ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU

An Autonomous College in the Jurisdiction of Krishna University, Machilipatnam

NAAC reaccredited at 'A 'level

ISO 9001-2015

DEPARTMENT OF PHYSICS

BOARD OF STUDIES MEETING

2023-2024

ODD SEMESTER (1, 3, 5/6)

Dt : 13-10-2023

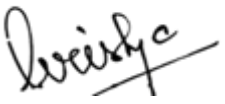
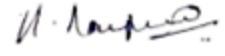
ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165, KRISHNA Dt., A.P. (AUTONOMOUS).

DEPARTMENT OF PHYSICS

BOARD OF STUDIES MEETING :- 13 th October 2023

The Board of studies meeting of Department of **PHYSICS** was convened at 11:00 AM on 13/10/2023 in **on-line mode** under the chairmanship of Sri J. Hareesh Chandra, Head of the Department .The members present have discussed various aspects such as changes to be made in the syllabi, scheme of Evaluation and Blue print both for theory and practical papers for I, III & V semesters for the academic year 2023-2024.

The following members were present.

S.No	Name	Designation	signature
1.	**Sri J. Hareesh Chandra** Head, Department of Physics A.G&S.G.S Degree College Vuyyuru .	Chairman	
2	**Prof. M. Rami Reddy** Department of Physics ACHARYA NAGARJUNA UNIVERSITY	University Nominee	
3.	**Dr. P.Venkata Ramana** H.O.D, Dept. of Physics Sri DNR Govt Degree college for women, Palakol,West Godavari .	Subject Expert	
4.	**Dr. T. Srinivasa Krishna,** Associate Professor , Head, Department of Physics, P.B. Siddhartha College, Vijayawada	Subject Expert	
5.	**Sri I. Chitti Babu** Representative from Industry, Sub Divisional Engineer, BSNL,Vijayawada .	Industrialist	
6.	**Sri B. Dileep Kumar** Lecturer in Physics, IIIT, NUZIVID.	Alumini	
7.	**Sri M. Sateesh** Lecturer in Physics , A.G&S.G.S Degree College, Vuyyuru	Member	
8.	**Smt. M.P.D. Parimala** Lecturer in Physics, A.G & S.G.S Degree College, Vuyyuru	Member	
9	**U.Ram Prasad** Guest Lecturer in Physics,Vuyyuru	Member	

Agenda of B.O.S Meeting

1. To recommend the syllabi (Theory & Practical) for First Semester of I B.Sc. Physics Major of B.Sc. Honours for the academic year 2023 -2024 as prescribed by APSCHE.

2. To recommend the Model Question paper, Blue Print and Guidelines for Question paper setters for First Semester of I B.Sc.physics Major of B.Sc.Honours for the academic year 2023 – 2024.

3. To discuss and recommend the Syllabi, Model Question Papers and Guidelines to be followed by question paper setters in Physics for the III rd Semester prescribed by APSCHE from the Academic Year 2023-2024.

4. To discuss and recommend the Syllabi, Model Question Papers and Guidelines to be followed by question paper setters in Physics for the V/ VI Semesters prescribed by APSCHE from the Academic Year 2023-2024.

5. To recommend the Teaching and Evaluation methods to be followed under CBCS.

6. Any other suggestions regarding Certificate Course, Seminars, Workshops, Guest Lectures to be organized.

7. Any other matter.

Chairman
(J. Hareesh Chandra)

RESOLUTIONS

The following resolutions are made in Board of studies in Physics for UG Programs of Odd - semester to recommend to the Academic Council for its approval .

1. It is resolved and recommended to introduce 'Essentials and Applications of Mathematical, Physical and Chemical Sciences" with course code No. 23SCIT11 and "Advances in Mathematical, Physical and Chemical Sciences" with code No. 23SCIT12 in 1st semester of B.Sc. Physics Major, Maths Major, Chemistry major & Computers major Programs for the batch of students admitted for the academic year 2023-24 as per APSCHE .
2. It is resolved to conform to the question paper format in accordance with APSCHE norms. Starting from the academic year 2023-24, both internal and external exams conducted by department will feature objective-type questions, replacing Descriptive questions, aligning with APSCHE guidelines.
3. Discussed and recommended the syllabi, with some Minor changes in Model Question Paper for question paper setters in Physics for the III rd Semester of II B.Sc (M.P.C, MPCS) for the Academic year 2023-2024.
4. To recommend Skill Development Course "SOLAR ENERGY" for II year (III SEMESTER) students in this academic year 2023-24.
5. Discussed and recommended with some changes in syllabi, Model Question Papers and Guidelines for question paper setters in Physics for the 5th / 6th Semesters of III B.sc. (MPC, MPCS) for the Academic year 2023-2024 Prescribed by APSCHE.
6. Changes are made in the syllabi of Paper "Electronic Instrumentation" i.e, Amplifiers, oscillators and Biomedical instruments topic was deleted in Unit-V and "operational amplifiers" has been Introduced in Unit- V. In the paper "Applications of Electricity & Electronics" the topic Design of FM Radio circuit and Design of 5V DC chargers topic deleted.
7. As per the direction of APSCHE and Krishna University, an INTERNSHIP is mandatory for Final year B.Sc. students. So, the BOS committee recommended and approved the same.
8. It is resolved to continue following Teaching and Evaluation methods for Academic year 2023-2024.

Teaching methods:

Besides the conventional methods of teaching, we use modern technology i.e. using of LCD projector, display on U boards etc, for better understanding of concepts.

Evaluation of a student is done by the following procedure:

Internal Assessment (IA) - I st Year MAJOR PHYSICS

Out of maximum 100 marks in each paper 30 marks shall be allocated for internal assessment for 1st Year MAJOR PHYSICS. Out of these 30 marks, 20 Marks are allocated for announced tests (i.e. IA-1 & IA-2). Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, and 5 marks are allocated for the assignment OR Activity. And reaming 5 marks are allocated for attendance. There is no minimum passing for IA.

Internal Assessment (IA) - II B.sc. (MPC, MPCS)

Out of maximum 100 marks in each paper 30 marks shall be allocated for internal assessment for II B.sc. (MPC, MPCS). Out of these 30 marks, 20 Marks are allocated for announced tests (i.e. IA-1 & IA-2). Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student 5 marks are allocated for the assignment/Activity. And reaming 5 marks are allocated for attendance. There is no minimum passing for IA.

