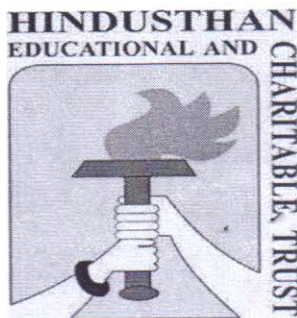


**LEARNING OUT COMES–BASED CURRICULUM FRAME
WORK (LOCF)**

**In the
UNDERGRADUATE PROGRAMME
B.Sc., PHYSICS**

**FOR THE STUDENTS ADMITTED FROM THE
ACADEMIC YEAR 2020-2021 Batch Only**



HICAS

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

(Affiliated to Bharathiar University and Accredited by NAAC)

COIMBATORE-641028

TAMILNADU, INDIA.

Phone:0422-4440555

Website:www.hindusthan.net/hicas/

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PREAMBLE

**Learning Outcome Based Curriculum Framework for Undergraduate education in
B.Sc., Physics**

HINDUSTHAN COLLEGE OF ARTS AND SCIENCE

DEPARTMENT OF PHYSICS

VISION

To provide world class 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,

PEO1: Produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community.

PEO2: Endow the students with creative and analytical skills, this will equip them to become entrepreneurs.

PROGRAM OUTCOME (PO):

B.Sc (Physics) Students will be able to

PO1: Apply the knowledge of Physical Science to solve real life problems.

PO2: Enhance the student's academic abilities, personal qualities and transferable skills, which will give the man opportunity to develop as responsible citizens.

PO3: Provide a systematic understanding of core physical concepts, their theories and applications.

PO4: Communicate the results of theoretical calculations and laboratory experiments in a clear and concise manner that incorporates the scientific conventions used by physicists worldwide.

PROGRAM 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.

HINDUSTHAN COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)

COIMBATORE - 641028

SCHEME OF EXAMINATIONS – CBCS & LOCF PATTERN

(For the Students admitted from the Academic year 2020-2021 & onwards)

UG PROGRAMME

Programme: B.Sc., PHYSICS

Part	Course Code	Course Type	Course Title	Lecture Hours/ Week	Exam Duration (hours)	MAX.MARKS			CREDIT POINTS
						I.E	E.E	TOTAL	
Semester-I									
I	20LAT01/ 20LAH01/ 20LAM01/ 20LAF01	MIL	Tamil-I/ Hindi-I/ Malayalam-I/ French-I	6	3	30	70	100	3
II	20ENG01	AECC	English-I	6	3	30	70	100	3
III	20PHU01	DSC	Properties of Matter and Sound	5	3	30	70	100	5
III	20PHU02	DSC	Electricity and Magnetism	4	3	30	70	100	4
III	20PHU03	GE	Applied Mathematics-I	6	3	30	70	100	5
III	20PHU04	DSC	Practical I: General Physics – I	3	3	40	60	100	2
IV	20PHUV01	ACC	VAC-I	2	1	50	-	50	Grade*
IV	20PHUJ01	AEE	Communicative Skills	2	1	50	-	50	Grade*
IV	20PHUJ02	AEE	Soft skill	2	1	50	-	50	Grade*
Semester-II									
I	20LAT02/ 20LAH02/ 20LAM02/ 20LAF02	MIL	Tamil-II/ Hindi-II/ Malayalam-II/ French-II	6	3	30	70	100	3
II	20ENG02	AECC	English-II	6	3	30	70	100	3
III	20PHU05	DSC	Heat and Thermodynamics	4	3	30	70	100	4
III	20PHU06	DSC	Energy Physics	4	3	30	70	100	4
III	20PHU07	GE	Applied Mathematics-II	5	3	30	70	100	5
III	20PHU08	DSC	Practical II: General Physics-II	3	3	40	60	100	2
IV	20GSU01	SEC	Value Education – Human Rights	2	2	100	-	100	2
IV	20PHUV02	ACC	VAC-II	2	1	50	-	50	Grade*
IV	20PHUJ03	AEE	Communicative Skills	2	1	50	-	50	Grade*
IV	20PHUJ04	AEE	Soft Skill	2	1	50	-	50	Grade*

Semester- III									
I	20LAT03 20LAH03 20LAM03 20LAF03	MIL	Tamil-III/ Hindi-III/ Malayalam-III/ French-III	6	3	30	70	100	3
II	20ENG02	AECC	English-III	6	3	30	70	100	3
III	20PHU09	DSC	Optics	4	3	30	70	100	4
III	20PHU10	GE	Chemistry-I	5	3	30	70	100	4
III	20PHU11	DSC	Semiconductor Devices	4	3	30	70	100	4
III	20PHU12	DSC	Practical III: Semiconductor Devices	3	3	40	60	100	2
IV	20GSU02	AECC	Environmental Studies	2	2	100	-	100	2
IV	20PHUV03	ACC	VAC-III	2	1	50	-	50	1
IV	20PHUJ05	SEC	Aptitude/Placement Training	2	1	50	-	50	Grade*
IV	20PHUJ06	SEC	Online Classes	2	1	-	-	-	Grade*
Semester-IV									
I	20LAT04 20LAH04 20LAM04 20LAF04	MIL	Tamil-IV/ Hindi - IV/ Malayalam-IV/ French-IV	6	3	30	70	100	3
II	20ENG04	AECC	English-IV	6	3	30	70	100	3
III	20PHU13	DSC	Materials Science	4	3	30	70	100	4
III	20PHU14	GE	Chemistry-II	4	3	30	70	100	4
III	20PHU15	DSC	Digital Electronics	4	3	30	70	100	3
III	20PHU16	DSC	Practical IV: Digital Electronics Lab	2	3	40	60	100	2
III	20PHU17	GE	Practical V: Allied-Chemistry Practical	2	3	40	60	100	2
IV	20GSU03	AECC	Skill Based Subject Internet Security	2	2	100	-	100	2
V	20GSU04	AECC	Extension Activity	-	-	100	-	100	G
IV	20PHUV04	ACC	VAC-IV	2	1	50	-	50	1
IV	20PHUJ07	SEC	Aptitude/Placement Training	2	1	50	-	50	Grade*
IV	20PHUJ08	SEC	Online Classes	2	1	-	-	-	Grade*
Semester- V									
III	20PHU18	DSC	Quantum Mechanics and Relativity	6	3	30	70	100	5
III	20PHU19	DSC	Nuclear Physics	5	3	30	70	100	5
III	20PHU20	DSC	Communication Electronics	5	3	30	70	100	4
III	20PHU21	SEC	C Programming	4	3	30	70	100	4
III	20PHU22A	DSE	Bio Physics	5	3	30	70	100	4
III	20PHU22B		Atomic Physics and Spectroscopy						

III	20PHU23	SEC	Practical VI: C-Programming Lab	3	3	40	60	100	2
IV	20GSU05	SEC	Non-Major Elective General Awareness	-	2	100	-	100	2
V	20GSU06	AEE	Law of Ethics	-	2	100	-	100	2
IV	20PHUV05	ACC	VAC-V	2	1	50	-	50	1
IV	20PHUJ09	SEC	Aptitude/Placement Training	2	1	50	-	50	Grade*
IV	20PHUJ10	SEC	Online Classes	2	1	-	-	-	Grade*
Semester- VI									
III	20PHU24	DSC	Thin Films and Nano Technology	6	3	30	70	100	4
III	20PHU25	DSC	Biomedical Instrumentation	6	3	30	70	100	4
III	20PHU26	DSE	Microprocessors	6	3	30	70	100	4
III	20PHU27A	DSE	Optical Fiber and Fiber Optic Communication System	5	3	30	70	100	4
III	20PHU27B		Consumer Electronics						
III	20PHU28	DSC	Practical VII: Electronics Lab	3	3	40	60	100	2
III	20PHU30	DSE	Project Work	4	-	40	60	100	4
IV	20PHUV06	ACC	VAC-VI	2	1	50	-	50	1
IV	20PHUJ11	SEC	Aptitude/Placement Training	2	1	50	-	50	Grade*
IV	20PHUJ12	SEC	Online Classes	2	1	-	-	-	Grade*
Credits Grand Total									144

- VAC-Value Added Course (Extra Credit Courses)
- *Grades depends on the marks obtained

Range of marks	Equivalent remarks
80and above	Exemplary
70-79	Very good
60-69	Good
50-59	Fair Satisfactory
40-49	Not Satisfactory
Below39	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% (25marks) in EE and 40 % in Total Marks
- For PG 50% (35 marks) in EE and 50in Total Marks

ABSTRACT FOR SCHEME OF EXAMINATIONS

(For the Candidates admitted during the academic year 2020- 2021 and onwards)

List of Open Elective Papers	
Open Electives	a).Mobile Phone Servicing
	b).PCB Design Using Electronic Tool
	c).Energy Science
	d).Photovoltaic Systems
	e).Basic Networking
	f).PC Hardware Assembling and Trouble Shooting
	g).Data Science
	h).Lab View
	i).Objected Oriented Programming with C++
	j).Arduino Programming

List of Elective Papers /DSE		
(Can choose anyone of the paper as electives)		
	Course Code	Title
Electives/DSE-I	20PHU20A	Bio Physics
	20PHU20B	Atomic Physics and Spectroscopy
Electives/DSE-II	20PHU24A	Optical Fiber and Fiber Optic Communication System
	20PHU24B	Consumer Electronics

ABSTRACT FOR SCHEME OF EXAMINATIONS

(For the Candidates admitted during the academic year 2020- 2021 and onwards)

S.No.	Part	Course (MIL/AECC/AEE/DSC/DSE/SEC/GE/ACC)	Papers	Credit	Total Credits	Marks	Total Marks
1	Part I	Modern Indian Language (MIL)	4	3	12	100	400
2	Part II	Ability Enhancement Compulsory course (AECC)	4	3	12	100	400
3	Part III	Discipline Specific course (DSC)	18	5/4/3/2	64	100	1800
		Discipline Specific Elective (DSE)	4	4	16	100	400
		Skill Enhancement Course (SEC)	2	4/2	6	100	200
		Generic Elective (GE)	5	5/4/2	20	100	500
4	Part IV	Additional Credit Course (ACC),	6	1	4	50	300
		Skill Enhancement Course (SEC), Ability Enhancement Elective(AEE), Ability Enhancement Compulsory course(AECC)	16	2	8	50/100	800
5	Part V	Ability Enhancement Elective (AEE), Ability Enhancement Compulsory Course (AECC)	2	1	2	100	200
Total			61		144		5000


BOS-Chairman


Syllabus Co-Ordinator


Academic Council-Member Secretary

Dr. M. MAHALAKSHMI.

Co-ordinator
Academic Audit Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

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

(For the students admitted during the academic year 2020-2021 Only)

1. Internal Marks for all UG

Components	Marks
Test I	5
Test II	5
Model Exam	10
Assignment	5
Attendance*	5
TOTAL	30

*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

2. a) Components for Practical I.E.

Components	Marks
Test -I	20
Test - II	20
Total	40

b) Components for Practical E.E.

