

Allied Physics

Syllabus

AFFILIATED COLLEGES

Program Code:

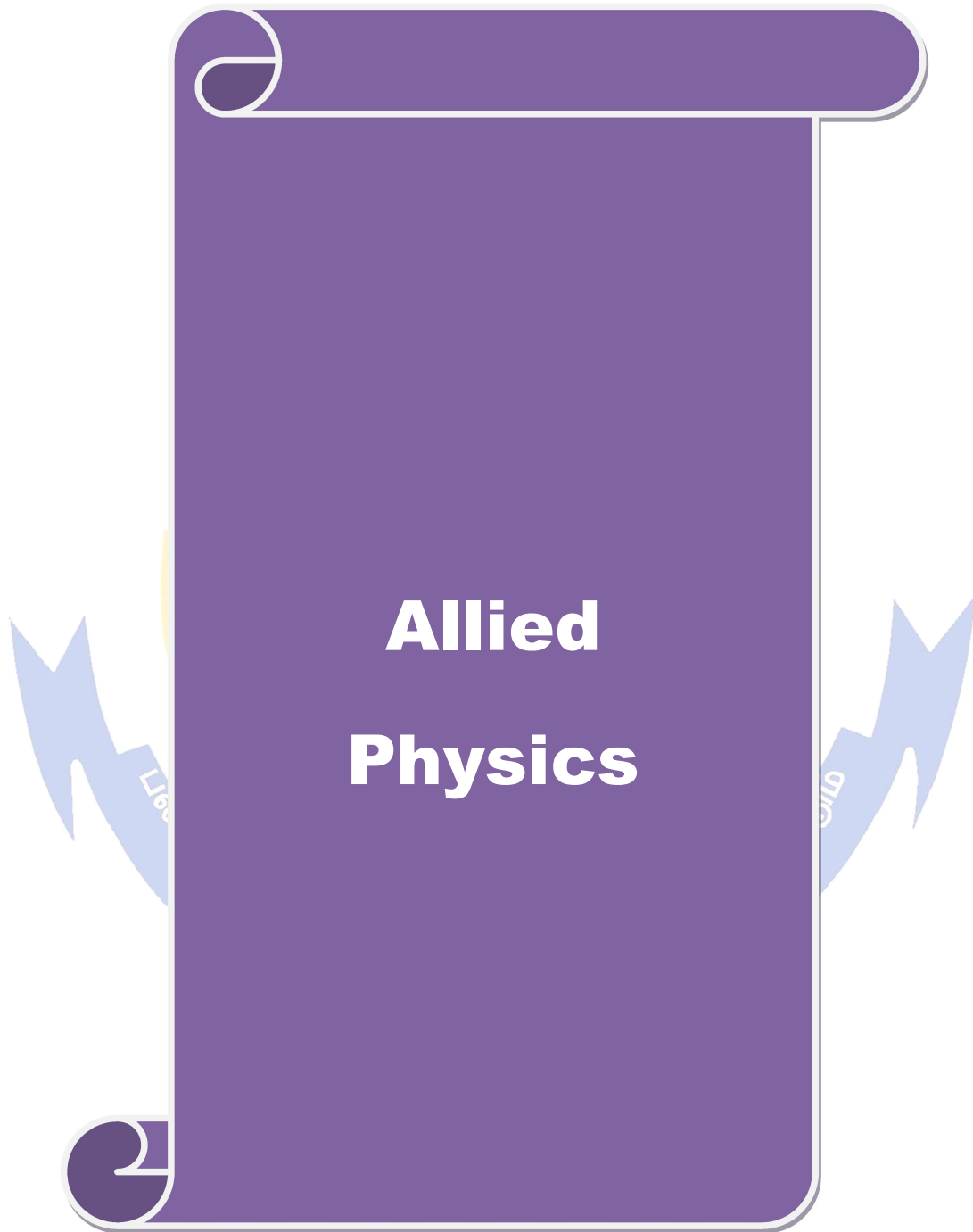
2021 – 2022 onwards



BHARATHIAR UNIVERSITY

(A State University, Accredited with “A” Grade by NAAC,
Ranked 13th among Indian Universities by MHRD-NIRF,
World Ranking: Times -801-1000, Shanghai -901-1000, URAP - 982)