Internal Assessment (IA) - III B.sc. (MPC, MPCS)

- Out of maximum 100 marks in each paper 25 marks shall be allocated for internal assessment. Out of these 25 marks, 15 Marks are allocated for announced tests (i.e. IA-1 & IA-2). Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, 5 marks allocated on the basis of candidate's percentage of attendance and remaining 5 marks are allocated for the assignment. There is no minimum passing for IA.

Semester End Examinations (SEE)

- **I Semester End examinations will be conducted in objective mode**. It will be of 3 hours duration, with maximum 70 marks for 1st year, 70 marks for 2nd year and 75 marks for 3rd year irrespective of the number of credits allotted to it.
- Even though the candidate is absent for two IA exams/obtained zero marks, the external marks are considered (if he/she gets 40/70) and the result shall be declared as 'PASS'.
- The pass mark shall be 28 out of 70 in the Semester end examination for I B.sc.Major physics and II B.sc. (MPC, MPCS)
- The pass mark shall be 30 out of 75 in the Semester end examination for III B.Sc (MPC,MPCS)

- The maximum marks for each Paper shall be 100. (Internal 30 + External 70) for I B.sc.Major physics and II B.sc. (MPC, MPCS).
- The maximum marks for each Paper shall be 100. (Internal 25+ External 75) for III B.Sc(MPC,MPCS).
- Discussed and recommended to organize certificate course online/offline, seminars, Guest lectures, Online Examinations and Workshops to upgrade the knowledge of students for Competitive Examinations for the approval of the Academic Council.

Chairman

(J. Hareesh Chandra)

SEMESTER – I

Course Code	Title of the Course	Instruction Hours per week	Credits	Evaluation		
				CIA MARKS	SEE	
					MARKS	Core/LSC/ SDC/MDC Elective/ Cluster
23SCIT11	Essentials and Applications of Mathematical, Physical and Chemical Sciences	5	4	30	70	CORE
23SCIT12	Advances in Mathematical, Physical and Chemical Sciences	5	4	30	70	CORE

SEMESTER – III

Course Code	Title of the Course	Instruction Hours per week	Credits	Evaluation		
				CIA MARKS	SEE	
					MARKS	Core/LSC/ SDC/MDC Elective/ Cluster
22PHYT31	Heat and Thermodynamics	4	3	30	70	CORE
22PHYP31	Heat and Thermodynamics Lab	2	2	15	35	LAB
SDCPHYT02	Solar Energy	2	2	15	35	SDC

SEMESTER- V / VI

Course Code	Title of the Course	Instruction Hours per week	Credits	Evaluation		
				CIA	SEE	
				MARKS	MARKS	Core/LSC/ SDC/MDC Elective/ Cluster
PHYSET01	Applications of Electricity and Electronics	3	3	25	75	CORE
PHYSEP01	Applications of Electricity and Electronics - Lab	3	2	10	40	LAB
PHYSET02	Electronic Instrumentation	3	3	25	75	CORE
PHYSEP02	Electronic Instrumentation - Lab	3	2	10	40	LAB

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Title of the Paper: Essentials and Applications of Mathematical, Physicaland Chemical Sciences

Semester: I

Course Code	**23SCIT11**	**Course Delivery Method**	**Class Room / Blended Mode**
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	5	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Year of Introduction : 2023 - 24	Year of Offering: 2023 - 24	Year of Revision :-----	Percentage of Revision: 0 %

Course Objective:

The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. The course aims to develop students' critical thinking, problem-solving, and analytical skills in these areas, enabling them to apply scientific principles to real-world situations.

Learning outcomes:

1. Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.
2. To Explain the basic principles and concepts underlying a broad range of fundamentalareas of physics and to Connect their knowledge of physics to everyday situations
3. To explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to connect their knowledge of chemistry to daily life.
4. Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.
5. To explore the history and evolution of the Internet and to gain an understanding of network security concepts, including threats, vulnerabilities, and counter measures.

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
Essentials and Applications of Mathematical, Physical and Chemical Sciences		
I	**Essentials of Mathematics** Complex Numbers: Introduction of the new symbol i – General form of a complex number – Modulus- Amplitude form and conversions Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of angles Vectors: Definition of vector addition – Cartesian form – Scalar and vector product and problems Statistical Measures: Mean, Median, Mode of a data and problems.	9 H
II	**Essentials of Physics:** Definition and Scope of Physics- Measurements and Units - Motion of objects- Newton's laws of motion- Laws of Thermodynamics and Significance- Acoustic waves, Electromagnetic Spectrum- Electric and Magnetic fields- coloumb's law, Behaviour of atomic and nuclear particles- Electrons, protons, Neutrons,Wave-particle duality, uncertainty principle -Theories and understanding of universe- Big bang theory .	9 H
III	**Essentials of Chemistry** Definition and Scope of Chemistry- Importance of Chemistry in daily life - Branches of chemistry and significance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Biomolecules- carbohydrates, proteins, fats and vitamins.	9 H
IV	**Applications of Mathematics, Physics & Chemistry** Applications of Mathematics in Physics & Chemistry: Calculus , Differential Equations & Complex Analysis Application of Physics in Industry and Technology : Physics for Electronics and Semiconductor Industry, Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies. Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage	9 H

	Industry.	
V	**Essentials of Computer Science**: Milestones of computer evolution - Internet, history, Internet Service Providers, Types ofNetworks, IP, Domain Name Services, applications. Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques- Privacy and Data Protection.	9 H

Reference Books

1. Functions of one complex variable by John.B.Conway, Springer- Verlag.
2. Elementary Trigonometry by H.S.Hall and S.R.Knight
3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. 4.Basic Statistics byB.L.Agarwal, New age international Publishers
5. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman
6. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker
7. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.
8. Physics for Technology and Engineering" by John Bird
9. Chemistry in daily life by Kirpal Singh
10. Chemistry of bio molecules by S. P. Bhutan
11. Fundamentals of Computers by V. Raja Raman
12. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

STUDENT ACTIVITIES

Unit II : Essentials of Physics

1. Concept Mapping

Divide students into groups and assign each group one of the topics.

Students will create a concept map illustrating the key concepts, relationships, and applications related to their assigned topic.

Encourage students to use visual elements, arrows, and labels to represent connections and interdependencies between concepts.

2. Laboratory Experiment

Select a laboratory experiment related to one of the topics, such as motion of objects or electric and magnetic fields.

