CURRICULUM PLAN OF Ms. VARSHA

FOR ODD SEMESTER 2025-26

B.Sc (H) Physics -2nd YEAR

PAPER- (GE) Introduction to Electronics (1 PERIODS/WEEK)

LEARNING OBJECTIVES

This paper aims to introduce fundamentals of electronics to students not majoring in physics. Basics of Analog and Digital Electronics are envisioned to be introduced with emphasis on applications of diodes, transistor (BJT), operational amplifier, 555 timer, number systems, basic gates and digital circuits.

LEARNING OUTCOMES

At the end of this course, students will be able to imbibe the following learning outcomes:

- This paper aims to describe the concepts of basic electronics in real-life. In this course, students will receive an introduction to the principle, performance and applications of basic electronic components.
- The students will gain an insight on the existence of analog and digital signals and their necessity. Specifically they would know the difference between active and passive electronic components including filters.
- Students will learn about diodes and its uses in rectification (analog) and switching properties thereof (digital). They will gain an insight into working principle of Photodiodes, Solar Cells, LED and Zener Diode as Voltage Regulator.
- They will gain an understanding of construction and working principle of bipolar junction transistors (BJTs). Specifically, they would understand the fundamentals of amplification.
- Students will be able to seamlessly understand and work on different numbers systems including binary, octal, hexadecimal besides decimal.
- They will learn about the existence of digital gates besides their need in electronic decision making thus laying the foundation for basic artificial intelligence.
- Students will learn the fundamentals of operation amplifier and their regular application including those used to sum, subtract and compare two or more signals.
- They will gain an in-depth understanding of working of Cathode Ray Oscilloscope which effectively acts as an electronic stethoscope for analysis of electronic signal in any laboratory.
- This paper will essentially connect the text book knowledge with the most common electronic components available that influence design of technology in a real world.
- The project component included in the practical section is envisaged to impart much needed hands-on skill sets to the student. Therein he/she gets an experience in correctly choosing components required to build an electronic circuit, identifying the procurement source (online/offline) besides gaining valuable experience in trouble-shooting.

CONTENTS	ALLOCATION OF LECTURES	MONTH WISE SCHEDULE FOLLOWED	TUTORIAL/ASSIGNMENT/PRESENTATION ETC
Unit - V Operational Amplifier (Black Box Approach): Pinout diagram of IC 741; Characteristics of Op-amp (Voltage Gain, offset voltage, slew rate, CMRR, Bandwidth, Input Impedance and Output Impedance). Open loop configuration and its application as a comparator and zero crossing detector. Closed Loop Configuration and its Applications as Inverting and Non inverting Amplifier (Voltage gain using concept of virtual ground), Summing Amplifier and Subtractor.	6 lectures	1st Sept. – 30th Sept. 2025	Syllabus Overview Reference books Building concepts Discussion of Important questions Home Register Checking
Unit – VI Block	4 lectures	1st Oct. – 30th Sep. 2025	Discussion of last year papers and clarification of doubts Revision of Syllabus

diagram of CRO, Voltage and frequency measurement. Pinout diagram of IC 555 and its application as Astable Multivibrator.			Home register Checking
Unit – II I-V characteristics of a diode and it's applications as rectifier (Half and full wave rectifier configurations) , Clipper and Clamper circuits (Qualitative Analysis only).	**4** LECTURES	1st Oct. – 30th Oct. 2025	Related Problems and assignments Student's difficulties Derivations and Numericals Class test on unit end
Unit – II Principle and working of Photodiodes, Solar Cells, LED and Zener Diode as Voltage Regulator.	2 lectures	1st Nov. – 26th Nov 2025	Class Test Revision Session Problem solving Derivations and Numericals Home exam paper discussion

References:

Essential Readings:

1) Electronic Devices, Thomas L Floyd; Pearsons Education
2) Op Amps and Linear Integrated Circuits, Ramakant A Gaekwad, Pearson Education
3) Microelectronic circuits, A. S. Sedra, K. C. Smith, A.N. Chandorkar, Oxford University Press.
4) Electronic Principles, A. Malvino, D. J. Bates, 7th Edition, 2018, Tata Mc-Graw Hill Education.
5) Electronic Devices and circuit theory, R. L. Boylestad & L. D. Nashelsky, Pearson Learning
6) Digital Principles and Applications, Donald P Leach, Albert Paul Malvino and Goutam Saha, Pearson Education, Tata Mc-Graw Hill.

Additional Readings:

1) Electronic Fundamental and Applications, John D Ryder; PHI Learning
2) Electronic Devices and Circuits, J. Millman and C. C. Halkias, Tata Mc-Graw Hill.