

**LEARNING OUTCOMES–BASED CURRICULUM  
FRAMEWORK (LOCF)**

**in the**

**UNDERGRADUATE PROGRAMME  
BACHELOR OF SCIENCE (B.Sc., PHYSICS)**

**FOR THE STUDENTS ADMITTED FROM THE  
ACADEMIC YEAR 2022 - 2023 AND ONWARDS**



**HICAS**

**HINDUSTHAN COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)**

**(Affiliated to Bharathiar University and Accredited by NAAC)**

**COIMBATORE-641028  
TAMILNADU, INDIA.**

Phone: 0422-4440555

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### **PREAMBLE**

Learning Outcome Based Curriculum Framework for Undergraduate education in Bachelor of Science in Physics. At the end of this programme, the students can acquire a comprehensive knowledge and sound understanding of fundamentals of Physics, including practical, analytical and mathematical skills to solve problems, to evaluate information, to use computers productively, to communicate with society effectively and learn independently. In addition, the students can obtain a job efficiently in diverse fields such as Science and Engineering, Education, Banking, Public Services, Business etc.

### **VISION**

To provide excellent education to the students to face global challenges and to inculcate the latest trends in technological advancement. To cater the needs of the environmental and ethical values in the mind of students to become good citizens and entrepreneurs.

### **MISSION**

The Mission of the college is to pursue a philosophy of perpetual acquisition of knowledge. The important policy is to provide value-based education and to bring out the hidden potentials in students that equip them to approach life with optimism.

### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**Under Graduates of Physics program will,**

**PEO 1:** Excel in the competencies and values required for leadership to serve a rapidly evolving global community.

**PEO 2:** Endow the students with creative and analytical skills, this will equip them to become entrepreneurs.

**PEO 3:** Serve the society with scientific advancement and to actively take part in building knowledge-based society.

**PEO 4:** Enter into higher studies leading to post-graduate and research degrees.

**PEO 5:** Engross in life-long learning to keep themselves abreast of new developments and to face global challenges.

## **PROGRAMME OUTCOME (PO)**

B.Sc (Physics) Students will be able to

**PO1: DISCIPLINARY KNOWLEDGE:** Understand the basic concepts and significance of various physical phenomena.

**PO2: PROBLEM SOLVING AND ANALYSING:** Apply the knowledge of Physical Science to solve real life problems.

**PO3: ENVIRONMENT SUSTAINABILITY AND ETHICS:** Develop an independent and self-disciplined specialized learning in tune with the changing socio-technological scenario.

**PO4: MODERN TOOL USAGE:** Develop creative thinking and innovative ideas using modern tools.

**PO5: CO-OPERATIVE TEAM WORK & COMMUNICATIVE SKILLS:** Communicate effectively in order to acquire employability / self – employment.

**PO6: SELF DIRECTED / LIFE LONG LEARNING:** Transform ideas into action i.e. lab to land.

**PO7: ENHANCING RESEARCH CULTURE:** Get motivated to pursue higher education and research activities in Physics to find professional level employment.

## **PROGRAMME SPECIFIC OUTCOME (PSO)**

**PSO1:** Understand the core areas of physics, including mechanics, thermodynamics, quantum mechanics and electronics at a level compatible with graduate programs.

**PSO2:** Be able to analyze and interpret quantitative results, both in the core areas of physics and interdisciplinary areas.

**PSO3:** Be able to use contemporary experimental apparatus and analysis tools to acquire, analyze and interpret scientific data.

**PSO4:** Communicate explicitly and exchange ideas with regard to the impacts of various components of Physics on environment and society.

**PSO5:** Identify and access the diverse applications of Physics using mathematical concepts enriching towards career opportunities.

**HINDUSTHAN COLLEGE OF ARTS & SCIENCE (AUTONOMOUS),  
COIMBATORE-641028**

**SCHEME OF EXAMINATIONS - CBCS & LOCF PATTERN**

*(For the Students admitted from the Academic year 2022-2023 and Onwards)*

**UG PROGRAMME**

**Programme: B.Sc.,**

**Branch: Physics**

Part	Course Code	Course Type	Course Title	Credit points	Lecture Hours/Week		Exam Duration (hours)	MAX. MARKS		
					Theory	Practical		I.E.	E.E	Total
<b>Semester – I</b>										
<b>I</b>	22LAT01/ 22LAH01/ 22LAM01/ 22LAF01	MIL	Tamil-I/ Hindi-I/ Malayalam – I/ French-I	4	6		3	50	50	100
<b>II</b>	22ENG01	AECC	English – I	4	6		3	50	50	100
<b>III</b>	22PHU01	DSC	<b>CORE-I:</b> Mechanics, Properties of Matter and Sound	4	6		3	50	50	100
<b>III</b>	22PHU02	DSC	<b>CORE-II:</b> Electricity and Magnetism	4	6		3	50	50	100
<b>III</b>	22PHU03	GE	<b>ALLIED-I :</b> Mathematics – I	4	5		3	50	50	100
<b>IV</b>	22PHUE01	AEE	Open Elective – I	1	3		3	100	-	100
<b>IV</b>	22GSU01	AECC	Environmental Studies	1	2		2	50	-	50
<b>IV</b>	22PHUV01	SEC	VAC-I/Life Skills-I @ / SEC-Communicative English	1*	2		1	50	-	50**
<b>IV</b>	-	SEC	<b>SDR- Student Development Report</b>	Assessment will be in the Fifth Semester						
<b>V</b>	-	AECC	Extension Activities NSS/NCC/SPORTS/YRC/SIS/SA	Assessment will be in the Fourth Semester						
<b>Total</b>				<b>22</b>	<b>36</b>			<b>400</b>	<b>250</b>	<b>650</b>
<b>Semester – II</b>										
<b>I</b>	22LAT02/ 22LAH02/ 22LAM02/ 22LAF02	MIL	Tamil-II/ Hindi-II/ Malayalam-II/ French-II	4	6		3	50	50	100
<b>II</b>	22ENG02	AECC	English – II	4	6		3	50	50	100
<b>III</b>	22PHU04	DSC	<b>CORE-III:</b> Heat and Thermodynamics	4	4		3	50	50	100
<b>III</b>	22PHU05	DSC	<b>CORE-IV:</b> Energy Physics	4	4		3	50	50	100
<b>III</b>	22PHU06	DSC	<b>CORE-V:</b> Semiconductor Devices	3	4		3	50	50	100

III	22PHU07	GE	<b>ALLIED-II:</b> Mathematics – II	4	5		3	50	50	100
III	22PHU08	DSC	<b>CORE-VI:</b> PRACTICAL – I : General Physics – I	2		3	3	50	50	100
III	22PHU09	SEC	Internship / Industrial Visit / <b>Mini Project</b> (Summer Course – 1 )	1	-	-		100		100
IV	22PHUV02	SEC	VAC-II/Life Skills-II @ / <b>SEC – Language</b>	1*	2		1	50	-	50**
IV	22PHUJ01	SEC	<b>Aptitude / Placement Training</b>	Grade*	2		1	50		50**
<b>Total</b>				<b>26</b>	<b>33</b>	<b>3</b>		<b>450</b>	<b>350</b>	<b>800</b>
<b>Semester – III</b>										
I	22LAT03/ 22LAH03/ 22LAM03/ 22LAF03	MIL	Tamil-III/ Hindi-III/ Malayalam – III/ French-III	4	6		3	50	50	100
II	22ENG03	AECC	English – III	4	6		3	50	50	100
III	22PHU10	DSC	<b>CORE-VII:</b> Optics	4	4		3	50	50	100
III	22PHU11	DSC	<b>CORE-VIII:</b> Mathematical Physics	4	4		3	50	50	100
III	22PHU12	DSC	<b>CORE-IX:</b> Practical – II: General Physics – II	2		3	3	50	50	100
III	22PHU13	GE	<b>ALLIED-III:</b> Chemistry – I	3	4		3	50	50	100
III	22PHU14A 22PHU14B	DSE	<b>ELECTIVES / DSE – I</b>	2	3		3	50	50	100
IV	22GSU02	AECC	Human Rights	1	1		2	50		50
IV	22PHUE02	AEE	Open Elective – II	1	2		3	100		100
IV	22PHUJ02	SEC	<b>Aptitude / Placement Training</b>	Grade*	2		1	50		50**
IV	22PHUJ03	SEC	<b>Online Course</b>	-	1			-	-	C/N C <sup>≠</sup>
<b>Total</b>				<b>25</b>	<b>33</b>	<b>3</b>		<b>500</b>	<b>350</b>	<b>850</b>
<b>Semester – IV</b>										
I	22LAT04/ 22LAH04/ 22LAM04/ 22LAF04	MIL	Tamil-IV/ Hindi-IV/ Malayalam – IV/ French-IV	4	6		3	50	50	100
II	22ENG04	AECC	English – IV	4	6		3	50	50	100
III	22PHU15	DSC	<b>CORE-X:</b> Atomic Physics and Spectroscopy	4	4		3	50	50	100
III	22PHU16	DSC	<b>CORE-XI:</b> Practical – III:	2		3	3	50	50	100