Components	Marks
Experiments	50
Record	5
Viva	5
Total	60

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		
Report	50	50	a)Attendance	10	
Viva-voce	25	50	b)Review/Work diary*	30	40
Total	100	100	E.E** a) Final report	40	
			b)Viva-voce	20	60
				Total	100

*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. Components for Value Education (Part IV):

S.No.	Components	Marks
a)	Attendance 96% and above - 30 marks 91% to 95% - 25 marks 86% to 90% - 20 marks 75% to 85% - 10 marks	30 marks
b)	Participation in group activity	30 marks
c)	Assignment (2 x 10)	20 marks
d)	Test (1 hr for 20 marks) 2 out of 3 questions, 10 marks each	20 marks
Total		100 marks

5. Guidelines for Environmental Studies (Part IV)

Components	Marks
Two Tests (each 2 hours) of 30 marks each [3 out of 5 descriptive questions 3 x 10 = 30 Marks]	60
Field visit and report (10 + 10) (At least one field trip should be arranged)	20
Two assignments (2 x 10)	20
Total	100

6. Guidelines for Skill based subject - Internet Security (Part IV)

Components	Marks
Two Tests (each 2 hours) of 40 marks each [4 out of 7 descriptive type questions 4 x 10 = 40 Marks]	80
Two assignments (2 x 10)	20
Total	100

7. Guidelines for General Awareness (Part IV)

Components	Marks
Two Tests (each 2 hours) of 50 marks each [50 objective type questions 50 x 1 = 50 Marks]	100

8. Guidelines for Law of Ethics (Part V)

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

9. Guidelines for Extension Activity (Part V)

No of Activities	Marks
2 x 50 (Each Activity for two days) (Activities may be Educating Rural Children, Unemployed Graduates, Self Help Group etc)	100

10. 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
Total	50

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:4,5,6,7,8,9, 10 are to be treated as 100% Internal papers.
4. For item No.10, Tests conducted through online modules (Google Form/any other)

UG PATTERN

QUESTION PAPER PATTERN FOR CIA I and CIA II EXAM

Reg.No: _____ Q.P.CODE: _____

HINDUSTHAN COLLEGE OF ARTS AND 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 5 = 20 marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

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

SECTION - C (3x 8 = 24 marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(Q.No: 11 to 13 : Either Or type)

QUESTION PAPER PATTERN FOR MODEL/END SEMESTER EXAMINATION

Reg.No: _____

Q.P.CODE: _____

HINDUSTHAN COLLEGE OF ARTS AND 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 (5x4=20 Marks)

Answer ALL Question

ALL Questions Carry EQUAL Marks

(Q.No 11 to 15 Either or type)

(One question from each Unit)

SECTION- C (5x8=40 Marks)

Answer ALL Questions

ALL Questions carry EQUAL Marks

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

Course Code:	20PHU01	Course Title						Batch:	2020-2021 & onwards
		PROPERTIES OF MATTER AND SOUND						Semester:	I
Hrs/Week:	5	L	5	T	-	P	-	Credits:	5

COURSE OBJECTIVE

1. To enable the students to learn about elasticity
2. To impart the concepts of hydrodynamics and viscosity
3. To provide knowledge on Newton's law of gravitation
4. To inculcate the concepts of ultrasonics waves

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Recall the fundamental principles of elastic behavior and working of torsional pendulum.	K1
CO2	Interpret the basic concept of hydrodynamics and viscosity.	K2
CO3	Analyze the surface tension, gravitation, Newton's law of gravitation and Kepler's laws of planetary motion.	K3
CO4	Evaluate the acoustic concepts in sound applications.	K4

SYLLABUS

20PHU01	PROPERTIES OF MATTER AND SOUND	Sem: I
Unit No.	Topics	Hours
I	Elasticity 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 - Scale and telescope) and Dynamic torsion method.	12
II	Hydrodynamics and Viscosity 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.	12

III	<p>Surface Tension 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.</p>	12
IV	<p>Gravitation Newton's law of gravitation – Kepler's laws of planetary motion – Determination of G by Boy's experiment – Gravitational field and gravitational potential – Gravitational potential and field due to a spherical shell – Gravitational potential and field due to a solid sphere – Variation of 'g' with latitude, altitude and depth– The compound pendulum (theory and experiment).</p>	12
V	<p>Sound 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 – Reverberation – Sabine's Reverberation formula– Determination of Absorption coefficient. Ultrasonics – Piezo-electric effect and Magnetostriction effect – Production of Ultrasonics by Piezoelectric oscillator and Magnetostriction oscillator – Detection and Applications of Ultrasonic waves.</p>	12

Teaching methods: < Lecturing, PowerPoint Projection through LCD, Assignment, Discussion and Activity>

TEXT BOOKS

1. *Properties of Matter* by R. Murugesan, S. Chand Publishing, 1994.
2. *A Textbook of Sound* by Brijlal and Subrahmanyam, Vikas publishing, 1995.

REFERENCE BOOKS

1. *Properties of Matter* by N. Subramanyam, Brijlal, S. Chand and co.
2. *Waves and oscillations* by N. Subramanyam, Brijlal, Vikas Publishing.
3. *Properties of Matter and Acoustics* by R. Murugesan and Kiruthiga Sivaprasath, S. Chand Publisher.

WEB RESOURCES

- A. <https://www.pbslearningmedia.org/subjects/science/physical-science/matter-and-interactions/properties-of-matter/>
- B. <https://www.khanacademy.org/science/physics/centripetal-force-and-gravitation/gravity-newtonian/v/introduction-to-newton-s-law-of-gravitation>
- C. <https://physicstoday.scitation.org/doi/10.1063/1.1580055>

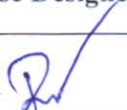

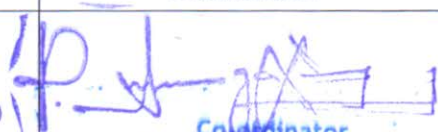
MAPPING WITH PROGRAM OUTCOMES

CO	PO	PO1	PO2	PO3	PO4
CO1		S	S	M	S
CO2		S	S	L	S
CO3		S	M	M	S
CO4		S	M	L	S

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mrs. R. Vishalashi) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Name & Signature Coordinator Curriculum Development Cell

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

Course Code:	20PHU02	Course Title						Batch:	2020-2021 & onwards
		ELECTRICITY AND MAGNETISM						Semester:	I
Hrs/Week:	4	L	4	T	-	P	-	Credits:	4

COURSE OBJECTIVE

1. To learn the basic concepts of Electrostatics
2. To impart the AC and DC Circuits
3. To inculcate the concepts of chemical effect of electric current
4. To provide the knowledge on Magnetic properties of materials and apply it to various physical problems.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Identify the fundamental principles of Electrostatics.	K1
CO2	Provide a knowledge of AC and DC Circuits.	K2
CO3	Predict the knowledge of concepts in magnetic properties.	K3
CO4	Analyze the concepts in chemical effect of electric current.	K4

SYLLABUS

20PHU02	ELECTRICITY AND MAGNETISM	Sem: I
Unit No.	Topics	Hours
I	Electrostatics: 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.	8
II	Chemical effects of Electric Current: Faraday's laws of Electrolysis - ionic velocities and mobilities. Calculation and experimental determination of ionic mobilities - transport number. Thermoelectricity - Peltier coefficient - Thomson coefficient - application of thermodynamics to a thermocouple and connected relations - thermoelectric diagram and uses.	10
III	DC Circuits: 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.	10

IV	Alternating Current: Peak, average and RMS values of AC voltage and current - power factor and current values in an AC circuit containing LCR (reactance and impedance) series and parallel resonant circuits - power in an AC circuit - wattless current - choke coil - construction and working of transformers - energy losses - AC motors - single phase, three phase - star and delta connections - electric fuses - circuit breakers.	10
V	Magnetic Properties of Materials: Susceptibility - permeability - intensity of magnetization and the relation $B = \mu_0 (H + \mu_m)$ - 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 - causes of earth's magnetic field.	10

Teaching methods: < Lecturing, PowerPoint Projection through LCD, Assignment, Discussion and Activity >

TEXT BOOKS

1. *Electricity & Magnetism by M. Narayanamurthy & N. Nagarathnam, National publishing Company, revised edition)*
2. *Electricity & Magnetism by K. K. Tewari, S.Chand & Co., 3rd Edition, 2001.*
3. *Electricity & Magnetism by Brij Lal & Subramaniam.*

REFERENCE BOOKS

1. *Electricity & Magnetism by D.Chattopadhyay, Books & allied Publishers.*
2. *Text book of applied electronics by R.S. Sedha S.Chand & co, New Delhi, 2002.*
3. *Fundamentals of Physics, 6th Edition, by D.Halliday, R. Resnick and J.Walker, Wiley, NY, 2001.*
4. *Physics, 4th Edition, Vols I, II & II Extended by D.Halliday, R. Resnick and K.S.Krane, Wiley, NY, 1994.*
5. *CRC Handbook of Physics & Chemistry, 80th Ed., CRS Press, NY, 1999.*
6. *The Feynman Lectures on Physics, Vols. I, II, and III, by R. P. Feynman, R B Leighton and M Sands, Narosa, New Delhi, 1998.*
7. *Basic Electronics, Edition by B. Grob, McGraw- Hill, NY, 1989.*

WEB RESOURCES

- A. https://www.researchgate.net/publication/239045863_Web_Resources_for_Teaching_Introductory_electric_and_Magnetic_Fields_The_MIT_TEAL_Physics_802_Electricity_Magnetism_Project.
- B. <https://iwant2study.org/ospsg/index.php/interactive-resources/physics/05-electricity-and-magnetism>
- C. http://www.dartmouth.edu/~physteach/ArticleArchive/Chabay_AJP_v74p329.pdf

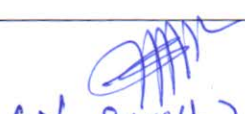
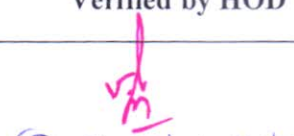
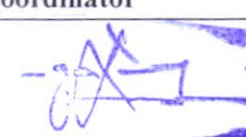
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	S	S	L	S
CO3	S	M	S	M
CO4	S	M	S	L

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (N. Suresh) Name & Signature of the Staff	 (Dr. V. Baleprakash) Name & Signature	 Name & Signature

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.

Course Code:	20PHU04	Course Title					Batch;	2020-2021 & onwards	
		Practical I: General Physics -I					Semester:	I & II	
Hrs/Week:	3	L	-	T	-	P	3	Credits:	2

COURSE OBJECTIVE

1. To make the students to gain a practical knowledge on general Physics.
2. To demonstrate knowledge on Practical Physics.
3. To expand experiments in modern physics for day to day requirements.
4. To connect each physical discovery with its history contents.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Identifying the significance of the experimental approach through actual experimentation	K1
CO2	Understand the operation of solid prism and liquid prism spectrometer.	K2
CO3	Analyze and display the operation of Low Range Voltmeter – potentiometer.	K3
CO4	Determine rigidity modulus using Torsional Pendulum and rigidity modulus using Torsional Pendulum.	K4

SYLLABUS

COURSE CODE	Course	Semester No
20PHU04	Practical I: General Physics -I	I

(Any 10 Experiments)

1. Young's Modulus – Non-Uniform bending (Pin & Microscope).
2. Young's Modulus – Uniform bending (Optic Lever).
3. Rigidity Modulus of a Wire – Torsion Pendulum (with mass).
4. Acceleration due to gravity – Compound Pendulum.
5. Surface Tension of a Liquid and Interfacial Surface Tension of liquids – Drop Weight method.
6. Viscosity of Highly Viscous Liquids – Stoke's method.
7. A.C. Frequency – Sonometer.
8. Specific Heat Capacity – Newton's Law of Cooling.
9. Thermal Conductivity of a bad conductor – Lee's disc method.
10. Refractive index – Solid Prism – Spectrometer.
11. Refractive index – Liquid Prism – Spectrometer.
12. Specific Resistance – Post-office Box.
13. Calibration of Low Range Voltmeter – Potentiometer.