Provide the necessary materials, instructions, and safety guidelines for conducting the experiment.

Students will work in small groups to carry out the experiment, collect data, and analyze the results.

After the experiment, students will write a lab report summarizing their findings, observations, and conclusions.

Unit IV : Applications of Mathematics, Physics & Chemistry

1 : Interdisciplinary Case Studies

Divide students into small groups and provide them with interdisciplinary case studies that involve the interdisciplinary application of mathematics, physics, and chemistry.

Each case study should present a real-world problem or scenario that requires the integration of concepts from all three disciplines.

2: Design and Innovation Project

Challenge students to design and develop a practical solution or innovation that integrates mathematics, physics, and chemistry principles.

Students can choose a specific problem or area of interest, such as renewable energy, environmental conservation, or materials science.

3. **Laboratory Experiments**

Assign students laboratory experiments that demonstrate the practical applications ofmathematics, physics, and chemistry.

Examples include investigating the relationship between concentration and reaction rate, analyzing the behavior of electrical circuits, or measuring the properties of materials.

4. **Mathematical Modeling**

Present students with real-world problems that require mathematical modeling and analysis.

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Title of the Paper: ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Semester: I

Course Code	23SCIT12	**Course Delivery Method**	**Class Room / Blended Mode**
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	5	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Year of Introduction : 2023 - 24	Year of Offering: 2023 - 24	Year of Revision : -----	Percentage of Revision: 0 %

Course Objective:

The objective of this course is to provide students with an in-depth understanding of the recent advances and cutting-edge research in mathematical, physical, and chemical sciences. The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

Learning outcomes

1. Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.
2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.
3. Understand the different sources of renewable energy and their generation processes
4. Understand the principles and techniques used in computer-aided drug design and drug delivery systems
5. Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications.
6. Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics.

Syllabus

Unit	Learning Units	Lecture Hours
Advances in Mathematical, Physical and Chemical Sciences		
I	**Advances in Basics Mathematics** Straight Lines: Different forms – Reduction of general equation into various forms –Point of intersection of two straight lines Limits and Differentiation: Standard limits – Derivative of a function –Problems on product rule and quotient rule Integration: Integration as a reverse process of differentiation – Basic methods of integration Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices –Transpose of a matrix and determinants	9hrs
II	**Advances in Physics** **Renewable energy** : Generation - solar energy - photovoltaic cells, Dye sensitized solar cells(DSSC), energy storage - Hydrogen fuel cell, Photo electrical chemical cell and energy efficient materials and devices . **Recent advances in the field of nanotechnology**: Quantum dots, Basic structure of quantum dots, Recent advances in biophysics- recent advances in medical physics.	9hrs
III	**Advances in Chemistry** Computer aided drug design and delivery, nano sensors, Chemical Biology, impact of chemical pollutants on ecosystems and human health, Dye removal - Catalysis method.	9hrs
IV	**Advanced Applications of Mathematics, Physics & Chemistry** Mathematical Modelling applications in physics and chemistry Application of Renewable energy: Grid Integration and Smart Grids Application of Nanotechnology: Nano medicine Application of biophysics: Biophysical Imaging, Biomechanics-Biomechanics in sports, Biomechanics in prosthetic Rehabilitation, Neurophysics Application of medical physics : Radiation Therapy, Nuclear medicine Solid waste management, Environmental remediation- Green Technology, Water treatment.	9hrs
V	**Advanced Applications of computer Science :** Number System-Binary, Octal, decimal, and Hexadecimal, Signals-Analog, Digital, Modem, Codec, Multiplexing, Transmission media, error detection and correction- Parity check and CRC, Networking devices- Repeater, hub, bridge, switch, router, gateway.	9 hrs

Reference Books

1. Coordinate Geometry by S.L.Lony, Arihant Publications
2. Calculus by Thomas and Finny, Pearson Publications
3. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle

5. "Energy Storage: A Nontechnical Guide" by Richard Baxter
6. "Nanotechnology: Principles and Applications" by Sulabha K. Kulkarni and Raghvendra A. Bohara.
7. "Biophysics: An Introduction" by Rodney Cotterill
8. "Medical Physics: Imaging" by James G. Webster
9. "Shape Memory Alloys: Properties and Applications" by
10. Dimitris C. Lagoudas
11. Nano materials and applications by M.N.Borah
12. Environmental Chemistry by Anil.K.D.E.
13. Digital Logic Design by Morris Mano
14. Data Communication & Networking by Bahrouz Forouzan.

STUDENT ACTIVITIES

UNIT II : ADVANCES IN PHYSICS

1. Case Studies

Provide students with real-world case studies related to renewable energy, nanotechnology, biophysics, medical physics, or shape memory materials.

Students will analyze the case studies, identify the challenges or problems presented, and propose innovative solutions based on the recent advances in the respective field.

They will consider factors such as energy generation, energy storage, efficiency, sustainability, materials design, biomedical applications, or technological advancements.

2. Experimental Design

Assign students to design and conduct experiments related to one of the topics: renewable energy, nanotechnology, biophysics, medical physics, or shape memory materials.

They will identify a specific research question or problem to investigate and design an experiment accordingly.

Students will collect and analyze data, interpret the results, and draw conclusions based on their findings. They will discuss the implications of their experimental results in the context of recent advancesin the field.

3. Group Discussion and Debate

Organize a group discussion or debate session where students will discuss the ethical, social, and environmental implications of the recent advances in renewable energy, nanotechnology, biophysics, medical physics, and shape memory materials.

Assign students specific roles, such as proponent, opponent, or moderator, and provide them with key points and arguments to support their positions.

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS AND CHEMISTRY

1: Mathematical Modeling Experiment

Provide students with a mathematical modelling experiment related to one of the topics. For example, in the context of renewable energy, students can develop a mathematical model to optimize the placement and configuration of solar panels in a solar farm.

Students will work in teams to design and conduct the experiment, collect data, and analyze the results using mathematical models and statistical techniques.

They will discuss the accuracy and limitations of their model, propose improvements, and interpret the implications of their findings in the context of renewable energy or the specific application area.

2. Case Studies and Group Discussions

Assign students to analyze case studies related to the applications of mathematical modelling in nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.

Students will discuss the mathematical models and computational methods used in the case studies, analyze the outcomes, and evaluate the effectiveness of the modelling approach.