			General Electronics							
III	22PHU17	GE	<b>ALLIED-IV:</b> Chemistry – II	3	4		3	50	50	100
III	22PHU18	GE	<b>ALLIED – V:</b> Practical: Chemistry	2		3	3	50	50	100
III	22PHU19A	DSE	<b>ELECTIVES / DSE – II</b>	3	4		3	50	50	100
	22PHU19B									
III	22PHU20	SEC	Internship / Institutional Training / <b>Mini-Project</b> (Summer Course-2 )	1	-		-	100	-	100
IV	22PHUV03	ACC	VAC-III	1*	2		2	50	-	50**
IV	22PHUJ04	SEC	<b>Aptitude / Placement Training</b>	Grade*	2		1	50		50**
IV	22PHUJ05	SEC	<b>Online Course</b>	-	1		-	-	-	C/N C <sup>≠</sup>
IV	22GSU03	AECC	Internet Security	1	1		2	50	-	50
V	22GSU04	AECC	Extension Activities NSS/NCC/SPORTS/YRC/SIS/SA#	2	-		-		-	C/N C <sup>≠</sup>
<b>Total</b>				<b>26</b>	<b>30</b>	<b>6</b>		<b>500</b>	<b>350</b>	<b>850</b>
<b>Semester – V</b>										
III	22PHU21	DSC	<b>CORE-XII:</b> Quantum Mechanics and Relativity	4	5		3	50	50	100
III	22PHU22	DSC	<b>CORE-XIII:</b> Solid State Physics	4	4		3	50	50	100
III	22PHU23	DSC	<b>CORE-XIV:</b> Nuclear Physics	4	4		3	50	50	100
III	21PHU24	DSC	<b>CORE-XV:</b> C-Programming	4	4		3	50	50	100
III	22PHU25	DSC	<b>CORE-XVI:</b> Practical – IV: General Physics – III	2		3	3	50	50	100
III	22PHU26	DSC	<b>CORE-XVII:</b> Practical – V: C-Programming	2		3	3	50	50	100
III	22PHU27A	DSE	<b>ELECTIVES / DSE – III</b>	3	4		3	50	50	100
	22PHU27B									
IV	22PHUE03	AEE	Open Elective-III	1	3		3	100	-	100
IV	22GSU05	AECC	General Awareness	1	1		2	50	-	50
IV	22GSU06	AECC	Law of Ethics	1	-		2	50	-	50
IV	22PHUV04	ACC	VAC-IV	1*	2		1	50	-	50**
IV	22PHUJ06	SEC	<b>Aptitude / Placement Training</b>	Grade*	2		1	50	-	50**
IV	22PHUJ07	SEC	<b>Online Course</b>	-	1		-	-	-	C/N C <sup>≠</sup>
IV	22PHUJ08	SEC	<b>SDR- Student Development Report</b>	2*	-	-	-	-	-	-
<b>Total</b>				<b>26</b>	<b>30</b>	<b>6</b>		<b>550</b>	<b>350</b>	<b>900</b>

		Semester – VI								
III	22PHU28A	DSE	ELECTIVES / DSE – IV	4	6		3	50	50	100
	22PHU28B									
III	22PHU29A	DSE	ELECTIVES / DSE – V	4	6		3	50	50	100
	22PHU29B									
III	22PHU30	SEC	Project Work /Student Research / Paper	4	8			50	50	100
IV	22PHU31	DSC	CORE-XVIII: Self-Study Course	3	-	-	3	50	50	100
<b>Total</b>				<b>15</b>	<b>20</b>			<b>200</b>	<b>200</b>	<b>400</b>
<b>Grant Total</b>				<b>140 + 6</b>	<b>Extra</b>			<b>2600</b>	<b>1850</b>	<b>4450 + 400**</b>
				<b>Credits</b>						

- \* denotes Extra credits which are not added with total credits.
- \*\* denotes Extra marks which are not added with total marks.
- VAC-Value Added Course (Extra Credit Courses)
- \* Grades depends on the marks obtained
- ≠ C-Completed / NC- Not Completed

Range of marks	Equivalent remarks
80 and above	Exemplary
70 – 79	Very good
60 – 69	Good
50 – 59	Fair
40 – 49	Satisfactory
Below 40	Not Satisfactory = Not completed

- Part IV & V not included in total marks and CGPA calculation.
- I.E-Internal Exam
- E.E-External Exam
- JOC-Job Oriented Course

#### PASSING MINIMUM

- Passing Minimum for UG 40% and for PG 50%
- For UG: 35% (25 marks) in EE and 40% in Total Marks
- For PG: 50% (30 marks) in EE and 50% in Total Marks

## ABSTRACT FOR SCHEME OF EXAMINATION

(For the candidates admitted during the academic year 2022 - 2023 and onwards)

Part	Course	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages/ (MIL)	4	4	16	100	400
Part II	English/AECC-I	4	4	16	100	400
Part III	Core /DSC	17	2/3/5	57	100	1700
	Self-Study Course /DSC	1	3	3	100	100
	Allied /GE	5	2/3/4	16	100	500
	Electives/DSE	5	2/3/4	16	100	500
	Project SEC	1	4	4	100	100
	<i>Internship/Institutional Training/Mini-Project (Summer Courses #)</i>	2	1	2	100	200
Part IV	Open Electives /AEE	3	1	3	100	300
	AECC –EVS/HR/IS/GA/LE	5	1	5	50	250
	<i>Value Added Course / ACC</i>	2	1	2*	50	100**
	Skill Based/ Placement/Aptitude SEC	4	Grade	Grade	50	200**
	Online courses / SEC	3	C/NC	C/NC	-	-
	Life Skills / VAC / SEC	2	1	2*	50	100**
	<i>SDR- Student Development Report</i>	1	2	2*	-	-
Part V	Extension Activities NSS / NCC/Sports/YRC / SIS / SA – AECC	1	C/NC	2	-	-
	<b>Total</b>			<b>140+6* *6 - Extra Credits</b>		<b>4450 +400**</b>



List of Open Elective Papers & VAC / JOC	
Open Electives	Yoga for Human Excellence Human Health & Hygiene Indian Culture and Heritage Indian Constitution and Political System Consumer Awareness and Protection Professional Ethics and Human Values Human Rights, Women's Rights & Gender Equality Disaster Management Green Farming Campus to Corporate Start-up Business Research Methodology and IPR General Studies for Competitive Examinations IIT JAM Examination (for Science only) CUCET Examination Special Tamil Special English
	Courses offered by the Departments to other Programmes

Note: VAC / JOC courses can be added along with the above open electives

**List of Elective Papers/ DSE**

**(Can choose any one of the paper as electives)**

	<b>Course Code</b>	<b>Title</b>
Electives/ <b>DSE-I</b>	22PHU14A	Basic Electronics
	22PHU14B	Digital Electronics
Electives/ <b>DSE-II</b>	22PHU19A	Introduction of Nano technology
	22PHU19B	8085 Microprocessor
Electives/ <b>DSE-III</b>	22PHU27A	Geo Physics
	22PHU27B	Astrophysics
Electives/ <b>DSE-IV</b>	22PHU28A	Physics for Materials
	22PHU28B	Introduction to Classical Mechanics
Electives/ <b>DSE-V</b>	22PHU29A	Computational Physics
	22PHU29B	Experimental Physics I

  
Syllabus Coordinator

(H. Suresh)

  
BOS-Chairman / Chairperson

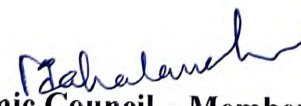
**Dr. V. BALAPRAKASH, M.Sc., M.Phil., Ph.D., NET.,**

Associate Professor and Head of the Department

Department of Physics

Hindusthan College of Arts & Science (Autonomous),

Coimbatore - 641 028

  
Academic Council - Member Secretary

  
PRINCIPAL

PRINCIPAL

Hindusthan College of Arts & Science (Autonomous),

Hindusthan Gardens, Behind Nava India,

Coimbatore - 641 028.