Teaching methods: < Practical demonstration >

WEB RESOURCES

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




MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	L
CO2	S	M	M	L
CO3	S	M	L	L
CO4	S	M	L	L

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mrs. R. Vishalashi) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Name & Signature

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

Course Code:	20PHU05	Course Title						Batch:	2020-2021 & onwards
		HEAT AND THERMODYNAMICS						Semester:	II
Hrs/Week:	4	L	4	T	-	P	-	Credits:	4

COURSE OBJECTIVE

1. To learn the basics of thermo metry
2. To impact the knowledge on kinetic theory of gases
3. To inculcate the behavior of thermo dynamics
4. To provide the knowledge of thermal conduction and radiation

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the basic concepts of heat and thermodynamics.	K1
CO2	Remember the kinetic theory of gases and low temperature physics.	K2
CO3	Analyze the concepts of thermodynamics and thermal conduction, convection and radiation.	K4
CO4	Evaluate the various thermal laws in thermal radiation.	K5

SYLLABUS

20PHU05	HEAT AND THERMODYNAMICS	Sem: II
Unit No.	Topics	Hours
I	Thermometry Temperature coefficient of Resistance – Platinum Resistance Thermometer – Thermocouple – Seeback Effect – Peltier Effect – 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.	8
II	Kinetic Theory of Gases Postulates – Mean free path – Degree of freedom – Velocity distribution and Theorem of equipartition of energy – Viscosity of gases – Van der Waals equation – Critical constants and their determination Low Temperature Physics 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

III	Thermodynamics 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
IV	Thermal Conduction 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.	10
V	Thermal Radiation Black body – Kirchhoff'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

Teaching methods: < Lecturing, PowerPoint Projection through LCD, Assignment, Discussion and Activity >

TEXT BOOK

1. *Heat and thermodynamics by Brij lal and Subramaniam, S Chand & Company Pvt Ltd, 2007.*

REFERENCE BOOKS

1. *Thermal Physics by R. Murugesan*
2. *Text book of heat by JB Rajam*
3. *Text book of heat by Saha*

WEB RESOURCES

- A. https://web.iit.edu/sites/web/files/departments/academic-affairs/academic-resource-center/pdfs/Thermodynamic_Properties.pdf
- B. <http://chemed.chem.purdue.edu/genchem/topicreview/bp/ch21/chemical.php>
- C. <https://www.khanacademy.org/science/physics/thermodynamics>




MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	M
CO2	S	S	M	L
CO3	S	M	M	L
CO4	S	S	L	L

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mrs. R. Vibhalashi) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Co-ordinator Name & Signature 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

Course Code:	20PHU06	Course Title						Batch:	2020-2021 & onwards
		ENERGY PHYSICS						Semester:	II
Hrs/Week:	4	L	4	T		P	Credits:	4	

COURSE OBJECTIVE

1. To understand the energy crisis and the alternative energy solutions.
2. To impart about the fundamentals of solar radiation
3. To inculcate the application of solar energy
4. To provide the knowledge of renewable energy sources

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Identify the basic energy sources.	K1

COURSE OUTCOMES (CO)

CO2	Interpret solar radiation and its measurement technical concepts.	K2
CO3	Analyze the application of solar energy.	K4
CO4	Evaluate the basic physics ideas in renewable energy sources, biomass and biogas-oriented applications.	K5

SYLLABUS

20PHU06	ENERGY PHYSICS	Sem: II
Unit No.	Topics	Hours
I	Introduction to Energy Sources 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.	8
II	Solar Radiation and its Measurement 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
III	Application of Solar Energy 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 – Multireflector type solar cooker.	10

IV	Wind Energy 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.	10
V	Renewable Energy Sources, Biomass and Biogas 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

Teaching methods: < Lecturing, PowerPoint Projection through LCD, Assignment, Discussion and Activity>

TEXT BOOKS

1. *Non-conventional energy sources* by G.D.Rai

REFERENCE BOOKS

1. *Solar energy* by M.P.Agarwal
2. *Solar energy* by S.P.Suhatme
3. *Principles of solar engineering* by Kreith&Kridner

WEB RESOURCES

- A. <https://www.youtube.com/watch?v=Zgp86PVXXuQ>
- B. <https://vikaspedia.in/energy/energy-basics/sources-of-energy>
- C. http://www.vssut.ac.in/lecture_notes/lecture1428910296.pdf


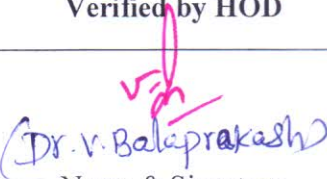
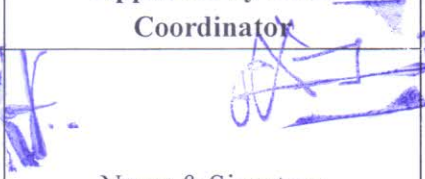
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	S	S	L	S
CO3	S	M	M	S
CO4	S	M	L	S

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mrs. N. Suresh) Name & Signature of the Staff.	 (Dr. V. Balaprakash) Name & Signature	 Name & Signature

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

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

Course Code:	20PHU08	Course Title					Batch:	2020-2021 & onwards	
		Practical II: General Physics -II					Semester:	I & II	
Hrs/Week:	3	L	-	T	-	P	3	Credits:	2

COURSE OBJECTIVE

1. To gain practical knowledge on general Physics.
2. To demonstrate the techniques used to carry out experimental physics.
3. To provide an experimental foundation for the theoretical concepts.
4. To learn how to write scientific information in a clear and concise manner.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS' LEVEL
CO1	Identifying the significance of the experimental approach through actual experimentation	K1
CO2	Understand the operation of solid prism and liquid prism spectrometer.	K2
CO3	Analyze and display the operation of Low Range Voltmeter– potentiometer.	K3
CO4	Determine rigidity modulus using Torsional Pendulum and rigidity modulus using Torsional Pendulum.	K4

SYLLABUS

COURSE CODE	Course	Semester No
20PHU08	Practical II: General Physics -II	I & II

(Any 12 Experiments)

1. Calibration of Low Range Voltmeter – Potentiometer.
2. Moment of a Magnet – Tan C Position.
3. Magnetic flux – Field along the axis of a coil..
4. Moment of a magnet – Field along the axis of a coil.
5. Determination of rigidity modulus using Torsional Pendulum – Without masses.
6. Determination of rigidity modulus using Torsional Pendulum – With identical masses.
7. Determination of dispersive power of a prism using spectrometer.
8. Determination of Cauchy's constant using spectrometer.
9. Determination of Laser parameters – Laser Grating.
10. Frequency of tuning fork – Sonometer.
11. Determination of velocity of ultrasonic waves in liquids.
12. Compound pendulum.
13. Characteristics of junction diode.

Teaching methods: < Practical demonstration >

WEB RESOURCES

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

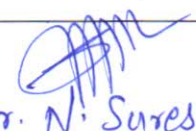
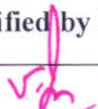
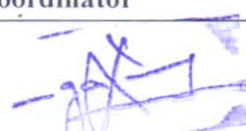
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	L
CO2	S	M	M	L
CO3	S	M	L	L
CO4	S	M	L	L

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mr. N. Suresh) Name & Signature of the Staff	 (Dr. V. Balarajesh) Name & Signature	 Name & Signature

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

Curriculum Development Cell
Hindusthan College of Arts & Science
Coimbatore

Course Code:	20PHU09	Course Title						Batch:	2020-2021 Batch Only
		OPTICS						Semester:	III
Hrs/Week:	4	L	4	T	-	P	-	Credits:	4

COURSE OBJECTIVE

1. To learn about different the optical instrument, objects in images.
2. To learn propagation and vibration behavior of light sources.
3. To study the applications of optics.
4. To recognize the basic concepts of light like interference and dispersion.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Remember the fundamental principles of optical properties.	K1
CO2	Provide knowledge of the behavior of light.	K2
CO3	Apply diffraction properties of optics.	K3
CO4	Analyze the concepts in light applications.	K4

SYLLABUS

20PHU09	OPTICS	Sem: III
UnitNo.	Topics	Hours
I	Thick Lenses: Principal foci and principal points - Thick lens formula - Power of a thick lens - Optic centre of a lens - Spherical aberration and lenses - Methods of minimizing spherical aberration - Condition for minimum spherical aberration in the case of two lenses separated by a distance - Chromatic aberration in lenses - Condition for achromatism of two thin lenses (in contact and out of contact) - coma - astigmatism - Curvature of the field - Huygen's and Ramsden's eye pieces.	9
II	Dispersion: Dispersion produced by a thin prism - Angular dispersion – Dispersive power - Cauchy's formula - combination of prisms to produce - Dispersion without deviation - Deviation without dispersion - Achromatic prisms. Direct vision spectroscopy - Constant deviation spectroscopy - Rainbows and haloes.	9
III	Interference: Colours of thin films - Air wedge - Determination of diameter of a thin wire by air wedge - Test for optical flatness - Haidinger's fringes - Michelson's Interferometer - Theory - Applications - λ , thickness of thin transparent material and resolution of spectral lines - Brewster's fringes - Refractive index	10

	of gases - Jamin's & Rayleigh's Interferometers - Stationary waves in light - Colour photography (principle only), Holography (principle only).	
IV	Diffraction: Fresnel diffraction - Diffraction at Circular aperture, Opaque circular disc, Straight edge and Narrow wire - Fraunhofer diffraction - single slit - Double slit - Plane diffraction grating - theory and experiment to determine wave length - Normal Incidence - Oblique incidence - Missing orders - Overlapping spectra - Concave reflection grating with theory. Rayleigh's criterion for Resolution - Resolving power of Microscope, Telescope, Prism and Grating.	10
V	Polarization: Double refraction - Nicol prism - polarizer and analyzer - Huygen's explanation of double refraction in uniaxial crystals - Dichroism - Polaroids and their uses - Double image polarizing prisms - quarter wave plate & half wave plate - Plane, elliptically and circularly polarized light - Production and detection - Babinet's Compensator - Optical Activity - Fresnel's explanation of optical activity - Specific Rotatory Power – Determination using Laurent's Half Shade Polarimeter.	10

Teaching methods: <Lecturing, PowerPoint Projection through LCD, Assignment, Discussion and Activity>

TEXTBOOKS

1. *Optics* by Subramaniam. N. & Brij Lal, S. Chand & Co. Pvt. Ltd., New Delhi, 2006.
2. *Optics* by Khanna D.R. & Gulati H.R., R. Chand & Co. Pvt. Ltd., New Delhi, 1984.
3. *Optics and Spectroscopy* by Murugesan, S. Chand & Co. Pvt. Ltd., New Delhi. 2010.

REFERENCEBOOKS

1. *Fundamentals of Optics* by Jenkins A Francis and White E. Harvey, McGraw Hill Inc., New Delhi, 1976.
2. *Optical Physics* by Lipson. S.G., Lipson H., and Tannhauser D.S., Cambridge University press, (1995).
3. *Fundamentals of Optics* by Raj M.G., Anmol Publications Pvt. Ltd., (1996), New Delhi.
4. *Fundamentals of Physics*, 6th Edition, by D.Halliday, R.Resnick and J.Walker. Wiley, NY, 2001.
5. *Physics*, 4th Edition Vols I, II & II Extended by D.Halliday, R.Resnick and K.S.Krane, Wiley, NY, 1994.
6. *CRC Handbook of Physics & Chemistry*, 80th Ed., CRS Press, NY, 1999.
7. *The Feynman Lectures on Physics*, Vols. I, II, and III, by R. P. Feynman, R B Leighton and M Sands, Narosa, New Delhi, 1999.