Encourage group discussions on the challenges, ethical considerations, and potential advancements in the field.

Students will present their findings and engage in critical discussions on the advantages and limitations of mathematical modelling in solving complex problems in these areas.

3. Group Project

Assign students to work in groups to develop a group project that integrates mathematical modelling with one of the application areas: renewable energy, nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.

The project could involve developing a mathematical model to optimize the delivery of radiation therapy in medical physics or designing a mathematical model to optimize waste management practices. Students will plan and execute their project, apply mathematical modelling techniques, analyzethe results, and present their findings and recommendations.

Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT V: Advanced Applications of computer Science

1. Students must be able to convert numbers from other number system to binary numbersystems
2. Identify the networking media used for your college network
3. Identify all the networking devices used in your college premises.

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Title of the Paper : HEAT AND THERMODYNAMICS

Semester: III **Offered to: II B.Sc. (MPC & MPCs)**

Course Code	**22PHYT31**	**Course Delivery Method**	**Class Room / Blended Mode**
Credits	**3**	CIA Marks	**30**
No. of Lecture Hours / Week	**4**	Semester End Exam Marks	**70**
Total Number of Lecture Hours	**60**	Total Marks	**100**
Year of Introduction : 2020 - 21	Year of Offering: 2020 - 21	Year of Revision: NIL	Percentage of Revision: NIL

Course Description:

The course makes the students able to understand the basic physics of heat and temperature and their relation with energy, work, radiation and matter. The students also learn how laws of thermodynamics are used in a heat engine to transform heat into work. The course contains the study of laws of thermodynamics, thermodynamic description of systems, thermodynamic potentials, kinetic theory of gases.

Course Objectives:

1. Introduce the microscopic approach through kinetic theory of gases and basic statistical thermodynamics
2. Give the fundamentals of thermodynamic systems, the laws of thermodynamics and their application to thermodynamic problems
3. Provide essential tools to analyze Carnot engine, heat engines and refrigerators with the help of their thermodynamic cycles
4. Highlight the use of mathematical methods to derive thermodynamic relationships
5. Analyses thermal conductivity and black body radiation

COURSE OUTCOMES

Upon successful completion of this course, students should have the knowledge and skills to:

CO1 State the First Law and define heat, work, thermal efficiency and the difference between various forms of energy and describe energy exchange processes, reversible and irreversible process.

CO2 Understand the microscopic behavior of molecules, interactions and the concepts of transport phenomena of heat transfer, mass transfer and momentumtransfer.

CO3 use kinetic theory of gases to derive expressions for pressure of an ideal gas, heat capacities of solids and gases and transport properties

CO4 Understand very low temperatures like the concept of Joule Thomson effect, Liquefaction of gases and the properties at very low temperatures.

CO5 Ability to evaluate entropy changes in a wide range of processes and determine the reversibility or irreversibility of a process from such calculations. Examine the nature of black body radiations and the basic theories.

Unit	Learning Units	Lecture Hours
I	**1. Kinetic Theory of gases**-Introduction, Maxwell's law of distribution of molecular velocities, Mean free path, Degrees of freedom, Principle of equipartition of energy (Qualitative ideas only), **2. Transport phenomenon in ideal gases**: viscosity, Thermal conductivity and diffusion of gases.	12
II	**3. Introduction to Thermodynamics** Introduction- Isothermal and Adiabatic processes - Work done in these processes, Heat engines - Reversible and irreversible processes, Carnot's engine and its efficiency, Second law of thermodynamics, Carnot's theorem, Thermodynamic scale of temperature and its identity with perfect gas scale. **4. Entropy** Entropy and its Physical significance, change in entropy in reversible and irreversible processes; Entropy and disorder-Entropy of Universe; Temperature-Entropy (T-S) diagram and its uses, change of entropy when ice changes into steam (**Qualitative**).	12
III	**5 Thermodynamic potentials** - Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy and their significance, Derivation of Maxwell's thermodynamic relations from thermodynamic potentials, **6. Applications of Maxwell's thermodynamic relations**: (i) Clausius-Clayperon's equation (ii) Value of C_P- C_V (iii) Value of C_P/C_V (iv) Joule-Kelvin coefficient for ideal and Van der Waals' gases	12
IV	**Low temperature Physics**: (12hrs) **7. Methods for producing very low temperatures**: Joule Kelvin effect - Porous plug experiment, Joule expansion, Distinction between adiabatic and Joule Thomson expansion, Expression for Joule Thomson cooling **8. Production of low temperature**: Adiabatic demagnetization, Principle of Refrigeration, effects of chloro and fluoro carbons on ozone layer.	12
V	**9. Radiation Laws**: (7 hrs) Blackbody and its spectral energy distribution of black body radiation, Kirchoff's law, Wein's displacement law, Stefan-Boltzmann's law and Rayleigh-Jean's law (No derivations), Planck's law of black body radiation-Derivation, Deduction of Wein's law and Rayleigh- Jean's law from Planck's law. **10. Measurement of Radiation (5 hrs)** Pyrometers: Angstrom pyroheliometer and determination Solar constant, Estimation of surface temperature of Sun.	12

TEXT BOOKS

1. BSc Physics, Vol.2, Telugu Akademy, Hyderabad
2. Unified Physics Vol.2, Optics & Thermodynamics, Jai Prakash Nath &Co.Ltd., Meerut

REFERENCE BOOKS:

1. Thermodynamics, R.C. Srivastava, S.K. Saha & Abhay K. Jain, Eastern Economy Edition.
2. Fundamentals of Physics. Halliday/Resnick/Walker.C. Wiley India Edition 2007
3. Heat, Thermodynamics and Statistical Physics-N Brij Lal, P Subrahmanyam, P S Hemne, S. Chand& Co., 2012
4. Heat and Thermodynamics- MS Yadav, Anmol Publications Pvt. Ltd, 2000
5. University Physics, HD Young, MW Zemanski Sears, Narosa Publishers, New Delhi

STUDENT ACTIVITY

1. Seminars
2. Assignments.

LIBRARY ACTIVITY

Student visit library to refer and gather information regarding seminar topics and assignments.