### UG - Scheme of Evaluation (Internal & External Components)

(For the students admitted during the academic year 2022-2023 and onwards)

#### 1. Internal Marks for all UG

Components	Marks
Test I	10
Test II	10
Model Exam	10
Assignment	5
Attendance*	5
Internal Assessment components **	10
<b>TOTAL</b>	<b>50</b>

#### \*Split-up of Attendance Marks

- ♣ 75-79 - 1 marks
- ♣ 80-84 - 2 marks
- ♣ 85-89 - 3 marks
- ♣ 90-94 - 4 marks
- ♣ 95-100 - 5 marks

#### \*\* List of components for Internal Assessment (MCQ Compulsory)

S.No	Components
1	Multiple choice questions
2	Club activities
3	Assignment
4	Seminar

(Any two components from the above list with five marks each will be calculated  
.2x5=10 marks)

#### 2. a) Components for Practical I.E.

Components	Marks
Test -I	15
Test - II	15
Observation	10
Application*	10
<b>Total</b>	<b>50</b>

#### b) Components for Practical E.E.

Components	Marks
Experiments/Exercise	40
Record	5
Viva	5
<b>Total</b>	<b>50</b>

#### 3. Institutional/ Industrial Training, Mini Project and Major Project Work

Institutional /Industrial Training (I.E)		Mini Project (I.E)	Major Project Work		
Component	Marks	Marks	Component	Marks	Total Marks
Work diary	25	-	I.E: a)Attendance	20	50
Report	50	50	b)Review/Work diary*	30	
Viva-voce	25	50			
<b>Total</b>	<b>100</b>	<b>100</b>	E.E** a) Evaluation	30	50
			b)Viva-voce	20	
			<b>Total</b>	<b>100</b>	<b>100</b>

\*Review is for Individual Project and Work Diary is for Group Projects  
(group consisting of minimum 3 and maximum 5)

\*\*Evaluation of report and conduct of viva voce will be done jointly by Internal and External Examiners

**4. Guidelines for Internet Security/Human Rights/ Law of Ethics/ Environmental Studies (Part IV)**

Components	Marks
Two Tests (each 2 hours) of 20 marks each [4 out of 7 descriptive type questions 4 x 5 = 20 Marks]	40
Two assignments (2 x 5)	10
<b>Total</b>	<b>50</b>

**5. Guidelines for General Awareness (Part IV)**

Components	Marks
Two Tests (each 2 hours) of 25 marks each [50 objective type questions 50 x 1/2 = 25 Marks]	50

**6. Guidelines for open Elective (Part IV)**

Components	Marks
Two Tests (each 2 hours) of 50 marks each [5 out of 8 descriptive type questions 5 x 10 = 50 Marks]	100

**7. Value Added Courses and Aptitude/Placement courses:**

Components	Marks
Two Test (each 1 hour) of 25 marks each QP is objective pattern (25x1=25)	50
<b>Total</b>	<b>50</b>

**Guidelines:**

1. The passing minimum for these items should be 40%
2. If the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent Semesters
3. Item No's:4,5,6 and 7 are to be treated as 100% Internal papers.
4. For item No.7, Tests conducted through online modules (Google Form/any other)
5. Item No.2: \* - Application should be from the relevant practical subject other than the Listed programmes. It must be enclosed in the practical record.

**UG PATTERN**  
**QUESTION PAPER PATTERN FOR CIA I and CIA II EXAM**

Reg.No:----- Q.P.CODE:-----

**HINDUSTHAN COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)**

----- DEGREE CIA-I/CIA-II EXAMINATIONS -----20----

(----- SEMESTER)

BRANCH: -----

SUBJECT NAME: -----

Time: Two Hours

Maximum:50 Marks

**SECTION - A (6 x 1 = 6 Marks)**

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(Q.No: 1 to 6: Multiple choice/Fill up the blanks /True or False questions)

**SECTION - B (4x 6 = 24 marks)**

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(Q.No: 7 to 10 Either Or type)

**SECTION - C (2x10 = 20 marks)**

Answer any TWO Questions out of THREE Questions

ALL Questions Carry EQUAL Marks

(Q.No: 11 to 13)

**QUESTION PAPER PATTERN FOR MODEL/END SEMESTER EXAMINATION**

Reg.No:-----

Q.P.CODE:-----

**HINDUSTHAN COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)**

----- DEGREE MODEL EXAMINATIONS -----20-----

(-----SEMESTER)

BRANCH : -----

SUBJECT NAME:-----

Duration: Three Hours

Maximum: 70 Marks

**SECTION - A (10x1=10 Marks)**

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(Q.No 1 to 10 Multiple choice/Fill up the blanks /True or False questions)

(Two questions from each unit)

**SECTION - B (5x6=30 Marks)**

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(Q.No 11 to 15 Either or type)

(One question from each Unit)

**SECTION- C (3x10=30 Marks)**

Answer any THREE Questions out of FIVE Questions

ALL Questions carry EQUAL Marks

(Q.No 16 to 20) (One question from each Unit)

## Blue Print of Question Paper for all UG Programmes

(For the academic year 2021-22, 2022-23)

### FOR CIA I CIA II - QUESTION PATTERN

Max. Marks: 50

Sec	Question No	Type	No of Question	Questions to be answered	Mark per question	K-level
A	1 to 6	MCQ/ True or False/ Fill up	6	6	1 (6x1=6)	All Questions will be K1
B	7 to 10	Either or Type (a or b)	8	4	6 (4x6=24)	4 Questions will be in K2 4 Questions will be in K3
C	11 to 13	Open choice	3	2	10 (2x10=20)	1 Question will be in K3 2 Question will be in K4

### FOR MODEL/ESE - QUESTION PATTERN

Max. Marks:70

Sec	Question No	Type	No of Question	Questions to be answered	Mark per question	K-level
A	1 to 10	MCQ/ True or False/ Fill up	10	10	1 (10x1=10)	All Questions will be K1
B	11 to 15	Either or Type (a or b)	10	5	6 (5x6=30)	6 Questions will be in K2 4 Questions will be in K3
C	16 to 20	Open choice	5	3	10 (3x10=30)	2 Question will be in K3 3 Question will be in K4

(For the academic year 2020-21)

### FOR CIA I CIA II - QUESTION PATTERN

Max. Marks:50

Sec	Question No	Type	No of Question	Questions to be answered	Mark per question	K-level
A	1 to 6	MCQ/ True or False/ Fill up	6	6	1 (6x1=6)	All Questions will be K1
B	7 to 10	Either or Type (a or b)	8	4	5 (4x5=20)	4 Questions will be in K2 4 Questions will be in K3
C	11 to 13	Either or Type (a or b)	6	3	8 (3x8=24)	3 Question will be in K3 3 Question will be in K4

### FOR MODEL/ESE - QUESTION PATTERN

Max. Marks:70

Sec	Question No	Type	No of Question	Questions to be answered	Mark per question	K-level
A	1 to 10	MCQ/ True or False/ Fill up	10	10	1 (10x1=10)	All Questions will be K1
B	11 to 15	Either or Type (a or b)	10	5	4 (5x4=20)	6 Questions will be in K2 4 Questions will be in K3
C	16 to 20	Either or Type (a or b)	10	5	8 (5x8=40)	5 Question will be in K3 5 Question will be in K4

