – Noise, Bandwidth, Speed	Graphical explanation & companding demo ((Module 1)Real-world examples, comparison chart ((Module 3)
4	4	Pulse Modulation – PAM, PWM, PPM	Data Sets, Interconnection, MODEM Classification	Waveform plotting, encoding demo ((Module 1) MODEM types discussion, datasheet analysis ((Module 3)
5	4	PCM, DPCM – Block Diagrams, Working, Pros/Cons	MODEM Interfacing – RS-232, USB, Connectors	Block diagram explanation & decoding task ((Module 1)Interface pin matching and connector setup ((Module 3)
6	4	Delta & Adaptive Delta Modulation – Slope Overload, Granular Noise	Network Organization, Switching, Protocols (OSI model)	Comparison table (DM, ADM, PCM), recap quiz ((Module 1) OSI layer matching, simulation demo ((Module 3)

WEEK	HOURS	DIGITAL COMMUNICATION – TOPIC	SATELLITE COMMUNICATION – TOPIC	ACTIVITIES
1	4	Introduction to Digital Communication, Digital v/s Analog, Bit rate, Baud rate, M-ary Encoding	Electromagnetic Spectrum, Ground & Sky Wave Propagation, Ionosphere Effects	Real-life system examples, bit/baud activity (Module 2) Propagation animation, frequency charts ((Module 4)
2	4	ASK & FSK – Block diagrams, waveforms, advantages/disadvantages	Tropospheric Scatter, Extra-terrestrial Comms, History of Satellites	Simulation of ASK/FSK ((Module 2) Satellite evolution case study ((Module 4)
3	4	QAM, BPSK, QPSK – Block & Constellation diagrams	Kepler's Laws, Satellite Orbits, Geo-synchronous Satellites	Constellation mapping and group discussion ((Module 2) Orbital simulation, diagram drawing ((Module 4)
4	4	Digital Transmission – Advantages, Disadvantages, Applications	Antenna Look Angles, Satellite Classification, Frequency Allocation	Video demo, group quiz ((Module 2) Look angle calculations, footprint mapping ((Module 4)
5	4	Shannon Theorem, Information Capacity, Bandwidth, Transmission Speed	Satellite Link Models – Uplink, Downlink, Transponder, GPS Services	Numerical exercises, Shannon limit activity (Module 2) Block diagram explanation, GPS demo (Module 4)
6	4	Data Transmission Issues – Noise, Crosstalk, Echo, Distortion, Equalizers	Multiple Access Techniques – TDMA, FDMA, CDMA, SDMA	Noisy signal demo, mitigation discussion (Module 2) Access method chart and quiz ((Module 4)

Unit 5

WEEK	MODULE	HOURS	TOPIC	ACTIVITY
1	Optical Fiber Communication	2	Introduction to Optical Fibers, Block Diagram of Optical Fiber Communication System, Types of Optical Fibers	Diagram-based explanation, comparison of step-index and graded-index fibers
2	Optical Fiber Communication	2	Light Propagation – Basic Concepts, Definitions, Acceptance Angle, Numerical Aperture	Numerical aperture calculation, laser light demo, ray diagram drawing
3	Optical Fiber Communication	2	Optical Fiber Configuration & Classification – Single-mode and Multi-mode	Classification chart activity, sample fiber cable handling (if available)
4	Optical Fiber Communication	2	Losses in Optical Fibers – Absorption, Scattering, Bending, Coupling Losses	Graph plotting for losses vs length, discussion on loss minimization
5	Optical Fiber Communication	2	Light Sources – LED and LASER: Working Principles and Applications	Video demonstration, source comparison table
6	Optical Fiber Communication	2	Light Detectors – Photodiode, PIN Diode, Avalanche Diode, Applications of Optical Fiber Communication	Real-world applications discussion, role-play or poster on use-cases

Signature of the Faculty Member

Signature of HOD

Head of the Department
Department of Electronics
Mount Carmel College, Autonomous
58, Palace Road, Bengaluru - 560 052.