Course Delivery method: Face-to-face / Blended

Course has focus on: Foundation & Employability

Model Question Paper
Heat and Thermodynamics

TOTAL MARKS : 70 **TIME : 3 HRS**

Section-A

Answer the following: 5X10=50M

1 a) Derive an expression for Maxwell's law of distribution of molecular speeds in a gas. (CO1, L1)

(OR)

b) Define coefficient of viscosity. On the basis of kinetic theory of gases, derive an expression for the coefficient of viscosity. (CO1, L1)

2 a) Describe the working of Carnot's reversible engine and derive an expression for its efficiency. (CO2, L2)

(OR)

b) What are reversible and irreversible processes? How does the entropy change in each of these processes? (CO2, L2)

3 a) Define the four thermodynamic potentials. Obtain Maxwell's thermodynamic equations using these potentials. (CO3, L3)

(OR)

b) State and explain Joule-kelvin effect. Obtain an expression for Joule-kelvin coefficient. (CO3, L3)

4 a) What is adiabatic demagnetization? How is this principle used in producing low temperatures? (CO3, L2)

(OR)

b) Explain Joule-kelvin effect. Derive an expression for Joule-Thompson cooling. (CO4, L2)

5 a) Derive the Planck's formula for the distribution of energy in black body radiation. (CO5, L2)

(OR)

b) What is a pyrometer? Describe the construction and working of Angstrom pyroheliometer (CO5, L2)

Section-B

Answer all Questions: 5X4=20M

6. A) Write a note mean free path. (CO1, L1)

(OR)

B) Explain the second law of thermodynamics in terms of entropy. (CO2, L2)

7. A) Prove $C_p - C_v = R$

(OR)

B) Write the principle of refrigeration. (CO4, L3)

8. A) How did you find the solar constant. (CO5, L2)

(OR)

B) What are the characteristics of Black Body

9. A) Find the R.M.S velocity of hydrogen at N.T.P and at C? (CO1, L3)

(OR)

B) Calculate the efficiency of a reversible engine that operates between the temperatures 200^0 Cand 120^0 C? (CO1, L3)

10. A) Calculate the temperature inversion of helium gas. Given a=3.44 $x10^{-3}$ntm^4/mol^{2}and b = 0.023 $x10^{-3}$ m^3 /mol. (CO1, L3)

(OR)

B) Find the wavelength at which maximum energy is radiated by a black at a temperature of 227^0c and wien's constant is $2.877x10^{-3}$mk. (CO1, L3)

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Title of the Paper: HEAT AND THERMODYNAMICS (LAB)

Semester: III **Offered to: II B.Sc. (MPC&MPCs)**

Course Code	**22PHYP31**	**Course Delivery Method**	**Class Room / Blended Mode**
Credits	**2**	CIA Marks	**15**
No. of Lecture Hours / Week	**2**	Semester End Exam Marks	**35**
Total Number of Lecture Hours	**30**	Total Marks	**50**
Year of Introduction : 2020 - 21	Year of Offering: 2020-21	Year of Revision: NIL	Percentage of Revision: NIL

Course Description

Students would gain practical knowledge about heat and radiation, thermodynamics, thermo emf, RTD etc. and perform various experiments.

Course Objectives:

1. The primary objective of this course is to provide the fundamental knowledge to understand the behaviour of thermal systems.
2. This course provides a detailed necessary transfer through solids, fluids, and experimental analysis, including the application and heat vacuum.
3. Convection, conduction, and radiation heat transfer in one and two dimensional steady and unsteady systems are examined.

COURSE OUTCOMES

Upon successful completion of this course, students should have the knowledge and skills to:

CO1: Determine the thermal conductivity of bad conductor-Lee's method, thermal conductivity of rubber and Coefficient of thermal conductivity of copper by using Searle's apparatus.

CO2: Study the heating efficiency of electrical kettle with varying voltages.

CO3: Determine Specific heat of a liquid by Joule's calorimeter and study Barton's radiation correction by plotting a graph between temperature and time and Specific heat of a liquid by applying Newton's law of cooling correction.

CO4: Study temperature variation of resistance in a thermostat.

List of experiments

1) Study of variation of resistance with temperature - Thermistor.

2) Thermal conductivity of bad conductor-Lee's method

3) Thermal conductivity of rubber.

4) Measurement of Stefan's constant - emissive method

5) Heating efficiency of electrical kettle with varying voltages.

6) Specific heat of a liquid –Joule's calorimeter –Barton's radiation correction

7) Specific heat of a liquid by applying Newton's law of cooling correction.

8) Thermo emf- thermo couple - Potentiometer

9) Thermal behavior of an electric bulb (filament/torch light bulb)

10) Measurement of Stefan's const

Note :

1. 9 (NINE) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 7 (Seven) experiments must be done and recorded by student who had put in 75 % of attendance in the lab.
3. Best 6 experiments are to be considered for CIA.
4. 15 marks for CIA.
5. 35 marks for practical exam.

The marks distribution for the Semester End practical examination is as follows:

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
Total Marks:	**35**

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Title of the Paper : SOLAR ENERGY

(AS PART OF SKILL DEVELOPMENT COURSES)

Semester: III

Course Code	**SDCPHYT02**	**Course Delivery Method**	**Class Room / Blended Mode - Both**
Credits	**2**	**CIA Marks**	**15**
No. of Lecture Hours / Week	**2**	**Semester End Exam Marks**	**35**
Total Number of Lecture Hours per semester	**30**	**Total Marks**	**50**
Year of Introduction: 2020-21	**Year of Offering: 2021 -22**	**Year of Revision: NIL**	**Percentage of Revision: NIL**
CLASS :	II B.Sc (BZC,AQUA)		

Learning Outcomes :

After successful completion of the course, students will be able to:

1. Acquire knowledge onsolarradiation principles with respect to solar energy estimation.
2. Get familiarized with various collecting techniques of solar energy and its storage
3. Learn the solar photovoltaic technology principles and different types of solar cells for energy conversion and different photovoltaic applications.
4. Understand the working principles of several solar appliances like Solar cookers, Solar hot water systems, Solar dryers, Solar Distillation, Solar greenhouses **.**

SYLLABUS

UNIT-I – Solar Radiation : (10 hrs)

Sun as a source of energy, Solar radiation, Solar radiation at the Earth's surface, Measurement of Solar radiation-Pyroheliometer, Pyranometer, Sunshine recorder, Prediction of available solar radiation, Solar energy-Importance, Storage of solar energy, Solar pond .