## Blue Print of Question Paper

Distribution of section-wise marks with K levels for UG 2021-22, 2022-23

CIA							
Sec.	K1	K2	K3	K4	Total questions	Questions to be answered	Total marks
A - MCQ/T or F / Fill up	6				6	6	6x1=6
B - Either or type		4	4		8	4	4x6=24
C - Open choice			1	2	3	2	2x10=20
<b>Total Marks</b>	<b>6</b>	<b>24</b>	<b>34</b>	<b>20</b>			<b>84</b>
% of marks without choice	7.14	28.57	40.48	23.81			100

Model Exam							
Sec.	K1	K2	K3	K4	Total questions	Questions to be answered	Total marks
A- MCQ/T or F/ Fill up	10				10	10	10x1=10
B - Either or type		6	4		10	5	5x6=30
C - Open choice			2	3	5	3	3x10=30
<b>Total Marks</b>	<b>10</b>	<b>36</b>	<b>44</b>	<b>30</b>			<b>120</b>
% of marks without choice	8.33	30	36.67	25			100

Distribution of section-wise marks with K levels for UG (2020-21)

CIA							
Sec.	K1	K2	K3	K4	Total questions	Questions to be answered	Total marks
A MCQ/T or F/ Fill up	6				6	6	6x1=6
B - Either or type		4	4		8	4	4x5=20
C - Either or type			3	3	6	3	3x8=24
<b>Total Marks</b>	<b>6</b>	<b>20</b>	<b>54</b>	<b>24</b>			<b>104</b>
% of marks without choice	5.77	19.23	51.92	23.08			100

Model Exam							
Sec.	K1	K2	K3	K4	Total questions	Questions to be answered	Total marks
A MCQ/True or False/ Fill up	10				10	10	10x1=10
B - Either or type		6	4		10	5	5x4=20
C - Either or type			5	5	10	5	5x8=40
<b>Total Marks</b>	<b>10</b>	<b>24</b>	<b>56</b>	<b>40</b>			<b>130</b>
% of marks without choice	7.69	18.46	43.08	30.77			100

**UG Programme Regulations for the academic year 2022-2023**

1. Internal marks components for the candidates admitted from the academic year 2022-2023 and onwards is as follows.

**For Theory courses**

Components	Marks
Test I	10
Test II	10
Model Exam	10
Assignment	5
Attendance	5
Internal Assessment components	10
<b>TOTAL</b>	<b>50</b>

**For Practical courses**

Components	Marks
Test -I	15
Test - II	15
Observation/Exercise	10
Application*	10
<b>TOTAL</b>	<b>50</b>

2. The pattern of the question paper for External Examination will be maximum of 70 marks for theory courses, the marks obtained will be converted into 50 as per the scheme.
3. Passing minimum for all UG programme is 40% in Internal and 40 % in External and the composition of total 40 marks out of 100 marks.
4. Internship / Institutional Training / Mini-Project is related to the discipline. The students can be permitted to complete the Internship / Institutional Training / Mini-Project before the end of First year (end of II semester) and before the end of the second year (end of IV semester) and submit a report.

Internship / Institutional Training	Duration: Not more than seven days
Mini project	During the course of study for not more than seven days.

5. Project work is considered as a special course involving application of knowledge in problem solving/analyzing/exploring a real-life situation. A Project work may be given in lieu of a discipline specific elective paper. Distribution of marks for major project for all UG programme will be 50:50 pattern for both Internal and External in total of 100/200 marks.
6. Two tests for fully internal subjects should be conducted during CIA-I and CIA -II by the department.
7. Retest for the failure candidates in CIA I or CIA II or Part IV or Part V or Extra credit courses should be conducted during the model examination after getting approval from the COE office. The candidates who are not able to complete the minimum pass mark in internal components even getting chance of reappearance, will be treated as arrear candidates.
8. For the Theory cum Practical blended courses, 50:50 Internal and External pattern will be followed for theory examination and Fully internal pattern will be followed for Practical examination. For theory part, External examination will be conducted as regular pattern (max of 70 marks) and it will be converted into 25 marks.



Course	Internal Marks		External marks		Total marks (Max. marks 50)	
	Min.	Max.	Min.	Max.	Min.	Max.
Theory	10	25	10	25	20	50
Practical	20	50	-		20	50

For Practical components for Theory cum Practical courses (Fully Internal)

Components	Marks
Test I	10
Test II	10
Experiment/Excercise	20
Record	5
Viva	5
Total	50

The Internal mark 50 will be converted into 25.

9. For the candidates admitted under the Fast Track System (FTS) must register their names to their concerned department heads and get approval from the COE office at the beginning of the III semester.
10. Students who are not willing to select the Project/Research work in Semester VI, can chose the theory papers offered by their departments as per the prescribed theory pattern.
11. Self Study will be a Core Paper of the department for which the examination pattern will be as like part III courses is followed.
12. NSS / NCC/Sports/YRC / SIS / SA is mandatory for all students as per New Education Policy and the students must attend the allocated hours within two years and complete the programme. They will be evaluated during the end of second year (Fourth Semester) and also a certificate will be issued.
13. SDR – Student Development Report to be received by the department from the students till end of the fifth semester. (Evidences of Curricular activities and Co-curricular activities)
14. For online courses minimum of 2 certificates in any of the online platform is mandatory.
15. Open elective courses:  
Departments can offer list of subjects which teaches moral ethics to the young community for the better future. The topics relevant to Indian ethics, Culture, Women rights, Yoga, Green farming, Indian constitution etc., as an open elective courses. These courses can be offered by the department or other department as inter department courses. Marks earned for this courses will not be included for CGPA calculations.

#### Extension Activities

NSS – National Service Scheme, as enrolled member with the College Unit.

NCC – National Credit Corps, as enrolled member with the College Unit.

SPORTS – Sports & Games Participation with College Team

YRC/RRC–Youth Red Cross / Red Ribbon Club, as enrolled member with the College Unit.

Rotaract Club - Rotaract Club, as enrolled member with the College Unit.

SIS – Special Interest Subjects, as approved by the Academic Council

SA – Social Activity for not less than 50 hours with NGGO like Aram Foundation / Shanthi Social Service /Siruthuli /KulangaI Pathukappu Amaipu /Old age Home /Nature Foundation / etc.

### Regulations of Fast Track System (FTS)

- From the academic year 2021-22, our college is offering Fast Track System (FTS) for all UG and PG programmes. In this system, we are offering two courses under the course type of Discipline Specific Elective (DSE) in the sixth semester for all UG programmes and fourth semester for all PG programmes, which are equivalent and related with **National Programme on Technology Enhanced Learning/Study Webs of Active-Learning for Young Aspiring Minds (NPTEL/SWAYAM)** courses.
- The students have the option of taking two subjects of the sixth semester of their programme through NPTEL/SWAYAM portal from the list given by NPTEL and can complete the online course before fifth semester and submit the received original certificates to the COE office for getting approval. If the student completes these courses before the beginning of the sixth semester (UG)/fourth semester (PG), the candidate can be considered and exempted to write the examination from the assigned DSE courses in the sixth semester/fourth semester. They should complete only the self study course and project work during the VI/IV semester as assigned in the scheme. The candidate who completes the online courses and submits the successful course completion credentials, the credit transfer will be considered as per our Scheme of Examination for qualifying the degree. **The minimum duration of the registered online course must be 12 weeks.** Course duration of less than 12 weeks will not be considered.
- For all PG programmes, the candidates who were admitted during the academic year 2021-2022 under the Fast track system, for the self study course, the internal mark component will be as follows. For others regular internal pattern follows.

TEST	Max. Marks	Mode
CIA I	50 (50x1=50)	Online objective type
Model Exam.	50 (50x1=50)	Online objective type

Out of these two tests, the total marks will be converted into 40 marks as Internal.

- For all UG programmes, the candidates who were admitted during the academic year 2021-2022 under the Fast track system, for the self study course, the internal mark component will be as follows. For others regular internal pattern follows.

TEST	Max. Marks	Mode
CIA I	50 (50x1=50)	Online objective type
CIA II	50 (50x1=50)	Online objective type
Model Exam.	50 (50x1=50)	Online objective type

Out of three tests, the total mark will be converted into 30 marks as Internal.

