# FOUR YEARS UNDERGRADUATE PROGRAM (2024 – 28)
# DEPARTMENT OF PHYSICS
# COURSE CURRICULUM

## PART – A: INTRODUCTION

| Program:Bachelor in Science (Diploma/ Degree/ Honors) | | Semester: III | Session: 2024-25 |
|---|---|---|---|
| 1 | Course Code | PHSC- 03P | |
| 2 | Course Title | Heat and Thermodynamics | |
| 3 | Course Type | Discipline Core Course | |
| 4 | Pre-requisite (if any) | As per Program | |
| 5 | Course Learning Outcomes (CLO) | ➢ Lab Proficiency: Thermometers, pressure gauges, calorimeters, heat transfer apparatus, experimental setup, data acquisition.<br>➢ Hands-on Learning**: Heat transfer, work done, entropy, phase transitions, experiments.<br>➢ Data Analysis: Experimental data, theoretical discrepancies, analysis.<br>➢ Predictive Skills: Thermodynamic behavior, varying conditions, experimentation.<br>➢ Theory-Practice Integration: Theoretical knowledge, practical lab work, synthesis, applications. | |
| 6 | Credit Value | 01 Credit | 1 Credit = 30 HoursLaboratory Work |
| 7 | Total Marks | Maximum Marks: 50 | Minimum Pass Marks: 20 |

## PART – B: CONTENT OF THE COURSE

TotalNo.of learning-Training/performance Periods -30 Periods (30 Hours)

| Sr. No. | Objects (At least 10 of the following or related Experiments) | No. of Periods |
|---|---|---|
| 1 | To determine the thermal conductivity of a non-conducting material by Lee's disc method. | 30 |
| 2 | To study the variation of thermo emf across two junctions of a thermocouple with temperature. | |
| 3 | To verify Newton's law of cooling. | |
| 4 | To determine the temperature co-efficient of resistance by Platinum resistance thermometer. | |
| 5 | To determine the coefficient of thermal conductivity(k) of a rubber tube. | |
| 6 | To study the heat efficiency of an electric kettle with varying voltage. | |
| 7 | To determine the ratio of specific heat at constant pressure and constant volume ($\gamma$=Cp/Cv) of air Clement and Desorme's method. | |
| 8 | To determine the coefficient of thermal conductivity of copper by Searle's Apparatus. | |
| 9 | To study the variation of thermos-Emf of thermos couple with Difference of Temperature of its Two Junctions. | |
| 10 | To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method. | |
| 11 | Measurement of Planck's constant using black body radiation. | |
| 12 | To determine Stefan's Constant. | |

| *Keywords*: | Thermal conductivity, Thermocouple, Newton's law of cooling, Temperature coefficient of resistance, Heat efficiency, Specific heat ratio, Mechanical equivalent of heat, Planck's constant |
|---|---|

SignatureofConvener&Members (CBoS) :

10/6/24

## PART – C: LEARNING RESOURCES

***Text Books, Reference Books and Others***

***Text Books Recommended-***

1. Advanced Practical Physics for students, B.L.Flint&H.T.Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
4. A Laboratory Manual of Physics for Undergraduate Classes, D.P. Khandelwal, 1985, Vani Publication.
5. Unified Practical Physics B.Sc II : R P Goyal, Shivlal Agrawal &Sons Publications

***Reference Books Recommended-***

1. Practical Physics by C.L. Arora
2. Practical Physics by S.L. Gupta and Vijay Kumar
3. Advanced Practical Physics for Students by B.L. Worsnop and H.T. Flint

***Online Resources (e-books/ learning portals/ other e-resources)***

Link for e-Books for Physics Practicaland Virtual labs

1. Thermal Physics and Statistical Mechanics: Laboratory Collectionhttps://egyankosh.ac.in/handle/123456789/67450
2. Virtual Lab :https://vlab.amrita.edu/index.php?sub=1&brch=194
3. https://vlab.amrita.edu/index.php?sub=1&brch=194&sim=802&cnt=1
4. https://vlab.amrita.edu/index.php?sub=1&brch=194&sim=801&cnt=4
5. https://srmap.edu.in/seas/physics-virtual-lab/
6. https://sites.google.com/view/vlab-bnmitmech/home/heat-transfer-lab
   https://www.pbslearningmedia.org/resource/lsps07-sci-phys-thermalenergy/thermal-energy-transfer/#.WdJiOJIrLIU

## PART – D: ASSESSMENT AND EVALUATION

**Suggested Continuous Evaluation Methods:**
**Maximum Marks: 50 Marks**
**Continuous Internal Assessment(CIA):15 Marks**
**EndSemester Exam(ESE):35 Marks**

| | | |
|---|---|---|
| **Continuous InternalAssessment( CIA):** (By Course Teacher) | Internal Test / Quiz-(2): **10 & 10**<br>Assignment/Seminar +Attendance –**05**<br>Total Marks - **15** | Better marks out of the two Test / Quiz **+Marks** obtained in Assignment shall be considered against **15** Marks |
| **End Semester Exam (ESE):** | **Laboratory Performance: On spot Assessment**<br>**Performed the Task based on lab. work - 20 Marks**<br>**Spotting based on tools & technology (written) – 10 Marks**<br>**Viva-voce (based on principle/technology) - 05 Marks** | **Managed by Course teacher as per lab. status** |

***Name and Signature of Convener & Members of CBoS:***

10/6/24