UNIT-II – Solar Thermal Systems : (10 hrs)

Principle of conversion of solar radiation into heat, Collectors used for solar thermal conversion: Flat plate collectors and Concentrating collectors, Solar Thermal Power Plant, Solar cookers, Solar hot water systems, Solar dryers, Solar Distillation, Solar greenhouses.

UNIT-III – Solar Photovoltaic Systems : (10 hrs)

Conversion of Solar energy into Electricity - Photovoltaic Effect, Solar photovoltaic cell and its working principle, Different types of Solar cells, Series and parallel connections, Photovoltaic applications: Battery chargers, domestic lighting, street lighting and water pumping .

Co-curricular Activities (Hands on Exercises): (04 hrs)

[Any four of the following may be taken up]

1. Plot sun chart and locate the sun at your location for a given time of the day.
2. Analyse shadow effect on incident solar radiation and find out contributors.
3. Connect solar panels in series & parallel and measure voltage and current.

4. Measure intensity of solar radiation using Pyranometer and radiometers.
5. Construct a solar lantern using Solar PV panel (15W)
6. Assemble solar cooker
7. Desigining and constructing photovoltaic system for a domestic house requiring 5kVA power
8. Assignments/Model Exam.

Reference Books:

1. Solar Energy Utilization, G. D. Rai, Khanna Publishers 1. Solar Energy- Fundamentals, design, modeling & applications, G.N. Tiwari, Narosa Pub., 2005.
2. Solar Energy-Principles of thermal energy collection & storage, S.P. Sukhatme, Tata McGraw Hill Publishers, 1999.
3. Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd.,
4. Science and Technology of Photovoltaics, P. Jayarama Reddy, BS Publications, 2004.

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE

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ACADEMIC YEAR-2022-23

SEMESTER – III	**COURSE CODE : SDCPHYT02**
PAPER TITLE : SOLAR ENERGY	

Model Paper

Time: 2 Hours Maximum marks : 35 M Pass marks : 14M

SECTION-A

Answer any **Three** Questions . Each question carries **5** marks. **(3X5=15Marks)**

1)

2)

3)

4)

5)

SECTION-B

Answer any **Two** Questions. Each question carries **10** marks. **(2X10=20M)**

6)

7)

8)

9)

The Guidelines to be followed by the question paper setters in PHYSICS for the III-Semester - end exams. **ACADEMIC YEAR-2022-23**

Weightage for the question paper :-

syllabus	Section-A (Short answer questions)	Section-B (Essay questions)
Unit-1 (20Marks)	2	1
Unit-2 (25 Marks)	1	2
Unit-3 (20 Marks)	2	1

- Each Short answer question carries 5 marks in Section –A
- Each Essay question carries 10 marks in Section –B
- The Question papers setters are requested to cover all the topics in the syllabus stipulated as per the weightage given by us.

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Title of the Paper: Applications of Electricity & Electronics

Semester : V/VI **YEAR : III B.Sc(MPC,MPCS)**

Course Code	**PHYSET01**	**Course Delivery Method**	**Class Room / Blended Mode - Both**
Credits	**3**	**CIA Marks**	**25**
No. of Lecture Hours / Week	**3**	**Semester End Exam Marks**	**75**
Total Number of Lecture Hours per semester	**45**	**Total Marks**	**100**
Year of Introduction: 2022-23	**Year of Offering: 2022 -23**	**Year of Revision: 2023-24**	**Percentage of Revision: 5%**
CLASS :	III B.Sc (MPC, MPCS)		

Course Objectives:

- To help students to understand the principles and laws of electricity which isessential to constantly emerging newest technologies
- To create interest among the students about the communication systems bystudying electricity and electronics
- Students will be able to understand applications of passive elements, AC, DCcircuits and power supplies

Course Outcomes:

At the end of this course, students should be able to:

CO1 Understand the types of resistors, Inductors and capacitors and itsapplications

CO2 Distinguish between AC and DC sources and understand about the batteriesand Network theorems for DC circuits

CO3 Explain the working principle and construction of Generators and transformers

CO4 Learn the applications of EM induction and power supplies

SYLLABUS

Unit	Learning Units	Lecture Hours
I	**UNIT-I: INTRODUCTION TO PASSIVE ELEMENTS** **a) Passive elements** Resistor - Types of Resistors, Color coding, Combination of Resistors – Series combination (Voltage division), Parallel combination (Current division), Ohms Law and its limitation. Inductor - Principle, Types of Inductors. Capacitor - Principle, Charging and discharging of a Capacitor, Types of Capacitors. **b) Applications of Passive elements:** Applications of a Resistor as a heating element in heaters and as a fuse element. Applications of Inductors, Application of choke in a fan and in a radio tuning circuit, Series resonance circuit as a Radio tuning circuit. Applications of Capacitor in power supplies, motors (Fans).	9
II	**UNIT-II: POWER SOURCES (BATTERIES)** **a) Power sources:** Types of power sources-DC & AC sources, Different types of batteries, Rechargeable batteries - Lead acid batteries, Li-ion batteries, Series, Parallel & Series-Parallel configuration of batteries **b) Network Theorems for DC circuits** Thevenin's theorem, Norton's theorem, Maximum Power transfer theorem, Constant Voltage source - Constant Current Source-Applications of Current sources & Voltage sources.	9
III	**UNIT-III: ALTERNATING & DIRECT CURRENTS** **a)** A.C Generator, Construction and its working principle, DC Generator, Construction and its working principle, advantages and disadvantages, Differences between DC and AC generators **b)** Transformers- Construction and its working principle, Open circuit and short circuit tests, Types of Transformers - Step-down and Step-up Transformers, Relation between primary and secondary turns of the transformer with emf, Use of Transformer in a regulated Power supply	9
IV	**UNIT-IV: MODULATION CIRCUITS** (Skill Based) **a) Amplitude modulation:** Amplitude modulation, modulation index, Waveforms, Power relations, AM transmitter, AM Receiver, Demodulation, Diode detector **b) Frequency modulation:** Frequency modulation, modulation index, Waveforms, FM Transmitter, FM Receiver	9
V	**Unit-V: Applications of EM Induction & Power Supplies (Skill Based)** **a)** DC motor – Construction and operating principle, Calculation of power, voltage and current in a DC motor, Design of a simple Motor (Fan) with suitable turns of coil **b)** Working of a DC regulated power supply, Construction of 5 volts regulated power supply, Design of a step-down (ex:220-12V) and step-up (ex:120-240V) transformers.	9

TEXT BOOKS

BSc Unified Physics: Applications of Electricity & Electronics, S.L Gupta & Sanjeev Gupta

References:

1. Grob's Basic Electronics by Mitchel Schultz , TMH or McGraw Hill
2. Electronic and Electrical Servicing by Ian Robertson Sinclair, John Dunton, Elsevier Publications
3. Troubleshooting Electronic Equipment by R.S.Khandapur ,TMH
4. Web sources suggested by the teacher concerned and the college librarian including reading material.

