

## Syllabus completion Report

T.Y.B.Sc. Physics (Sem V )

Year: 2023-2024

PHY-351: Mathematical Methods in Physics-II

Teacher: A.B.Kanawade

Chapter No.	Month	Contents	Remarks
<b>1</b>	17/08/2023 to 27/08/2023	<b>1: Curvilinear Co-ordinates</b>  Review of Cartesian, spherical and cylindrical co-ordinate,  transformation equation, General Curvilinear co-ordinate system:  Co-ordinate surface, co-ordinate lines, length, surfaces and  volume elements in curvilinear co-ordinate system.  Orthogonal curvilinear co-ordinate system, expressions for gradient, divergence,  Laplacian, and curl, special case for gradient, divergence and curl in Cartesian, spherical polar and cylindrical co-ordinate system,  Problems.	
<b>2</b>	14/10/2023 to 25/10/2023	<b>2: The Special Theory of Relativity</b>  Introduction,  Newtonian relativity, Galilean transformation equation,  Michelson-Morley experiment,  Postulates of special theory of relativity,  Lorentz transformations,  Lorentz transformations,  Kinematic effects of Lorentz transformation,	

		<p>Length contraction,</p> <p>Proper time,</p> <p>Problems.</p>	
<b>3</b>	<p>28/08/ 2023 to 11/09/ 2023</p>	<p><b>3: Partial Differential Equations</b></p> <p>Introduction to Partial differential equations (PDE),</p> <p>General methods for solving second order PDE,</p> <p>Method of separation of variables in Cartesian,</p> <p>Spherical polar and cylindrical co-ordinate system (two dimensional Laplace's equation,  one dimensional Wave equation),</p> <p>Singular points (<math>x = x_0</math>),</p> <p>Solution of differential equation-Statement of Fuch's theorem,</p> <p>Frobenius method of series solution.</p>	
<b>4</b>	<p>12/09/ 2023 to 13/10/ 2023</p> <p>04/11/ 2023</p>	<p><b>4: Special Functions</b></p> <p>Introduction, generating function for Legendre Polynomials: <math>P_n(x)</math>, Properties of Legendre Polynomials,</p> <p>Generating function for Hermite Polynomials: <math>H_n(x)</math>, Properties of Hermite Polynomials,</p> <p>Bessel function of first kind: <math>J_n(x)</math>, Bessel function of first kind: <math>J_n(x)</math>, Properties of Bessel function of first kind, Problems.</p> <p>Revision</p>	

## Syllabus completion Report

**S.Y.B.Sc. (Physics) (Sem III)**  
**PHY-232(A): Electronics-I**

**Year: 2023-2024**  
**Teacher: A.B.Kanawade**

Chapter No.	Month	Contents	Remarks
1.	31/07/ 2023 to 05/08/ 2023	<p><b>1. Network Theorem:</b></p> <p>1.1 Krichhoff's Law</p> <p>1.2 Voltage and current Divider Circuit</p> <p>1.3 Thevenin's Theorem</p> <p>1.4 Norton's Theorem</p> <p>1.5 Superposition Theorem</p> <p>1.6 Maximum Power transfer theorem (With proof)</p> <p>1.7 Problems</p>	
2.	08/08/ 2023 to 26/08/ 2023	<p><b>2. Study of Transistor</b></p> <p><b>2.1 Bijunction Transistor</b></p> <p>1. Revision of bipolar Junction Transistor, Types, Symbol and basic action.</p> <p>2. Configuration (Common Base, Common Emitter and Common Collector)</p> <p>3. Current Gain Factors (<math>\alpha</math> and <math>\beta</math>) and their relations</p> <p>4. Input, Output and transfer Characteristic of CE Configuration</p> <p>5. Biasing method and Voltage Divider</p> <p>6. DC Load line (CE), Operating Point (Q-point)</p> <p>7. Transistor as a switch</p> <p>8. Problems</p> <p><b>2.2 Uniunction Transistor:</b></p> <p>1. Symbol, Types, Construction, Working Principle, I-V characteristics, Specifications and</p>	

