DEPARTMENT OF ELECTRONICS
LESSION Plan
Session 2023-24
SEMESTER – II

Name of Teacher: Dr. Subhro Ghosal

Paper Allotted: Major-2 (Electronics Foundations-II), MDC (Theory: Interdisciplinary Electronics)

Month	Paper	Topic	No of classes
May 2024 (04.05.2024)	Major-2 (Theory)	**Unit-II: Network Analysis** 4) Network topology and definitions, Mesh analysis, Node analysis. 5) Principle of duality, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum power transfer theorem, Millman's Theorem, Reciprocity Theorem, Compensation Theorem (Substitution Theorem), AC circuit analysis using network theorems. 6) Star-Delta transformation Theorem, Delta-Star transformation Theorem	10
	MDC (Theory)	**Unit–III Digital Logic Circuits** Difference between digital and Analog Electronic circuits. Significance of binary logic in Digital Electronics - Basic Idea of Boolean Algebra, Logic Symbol and Truth Tables of Basic Logic Gates (AND, OR, NOT), Switching equivalent of Logic gates. Derived Logic Gates (NAND, NOR, XOR and XNOR.	10
June 2024	Major-2 (Theory)	**Unit-II: Network Analysis** 7) Transient responses of series CR, LR circuits with DC excitation (using differential equation and Laplace transform). 8) Power in AC circuits (average power, instantaneous power), Power factor, Phasor diagram, Bode plot, AC analysis of CR, LR, and LCR circuits, Resonance in series and parallel LCR circuits and their frequency responses, Quality factor and bandwidth. 9) Passive filters: Lowpass, Highpass, Bandpass, Bandstop.	10
July 2024	Major-2 (Theory)	**Unit-II: Network Analysis** 10) Two-port Networks–Impedance (Z) parameters, Admittance (Y) Parameters, h-parameters, Transmission (ABCD) parameters.	5
1st Week of August 2024		**Internal Examination &** **Class for Slow Learners**	4
August 2024		**END SEMESTER EXAMINATION**	
Total Classes			39

Name of Teacher: Dr. Prosenjit Roy Chowdhury

Paper Allotted: Major-2 (Electronics Foundations-II), MDC (Theory: Interdisciplinary Electronics)

Month	Paper	Topic	No of classes
May 2024 (04.05.2024)	**Major-2 (Practical)**	**Expt. 1: Verification of Thevenin's theorem.** **Expt. 2: Verification of Norton's theorem.** **Expt 3: (i) Verification of equivalence of Star-Delta conversion and vice-versa. (ii) Verification of Superposition Theorem.**	**12**
	MDC (Theory)	**Unit–II: Semiconductor Devices and Circuits** **Material classification on the basis of electrical conductivity- Insulator, Semiconductor and conductor, importance of semiconductor in Electronics, mechanism of current conduction in semiconductors – electron and hole transport mechanism, intrinsic and extrinsic semiconductors**	**7**
June 2024	**Major-2 (Practical)**	**Expt. 4: Verification of maximum power transfer theorem.** **Expt. 5: Study of RC circuit as lowpass and high-pass filter (plot gain in dB as a function of frequency, use semi-log graph paper). Determine pass-band gain, 3 dB point, slope beyond the cut-off from the graph.** **Expt. 6: Study frequency responses (amplitude of current Vs frequency) of a series and a parallel LCR circuits. Find the resonance frequency, Q factor and bandwidth for each these circuits.**	**12**
	MDC (Theory)	**Unit-II: Semiconductor Devices and Circuits** **Basic Concept of P-N Junction, P-N junction diode as a switching element using piece-wise linear model as an approximation of their I-V characteristics.** **Rectifier- It's need in electronic circuits, use of diode as Half-Wave and Full-Wave Rectifier using switching model. Explanation of working of a simple series regulated power supply. Working Principle of Solar Cell, LED, Lithium-ion batteries, Mobile charger.**	**8**
July 2024	**Major-2 (Practical)**	**Expt. 7: Characterization of a Two-port network (for example, a step-down transformer may be considered as a Two-port network).**	**6**
1st Week of August 2024		**Internal Examination &** **Class for Slow Learners**	**4**
August 2024		**END SEMESTER EXAMINATION**	
Total Classes			**49**

Name of Teacher: Ayan Kanti Pradhan

Paper Allotted: Major-2 (Electronics Foundations-II), MDC (Theory: Interdisciplinary Electronics)

Month	Paper	Topic	No of classes
May 2024 (04.05.2024)	**Major-2 (Theory)**	**Unit-1: Mathematic for Electronics** **4) Introduction to Matrices and Determinants, Types of matrices, Matrix arithmetic, Determinant of a square matrix, Simultaneous Equations and the Characteristic Matrix, Eigenvalues of a square matrix.** **5) Introduction to Laplace transform method, Convergence of the integral, Initial and final value theorems, Partial-Fractions Expansions.**	**10**
	MDC (Theory)	**Unit–I: Basic Circuit Components** **Energy Source- Concept of A.C. and DC signal. RMS and average value of AC sinusoidal signal, Its need in electronics, Concept of voltage and current sources.**	**7**
June 2024	**MDC (Theory)**	**Unit-I: Basic Circuit Components** **Circuit Elements- Resistors, Inductors, Capacitors. Kirchhoff's current and voltage laws as an extension of laws of conservation of charge and energy.** **Behaviour of circuit components under DC and AC excitation concept of reactance and impedance of R, L and C.**	**7**
July 2024	**MDC (Theory)**	**Unit-I: Basic Circuit Components** **Qualitative explanation of frequency selective circuits - tuning circuits and filters based on reactance curve. Power in electric circuits – True power, Active power and wattless component. Use of resistors, inductors and capacitors in everyday life, viz tube-light, fans etc. Working principle of transformer and its significance in everyday life.**	**6**
1st Week of August 2024		**Internal Examination &** **Class for Slow Learners**	**4**
August 2024		**END SEMESTER EXAMINATION**	
Total Classes			**34**