Model Question Paper
APPLICATIONS OF ELECTRICITY & ELECTRONICS
Section A

Answer ALL questions 5X10=50M

1. A) Briefly explain the different types of resistors and capacitors. (CO1, L3)

(OR)

B) Write a note on applications of passive elements. (CO1, L2)

2 A) Describe Li ion batteries. (CO2, L2)

(OR)

B) Briefly explain the Thevenin's theorem with equivalent circuit. (CO2, L2)

3 A) Explain the construction and working principle of AC generator. (CO3, L2)

(OR)

B) Explain the construction and working principle of Transformers. (CO3, L2)

4 A) What is amplitude modulation? Explain. (CO4, L2)

(OR)

B) What is frequency modulation? Explain. (CO4, L2)

5 A) Explain the construction and operating principle of DC motor. (CO5, L2)

(OR)

B) Explain the working of DC regulated power supply. (CO5, L2)

Section B

Answer ANY FIVE of the following 5X5=25M

6. What is Ohm's law? (CO1, L1)
7. Explain the Series resonance circuit as a Radio tuning circuit. (CO1, L2)
8. Explain series-parallel configuration of batteries. (CO2, L2)
9. Write the applications of current and voltage sources. (CO2, L1)
10. Distinguish between DC and AC generators. (CO3, L2)
11. Explain the use of a Transformer in a regulated Power supply. (CO3, L1)
12. Explain the concept of demodulation. (CO4, L2)

13. Write a note on transmitters and receivers. (CO4, L1)
14. Explain the measurement of power, current and voltage in DC motor. (CO5, L2)
15. Write a short note on step-down and step-up transformers. (CO5, L1)

Course : Applications of Electricity & Electronics
PRACTICAL (Laboratory) SYLLABUS *(Max Marks:50)*

Course Code	PHYSEP01	**Course Delivery Method**	**Class Room / Blended Mode**
Credits	**2**	CIA Marks	**10**
No. of Lecture Hours / Week	**2**	Semester End Exam Marks	**40**
Total Number of Lecture Hours	45	Total Marks	**50**
Year of Introduction : 2022 - 23	Year of Offering: 2022 - 23	Year of Revision: NIL	Percentage of Revision: NIL

EXPERIMENTS LIST

Minimum SIX experiments are to be done and recorded

1. Measurement of R using Color coding of Resistors and measurement of R using multimeter - Resistors of different values, Multimeters
2. Connect two or three resistors or capacitors or inductors and measure the Series, Parallel Combination values using a Multimeter and compare the values with the calculated values - Capacitors of different values
3. Use the Digital Multimeter and Analog Multimeter to measure the output voltage of an AC & DC power supply - Digital Multimeters, Analog Multimeters
4. Draw the characteristics of FET
5. Construct a series electric circuit with R, L and C having an AC source and study the frequency response of this circuit Using Function generator
6. Construct a Parallel electric circuit with R, L & C having an AC source and study the frequency response of this circuit using Function generator
7. Efficiency of Transformer.
8. Verification of Network Theorems – Thevenin's theorem, Norton's theorem
9. AM Generation Kit
10. FM generation Kit

Lab References:

1. Laboratory Manual for Introductory Electronics Experiments by Maheshwari, L.K. Anand, M.M.S., New Age International (P) Ltd.
2. Electricity-Electronics Fundamentals: A Text-lab Manual by Paul B. Zbar, Joseph Sloop, & Joseph G. Sloop , McGraw-Hill Education
3. Laboratory Manual Basic Electrical Engineering by Umesh Agarwal, Notion Press
4. Basic Electrical and Electronics Engineering by S.K. Bhattacharya , Pearson Publishers.
5. Web sources suggested by the teacher concerned.

Note :

1. Eight experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 6 (Six) experiments must be done and recorded by

student who had put in 75 % of attendance in the lab.

3. Best 6 experiments are to be considered for CIA.
4. 10 marks for CIA.
5. 40 marks for practical exam.

The marks distribution for the Semester End practical examination is as follows:

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
Record	05
Total Marks:	40

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Domain Subject: **PHYSICS**

Title of the Paper : ELECTRONIC INSTRUMENTATION **Semester: V/VI**

[Skill Enhancement Course (Elective)] **Offered to : III** B.Sc (MPC & MPCs) **Course Type:** Core (TH)

Course Code	**PHYSET02**	**Course Delivery Method**	**Class Room / Blended Mode**
Credits	**3**	CIA Marks	**25**
No. of Lecture Hours / Week	**3**	Semester End Exam Marks	**75**
Total Number of Lecture Hours per semester	**45**	Total Marks	**100**
Year of Introduction : 2022-23	Year of Offering: 2022-23	Year of Revision: 2023-24	Percentage of Revision: 25%

Course Objectives:

- Explain basic concepts and definitions in measurement.
- Describe the bridge configurations and their applications.
- Elaborate discussion about the importance of electronic instruments

COURSE OUTCOMES

On successful completion of this course, the students will be able to:

CO1 Understand the basic measurements of Instruments (accuracy, precision, range, resolution, sensitivity and errors). Understand the theory, working principle, specifications and significance of Multimeter.

