Government General Degree College, Chapra

Department of Physics (Sem-V)

Lesson Plan 2024-2025, Undergraduate Course in Physics (General)

Semester	University Exam	Name of the faculty	Course code	Allotted topic/text	Sub-topic/Lesson plan (No. Of Lecture)
Sem-V	Follow the latest notification by KU	**Sudipta Das (SD)**	**DSE-T-01** (Digital, Analog Circuits and Instrumentation)	**Digital Circuits**	Difference between Analog and Digital Circuits. Binary Numbers. Decimal to Binary and Binary to Decimal Conversion, AND, OR and NOT Gates (Realization using Diodes and Transistor). NAND and NOR Gates as Universal Gates. XOR and XNOR Gates. **(4 Lectures)** De Morgan's Theorems. Boolean Laws. Simplification of Logic Circuit using Boolean Algebra. Fundamental Products. Minterms and Maxterms. Conversion of a Truth Table into an Equivalent Logic Circuit by (1) Sum of Products Method and (2) Karnaugh Map. **(5 Lectures)** Binary Addition. Binary Subtraction using 2's Complement Method). Half Adders and Full Adders and Subtractors, 4-bit binary Adder-Subtractor. **(4 Lectures)**
				Power Supply	Half-wave Rectifiers. Centre-tapped and Bridge Full-wave Rectifiers Calculation of Ripple Factor and Rectification Efficiency, Basic idea about capacitor filter, Zener Diode and Voltage Regulation. **(6 Lectures)**
			DSE-P-01 (Digital, Analog Circuits and Instrumentation)	**Practical**	1. To measure (a) Voltage, and (b) Frequency of a periodic waveform using CRO 2. To verify and design AND, OR, NOT and XOR gates using NAND gates. 3. To minimize a given logic circuit. 4. Half adder, Full adder and 4-bit Binary Adder. 5. Adder-Sub tractor using Full Adder I.C. **(20 Lectures)**
			DSE-T-01 (Digital, Analog Circuits	**Semiconductor Devices and Amplifiers**	Semiconductor Diodes: P and N type semiconductors. Barrier Formation in PN Junction Diode. Qualitative Idea of Current Flow Mechanism in Forward and Reverse Biased Diode. PN junction and its characteristics. Static and Dynamic Resistance. Principle and structure of (1) LEDs, (2) Photodiode, (3) Solar Cell. **(5 Lectures)** Bipolar Junction transistors: n-p-n and p-n-p Transistors. Characteristics of CB, CE and CC Configurations. Current gains α and β, Relations between α and β. Load Line analysis of Transistors. DC Load line & Q-point. Active, Cutoff & Saturation regions. Voltage Divider Bias

		Dr. Shaikh Safikul Alam (SSA)	and Instrumentation)	**Instrumentations**	Circuit for CE Amplifier. h-parameter Equivalent Circuit. Analysis of single-stage CE amplifier using hybrid Model. Input & output Impedance. Current, Voltage and Power gains. Class A, B & C Amplifiers. **(12 Lectures)** Introduction to CRO: Block Diagram of CRO. Applications of CRO: (1) Study of Waveform, (2) Measurement of Voltage, Current, Frequency, and Phase Difference. **(3 Lectures)**
			DSE-P-01 (Digital, Analog Circuits and Instrumentation)	**Practical**	6. To design an astable multivibrator of given specifications using 555 Timer. 7. To design a monostable multivibrator of given specifications using 555 Timer. 8. To study IV characteristics of PN diode, Zener and Light emitting diode 9. To study the characteristics of a Transistor in CE configuration. 10. To design a CE amplifier of given gain (mid-gain) using voltage divider bias. **(20 Lectures)**
		Dr. Supriya Mandal (SM)	**DSE-T-01** (Digital, Analog Circuits and Instrumentation)	**Operational Amplifiers (Black Box approach)** **Sinusoidal Oscillators** **Timer IC**	Characteristics of an Ideal and Practical Op-Amp (IC 741), Open-loop and closed- loop Gain. CMRR, concept of Virtual ground. Applications of Op-Amps: (1) Inverting and non-inverting Amplifiers, (2) Adder, (3) Subtractor, (4) Differentiator, (5) Integrator, (6) Zero crossing detector. **(13 Lectures)** Barkhausen's Criterion for Self-sustained Oscillations. Determination of Frequency of RC Oscillator **(5 Lectures)** IC 555 Pin diagram and its application as Astable and Monostable Multivibrator. **(3 Lectures)**
			DSE-P-01 (Digital, Analog Circuits and Instr.)	**Practical**	11. To design an inverting amplifier of given gain using Op-amp 741 and study its frequency response. 12. To design a non-inverting amplifier of given gain using Op-amp 741 and study its Frequency Response. 13. To study Differential Amplifier of given I/O specification using Op-amp. 14. To investigate a differentiator made using op-amp. 15. To design a Wien Bridge Oscillator using an op-amp. **(20 Lectures)**