Name of Teacher: Dr. Aswini Kumar Mallick

Paper Allotted: Major-2 (Electronics Foundations-II), Minor-2 (Electronic Device), Minor-2 (Practical)

Month	Paper	Topic	No of classes
May 2024 (04.05.2024)	**Major-2 (Theory)**	**Unit–I: Mathematic for Electronics** **3) Ordinary differential equations: Basic Concepts, Separable Ordinary Differential Equations, Exact Ordinary Differential Equations, Linear Ordinary Differential Equations, Second Order homogenous and non-homogeneous differential equations.**	**10**
	Minor-2 (Theory)	**UNIT II: Field Effect Transistor:** **MOSFET Structure, Depletion and Enhancement Modes.**	**5**

Month	Paper	Topic	No of classes
		Small Signal Parameters. Concept of Complimentary MOS (CMOS).	
	Minor-2 (Practical)	1. Study of the I-V Characteristics of a Zener diode under reverse bias. Plot its line and load regulation 2. Study of load regulation and ripple factor of Half wave rectifier with and without a capacitor filter 3. Study of load regulation and ripple factor of a Full wave /Bridge rectifier (FWR) with and without a capacitor filter	12
June 2024	Minor-2 (Theory)	UNIT III: Feedback Amplifier and OPAMP Feedback in Amplifiers: Concept of feedback, negative and positive feedback, advantages of negative feedback Effects of positive feedback. Barkhausen criterion for sustained oscillations. Qualitative discussion of different oscillators using generalized block diagram	7
	Minor-2 (Practical)	4. Study the input and output characteristics of a transistor in common emitter mode. Calculate hie and hfe from the characteristic curves 5. Design an (a) inverting and (b) adder using IC 741 (OPAMP) for different voltage gains	12
July 2024	Minor-2 (Theory)	UNIT III: Feedback Amplifier and OPAMP Operational Amplifiers (Black box approach): Characteristics of an Ideal and Practical Operational Amplifier (IC 741), Open and closed loop configuration, Frequency Response. CMRR. Slew Rate and concept of Virtual Ground. Applications of Op-Amps: (1) Inverting and non-inverting amplifiers, (2) Summing and Difference Amplifier, (3) Differentiator, (4) Integrator, (5) Comparator and Zero-crossing detector (6) Schmitt Trigger	8
	Minor-2 (Practical)	6. Design a (a) non-inverting amplifier using IC 741 (OPAMP) for different voltage gains. Hence show how it can be used as a unity gain buffer 7. Design a differential amplifier using IC 741	12
1st Week of August 2024		Internal Examination & Class for Slow Learners	4
August 2024		END SEMESTER EXAMINATION	
Total Classes			70

Name of Teacher: Ruma Bhattacharjee

Paper Allotted: Minor-2 (Electronic Device), Minor-2 (Practical)

Month	Paper	Topic	No of classes
May 2024 (04.05.2024)	Minor-2 (Theory)	UNIT-I: Physics of Bipolar Junction Transistor: Static Characteristics (Minority Carrier Distribution and Terminal Currents), Current gains α and β and their interrelationship. Base- Width Modulation, Regions of operation (active, cut off and saturation). Modes of operation, Characteristics of CB, CE and CC Configurations, Transistor	10

		biasing, DC load line, operating point, need for biasing. Transistor as a switch.	
	Minor-2 (Practical)	1. Study of the I-V Characteristics of a Zener diode under reverse bias. Plot its line and load regulation 2. Study of load regulation and ripple factor of Half wave rectifier with and without a capacitor filter 3. Study of load regulation and ripple factor of a Full wave /Bridge rectifier (FWR) with and without a capacitor filter	12
June 2024	**Minor-2 (Theory)**	UNIT-II: Applications of Bipolar Junction Transistor: Amplifiers: Transistor biasing and Stabilization circuits- Fixed Bias and Voltage Divider Bias. Thermal runaway, stability and stability factor S (qualitative).	10
	Minor-2 (Practical)	4. Study the input and output characteristics of a transistor in common emitter mode. Calculate hie and hfe from the characteristic curves 5. Design an (a) inverting and (b) adder using IC 741 (OPAMP) for different voltage gains	12
July 2024	**Minor-2 (Theory)**	UNIT-II: Applications of Bipolar Junction Transistor: Transistor as a two port network, h-parameter equivalent circuit. Qualitative analysis of transistor as a single stage amplifier and effects of R-C coupling on frequency response of multistage amplifiers.	10
	Minor-2 (Practical)	6. Design a (a) non-inverting amplifier using IC 741 (OPAMP) for different voltage gains. Hence show how it can be used as a unity gain buffer 7. Design a differential amplifier using IC 741	12
1st Week of August 2024		Internal Examination & Class for Slow Learners	4
August 2024		END SEMESTER EXAMINATION	
Total Classes			**70**