- For the students admitted in Fast Track System, must enroll their names to the concerned department heads and get approval from the COE office at the beginning of III semester for all UG Programmes and at the beginning of II semester for all PG programmes.
- The students who cleared and got certified for online courses under the fast track system, the grade obtained will be converted into average marks of range. The received certificates must be submitted to the COE office for approval of the Controller and the Principal. The FTS courses will be treated as fully external.

DEPARTMENT OF PHYSICS				CLASS: I B.Sc Physics				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
I	DSC	22PHU01	Mechanics, Properties of Matter and Sound	4	6	50	50	100

Nature of Course		
Knowledge and Skill Oriented	Employability Oriented	
	Entrepreneurship Oriented	✓
	Skill Development	

Course Objectives	
<ul style="list-style-type: none"> <li>• To study the principles of rigid body and modes of rocket.</li> <li>• To apply the elastic and bending behavior of beams in the real life applications.</li> <li>• To understand the properties of fluid.</li> <li>• To explore the surface behavior of liquids.</li> <li>• To study the basic properties ultrasonics and production of ultrasonics by different methods.</li> </ul>	

Unit	Course Contents	Hours	K Level
I	<b>Mechanics</b> Impulse – Impact – Direct impact of two smooth sphere – Direct impact of two smooth sphere-oblique impact of two smooth sphere – Final velocity and loss of kinetic energy – Motion of a particle in a vertical circle – friction – Laws of friction – angle of friction – resultant reaction – cone of friction – Moment of inertia – Parallel axes theorem and perpendicular axes theorem – Moment of Inertia of rectangular Lamina and Moment of Inertia of Triangular lamina – Moment of Inertia of a solid sphere about an axis through its C.G.	15	Up to K4
II	<b>Elasticity</b> Bending of beams – Definitions – Expression for the bending moment – Depression for the loaded end of a cantilever – Depression at the mid-point of a beam loaded at the middle Uniform bending of a beam – Measurement of Young's modulus by Non-Uniform bending and Uniform bending – I section of girders. Torsion of a body – Expression for torque per unit twist – Determination of rigidity modulus: Static torsion method (Searle's apparatus).	15	Up to K4
III	<b>Hydrodynamics and Viscosity</b> Equation of continuity – Energy of the liquid – Euler's equation for unidirectional flow – Bernoulli's theorem – Explanation and Applications of Bernoulli's theorem. Coefficient of Viscosity – Poiseuille's formula for the flow of a liquid through a capillary tube – Corrections to Poiseuille's formula – Searle's viscometer; Rotating cylinder method of finding coefficient of viscosity– Modification of Poiseuille's formula for gases.	15	Up to K4

IV	<b>Surface Tension</b> Introduction – Explanation of Surface tension on Kinetic theory – Surface energy – Work done in increasing the area of a surface – Work done in blowing a bubble – Angle of contact. Neumann's triangle – Excess pressure inside a curved liquid surface – Determination of surface tension of a liquid by Jaegar's method – Variation of surface tension with temperature – Quincke's method and Drop weight method of determining the surface tension of liquid – Problems in Work done and Excess pressure.	15	Up to K4
V	<b>Sound</b> Laws of Transverse vibrations in strings – Determination of frequency by Melde's method – Musical Sound and Noise – Characteristics of Musical Sound-Intensity of Sound. Acoustics of buildings– Reverberation – Sabine's Reverberation formula– Determination of Absorption coefficient. Ultrasonics – Piezoelectric effect and Magnetostriction effect – Production of Ultrasonics by Piezoelectric oscillator and Magnetostriction oscillator – Detection and Applications of Ultrasonic waves.	12	Up to K4

**Note: Distribution of marks: Problems - 30%, Theory - 70%**

#### Book for Study

1. R.Murugesan, "Mechanics and Mathematical Methods", S Chand & Co. Pvt. Ltd., New Delhi, 2018. (Unit-I)
2. Brijlal & Subramaniam.N, "Properties of Matter" by Eurasia publishing Co., New Delhi, 1989 (Unit-II, III & IV)
3. Brijlal & Subramaniam.N, "Text Book of Sound" Vikas Publishing House, New Delhi, 1982 (Unit-V)

#### Books for Reference

1. D S Mathur, "Mechanics" by S.Chand & Company Ltd, 2018.
2. Mathur D S, "Elements of Properties of Matter", sby Shyamlal Charitable Trust, New Delhi, 2007.
3. Murugesan, "Properties of Matter", by S Chand & Co. Pvt. Ltd., New Delhi, 2017.
4. Subramanyam N & Brijlal, "Waves & Oscillations", by Vikas Publishing House Pvt. Ltd., New Delhi, 2020.
5. M N Srinivasan, "Text Book of Sound" by Himalaya Publications, 1991.

#### Web Resources

1. <https://www.yumpu.com/en/document/read/16977833/mechanicsproperties-of-matter-and-soundsph8a11>
2. [www.khanacademy.org/science/physics/elasticity/surface-tension](http://www.khanacademy.org/science/physics/elasticity/surface-tension)

**Pedagogy:** Chalk & Talk, Exercises, Assignments, PPTs & Experimental demonstration

**Rationale for Nature of course:** Can be professionals in solving advanced problems to pursue higher studies.

**Activities to be given**

1. Providing chart work to the students.
2. Assignments to the students for developing analytical skills.

**Name of the Course Designer:** Mrs.R.Vishalashi, Assistant Professor

**Course Learning Outcomes**

CLOs	On Completion of the Course, the students should be able to	K – Level
CLO1	Remember the laws involved in mechanics.	Up to K4
CLO2	Understand the various concepts of mechanics and its fundamentals.	Up to K4
CLO3	Apply the concept of properties of matter and to recognize their applications in various real world problems.	Up to K4
CLO4	Analyze the universal behavior of wave motion.	Up to K4
CLO5	Evaluate the materials properties such as elasticity, surface tension, viscosity and sound.	Up to K4




**Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)**

CLOs	Programme Outcomes (with Graduate Attributes)						
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7
CLO 1	2	2	1	3	2	3	3
CLO 2	3	3	1	3	2	3	3
CLO 3	3	2	1	3	3	2	3
CLO 4	3	1	1	2	3	3	3
CLO 5	2	3	1	3	3	3	3

3 – Advance Application

2 – Intermediate Level

1 – Basic Level

Course Designed by	Verified by HOD	Approved by CDC Co-ordinator
 (Mrs. R. Vishalashi)	 (Dr. V. Balaprakash)	 Co-ordinator Curriculum Development Cell

**Head of the Department**  
Department of Physics  
Hindusthan College of Arts & Science,  
Coimbatore-641 028

Hindusthan College of Arts & Science,  
Coimbatore-641 028.

DEPARTMENT OF PHYSICS				CLASS: I B.Sc Physics				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
I	DSC	22PHU02	Electricity and Magnetism	4	6	50	50	100

Nature of Course		
Knowledge and Skill Oriented	Employability Oriented	
	Entrepreneurship Oriented	✓
	Skill Development	

Course Objectives			
<ul style="list-style-type: none"> <li>To understand the general concepts of Electrostatics.</li> <li>To analyze the various thermo electric effects.</li> <li>To learn the basics of LCR function.</li> <li>To study the fundamental concept of dynamics in charged particles.</li> <li>To analyze the relations between b, h and m.</li> </ul>			
Unit	Course Contents	Hours	K Level
I	<b>Electrostatics:</b> Coulomb's law – electric intensity and electric potential – electrical images – electric intensity and potential due to an earthed conducting sphere applying the principle of electrical images – electric dipole – potential and intensity due to a dipole – capacity – capacitance of a spherical and cylindrical capacitor – energy of a charged capacitor – loss of energy due to sharing of charges.	15	Up to K4
II	<b>Thermo Electricity</b> Seebeck effect – Laws of thermo e.m.f – Peltier effect-Peltier Co-efficient – determination of Peltier co-efficient – thermo dynamical consideration of Peltier effect – Thomson effect – Thomson Co-efficient –Expressions for Peltier and Thomson Co-efficients– Thermo electric power – Application of thermodynamics to Thermocouple – Thermoelectric diagrams and their uses.	15	Up to K4
III	<b>DC Circuits:</b> Growth and decay of current in a circuit containing resistance and inductance. Growth and decay of charge in a circuit containing resistance and capacitor – growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – frequency of oscillation – network analysis – Thevenin and Norton's Theorems.	15	Up to K4