WEB RESOURCES

1. <https://www.youtube.com/watch?v=lzBKlY4f1XA>
2. <https://www.youtube.com/watch?v=PgW7qaOZD0U>
3. <https://www.youtube.com/watch?v=N3smMSjxvQ>


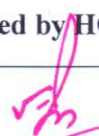

MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	M
CO2		M	S	S
CO3	S	M	M	
CO4	S	M	S	S

S-Strong, M-Medium, L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mr. N. Suresh) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 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

Course Code:	20PHU10	Course Title						Batch:	2020-2021 Batch Only
		CHEMISTRY -I						Semester:	III
Hrs /Week:	5	L	5	T	-	P	-	Credits:	5

COURSE OBJECTIVE

- 1.To learn chemical bonding, covalent bonds, photochemistry,
- 2.To study briefly on electrochemistry
- 3.To analyze the orbital overlap, hybridization, geometry of organic molecules
4. To have a knowledge about chemical kinetics.

COURSE OUTCOMES (CO)

S. No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Remember the chemical bonding and structure	K1
CO2	Understand and apply the geometric and isomeric properties of molecules	K2
CO3	Analyze the laws of photochemistry and principles of electrochemistry	K3
CO4	Investigate the decomposition of molecules and order of chemical reactions	K4

SYLLABUS

20PHU10	CHEMISTRY-I	III
Unit No.	Topics	Hours
I	Chemical Bonding Molecular orbital theory: bonding, antibonding and non-bonding orbitals - Molecular orbitals - MO configuration of H ₂ , N ₂ , O ₂ , F ₂ - Bond order - Diamagnetism and paramagnetism. Preparation-properties-structure and Uses of Borane : NaBH ₄ , Borazole.	12
II	Photochemistry and Phase Rule Photochemistry -Grotthus-Draper law and Stark - Einstien's law of photochemical equivalence, Quantum yield - Example for photochemical reactions: Hydrogen-Chlorine reaction (elementary idea only).Photosynthesis-Phosphorescence and Fluorescence Phase rule - definition of terms in it, application of phase rule to water system.	12
III	Covalent bond Orbital overlap, hybridization, geometry of organic molecules: CH ₄ , C ₂ H ₄ and C ₂ H ₂ - Inductive effect - Electrometric - mesomeric - hyperconjugative and steric effects in properties of compounds. Stereoisomerism - Conditions of	12

	optical activity -Optical isomerism of tartaric acid –Racemisation : Resolution of racemates – Geometrical isomerism of maleic and fumaric acids.	
IV	ElectroChemistry Electro Chemistry - Kohlrausch law, measurement of conductance – pH determination - Conductometric titrations - Galvanic cells: EMF, standard electrode potentials, reference electrodes - Corrosion: Definition- Types- Methods of prevention.	12
V	Chemical equilibrium Chemical equilibrium - Criteria of homogeneous and heterogeneous equilibria: Decomposition of HI, N ₂ O ₄ , CaCO ₃ and PCl ₅ . Chemical Kinetics: Order – types and their determinations, order and molecularity effects of temperature on reaction rate - activation energy	12

Teaching methods: <Lecturing, Power Point Projection through LCD, Assignment, Discussion and Activity>

TEXT BOOKS

1. Malik, Wahid U., G.D. Tuli and R.D. Madan. "Selected Topics in Inorganic Chemistry", 7th ed., New Delhi S. Chand & Company Ltd., 2007.
2. Text book of Physical Chemistry, P.L.Soni, D.B.Dharmarke, Sultan Chand & Sons. 2009.
3. Text book of Allied Chemistry Highmount Publishing House, 1st Edn V.Veeraiyan, A.N.S.Vasudevan, 2005

REFERENCE BOOKS

1. Puri B.R., Sharma L.R and Pathania M.S, "Principles of Physical Chemistry", Vishal Publishing Co., New Delhi. 2018.
2. Puri B. R and Sharma L.R, "Inorganic chemistry", Shobanlal Nagin Chand and Co., New Delhi. 2013.
3. Advanced Organic Chemistry, B.S.Bahl, Arunbahl, S.Chand&Co. 2014.
4. Organic Chemistry, Vol. 1, 2,3, S.M.Mugherjee, S.P.Singh, R.P.Kapoor, Wiley Eastern. 2017.
5. Essentials of Physical Chemistry, B.S.Bahl and G.D.Tuli, S.Chand & Co. 2014.

WEB RESOURCES

1. www.chem.kyushu-u.ac.jp
2. <https://chemed.chem.purdue.edu/genchem/topicreview/bp/ch22/rate.php/>
3. www.khanacademy.org/.../sp3-hybrid-orbital-jay-final/
4. <https://en.wikipedia.org/wiki/Photochemistry/>

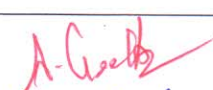
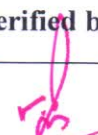
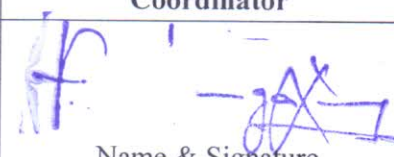
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	M		M	M
CO3	S	S	M	S
CO4	M	S	M	

S-Strong, M-Medium, L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Dr. A. Geetha) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Name & Signature

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 Page 14 of 37

Coimbatore-641 028

Course Code:	20PHU11	Course Title						Batch:	2020-2021 Batch Only
		SEMICONDUCTOR DEVICES						Semester:	III
Hrs/Week:	4	L	4	T	-	P	-	Credits:	4

COURSEOBJECTIVE

1. To learn the construction, working and characteristics of various semiconductor devices.
2. To develop the fundamentals of diodes.
3. To study the different types of bipolar transistors.
4. To learn the overview of transistors.

COURSEOUTCOMES (CO)

S. No	COURSEOUTCOME	BLOOMSLEVEL
CO1	Remember the essential fundamentals of atomic structure and semiconductor devices.	K1
CO2	Understand the principles and functions of semiconductor diodes for switching applications.	K2
CO3	Analyze the switching and amplification applications of transistor.	K3
CO4	Demonstrate the control applications using power electronic semiconductor devices.	K4

SYLLABUS

20PHU11	SEMICONDUCTOR DEVICES	Sem: III
Unit No.	Topics	Hours
I	Atomic Structure and Semiconductor Physics 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.	9
II	Special Diodes 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.	9
III	Bipolar Junction Transistors (BJT) 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

IV	Field Effect Transistors 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
V	Thyristors 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

Teaching methods: <Lecturing, Power Point Projection through LCD, Assignment, Discussion and Activity>

TEXTBOOKS

1. V.K.Mehta, "PrinciplesofElectronics", S.Chand,1997.(Unit-I,II&III).
2. R.S.Sedha, "ATextBookofAppliedElectronics",S.Chand,3rd Revised Edition, 2008.(Unit-IV&V)

REFERENCEBOOKS

1. B.L.Theraja "Basic Electronics Solid State", S.Chand, 1998.
2. S. Salivahanan, N. Suresh Kumar & A. Vallavaraj, "Electronics Devices and Circuits", Tata McGraw Hill PublishingCompany 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://onlinecourses.nptel.ac.in/noc21_ee59/preview
2. <https://nptel.ac.in/courses/108/108/108108122/>



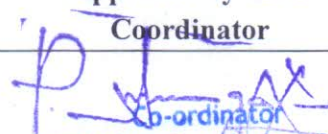
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	S
CO3	S	M	S	M
CO4	S	M	M	S

S-Strong, M-Medium, L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Dr. V. Balaprakash) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Co-ordinator Curriculum Development Cell Hindusthan College of Arts & Science, Coimbatore-641 028. Name & Signature

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

Course Code:	20PHU12	Course Title						Batch:	2020-2021 Batch Only
		PRACTICAL III: SEMICONDUCTOR DEVICES						Semester:	III
Hrs/Week:	3	L	-	T	-	P	3	Credits:	2

COURSE OBJECTIVE

1. To learn the working and characteristics of various active electronic and digital electronics components.
2. To have an in depth knowledge about devices of semiconductors.
3. To study all the characteristics of diodes.
4. To learn designing sequential circuits

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the properties and principles of various semiconductor devices.	K1
CO2	Study the characteristics of semiconductor diodes and various transistors configurations.	K2
CO3	Design various combinational gates using semiconductor components.	K3
CO4	Demonstrate the knowledge by designing sequential circuits.	K4

SYLLABUS

COURSE CODE	COURSE TITLE	Semester No
20PHU12	PRACTICAL III: SEMICONDUCTOR DEVICES	III
(Any 10 Experiments)		
1.	Band Gap Energy of Silicon / Germanium Diode.	
2.	Temperature Co-efficient of Junction Diode.	
3.	Characteristics of PN Junction Diode.	
4.	Characteristics of Zener Diode.	
5.	Characteristics of Light Emitting Diode.	
6.	Common Emitter (CE) Characteristics of Transistor.	
7.	Common Base (CB) Characteristics of Transistor.	
8.	Common Collector (CC) Characteristics of Transistor.	
9.	Transistor Biasing Circuits.	
10.	Transistor as a Switch.	
11.	Characteristics of JFET.	
12.	Characteristics of MOSFET	
13.	Characteristics of SCR.	
14.	Characteristics of DIAC.	
15.	Characteristics of TRIAC.	

Teaching methods: < Practical demonstration >

WEB RESOURCES

1. https://www.electronics-tutorials.ws/transistor/tran_1.html
2. <https://www.elprocus.com/types-of-transistor-configuration/>

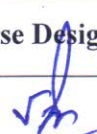
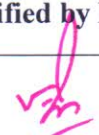
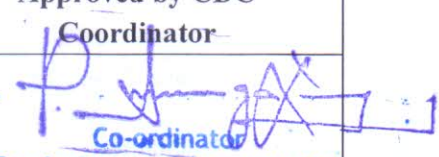
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	S
CO3	S	M	S	S
CO4	S	M	S	S

S-Strong, M-Medium, L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Dr. V. Balaprakash) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Co-ordinator Curriculum Development Cell Name & Signature Hindusthan College of Arts & Science, Coimbatore-641 028.

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

Course Code:	20PHU13	Course Title						Batch:	2020-2021 Batch Only
		MATERIALS SCIENCE						Semester:	IV
Hrs/Week:	4	L	4	T	-	P	-	Credits:	4

COURSE OBJECTIVE

1. To learn the basics of Material Science concepts and principles.
2. To understand the concepts of electron theory of metals.
3. To analyze phase transformation techniques.
4. To understand the concepts of phase diagram.