CO2 Describe the function of basic building blocks of Cathode Ray Oscilloscope. Measure the appropriate parameters (Voltage, Time Period, Frequency and Phase angle)

CO3 Understand the A/D & D/A converters and display instruments

CO4 Gain knowledge about amplifiers, oscillators and biomedical instruments

CO5 Understand the fundamental theory of Transducers and bridges

SYLLABUS

Unit	Learning Units	Lecture Hours
I	**UNIT-I INTRODUCTION TO INSTRUMENTS** **a)** Basic of measurements: Instruments accuracy, precision, sensitivity, resolution, range, types of errors, Classification of Instruments, Analog instruments & Digital Instruments, Construction and working of an Analog Multimeter and Digital Multimeter (Block diagram approach) **b)** DC Voltmeter and AC Voltmeter, Sensitivity, Sources of errors in the Measurement of resistance, voltage and current, Specifications of multimeter and their significance, Basic ideas on Function generator (brief explanation).	9
II	**UNIT-II OSCILLOSCOPE** **a)** Cathode ray oscilloscope – Principle and block diagram of CRO - Cathode Ray Tube – functioning – various controls **b)** Applications CRO: Measurement of voltage (dc and ac), frequency& time period, Different types of oscilloscopes and their uses, Digital storage Oscilloscope	9
III	**UNIT-III TRANSDUCERS AND BRIDGES** **a)** Classification of Transducers, Resistive, Capacitive & Inductive transducers, Piezoelectric transducer, Photo transducer. b) DC bridge – Wheatstone's bridge, AC Bridges - Measurement of Inductance and Capacitance – Maxwell's bridge .	9
IV	**UNIT-IV ADC AND DAC & DISPLAY INSTRUMENTS** **a)** A/D & D/A converters - Binary ladder, A/D converters – continuous type, integrating type, successive approximation type. b)Introduction to Display devices, LED Displays, Seven Segment Displays, Construction and operation (Display of numbers).	9
V	**UNIT-V OPERATIONAL AMPLIFIERS** **A)** Differential amplifier, IC-741 identification, internal blocks of OP-AMP. Characteristics of ideal and practical op-amp, inverting and non-inverting configuration. B) Applications of op-amp (IC-741): summing and difference amplifiers, differentiator and integrator	9

Reference Books:

1. Electronic Instrumentation by H.S.Kalsi ,TMH Publishers
2. Electronic Instrument Hand Book by Clyde F. Coombs ,McGraw Hill
3. Introduction to Biomedical Instrumentation byMandeep Singh, PHI Learning.
4. Electronic Instrumentation – WD Cooper
5. Electrical and Electronic Instrumentation – AK Sawhany
6. A text book in electrical technology by B.L.Thereja (S.Chand&Co)
7. *Biomedical Instrumentation* and Measurements by Leslie *Cromwell ,Prentice Hall India*.
8. Electronic Measurements and Instrumentation by Kishor, K Lal, Pearson, New Delhi
9. Electrical and Electronic Measurements by Sahan, A.K., Dhanpat Rai, New Delhi
10. Electronic Instruments and Measurement Techniques by Cooper, W.D. Halfrick, A.B., PHI Learning, New Delhi
11. Web sources suggested by the teacher concerned and the college librarian including reading material.

Course : Electronic Instrumentation– PRACTICAL SYLLABUS

Practical (Laboratory) Syllabus: *(Max Marks:50)*

Course Code	PHYSEP02	**Course Delivery Method**	**Class Room / Blended Mode**
Credits	**2**	CIA Marks	**10**
No. of Lecture Hours / Week	**2**	Semester End Exam Marks	**40**
Total Number of Lecture Hours	**45**	Total Marks	**50**
Year of Introduction : 2022 - 23	Year of Offering: 2022 - 23	Year of Revision: NIL	Percentage of Revision: NIL

Minimum SIX experiments are to be done and recorded

1. Familiarization of digital multimeter and its usage in the measurements of (i) resistance (ii) current, (iii) AC & DC voltages
2. Measure the AC and DC voltages, frequency using a CRO and compare the values measured with other instruments like Digital multimeter.
3. Formation of Sine, Square wave signals on the CRO using Function Generator and measure their frequencies. Compare the measured values with actual values.
4. Display the numbers from 0 to 9 on a single Seven Segment Display module by applying voltages.
5. Summing amplifier
6. Difference amplifier
7. Integrator
8. Differentiator
9. Display the letters **a** to **h** on a single Seven Segment Display module by applying voltages.

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VI. Lab References:

1. Electronic Measurement and Instrumentation by J.P. Navani. ,S Chand & Co Ltd
2. Principles of Electronic Instrumentation by A De Sa, Elsevier Science Publ.
3. Electronic Measurements and Instrumentation by S.P.Bihari, YogitaKumari, Dr. Vinay Kakka, Vayu Education of India .
4. Laboratory Manual For Introductory Electronics Experiments by Maheshwari, New Age International (P) Ltd., Publishers.
5. Electricity-Electronics Fundamentals: A Text-lab Manual by Paul B. Zbar ,Joseph
6. Sloop, & Joseph G. Sloop , McGraw-Hill Education.

Web sources suggested by the teacher concerned.

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MODEL PAPER

III B.Sc ,PHYSICS , SEMESTER – V/VI	**PAPER CODE : PHYSEP02**
PAPER TITLE : ELECTRONIC INSTRUMENTATION **ACADEMIC YEAR-2023-2024**	

Time: 3Hours Maximum marks: 75 Minimum marks: 28

MODEL PAPER

Section A

Answer ALL questions (5x 10 = 50M)

1. A) Define error. Mention different types of Errors. Explain any three types of errors associated with measurements. (CO1, L2)

(OR)

B) What is a multimeter? What are the advantages of analog multimeter? How do we measure voltage using analog multimeter? (CO1, L2)

2 A) Describe the principle and working of CRO. (CO2, L3)

(OR)

B) Write a brief note on different types of oscilloscopes and their uses. (CO2, L2)

3 A) Explain in brief Piezoelectric transducer. (CO3, L2)

(OR)

B) Discuss about Wheatstone's bridge. (CO3, L2)

4 A) Explain A/D and D/A converters. (CO4, L2)

(OR)

B) Discuss about various display devices. (CO4, L2)

5 A) What is an op-amp? Explain Inverting and Non-Inverting configuration. (CO5, L2)

(OR)

B) Explain Integrator and Differentiator using op-amp. (CO5, L2)

Section B

Answer any FIVE of the following **5X5=25M**

6. Distinguish between accuracy and precession of a measurement. (CO1, L1)
7. What are the uses of function generator? (CO1, L1)
8. Write a short note on photo transducer. (CO2, L1)
9. What are the various applications of CRO? (CO2, L1)
10. Explain any two specifications of CRO. (CO3, L2)
11. Distinguish between DC and AC bridges. (CO3, L2)
12. Explain A/D Converter using successive approximation type. (CO3, L2)
13. Explain LED display systems. (CO4, L2)
14. Explain summing and difference amplifier? (CO5, L2)
15. What are the ideal characteristics of op-amp? (CO5, L1