IV	<b>Dynamics of Charged Particles:</b> Motion of charged particle in uniform electric field – longitudinal – transverse – motion of charged particle in alternating electric field – motion of charged particle in uniform constant magnetic field – Motion of charged particle in crossed electric and magnetic field.	15	Up to K4
V	<b>Magnetic Properties of Materials:</b> Magnetic Induction-Susceptibility – permeability – intensity of magnetization and the relation $B = \mu_0 (H+Lm)$ – I-H and B-H curves for a magnetic material using magnetometer method and ballistic galvanometer method. Terrestrial magnetism – magnetic elements – dip circle – Kew magnetometer – Magnetic circuit.	12	Up to K4

**Note: The Questions should be asked in the ratio of 30% Problems and 70 % for theory**

**Book for Study**

1. M Narayanamurthy & N.Nagarathnam, "Electricity & Magnetism" by, National publishing Company, 5<sup>th</sup> Edition, 1998. (Unit-I)
2. R.Murugesan, "Electricity and Magnetism" by, Chand and Company Ltd, 9<sup>th</sup> Edition, 2017. (Unit-II to Unit-V)

**Books for Reference**

1. Electricity & Magnetism by D.Chattopadhyay, Books & allied Publishers.
2. Fundamentals of Physics, 6<sup>th</sup> Edition, by D.Halliday, R.Resnick and J.Walker, Wiley, NY, 2001.
3. Physics, 4<sup>th</sup> Edition, Vols I, II & II Extended by D.Halliday, R.Resnick and K.S.Krane, Wiley, NY, 1994.
4. CRC Handbook of Physics & Chemistry, 80<sup>th</sup> Ed., CRS Press, NY, 1999.
5. The Feynman Lectures on Physics, Vols. I, II, and III, by R. P. Feynman, R B Leighton and M Sands, Narosa, New Delhi, 1998.

**Web Resources**

1. <https://www.researchgate.net/publication/239045863> Web Resources for Teaching Introductory electric and Magnetic Fields The MIT TEAL Physics 802 Electricity Magnetism Project.
2. <https://iwant2study.org/ospsg/index.php/interactive-resources/physics/05-electricity-and-magnetism>.

**Pedagogy:** Chalk & Talk, Exercises, Assignments, PPTs and Experimental demonstration

**Rationale for Nature of course:** Can be professionals in solving advanced problems to pursue higher studies.

**Activities to be given**

1. Prepare comprehensive advanced problems on Electrostatics.
2. Assignment on Magnetic properties of materials.
3. Preparing the students to appear NPTEL Online courses by giving Advanced Exercise and workout problems on relevant topics.

**Name of the Course Designer: Mr.R.Murugan, Assistant Professor**

### Course Learning Outcomes

CLOs	On Completion of the Course, the students should be able to	K – Level
CLO1	Remember and understand the various concepts of Electrostatics and Thermoelectricity	Up to K4
CLO2	Understand the working of various DC circuits.	Up to K4
CLO3	Analyze the dynamics of charged particles in various applications.	Up to K4
CLO4	Evaluate the motion of charged particles.	Up to K4
CLO5	Analyze the magnetic properties materials.	Up to K4

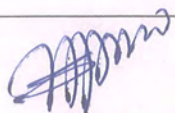

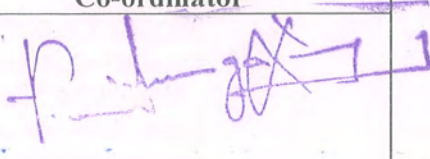
### Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs	Programme Outcomes (with Graduate Attributes)						
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7
CLO 1	3	2	1	2	3	3	3
CLO 2	2	3	1	2	3	3	3
CLO 3	3	2	1	2	3	3	3
CLO 4	3	2	1	3	3	3	3
CLO 5	3	2	1	3	3	3	3

3 – Advance Application

2 – Intermediate Level

1 – Basic Level

Course Designed by	Verified by HOD	Approved by CDC Co-ordinator
 [Mr. N. Suresh]	 (Dr. V. Balaprakash)	

Head of the Department  
Department of Physics  
Hindusthan College of Arts & Science  
Coimbatore-641 028

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.



DEPARTMENT OF PHYSICS				CLASS: I B.Sc Physics				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
II	DSC	22PHU04	Heat and Thermodynamics	4	4	50	50	100

Nature of Course		
Knowledge and Skill Oriented	Employability Oriented	
	Entrepreneurship Oriented	✓
	Skill Development	✓

Course Objectives			
<ul style="list-style-type: none"> <li>To learn the basics of thermometry and calorimeter.</li> <li>To understand the kinetic theory of gases and low temperature physics.</li> <li>To explore the principle and laws of thermodynamics.</li> <li>To understand the concepts involved in transmission of heat by conduction.</li> <li>To learn the laws involved in transmission of heat by radiation.</li> </ul>			
Unit	Course Contents	Hours	K Level
I	<b>Thermometry and Calorimetry</b> Temperature coefficient of Resistance – Platinum Resistance – Thermoelectric thermometer – Calorimetry – Thermoelectric diagrams – Specific heat of solids – Radiation correction – Copper block calorimeter – Nernst vacuum calorimeter – Newton's law of cooling – Specific heat capacity of a liquid by cooling – Specific heat capacity of gases – Relation between them – Joly's differential steam calorimeter – Continuous flow electric method.	10	Up to K4
II	<b>Kinetic Theory of Gases</b> Postulates – Mean free path – Degrees of freedom – Velocity distribution and Theorem of equipartition of energy – Viscosity of gases – Van der Waals equation – Critical constants and their determination. <b>Low Temperature Physics</b> Joule-Thomson Effect – Liquefaction of air, hydrogen and helium – Helium I and II – Peculiar properties of He-II – Adiabatic demagnetization Superconductivity: Discovery – Critical Temperature – Meissner Effect – Isotope Effect – Applications.	10	Up to K4
III	<b>Thermodynamics</b> Carnot's Theorem – Otto Cycle – Petrol Engine – Diesel engine – Clapeyron's Latent heat equation – Entropy – Change in entropy (Reversible and irreversible process) – Temperature-Entropy diagram – Entropy of a perfect gas – Maxwell's thermodynamical relations and applications – Helmholtz function – Gibb's function – Enthalpy.	10	Up to K4

IV	<b>Thermal Conduction</b> Conduction, convection and radiation – Coefficient of thermal conductivity, thermal diffusivity – Steady state – Lee's disc method of determining the thermal conductivity of a bad conductor – Searle's method – Forbe's method – Spherical Shell method – Cylindrical flow of heat – Thermal conductivity of rubber – Thermal conductivity of glass – Wiedemann-Franz law.	8	Up to K4
V	<b>Thermal Radiation</b> Black body – Kirchoff's law of heat radiation – Prevost's theory of heat exchange – Stefan's law – Mathematical derivation – Derivation of Newton's law of cooling from Stefan's law – Experimental verification of Stefan's law – Distribution of energy in the spectrum of black body – Derivation of Planck's law – Derivation of Wien's law and Rayleigh-Jean's law from Planck's law.	10	Up to K4

**Note: The Questions should be asked in the ratio of 30% Problems and 70% for theory**

#### Book for Study

1. Brij Lal and Subramanian, "Heat and thermodynamics" by S Chand & Company Pvt Ltd, 2007.(Unit-I to Unit-V)

#### Books for Reference

1. R.Murgesan and Kiruthika Sivaprasath, "Thermal Physics" by S.Chand & Co, 2013.
2. JB Rajam, "Text book of heat" S.Chand & Co, 1960.
3. Meghnad Saha, "Text book of heat" by Isha books, 2003.
4. Richard H Dittman and Zemansky MW, "Heat and Thermodynamics" by McGraw Hill, 3<sup>rd</sup> Special Edition, 2008

#### Web Resources

1. [https://web.iit.edu/sites/web/files/departments/academic-affairs/academic-resource-center/pdfs/Thermodynamic\\_Properties.pdf](https://web.iit.edu/sites/web/files/departments/academic-affairs/academic-resource-center/pdfs/Thermodynamic_Properties.pdf)
2. <http://chemed.chem.purdue.edu/genchem/topicreview/bp/ch21/chemical.php>
3. <https://www.khanacademy.org/science/physics/thermodynamics>

**Pedagogy:** Chalk & Talk, Exercises, Assignments, PPTs & Experimental demonstration

**Rationale for Nature of course:** Can be professionals in solving advanced problems to pursue higher studies.

#### Activities to be given

1. Prepare advanced problems on Law of thermodynamics.
2. Assignment on Experimental verification of Stefan's law.
3. Preparing the students to appear NPTEL Online courses by giving Advanced Exercise and workout problems on relevant topics.