COURSE OUTCOMES (CO)

S. No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Remember basic concepts of the material science.	K1
CO2	Understand the phase diagram.	K2
CO3	Analyze the phase transformation techniques.	K3
CO4	Apply the electrical and magnetic properties of materials.	K4

SYLLABUS

20PHU13	MATERIALS SCIENCE	Sem: IV
UnitNo.	Topics	Hours
I	Material Science Classification of materials - Engineering requirements of materials - Material structure - Types of Bonds and their energies - Bond formation mechanism - Ionic bond - covalent bond examples ceramics - thermal and electrical properties - uses. Metallic bond - comparison of bonds [Dispersion bonds, Dipole bonds and Hydrogen bonds]. Crystal Imperfections - Types of imperfections - Thermal vibrations - point, line and surface imperfections - Frank - Read source.	9
II	Phase Diagrams Basic terms - solid solutions - Hume - Rothery's rules - Intermediate phase - phase diagrams - Gibb's Phase rules - Time - Temperature cooling curves - construction of phase diagrams - the Lever rule - eutectic systems- eutecoid systems - peritectic and peritectoid systems Ternary equilibrium diagram.	9
III	Phase Transformation Rate of transformation - Nucleation [Homogeneous, Heterogenous] - Nucleation and growth - Applications of Phase transformations - Micro constituent of iron - carbon system - The allotropy of iron- Iron - Carbon equilibrium diagram - formation of Austenite - TTT Diagram - transformation Austenite upon continuous cooling.	10

IV	Electron theory of metals Fundamental theories of electrons [Drude and Lorentz theory and Sommer field free electron theory] - Electron energies in a metal – zone theory of solids - energy gaps - Density of states - zones in conductors, insulators and semiconductors - Factors affecting electrical resistance of materials.	10
V	Electrical and magnetic properties of materials Resistivity - Conductivity - Semiconductors - classification of semi-conductors on the basis of Fermi energy and Fermi level - Insulators - Dielectrics - Ferro electricity - Electro striction - Piezoelectricity - uses of dielectrics - Capacitors Dielectric strength - Magnetic properties of classification - magneto striction - Magnetic Domain - Soft and Hard magnetic materials.	10

Teaching methods: <Lecturing, Power Point Projection through LCD, Assignment, Discussion and Activity>

TEXTBOOKS

1. *Materials Science and processes in SI units* by SK Hajra Choudhury, Indian Book distributing company
2. *Materials Science* by G.K. Narula; K.S. Narula; V.K. Gupta, Tata McGraw-Hill
3. *Material Science* by R.B. Gupta for AMIE Satya Prakashan New Delhi

REFERENCEBOOKS

1. *Materials Science* by M.Arumugam, Anuradha Publishers. 1990Vidayalkaruppur, Kumbakonam.
2. *Materials Science and Engineering* V.RaghavanPrintice Hall India Ed. V2004. New Delhi.

WEB RESOURCES

1. <https://nptel.ac.in/courses/113/106/113106032/>
2. <https://lecturenotes.in/download/note/23951-note-for-material-science-and-engineering-mse-by-5-bro-s>


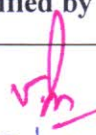

MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S		S
CO2	S	M	M	M
CO3	S		M	S
CO4	S	M	S	M

S-Strong, M-Medium, L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mr. N. Suresh) Name & Signature of the Staff	 (Mr. V. Balaprakash) Name & Signature	 Name & Signature

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.

Course Code:	20PHU14	Course Title						Batch:	2020-2021 & onwards
		CHEMISTRY -II						Semester:	IV
Hrs /Week:	4	L	4	T	-	P	-	Credits:	4

COURSE OBJECTIVE

1. To learn the basic concepts related to UV
2. To study about nano science and their techniques
3. To discuss on types of solids and solutions
4. To understand the concepts of Chromatography

COURSE OUTCOMES (CO)

S. No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Remember the basic concept related to UV-Visible Spectroscopy and nanoscience	K1
CO2	Understand the knowledge in nuclear chemistry	K2
CO3	Analyze the structure of solids	K3
CO4	Investigate the chromatographic techniques in detail	K4

SYLLABUS

20PHU14	CHEMISTRY-II	IV
UnitNo.	Topics	Hours
I	U.V-Visible Spectroscopy Definition of spectrum - Types: absorption and emission spectra, Electromagnetic radiation, quantization of different types of energies in molecules (translational, rotational and electronic) - U.V-Visible Spectroscopy - Types of electronic transitions - Beer's - Lambert's law - chromophore, auxochrome, bathochromic and hypsochromic shifts - Instrumentation - Applications.	9
II	NanoScience Definition - types - quantum dots - Nano rods, fullerenes and Carbon nano tubes, nano wires and crystals, nano composites and clusters, properties of nano materials, Plasmon resonance. Preparation of Nano structured materials- Bottom up and Top down Approaches - Methods of preparation of nano material: Plasma arching, Chemical vapour deposition, Electro deposition, Sol-gel synthesis, Ball-milling, Chemical reduction.	9
III	Nuclear Chemistry Natural radioactivity-radioactive series including Neptunium series, Group displacement law - Nuclear Binding energy, mass defect, Calculations- Nuclear Fission and Nuclear Fusion differences - Stellar energy - Nuclear reactors - Applications of radio isotopes - C-14 dating.	10

IV	Physical Chemistry Solid state chemistry - elements of symmetry, plane, center and axis of symmetry - definitions. Unit cell of simple body center and face center cubic crystals - Weiss and miller indices - Nature of unit cell of NaCl and CsCl - structure of diamond and graphite.	10
V	Solutions & Chromatography Solutions - Liquid in liquid type: Raoult's law for ideal solution, positive and negative deviation from Raoult's law - Reasons and examples-Fractional distillation and Azeotropic distillation. Chromatography : principle and application of column - paper and thin Layer chromatography.	10

Teaching methods: <Lecturing, Power Point Projection through LCD, Assignment, Discussion and Activity>

TEXTBOOK

1. Sharma Y. R Elements of organic spectroscopy – 4th edition Suljan Chand and Company, 2011

REFERENCEBOOKS

1. Puri, Sharma and Pathania, Text-book of Physical Chemistry, Vishal Publishing co.2011
2. Madan R.I, Chemistry for degree students, S.Chand and Company Ltd, New Delhi, 2016
3. Puri B.R., Sharma L.R. and Pathania M.S. (2013), Principles of Physical Chemistry, (35th edition), New Delhi: Shoban Lal Nagin Chand and Co.
4. Introduction to nano science Gabor L.Hornyak, Joydeep Dutta, H.F Tibbals, Anil Rao

WEB RESOURCES

1. http://lcwu.edu.pk/ocd/cfiles/Chemistry/MSc/Chem-C-410/Fundamentals_UV_VIS.pdf
2. <https://www.sciencelearn.org.nz/resources/2166-nanoscience/>
3. <https://www.wou.edu/las/physci/ch371/lecture/lecture4/nuclear.ppt/>
4. https://en.wikipedia.org/wiki/Solid-state_chemistry/
5. <https://byjus.com/chemistry/types-of-solutions/>

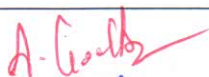
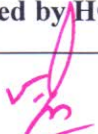
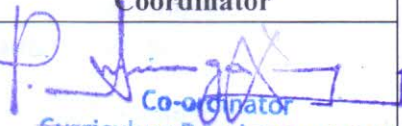
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	M		M	S
CO2	M	S		M
CO3	S	S	M	
CO4	M	S	M	M

S-Strong, M-Medium, L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Dr. A. Geetha) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Co-ordinator Curriculum Development Cell Name & Signature

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

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

Course Code:	20PHU15	Course Title						Batch:	2020-2021 Batch Only
		DIGITAL ELECTRONICS						Semester:	IV
Hrs/Week:	4	L	5	T	-	P	-	Credits:	3

COURSE OBJECTIVE

1. To learn different number systems.
2. To study digital IC's, flip flops and registers.
3. To enhance knowledge in combinational and sequential logic circuits design.
4. Enable the students to learn different types ADC and DAC.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMSLEVEL
CO1	Convert different type of codes and number systems which are used in digital systems.	K1
CO2	Employ the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy.	K2
CO3	Analyze various methods and logical tools and know the techniques to prepare the most simplified circuit using arithmetical circuits.	K3
CO4	Design different types of with and without memory element digital electronic circuits for particular operation, within the realm of economic.	K4

SYLLABUS

20PHU15	DIGITAL ELECTRONICS	Sem: IV
Unit No.	Topics	Hours
I	Number System and Codes Binary Number System – Binary to Decimal Conversion – Decimal to Binary Conversion – Octal Numbers – Hexadecimal numbers – ASCII codes – Excess three – Gray code – Error Detection and Correction.	9
II	Boolean Algebra and Logic Gates Basic Logic Gates – Universal Logic Gates – AND-OR-Invert Gates – Positive and Negative Logic – Boolean Laws and theorems – SOP – Karnaugh Map Simplifications – Don't care Conditions - POS – POS – Simplification.	9
III	Arithmetic Circuits Binary Addition - Binary Subtraction – Unsigned Binary Numbers- Sign-magnitude Numbers – 2's Complement Representation – 2's Complement Arithmetic – Adder - Subtractor – Arithmetic Logic Unit – Binary Multiplication and Division – Multiplexers – De-multiplexers – Decoder-Encoder	10
IV	Sequential Logic Circuits Flip Flops: RS, Clocked RS, D, JK, JK Master Slave and T Flip Flops. Counters: Asynchronous counter – Synchronous counter – Up/Down counter	10

	– Modulus counters – Decade counter. Shift Registers: Serial In/Serial Out – Serial In/Parallel Out – Parallel In/Serial Out – Parallel In/Parallel Out.	
V	D/A and A/D Converters Digital to Analog converters: Weighted Resistor Method – R-2R Ladder Method – Accuracy and Resolution of DAC. Analog to Digital converters: Simultaneous converter – Counter type converter –Continuous type converter –Successive approximation type converter –Dual slope converter – Accuracy and resolution of ADC.	10

Teaching methods: <Lecturing, Power Point Projection through LCD, Assignment, Discussion and Activity>

TEXTBOOKS

1. Donald P. Leach, Albert Paul Malvino & Goutam Saha, "Digital Principles and Applications", Tata McGraw Hill, 7th Edition, 2011

REFERENCEBOOKS

1. Thomas L. Floyd & R.P.Jain, "Digital Fundamentals", Pearson Education, 8th Edition, 2005.
2. M.Morris Mano, "Digital Logic and Computer Design", PHI, 2005.
3. M.Morris Mano, "Digital Design", PHI, 2005.

WEB RESOURCES

1. <http://www.ddegjust.ac.in/studymaterial/pgdca/ms-03.pdf/>



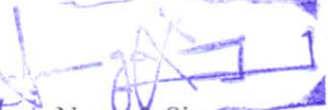
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO	PO1	PO2	PO3	PO4
CO1		S	S	S	
CO2		S	S	M	S
CO3		S	M		S
CO4			M	M	M

S-Strong, M-Medium, L-Low

ASSESSMENTPATTERN(if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Dr. V. Balaprakash) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature of the Staff	 Name & Signature

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.

Course Code:	20PHU16	Course Title						Batch:	2020-2021 Batch Only
		PRACTICAL IV: DIGITAL ELECTRONICS LAB						Semester:	IV
Hrs/Week:	2	L	-	T	-	P	2	Credits:	2

COURSE OBJECTIVE

1. To become familiar with code conversion.
2. To develop detailed knowledge in combinational logic circuits design.
3. To create detailed knowledge in sequential logic circuits design.
4. To analyze the logic circuit design and simulation process in VHAL.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the properties and principles of digital electronics.	K1
CO2	Study the characteristics of semiconductor diodes, various transistors configurations and various digital IC's.	K2
CO3	Evaluate various combinational logic and sequential logic circuits using digital ICs.	K3
CO4	Demonstrate designing knowledge of sequential circuits.	K4

SYLLABUS

COURSE CODE	COURSE TITLE	Semester No
20PHU16	PRACTICAL IV: DIGITAL ELECTRONICS LAB	IV
(Any 10 Experiments)		
<ol style="list-style-type: none"> 1. Binary to Grey and Grey to Binary conversion. 2. Verification of Basic Logic Gates and Universal Gates. 3. Verification of Boolean Laws and Demorgan's Theorem. 4. Parity Generator and Checker. 5. Half Adder and Full Adder. 6. Half Subtractor and Full Subtractor. 7. Multiplexer and De multiplexers. 8. Encoder and Decoder. 9. BCD to 7-Segment Display. 10. Flip Flops. 11. Shift Registers and Ring Counter. 12. Analog to Digital Converter. 13. Digital to Analog Converter. 14. Design and Simulation of Universal Logic Gates using VHDL Coding. 15. Design and Simulation of Adder Circuits using VHDL Coding 		

Teaching methods: < Practical demonstration >

WEB RESOURCES

1. <https://www2.mvcc.edu/users/faculty/jfiore/Resources/DigitalElectronics1LaboratoryManual.pdf>
2. <https://www.youtube.com/watch?v=cdMJvFT-Afc>




MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO	PO1	PO2	PO3	PO4
CO1		S	S		M
CO2		S	S	M	
CO3		S	M	S	S
CO4		S	M	S	S

S-Strong, M-Medium, L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Dr. V. Balaprakash) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Name & Signature

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.