<p>3.</p>	<p>31/08/ 2023 to 01/10/ 2023</p>	<p>parameters of Unijunction Transistor (UJT)</p> <p>2. UJT as a relaxation Oscillator.</p> <p><b>3.Operational Amplifiers and Application</b></p> <p><b>3.1 Operational Amplifiers:</b></p> <p>1. Introduction</p> <p>2. Ideal and practical Characteristics</p> <p>3. Operational Amplifier: IC741-Block Diagram and Pin diagram</p> <p>4. Concept of Virtual Ground</p> <p>5. Inverting and Non-inverting operational amplifiers with concept of gain</p> <p>6. Operational amplifier as an adder and subtractor</p> <p>7. Problems</p> <p><b>3.2 Oscillators:</b></p> <p>1. Concept of Positive and negative feed back</p> <p>2. Barkhausein Criteria for an oscillator</p> <p>3. Construction, working and application of phase shift oscillator using IC741</p> <p>4. Problems</p>	
<p>4.</p>	<p>02/10/ 2023 to 21/10/ 2023</p> <p>26/10/ 2023</p>	<p><b>4. Number System and Logic Gates</b></p> <p>1. Number System: Binary, Binary coded Decimal (BCD), Octal, Hexadecimal</p> <p>2. Addition and Subtraction of binary numbers and binary fractions using one's and two's complement</p> <p>3. Basic Logic gates (OR, AND, NOT)</p> <p>4. Derived gates: NOR, NAND, EXOR, EXNOR, with symbols and truth table</p> <p>5. Boolean Algebra</p> <p>6. De Morgan's theorem and its verification</p> <p>7. Problems</p> <p>Revision</p>	

## Syllabus completion Report

T.Y.B.Sc. Physics (Sem V )  
PHY-356(D): Renewable Energy Sources

Year: 2023-2024  
Teacher: A.B.Kanawade

Chapter No.	Month	Contents	Remarks
1.	16/09/2023 to 01/10/2023	<b>1: An Introduction to Energy Sources: (10L)</b> 1. Energy: Definition, Classifications of energy sources 2. Conventional and non-conventional energy sources. 3. Sun: The source of energy (Structure, Characteristics and Composition) 4. Solar Constant 5. Electromagnetic Energy Spectrum. 6. Solar radiations outside earth atmosphere. 7. Solar radiation at the earth surface. 8. Problems.	
2.	01/10/2023 to 25/10/2023	<b>2: Photothermal Applications: (10L)</b> 1. Photothermal devices: Solar Insolation, Selective Coating, Glass Cover, Heat Conductor and Heat Insulation. 2. Solar water heating systems: Types, construction and working of Liquid Flat Plate Collector (FPC) and Evacuated Tube Collector (ETC) 3. Energy Balance Equation (without thermal Analysis). 4. Concentrating collectors: Flat plate collector with plane reflector, Cylindrical parabolic, Compound parabolic, Collector with fixed circular concentrators and moving receiver, paraboloid concentrator. 5. Comparative study between flat plate collector and solar concentrators. 6. Solar distillation, Solar dryer, Solar cooker (box type)	

<p>3.</p>	<p>26/10/2023 to 30/10/2023</p>	<p><b>3: Photovoltaic systems: (10L)</b></p> <ol style="list-style-type: none"> <li>1. Introduction to Photovoltaic effect and Photovoltaic Conversion.</li> <li>2. Basic photovoltaic system for power generation</li> <li>3. Basics of Solar Cell, PV modules, Arrays,</li> <li>4. Solar Cell: I-V characteristics, Power output and conversion efficiency.</li> <li>5. Factors affecting on photovoltaic efficiency. (Change in amount of input light, solar cell area, Change in angle, Change in operating Temperature etc.)</li> <li>6. Types of solar cells: p-n junction solar cell, p-i-n diode solar cell, cadmium sulphide solar cell, Gallium arsenide solar cell, Indium phosphide solar cell, nano-crystalline solar cell.</li> <li>7. Application of solar photovoltaic systems.</li> </ol>	
<p>4.</p>	<p>31/10/2023 to 03/11/2023</p>	<p><b>4: Energy Storage: (06L)</b></p> <ol style="list-style-type: none"> <li>1. Importance and Needs of Energy storage in Conventional and Nonconventional Energy Systems.</li> <li>2. Various forms of Energy Storage</li> <li>3. Electrical Energy: Super capacitors</li> <li>4. Electrochemical Energy: Battery</li> <li>5. Chemical Energy: Hydrogen Production and storage</li> </ol>	