**Name of the Course Designer:** Mrs.R.Vishalashi, Assistant Professor.



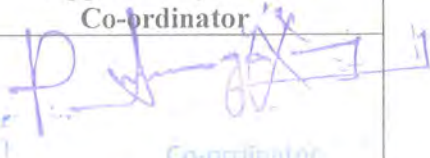
### Course Learning Outcomes

CLOs	On Completion of the Course, the students should be able to	K – Level
CLO1	Remember the kinetic theory of gases and low temperature physics.	Up to K4
CLO2	Understand the basic concepts of heat and thermodynamics.	Up to K4
CLO3	Realize the transmission of thermal energy by conduction process.	Up to K4
CLO4	Apply the various thermal laws in thermal radiation.	Up to K4
CLO5	Analyze the concepts of thermodynamics for various functions.	Up to K4

### Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs	Programme Outcomes (with Graduate Attributes)						
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	3	3	1	3	2	3	3
CLO 2	3	3	2	3	2	3	3
CLO 3	2	3	2	2	3	3	3
CLO 4	3	3	1	3	3	3	3
CLO 5	3	2	2	3	3	3	3

3 – Advance Application      2 – Intermediate Level      1 – Basic Level

Course Designed by	Verified by HOD	Approved by CDC Co-ordinator
 (Mrs. R. Vishalashi)	 (Dr. V. Balaprakash)	 Co-ordinator Curriculum Development Cell

**Head of the Department**  
 Department of Physics  
 Hindusthan College of Arts & Science  
 Coimbatore-641 028

Hindusthan College of Arts & Science,  
 Coimbatore-641 028.

DEPARTMENT OF PHYSICS				CLASS: I B.Sc Physics				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
II	DSC	22PHU05	Energy Physics	4	4	50	50	100

Nature of Course		
Knowledge and Skill Oriented	Employability Oriented	
	Entrepreneurship Oriented	
	Skill Development	✓

### Course Objectives

- To impart the knowledge on renewable energy resources.
- To learn the photo thermal energy systems and its applications.
- To learn the applications of solar energy to overcome the energy crisis.
- To understand the wind energy generation.
- To learn the concepts of biomass and biogas systems.

Unit	Course Contents	Hours	K Level
I	<b>Introduction to Energy Sources</b> An Introduction to Energy Sources and their availability – Conventional energy sources – nonconventional energy sources – renewable energy sources – advantages of renewable energy – obstacles to the implementation of renewable energy systems – prospects of renewable energy sources.	10	Up to K4
II	<b>Solar Radiation and its Measurement</b> Introduction – solar constant – solar radiation at the Earth's surface – solar radiation measurements – solar radiation data – solar energy collectors – physical principles of the conversion of solar radiation into heat – flat-plate collectors – typical liquid collectors – typical air collectors –concentrating collector – focusing and non-focusing types – selective absorber coatings.	10	Up to K4
III	<b>Application of Solar Energy</b> Solar water heating-space heating – active and passive system – solar cooling – absorption – air-conditioning system – solar electric power generation – solar photovoltaic cells Application of solar energy in agricultural and industrial – solar distillation – solar pumping – solar furnace – solar cooking-simple box type cooker – concentric parabolic type solar cooker – Multi reflector type solar cooker.	10	Up to K4
IV	<b>Wind Energy</b> Basic principles of wind energy conversion – wind data and energy estimation - basic components of wind energy conversion system (WECS)– advantages and disadvantages of WECS – types of wind machines-horizontal axis wind machines – vertical axis wind machines – application of wind energy – environmental aspects – global warming.	8	Up to K4
V	<b>Renewable Energy Sources, Biomass and Biogas</b> Energy from the ocean: ocean thermal electric conversion (OTEC) –		

tidal energy – geothermal energy. Energy from biomass: biomass conversion technologies – wet and dry processes – photosynthesis; Biogas generation; introduction-basic processes and energetic – advantages of anaerobic digestion – factors affecting the bio-digestion and generation of gas.	10	Up to K4
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### Book for Study

1. G.D.Rai, "Non-conventional energy sources" by Khanna Publishers, 2011. (Unit-I to Unit-V)

### Books for Reference

1. M.P.Agarwal, "Solar energy" by Chand & Co Publishers, 1983.
2. S.P.Suhatme and J.K.Nayak "Solar energy" by McGraw-Hill Education, 2017.
3. D.Yogi Goswami, Frank Kreith and Jan.F.Kreider, "Principles of solar engineering" by CRC Press, 2009.

### Web Resources

1. <https://www.youtube.com/watch?v=Zgp86PVXXuQ>
2. <https://vikaspedia.in/energy/energy-basics/sources-of-energy>
3. [http://www.vssut.ac.in/lecture\\_notes/lecture1428910296.pdf](http://www.vssut.ac.in/lecture_notes/lecture1428910296.pdf)

**Pedagogy:** Chalk & Talk, Exercises, Assignments, PPTs & Experimental demonstration

**Rationale for Nature of course:** Can be professionals in solving advanced problems to pursue higher studies.

### Activities to be given

1. Preparing the students for the demonstration of various renewable energy sources.
2. Assignment on Applications of Solar energy.
3. Preparing the students to appear Online courses by giving Advanced Exercise on relevant topics.

**Name of the Course Designer:** Mr.N.Suresh, Assistant Professor.

### Course Learning Outcomes

CLOs	On Completion of the Course, the students should be able to	K - Level
CLO1	Remember the basic energy sources.	Up to K4
CLO2	Understand the solar radiation and its measurement.	Up to K4
CLO3	Analyze the working different solar energy based devices.	Up to K4
CLO4	Evaluate the working of different wind energy system.	Up to K4
CLO5	Evaluate the basic physics of renewable energy sources, biomass and biogas-oriented applications.	Up to K4




### Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs	Programme Outcomes (with Graduate Attributes)						
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	3	3	1	3	1	2	3
CLO 2	3	2	2	2	2	3	3
CLO 3	3	2	1	3	3	3	3
CLO 4	2	3	2	2	2	3	3
CLO 5	2	3	2	3	2	2	3

3 – Advance Application

2 – Intermediate Level

1 – Basic Level

Course Designed by	Verified by HOD	Approved by CDC Co-ordinator
 (Mr. N. Suresh)	 (Dr. V. Balaprakash)	 Co-ordinator

Head of the Department  
Department of Physics  
Hindusthan College of Arts & Science,  
Coimbatore-641 028

Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

DEPARTMENT OF PHYSICS				CLASS: I B.Sc Physics				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
II	DSC	22PHU06	Semiconductor Devices	3	4	50	50	100

Nature of Course		
Knowledge and Skill Oriented	Employability Oriented	✓
	Entrepreneurship Oriented	
	Skill Development	

Course Objectives	
<ul style="list-style-type: none"> <li>To understand the theory of semiconductors.</li> <li>To know the available basic semiconductor devices in the field.</li> <li>To learn and implement the functions of Bipolar Junction Transistors.</li> <li>To learn the functions of Field Effect Transistors.</li> <li>To understand the concepts and uses of thyristors.</li> </ul>	