Course Code:	20PHU17	Course Title					Batch:	2020-2021 Batch Only	
		Practical V–Allied Chemistry Practical					Semester:	III&IV	
Hrs/Week:	2	L	-	T	-	P	2	Credits:	2

COURSE OBJECTIVE

1. To equip the students to acquire practical knowledge on volumetric analysis.
2. To determine the chemical composition in organic salts
3. To differentiate the functional groups
4. To inference the given organic compound by functional group test

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Classification of chemicals by different methods	K1
CO2	Identification of the presence of elements	K2
CO3	Distinguish between organic compounds	K3
CO4	Examine the functional group tests	K4

SYLLABUS

COURSE CODE	COURSE TITLE	Semester No
20PHU17	Practical V Allied Chemistry Practical (Any 10 Experiments)	III & IV
<u>I. Volumetric Analysis</u>		
<ol style="list-style-type: none"> 1. Estimation of Sodium Hydroxide using standard Sodium Carbonate. 2. Estimation of Hydrochloric acid using standard Oxalic acid. 3. Estimation of Oxalic acid using standard Sulphuric acid. 4. Estimation of Ferrous sulphate using standard Mohr salt solution. 5. Estimation of Oxalic acid using standard Ferrous sulphate solution. 6. Estimation of Ferrous ammonium sulphate using standard FeSO₄ 7. Estimation of Potassium Permanganate-Standard Sodium Hydroxide 		

II. Organic Analysis

To distinguish between aliphatic & aromatic, saturated & unsaturated. Detection of Elements (N, S, Halogens). Functional group tests for phenols, acids (mono & di), aromatic primary amine, mono amide, diamide, carbohydrate, Functional group characterized by Confirmatory test.

1. Systematic analysis of organic salt- Phenol
2. Systematic analysis of organic salt-Carbohydrate (monosaccharide)
3. Systematic analysis of organic salt-Benzoic acid (mono carboxylic)
4. Systematic analysis of organic salt- Phthalic acid (dicarboxylic)
5. Systematic analysis of organic salt-Aniline (Aromatic primary amine)
6. Systematic analysis of organic salt-Cinnamic acid (dicarboxylic)
7. Systematic analysis of organic salt-Benzamide (Amide)
8. Systematic analysis of organic salt- Urea (Diamide)

Teaching methods: < Practical demonstration >

TEXTBOOKS

1. *Lab Manual- Prepared by Faculty, Department of Chemistry, Hindusthan College of Arts & Science, Coimbatore.*

REFERENCEBOOKS

1. *A.I. Vogel A text book of quantitative inorganic analysts Longman publishers. 6 th Edn.*
2. *N.S.Gnanapragasam, G.Ramamurthy Organic Chemistry Lab Manual S.Viswanathan Printers & Publishers Pvt Ltd Reprint 1996*

WEB RESOURCES

1. www.bbc.co.uk/bitesize/guides/ztkdd2p/revision/4
2. www.sciencedirect.com/.../carboxylic-acid

Course Code:	20PHU17	Course Title						Batch:	2020-2021 Batch Only
		Practical V–Allied Chemistry Practical						Semester:	III&IV
Hrs/Week:	2	L	-	T	-	P	2	Credits:	2

COURSE OBJECTIVE

1. To equip the students to acquire practical knowledge on volumetric analysis.
2. To determine the chemical composition in organic salts
3. To differentiate the functional groups
4. To infer the given organic compound by functional group test

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Classification of chemicals by different methods	K1
CO2	Identification of the presence of elements	K2
CO3	Distinguish between organic compounds	K3
CO4	Examine the functional group tests	K4

SYLLABUS

COURSE CODE	COURSE TITLE	Semester No
20PHU17	Practical V Allied Chemistry Practical (Any 10 Experiments)	III & IV
<u>I. Volumetric Analysis</u>		
<ol style="list-style-type: none"> 1. Estimation of Sodium Hydroxide using standard Sodium Carbonate. 2. Estimation of Hydrochloric acid using standard Oxalic acid. 3. Estimation of Oxalic acid using standard Sulphuric acid. 4. Estimation of Ferrous sulphate using standard Mohr salt solution. 5. Estimation of Oxalic acid using standard Ferrous sulphate solution. 6. Estimation of Ferrous ammonium sulphate using standard FeSO₄ 7. Estimation of Potassium Permanganate-Standard Sodium Hydroxide 		

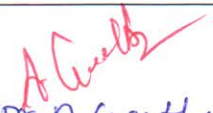
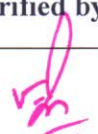
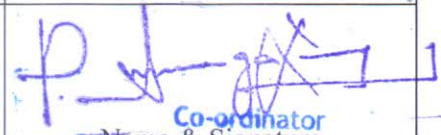
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	M	S	M	S
CO2	M		M	S
CO3	M	S	M	S
CO4	M	S	M	

S-Strong, M-Medium, L-Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 CDr. A. Geetha Name & Signature of the Staff	 Dr. V. Balaprakash Name & Signature	 Co-ordinator Name & Signature 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

Course Code:	20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	Course Title						Batch:	2020-2021 & Onwards
		VAC: Mobile Phone Servicing						Semester:	I /II/III/IV/V/VI
Hrs/Week:	2	L	2	T	-	P	-	Credits:	1/G

COURSE OBJECTIVE

The Course has been designed to provide knowledge on Mobile Phone Repair & Maintenance.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the basic servicing skills and concept of mobile phones.	K1
CO2	Apply the electronics basic knowledge and service skills in mobile phone servicing.	K2
CO3	Analyze and find the common mobile phone problems.	K3
CO4	Implement the service knowledge in problem solving skills.	K4

SYLLABUS

20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	VAC: Mobile Phone Servicing	Sem: I/II/III/IV/V/VI
	Topics	Hours
20PHUV06	Introduction to mobile phones - Generations of mobile phones - Handset Specific operating systems - Handset features & applications - working principle of mobile handset - Components used in mobile handsets.	6
II	Tools - equipment used for repairing - maintenance of mobile handsets - types of power supply – batteries - boosting a battery - Troubleshooting basics.	6
III	Network problems - Power failure (dead) - Mobile phone hardware troubleshooting (water damage – hanging - charging & keypad problems), Handsets assembly - disassembly - Soldering & desoldering.	6
IV	BGA IC's - Basics of Computer - Installation of software – Flashing - PC based diagnostic tools – mobile sets formatting – use of secret codes.	6
V	Mobile software's - Data cable - Card reader - Mobile display -Remove/replace Component & Mobile phone hardware troubleshooting (Troubleshooting through circuit diagram, transmission-transmitter filter – microphone –reception - Antenna - RF power amplifier - local oscillator - Audio IC – speaker and charger.	6

Teaching methods: < Lecturing, Lecture imposed with questions, PowerPoint Projection through LCD, Assignment, Discussion, Seminar, Buzzles and Quiz>

TEXT BOOKS

1. *Mobile Communication- Jochen Schiller- Person Education Ltd. (UNIT I, II&III)*
2. *Modern Mobile Phone Repair: Using Computer Software and Service Devices- M. Lotia, Pradeep Nair- BPB Publications. (UNIT IV &V).*

REFERENCE BOOKS

1. *Mobile Computing Technology, Application And Service Creation - Asoke K Talukder, RoopaR.Yavagal.*

WEB RESOURCES

Web Link:

1. <https://nptel.ac.in/courses/106/105/106105166/>
2. <https://nptel.ac.in/content/storage2/courses/106105080/pdf/M5L9.pdf>




MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	M	M
CO3	S	S	M	S
CO4	S	M	S	L

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of internal assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mrs. R. Vishalashi) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Name & Signature

Head of the Department
Department of Physics

Co-ordinator

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

Course Code:	20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	Course Title					Batch:	2020-2021 & Onwards	
		VAC: PCB Design Using Electronic Tool					Semester:	I /II/III/IV/V/VI	
Hrs/Week:	2	L	2	T	-	P	-	Credits:	1/G

COURSE OBJECTIVE

To enable the students to learn the design concept of PCB and become familiarize in PCB fabrication techniques.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the steps involved in schematic, layout, fabrication and assembly process of PCB design.	K1
CO2	Understand concepts of layout planning, basic printing process.	K2
CO3	Analyze and Design (schematic and layout) PCB for analog circuits, digital circuits and mixed circuits.	K3
CO4	Design (schematic and layout) and fabricate PCB for simple circuits.	K4

SYLLABUS

20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	VAC: PCB Design Using Electronic Tool	Sem: I/II/III/IV/V/VI
Unit No.	Topics	Hours
I	Single sided board – double sided – Multilayer boards – Plated through -holes technology – Benefits of Surface Mount Technology (SMT).	6
II	Layout Planning – General rules of Layout – Resistance, Capacitance and Inductance – Conductor Spacing – Supply and Ground Conductors.	6
III	Manufacture of copper clad laminates – Properties of laminates – Types of Laminates – Manual cleaning process – Basic printing process for double sided PCB's – Photo resists.	6
IV	Introduction – Etching machine – Etchant system. Soldering: Principles of Solder connection – Solder joints – Solder alloys – Soldering fluxes Soldering Tools: Soldering, Desoldering tools and Techniques	6

10-11-2020
 10-11-2020
 10-11-2020

V	Reflection – Crosstalk – Ground and Supply line noise – Electromagnetic interference from pulse type EM fields and automation – Automated artwork drafting – CAD.	6
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Teaching methods: < Lecturing, Lecture imposed with questions, PowerPoint Projection through LCD, Assignment, Discussion, Seminar, Buzzles and Quiz>

TEXT BOOKS

1. Printed circuit Board – Design & Technology by Walter C. Bosshart, Tata McGraw Hill(UNIT-1-IV)
2. Printed Circuit Board –Design, Fabrication, Assembly & Testing, R.S. Khandpur, TATA McGrawHill Publisher. (UNIT-V)

REFERENCE BOOKS

1. Clyde F. Coombs “Printed Circuits Handbook” McGrawhill , 7th Edition, 2016.
2. R.G. Gupta “Electronic instruments and system” Tata McGraw Hill Publication. NewDelhi, 2001.

WEB RESOURCES

1. https://www.ee.iitb.ac.in/~pcpandey/courses/ee616/pcblayout_c_aug07.pdf
2. <https://www.coursera.org/lecture/tinkering-circuits/making-circuit-boards-ZMJYT>


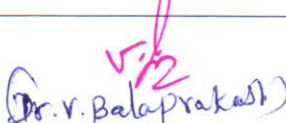
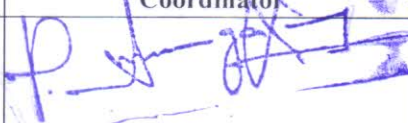
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO	PO1	PO2	PO3	PO4
CO1		S	S	M	S
CO2		S	M	M	M
CO3		S	S	M	M
CO4		S	M	S	S

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of internal assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mr. M. Suresh) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Name & Signature

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.

Course Code:	20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	Course Title						Batch:	2020-2021 & Onwards
		VAC: Energy Science						Semester:	I /II/III/IV/V/VI
Hrs/Week:	2	L	2	T	-	P	-	Credits:	1/G

COURSE OBJECTIVE

1. To make the students to understand the different form of energy and the sources.
2. To impart the knowledge of electromagnetic energy
3. To apply the knowledge of Biological energy sources
4. To inculcate the concept of nuclear radiation

COURSE OUTCOMES (CO)

S. No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the concept of energy and sources	K1
CO2	Analyze and convert the different form of energy	K2
CO3	Interpret the features of Electromagnetic energies and functions	K3
CO4	Student can able to apply knowledge over the energy conversion process and machines	K4

SYLLABUS

20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	VAC: Energy Science	Sem: I/II/III/IV/V/VI
Unit No.	Topics	Hours
I	Energy and its Usage: Units and scales of energy Mechanical energy and transport - Heat energy: Conversion between heat and mechanical energy.	6
II	Electromagnetic energy: Storage – Conversion - Transmission and radiation - AC and DC - Solar Energy: Introduction to solar energy - Fundamentals of solar radiation and its measurement aspects	6
III	Energy in chemical systems and processes: flow of CO ₂ - Entropy and temperature -carnot and Stirling heat engines - Phase change: Energy conversion - Refrigeration and heat pumps - Internal combustion engines - Steam and gas power cycles.	6
IV	Conventional & non-conventional energy source: Biological energy sources and power in the wind - Available resources – fluids – Viscosity - Types of fluid flow - Wind turbine dynamics and design - Wind farm - Geothermal power	6

V	Energy needs: Overview of World Energy Scenario - Nuclear radiation - Fuel cycles - Waste and proliferation - Climate change - Energy storage - Energy conservation.	6
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Teaching methods: < Lecturing, Lecture imposed with questions, PowerPoint Projection through LCD, Assignment, Discussion, Seminar, Buzzles and Quiz >

TEXT BOOKS

1. *Energy and the Challenge of Sustainability, World Energy Assessment, UNDP, New York, (2000).*
2. *Physics of Solar Cells: From Basic Principles to Advanced Concepts by Peter Würfel, John Wiley & Sons, 2016.*

REFERENCE BOOKS

1. *Energy Conversion by D. Yogi Goswami, Frank Kreith - CRC Press, 2017.*

WEB RESOURCES

Web Link: <https://www.energy.gov/eere/education/eere-energy-101-video-series>

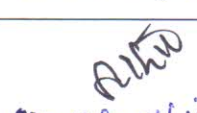
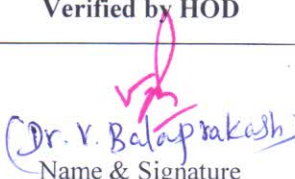
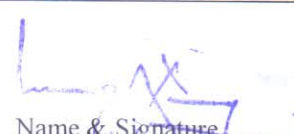
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	M
CO3	S	S	M	S
CO4	S	M	S	S

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Dr. V. Senthil) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Name & Signature

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.

Course Code:	20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	Course Title					Batch:	2020-2021 & Onwards	
		VAC: Photovoltaic Systems					Semester:	I /II/III/IV/V/VI	
Hrs/Week:	2	L	2	T	-	P	-	Credits:	1/G

COURSE OBJECTIVE

1. To Identify common types of PV system and applications
2. To understand the utility of energy storage devices
3. To impart the knowledge AC module technologies
4. To inculcate the knowledge of power processing schemes

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Identify the various safety hazards associated with both operation and nonoperation PV systems and components.	K1
CO2	Understand the meaning of basic electrical parameters including electrical charge, current, voltage, and power.	K2
CO3	Interpret and analyze the difference between electrical power (rate of work performed) and energy (total work performed).	K3
CO4	Demonstrate and determine the requirements for charge control in battery-based PV systems, based on system voltages.	K4

SYLLABUS

20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	VAC: Photovoltaic Systems	Sem: I /II/III/IV/V/VI
Unit No.	Topics	Hours
I	Photovoltaic Introduction-Fossil Fuel Energy Usage - Global Warming - Role of Renewable Energy in Sustainable Development - Renewable Energy Sources - Global Potential For Solar Electrical Energy Systems - Solar Radiation.	6
II	Solar Radiation-Extra-Terrestrial and Terrestrial Solar Spectrum - Clear Sky Direct-Beam Radiation - Total Clear Sky Insulation on A Collecting Surface - Radiation on The Collector in Tracking Systems - Calculation of Average Monthly Insolation from Measured Data.	6
III	Photovoltaic cell and its simple model - i-v and p-v characteristics - pv modules and arrays - effect of shading - use of bypass and blocking diodes - influence of temperature - types of solar cells and their performance.	6
IV	Grid-connected single phase pv inverter schemes and control - power processing schemes based on single string - multi-string and ac module technologies - types of grid interface - power electronic converters used in single phase pv systems.	6

V	Power processing schemes and control for stand-alone applications - batteries for energy storage – types – charging -battery sizing and turn-around efficiency - other types of energy storage for pv systems.	6
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Teaching methods: < Lecturing, Lecture imposed with questions, PowerPoint Projection through LCD, Assignment, Discussion, Seminar, Buzzles and Quiz>

TEXT BOOKS

1. Study of the MPPT tracking algorithms: Focusing the numeric al method techniques. A. Amira, A. Amira, J Selvaraja, N.A. Rahima. . (UNIT I, II & III)
2. Overview of Maximum Power Point Tracking Techniques for Photovoltaic Energy Production Systems. Ekoutrolis, Fblaabjerg. (UNIT IV & V)

REFERENCE BOOKS

1. Planning and installation photovoltaic system. Earthscan expert handbook.

WEB RESOURCES

1. <https://nptel.ac.in/courses/117/108/117108141/>
2. https://onlinecourses.nptel.ac.in/noc20_ee57/preview

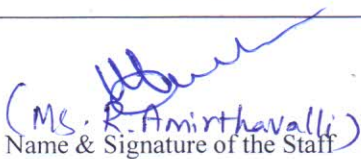

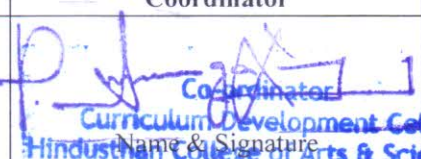
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO	PO1	PO2	PO3	PO4
CO1		S	M	M	S
CO2		S	S	S	M
CO3		S	S	M	M
CO4		S	M	S	S

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of internal assessment, suggested in the regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Ms. R. Amirthavalli) Name & Signature of the Staff	 (Dr. V. Bataprakash) Name & Signature	 Coordinator Curriculum Development Cell Name & Signature

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

Coimbatore-641 028.

Course Code:	20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	Course Title					Batch:	2020-2021 & Onwards	
		VAC: Basic Networking					Semester:	I /II/III/IV/V/VI	
Hrs/Week:	2	L	2	T	-	P	-	Credits:	1/G

COURSE OBJECTIVE

This Course has been designed to provide knowledge on computer networks.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the basics of OSI Model and network topologies.	K1
CO2	Analyze the requirements for a given organizational structure and its appropriate networking architecture and technologies.	K2
CO3	Apply the basic knowledge of the use of cryptography and network security.	K3
CO4	Evaluate and understand the issues surrounding Mobile and Wireless Networks.	K4

SYLLABUS

Unit No.	Topics	Hours
20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06		Sem: I /II/III/IV/V/VI
VAC: Basic Networking		
Unit No.	Topics	Hours
I	Photovoltaic Introduction-Fossil Fuel Energy Usage - Global Warming - Role of Renewable Energy in Sustainable Development - Renewable Energy Sources - Global Potential for Solar Electrical Energy Systems - Solar Radiation.	6
II	Solar Radiation-Extra-Terrestrial and Terrestrial Solar Spectrum - Clear Sky Direct-Beam Radiation - Total Clear Sky Insulation on A Collecting Surface - Radiation on The Collector in Tracking Systems.	6
III	Photovoltaic cell and its simple model - i-v and p-v characteristics - pv modules and arrays - effect of shading - use of bypass and blocking diodes - influence of temperature - types of solar cells and their performance - schemes for maximum power point tracking - solar pv concentrators.	6
IV	Grid-connected single phase pv inverter schemes and control - power processing schemes based on single string - multi-string and ac module technologies - types of grid interface - power electronic converters used in single phase pv systems.	6
	Power processing schemes and control for stand-alone applications - batteries for energy storage - types - charging -battery sizing and turn-around efficiency - other types of energy storage for pv systems- grid connected schemes with standby energy storage.	6

Teaching methods: < Lecturing, Lecture imposed with questions, PowerPoint Projection through LCD, Assignment, Discussion, Seminar, Buzzles and Quiz>

TEXT BOOKS

1. Behrouz and Forouzan, "Data Communications and Networking", 2nd Edition, Tata McGraw Hill, 2007.(UNIT I-IV).
2. Andrew.S.Tenenbaum, "Computer Networks", 4th Edition, Prentice Hall of India, 2008. (UNIT V).

REFERENCE BOOKS

1. William Stallings, "Data and Computer Communication", 6th Edition, Pearson Education.

WEB RESOURCES

1. <https://nptel.ac.in/courses/106/105/106105183/>
2. <https://nptel.ac.in/courses/106/106/106106091/>


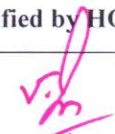
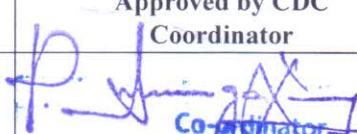
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	M	M	S
CO2	S	S	S	M
CO3	S	S	M	M
CO4	S	M	S	S

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of internal assessment, suggested in the regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Ms. R. Amirthavalli) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Co-ordinator Curriculum Development Cell Name & Signature

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

Hindusthan College of Arts & Science
 Coimbatore-641 028.

Course Code:	20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	Course Title						Batch:	2020-2021 & Onwards
		VAC: PC Hardware Assembling and Trouble Shooting						Semester:	I /II/III/IV/V/VI
Hrs/Week:	2	L	2	T	-	P	-	Credits:	1/G

COURSE OBJECTIVE

The Course has been designed to provide knowledge on PC, laptop repair & Maintenance.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand and explain the basic concepts associated with the different branches of hardware (motherboard, printer, memory).	K1
CO2	Understand and be able to describe the differences between the various parts used in motherboard.	K2
CO3	Analyze and implement the assembling and troubleshooting procedures.	K3
CO4	Design and implement the pc hardware and software.	K4

SYLLABUS

20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	VAC: PC Hardware Assembling and Trouble Shooting	Sem: I /II/III/IV/V/VI
Unit No.	Topics	Hours
I	Introduction to Computer Hardware - Common PC errors (Interactive discussion) -Types of Personal computers -Identifying key parts of a Personal Computer -Basic Software components -Overview of PC Operation.	6
II	CPU case and power supply - Types of PC case - Functions of a CPU Case Front Panel connectors - Removing CPU Case - Cleaning the PC case PC Cooling System.	6
III	The processor - CPU socket/slot types - Comparing different types of CPU (AMD / INTEL) - How to identify CPUs physically - Physical installation of CPU - Installing CPU fan - CPU Benchmarking.	6
IV	The motherboard- Types of motherboards - Motherboard layout, form factors - Motherboard Identification - Motherboard components - ROM BIOS - Motherboard BUSSES.	6
V	PC hardware servicing -PC Troubleshooting strategy - Designing a troubleshooting methodology - Establishing where to begin the testing - Determining common causes of failures - Finding and isolating the board with the problem.	6

Teaching methods: < Lecturing, Lecture imposed with questions, PowerPoint Projection through LCD, Assignment, Discussion, Seminar, Buzzles and Quiz>

TEXT BOOKS

1. Vishnu P. Sing, Computer Hardware and Networking, Computech Publications, 2ND edition.
2. ManaharLotia, Pradeep Nair and PayalLotia, Modern Computer Hardware Course, BPB Publications; Second Revised & Updated Edition 2007 edition.