Unit	Course Contents	Hours	K Level
I	<b>Atomic Structure and Semiconductor Physics</b> Bohr's atomic model – Energy levels – Energy bands – Energy bands in solids – Classification of solids and energy bands – Semiconductor – Bonds in semiconductors – Energy band description of semiconductors – Effect of temperature on semiconductor – Hole current – Intrinsic semiconductor– Extrinsic semiconductor – n-type and p-type semiconductor – Majority and minority carriers – PN junction – VI Characteristics.	10	Up to K4
II	<b>Special Diodes</b> Zener diode – Zener diode as a voltage regulator – Tunneling effect and Tunnel diode – Varactor diode – PIN diode – Schottky Diode – Step recovery diode – Thermistor – Gunn diode –LED – Photo diode.	8	Up to K4
III	<b>Bipolar Junction Transistors (BJT)</b> Introduction– Transistor as an Amplifier – CB, CE and CC Configurations– Comparison of transistor configurations – Transistor load line analysis – Operating point – Cut off and Saturation points – Power ratings – Transistor biasing – Types: Self bias, Fixed bias and Potential divider bias – Photo transistor.	10	Up to K4
IV	<b>Field Effect Transistors</b> Junction Field Effect Transistor – Operation – Transfer characteristics – Comparison of FET and BJT – MOSFET – Types: Depletion - Enhancement – Drain and transfer characteristics – MOSFET as a resistor– Advantage of N-Channel MOSFET over P- Channel	10	Up to K4
V	<b>Thyristors</b>		

Overview – Construction and Working: Silicon Controlled Rectifier (SCR)– TRIAC – DIAC – Uni Junction Transistor (UJT): Operation – UJT relaxation oscillator – Silicon Controlled Switch (SCS)- Silicon Unilateral Switch (SUS) – Silicon Bilateral Switch (SBS) – Opto-electronic devices.	10	Up to K4
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**Note: The Questions should be asked in the ratio of 30% Problems and 70 % for theory**

#### **Book for Study**

1. V.K. Mehta, “Principles of Electronics”, Chand, 2016. (Unit-I, II & III).
2. R.S. Sedha, “A Text Book of Applied Electronics”, Chand, 3rd Revised Edition, 2008. (Unit-IV & V)

#### **Books for Reference**

1. B.L. Theraja “Basic Electronics Solid State”, Chand, 1998.
2. S. Salivahanan, N. Suresh Kumar & A. Vallavaraj, “Electronics Devices and Circuits”, Tata McGraw Hill Publishing Company Limited, New Delhi, 8th edition.
3. S.M. Sze, “Semiconductor Devices: Physics and Technology”, Wiley India (P.) Ltd, Second Edition, 2008.

#### **Web Resources**

1. <https://nptel.ac.in/courses/108/108/108108122/>
2. <https://www.askiitians.com/revision-notes/physics/solid-and-electronic-device/>

**Pedagogy:** Chalk & Talk, Exercises, Assignments, & PPTs

**Rationale for Nature of course:** Can be professionals in solving advanced problems to pursue higher studies.

#### **Activities to be given**

1. Prepare the students to carryout experimental demonstration on V-I characteristics of PN Junction diode, Transistor etc.
2. Assignment on Applications of semiconductor devices.
3. Preparing the students to appear Online courses by giving Advanced Exercise on relevant topics.

**Name of the Course Designer: Mr. R. Murugan, Assistant Professor.**




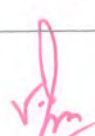
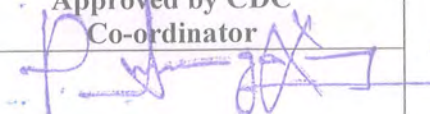
### Course Learning Outcomes

CLOs	On Completion of the Course, the students should be able to	K – Level
CLO1	Recall the essential fundamentals of semiconductor devices.	Up to K4
CLO2	Understand the construction and working of semiconductor devices such as Diode, Transistor, FET, SCR, DIAC & TRIAC etc.	Up to K4
CLO3	Analyze the working of Field Effect Transistor.	Up to K4
CLO4	Analyze the working of Power Electronic devices.	Up to K4
CLO5	Evaluate the application of various semiconducting devices.	Up to K4

### Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs	Programme Outcomes (with Graduate Attributes)						
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
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CLO 4	3	2	1	3	2	2	3
CLO 5	3	3	1	3	2	3	3

3 – Advance Application      2 – Intermediate Level      1 – Basic Level

Course Designed by	Verified by HOD	Approved by CDC Co-ordinator
 [ Mr. N. Suresh ]	 (Dr. V. Balaprakash)	 Co-ordinator Curriculum Development Cell Hindusthan College of Arts & Science, Coimbatore-641 028.

**Head of the Department**  
 Department of Physics  
 Hindusthan College of Arts & Science  
 Coimbatore-641 028

DEPARTMENT OF PHYSICS				CLASS: I B.Sc Physics				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours / Week	CIA	Ext	Total
II	DSC	22PHU08	PRACTICAL – I : GENERAL PHYSICS – I	2	3	50	50	100

Nature of Course		
Knowledge and Skill Oriented	Employability Oriented	
	Entrepreneurship Oriented	
	Skill Development	✓

Course Objectives	
<ul style="list-style-type: none"> <li>To gain knowledge and learn the process of measuring different Physical variables.</li> <li>To explore the field of properties of matter.</li> <li>To understand the basic concepts in acoustics.</li> <li>To learn the principles of thermodynamics.</li> <li>To have a deep knowledge on optic experiments.</li> </ul>	
S.No.	Topics
<b>(Any 10 Experiments)</b>	
1	Young's Modulus – Non-Uniform bending (Pin & Microscope).
2	Young's Modulus – Uniform bending (Pin & Microscope).
3	Young's Modulus – Uniform bending (Optic Lever).
4	Rigidity modulus – Static Torsion – Scale and Telescope.
5	Acceleration due to gravity – Compound Pendulum.
6	Surface Tension of a Liquid and Interfacial Surface Tension of liquids – Drop Weight method.
7	Viscosity of Highly Viscous Liquids – Stoke's method.
8	A.C. Frequency – Sonometer.
9	Specific Heat Capacity – Newton's Law of Cooling.
10	Thermal Conductivity of a bad conductor – Lee's disc method.
11	Refractive index – Solid Prism – Spectrometer.
12	Refractive index – Liquid Prism – Spectrometer.
13	Refractive index of Prism - (i-d) Curve - Spectrometer.
14	Specific Resistance – Post-office Box.
15	Calibration of Low Range Voltmeter – Potentiometer.

**Book for Study**

1. R. K. Shukla & Anchal Srivastava, "Practical Physics" New Age International (P) Ltd, Publishers, (Formerly Wiley Eastern Limited), 4835/24, Ansari Raod, Daryagani, New Delhi-11002. 2006.
2. C. L. Arora, "B.Sc., Practical Physics", S. Chand & Company Ltd. Ram Nagar, New Delhi-110055. 2007.

**Books for Reference**

1. G. L. Squires, "Practical Physics" Cambridge University Press", Fourth edition, 2001.
2. Geeta Sanon, "B. Sc., Practical Physics", R.Chand & Co, 1st Edition, 2007.

**Web Resources**

1. <https://www.olabs.edu.in/?pg=topMenu&id=40>
2. <https://praxilabs.com/en/ExperimentDetails.aspx?ID=19>

**Pedagogy:** Lab demonstration

**Rationale for Nature of course:**

Physics lab experiments promote the development of scientific thinking among students

**Activities to be given**

1. Prepare experimental demonstration on general practicals.
2. Assignment on Applications of Young's modulus experiments.

**Name of the Course Designer: Mr.R.Murugan, Assistant Professor.**

**Course Learning Outcomes**

CLOs	On Completion of the Course, the students should be able to	K – Level
CLO1	Remember the various measurement techniques for less than cm range.	Up to K4
CLO2	Understand the operation of solid prism and liquid prism.	Up to K4
CLO3	Evaluate the rigidity modulus using Static torsion.	Up to K4
CLO4	Apply the thermodynamics principles in thermal conductors.	Up to K4
CLO5	Analyze the transmission of sound waves through the air.	Up to K4



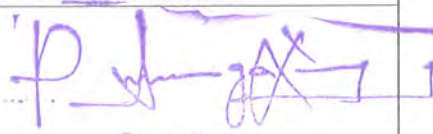
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CLO 2	3	3	1	3	3	3	3
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CLO 4	3	3	2	3	3	3	2
CLO 5	3	3	1	3	3	3	3

3 – Advance Application

2 – Intermediate Level

1 – Basic Level

Course Designed by	Verified by HOD	Approved by CDC Co-ordinator
 [Mr. N. Suresh]	 [Dr. V. Balaprakash]	 Co-ordinator

Head of the Department  
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