REFERENCE BOOKS

1. Arihant Experts, Objective Computer Awareness, Arihant Publication; Eight edition.
2. B N Bennoch, How to Build a Computer: Building Your Own PC - The Easy, Step-By-Step Guide to Building the Ultimate, Custom Made PC.

WEB RESOURCES

1. <https://nptel.ac.in/courses/106/105/106105194/>
2. <https://nptel.ac.in/courses/106/106/106106092/>


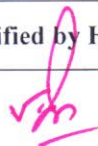
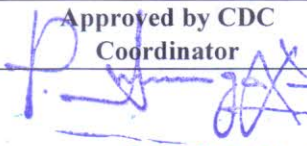
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	M
CO3	S	S	M	S
CO4	S	M	S	S

S-Strong, M- Medium, L - Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mrs. R. Vishalashi) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Co-ordinator Name & Signature

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.

Course Code:	20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	Course Title						Batch:	2020-2021 & Onwards
		VAC: Data Science						Semester:	I /II/III/IV/V/VI
Hrs/Week:	2	L	2	T	-	P	-	Credits:	1/G

COURSE OBJECTIVE

This course describes and introduce R as a programming language and mathematical foundations required for data science.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the basics of data science.	K1
CO2	Analyze and interpret data using an ethically responsible approach.	K2
CO3	Interpret and analysis, assess the quality of input, derive insight from results, and investigate potential issues.	K3
CO4	Apply computing theory, languages, and algorithms, and statistical models, in data analyses.	K4

SYLLABUS

20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	VAC: Data Science	Sem: I /II/III/IV/V/VI
Unit No.	Topics	Hours
I	Introduction to R – Variables and data types in R - Data frames – recasting and Joining of data frames- Arithmetic, Logical and Matrix operations in R. – Control structures.	6
II	Linear algebra and Data science - Solving linear equations – Linear algebra Distance – Hyperplanes – Half spaces – Eigenvalues - Eigenvectors.	6
III	Statistical modelling - Random variables and probability mass/ density functions – Sample statistics – Hypothesis testing.	6
IV	Multivariate optimization with equality constraints - Multivariate optimization with inequality constraints – Solving data analysis problems.	6
V	Linear regression – Model assessment – Diagnostic to improve linear model fit – Simple linear regression model building - Simple linear regression model assessment – Multiple linear regression ?	6

150 hrs
50 hrs
50 hrs
50 hrs
50 hrs
50 hrs

Teaching methods: < Lecturing, Lecture imposed with questions, PowerPoint Projection through LCD, Assignment, Discussion, Seminar, Buzzles and Quiz>

TEXT BOOKS

1. Roger D. Peng, "R Programming for Data Science", Lean Publishing, (2015), ISBN:9781365056826, 1365056821.
2. Winston Chang, "R Graphics Cookbook", O'Reilly Media, Inc., (2012), ISBN:9781449363086.

REFERENCE BOOKS

1. Using R for Introductory Statistics by John Verzani, CRC Press, 2004.

WEB RESOURCES

1. <https://nptel.ac.in/courses/106/106/106106179/>
2. <https://nptel.ac.in/courses/106/106/106106212/>


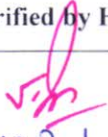

MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	M	S	S
CO2	S	S	S	S
CO3	S	S	M	M
CO4	S	M	S	S

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of internal assessment, suggested in the regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mrs. R. Vishalashi) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature Head of the Department Department of Physics Hindusthan College of Arts & Science Coimbatore-641 028	 Co-ordinator Name & Signature Curriculum Development Cell Hindusthan College of Arts & Science, Coimbatore-641 028.

Course Code:	20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	Course Title						Batch:	2020-2021 & Onwards
		VAC: Lab View						Semester:	I /II/III/IV/V/VI
Hrs/Week:	2	L	2	T	-	P	-	Credits:	1/G

COURSE OBJECTIVE

To enable the student on how to approach for solving Engineering problems using simulation tools and to prepare the students to use LABVIEW in their project works.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the concept of Programming.	K1
CO2	Analyze and synthesize the programming methodologies and data types.	K2
CO3	Interpret the features of functions and Structures.	K3
CO4	Design and implement simple programs on Constructors, Inheritance and Pointers.	K4

SYLLABUS

Unit No.	Topics	Hours
I	Lab view introduction - The LabVIEW Programming Environment - Controls/ Indicators Programming Structures and Examples – Auto indexing - Creating Subvi's – Debugging - Timing issues (counters).	6
II	Importing pictures – Structures - GPIB setup / IBIC - 488 vs. 488.2 commands Strings - GPIB serial poll byte - Timing of VI's - Testing Device Status - File I/O.	6
III	RS 232 - Attribute nodes (graphs) - Saving front panels - Turning on / off controls/ indicators – Menus - Idiot proofing.	6
IV	DAQ boards analog I/O - DAQ boards digital I/O - Real-Time Control Systems - Guest Lecturer: Prof. Timothy Chang.	6
V	LabVIEW Advanced Topics (ActiveX) - Advanced Topics – FFT - Frequency Filters - Time Domain Filters - Final Project.	6

Teaching methods: < Lecturing, Lecture imposed with questions, PowerPoint Projection through LCD, Assignment, Discussion, Seminar, Buzzles and Quiz >

TEXT BOOKS

1. Chapra, Steven C. (2018). *Applied Numerical Methods with MATLAB for Engineers and Scientists (4th ed.)*. McGraw-Hill Education. (UNIT-I-IV)
2. Fausett, Laurene V. (2009). *Applied Numerical Analysis Using MATLAB*. Pearson India. (UNIT-V)

REFERENCE BOOKS

1. Jain, M. K., Iyengar, S. R. K., & Jain R. K. (2012). *Numerical Methods for Scientific*

WEB RESOURCES

1. <https://nptel.ac.in/courses/103/106/103106118/>
2. https://nptel.ac.in/content/storage2/courses/103106118/Week%20-%201/MATLAB_Basics.pdf


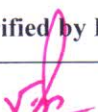

MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	M
CO3	S	S	M	S
CO4	S	M	S	S

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mrs. R. Vishalashri) Name & Signature of the Staff	 (Dr. V. Balaprakash) Name & Signature	 Name & Signature

Head of the Department
 Department of Physics
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 Coimbatore-641 028

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

Course Code:	20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	Course Title						Batch:	2020-2021 & Onwards
		VAC: Object Oriented Programming with C++						Semester:	I /II/III/IV/V/VI
Hrs/Week:	2	L	2	T	-	P	-	Credits:	1/G

COURSE OBJECTIVE

To impart the concepts of Object-Oriented Programming using C++ and equip the students to develop programming skills.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the concept of Programming.	K1
CO2	Analyze and synthesize the programming methodologies and data types.	K2
CO3	Interpret the features of functions and Structures.	K3
CO4	Design and implement simple programs on Constructors, Inheritance and Pointers.	K4

SYLLABUS

20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	VAC: Object Oriented Programming with C++	Sem: I /II/III/IV/V/VI
Unit No.	Topics	Hours
I	Evolution of Programming Methodologies-Introduction to OOP and its basic features - Basic components of a C++ - Program and program structure - Compiling and Executing C++ Program - Selection control statements in C++.	6
II	Data types - Expression and control statements - Iteration statements in C++ - Introduction to Arrays -Multidimensional Arrays – Strings.	6
III	Functions - Passing Data to Functions - Scope and Visibility of variables in Functions - Structures in C++.	6
IV	Classes objects - Data members - Member functions - Friends - Friend Functions - Friend Classes - Friend Scope -Static Functions.	6
V	Constructors and Destructors - Static variables and Functions in class - Operator Overloading in C++ - Inheritance - Pointers.	6

Handwritten notes in blue ink:
 2020-2021
 2020-2021
 2020-2021

Teaching methods: < Lecturing, Lecture imposed with questions, PowerPoint Projection through LCD, Assignment, Discussion, Seminar, Buzzles and Quiz>

TEXT BOOKS

1. E. Balagurusamy, "Object-oriented programming with C++", Tata McGraw Hill Publication, 2nd Edition. (Unit-I to V)

REFERENCE BOOKS

1. Robert Lafore, "Object-oriented programming in Turbo C++", Galgotia Publication, 4th Edition.

WEB RESOURCES

1. <https://nptel.ac.in/courses/106/101/106101208/>
2. https://onlinecourses.nptel.ac.in/noc19_cs39/preview

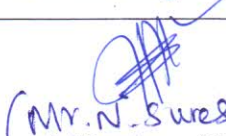
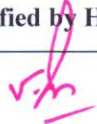

MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	M
CO3	S	S	M	S
CO4	S	M	S	S

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mr. N. Suresh) Name & Signature of the Staff	 (Dr. V. Balakrishna) Name & Signature	 Co-ordinator Name & Signature

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

Course Code:	20PHUV01 / 20PHUV02 / 20PHUV03 / 20PHUV04 / 20PHUV05 / 20PHUV06	Course Title						Batch:	2020-2021 & Onwards
		VAC: Arduino Programming						Semester:	I /II/III/IV/V/VI
Hrs/Week:	2	L	2	T	-	P	-	Credits:	1/G

COURSE OBJECTIVE

To impart the concepts of Sensors and Program the Arduino with latest applications and equip the programming skills.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Understand the concept of sensors.	K1
CO2	Analyze and amalgamate the programming methodologies	K2
CO3	Interpret the features of. Sensors with Arduino	K3
CO4	Design and implementation various applications	K4

SYLLABUS

Unit No.	Topics	Hours
	VAC: Arduino Programming	Sem: I /II/III/IV/V/VI
I	Microcontroller - Install the Software - The Integrated Development Environment (IDE) - Our first circuit-Updated Circuit-Our First Program-Comments- Gotchas	7
II	"Blinky" - IF Statements - ELSE Statements- WHILE statements - What is truth (true) - Combinations - FOR statements - Our New Circuit - Introducing Arrays	7
III	Input - Pushbuttons- Potentiometers - RGB LEDs- Sound Circuit - Simple note - Music - Music with functions – Making a digital thermometer - Serial Monitor - Measuring the temperature - Hooking up the LCD - Talking to the LCD - Bringing it all together	6
IV	Introduction - Photo Cell (Light Sensor) - Tilt Sensor Reed Switch (Magnetic Field Detector) - Piezo Element (Vibration sensor)	6
V	One Servo - Joystick Pan/Tilt bracket - Adding a firing mechanism	4

Teaching methods: < Lecturing, Lecture imposed with questions, PowerPoint Projection through LCD, Assignment, Discussion, Seminar, Buzzles and Quiz>

TEXT BOOKS

1. "Introduction to "Arduino", Alan G. Smith, 2011, ISBN: 1463698348 and ISBN-13: 978-1463698348. .
(Unit-I to V)

REFERENCE BOOKS

1. Beginning C for Arduino, Second Edition: Learn C Programming for the Arduino 2nd ed. Edition by Jack Purdu

WEB RESOURCES

1. <https://store.arduino>



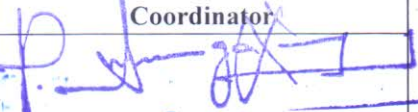
MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	M
CO3	S	S	M	S
CO4	S	M	S	S

S-Strong, M- Medium, L – Low

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of internal assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Coordinator
 (Mrs. R. Vishalashi) Name & Signature of the Staff	 Dr. V. Balaprakash Name & Signature	 Co-ordinator Curriculum Development Cell Hindusthan College of Arts & Science, Coimbatore-641 028.

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