Coimbatore - 641 046, Tamil Nadu, India



ALLIED PHYSICS PAPERS FOR B. Sc., MATHS / CHEMISTRY
2021-2022 BATCH AND ONWARDS
SEMESTER I /III

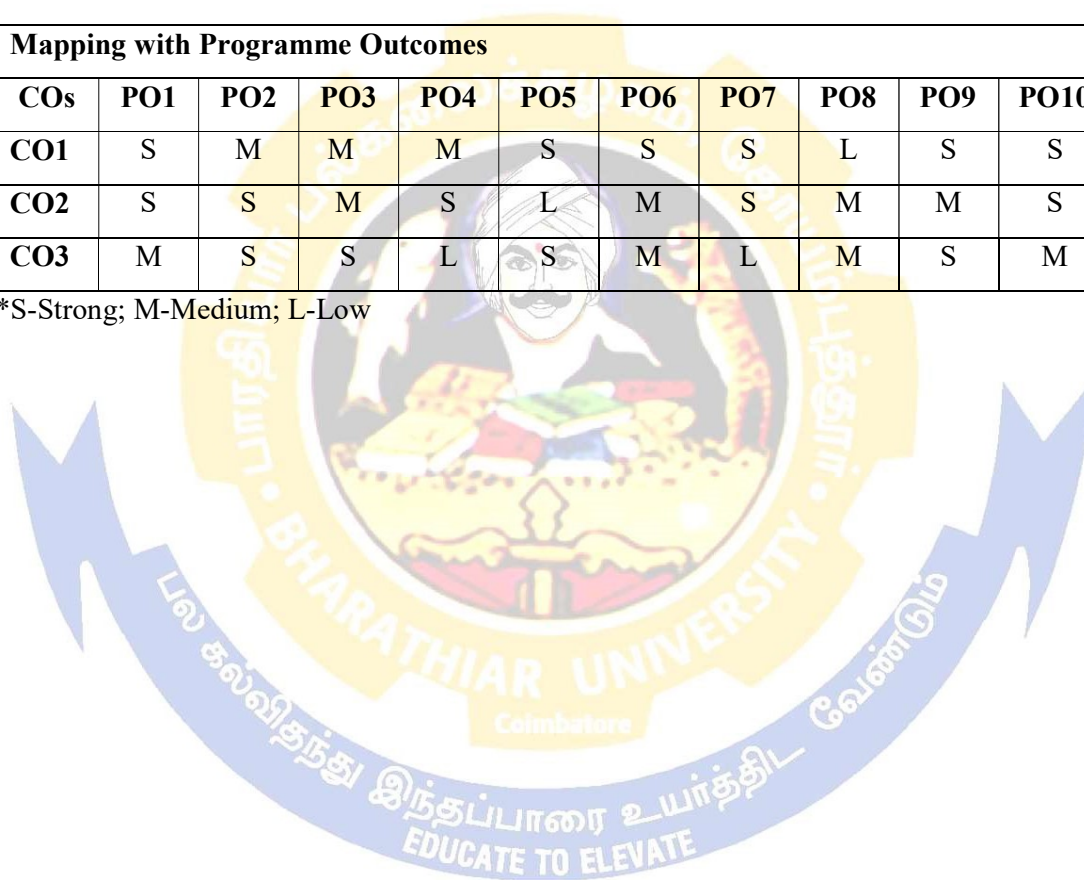
Course code	1AF/ 3AF	ALLIED PHYSICS-I	L	T	P	C
Allied Paper			4	0	0	4
Pre-requisite		The students are expected to know the fundamental of properties of matter, heat and electricity.	Syllabus Version		2021-22	
Course Objectives:						
The main objectives of this course are to:						
1. understand the behaviour of matter in everyday life.						
2. acquire .skill of solving related problems.						
3. get clear idea about properties of matter, electricity and magnetism.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	understand and define the laws involved in gravitation and elasticity.					K2
2	develop the knowledge about heat and thermodynamics, sound and spectroscopy.					K3
3	understand the concept of properties of matter and to recognize their applications in various real problems.					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 - Create						
Unit: I		Properties of Matter			12 hours	
Gravitation: Newton's law of Gravitation - Determination of G by Boy's method - mass and density of earth – acceleration due to gravity- Determination of g by compound pendulum.						
Elasticity: Basic concepts – bending of beams – depression of cantilever- Determination of Y by uniform and non- uniform bending methods – Torsion in a wire – Determination of rigidity modulus by torsional pendulum.						
Unit:II		Heat, Thermodynamics and Sound			12 hours	
Vanderwaal's equation of state-critical constants of a gas-derivation of critical constants in terms of						

Vanderwaal's constants – Joule-Thomson effect – Porous plug experiment –liquefaction of helium – K-Onnes method – properties of liquid Helium I and II.		
Sound: Ultrasonics – Introduction - Properties - Production – Piezoelectric method - applications.		
Unit: III	Atomic Physics	12hours
X-Rays: Introduction – Properties – Principle – Production – Coolidge tube – Bragg's law – derivation — Powder crystal method – Moseley's law and its importance – Compton scattering – Applications.		
Unit: IV	Electricity	12 hours
Ballistic Galvanometer – principle – construction – theory – figure of merit — current and voltage of sensitiveness – Conversion of galvanometer into ammeter and voltmeter – measurement of Thermo EMF and resistance by potentiometer – Electromagnetic induction – Transformers: Theory, energy loss and applications.		
Unit: V	Magnetism	10 hours
Magnetic properties of materials: Magnetic induction B – Magnetisation M – Magnetising field H – Relation between – B, H and M – Magnetic susceptibility – Magnetic permeability – Properties of dia, para and ferro magnetic materials – Curie temperature – Energy loss due to hysteresis – importance of hysteresis curves – magnetic circuit.		
Unit: VI	Contemporary Issues	2 hours
Expert lectures, online seminars - webinars		
Total Lecture hours		60
Text Book(s)		
1	Properties of Matter and Acoustics, R. Murugesan, 2nd Edition, S.Chand& Co. Ltd. Reprint (2017).	
2	Modern Physics, R.Murugesan, KiruthigaSivaprasath, Twelfth Revised Edition, S.Chand& Co. Ltd. Reprint (2006).	
3	Heat and Thermodynamics, BrijlalN.subramaniyam, S.Chand& Co. LtdReprint(2006).	
4	Electricity and Magnetism , R. Murugesan ,Revised edition , S.Chand& Co Reprint (2014)	
Reference Books		
1	Heat Thermodynamics and Satisfical Physics, BrijlalN.subramaniyam,P.S.Hemme,S.Chand&Co,Revised edition (2007).	
2	Thermodynamics and Statistical Physics, Agrawal Prakash, PragatiPrakashan, 27 th edition (2015)	

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.physicstutoronline.co.uk/alevelphysicsnotes/
2	https://www.askiitians.com/revision-notes/physics/atomic-physics/
3	www.khanacademy.org/science/physics/elasticity/surface tension
4	https://sites.google.com/brown.edu/lecture-demonstrations/home?authuser=0
Course Designed By: Dr. P. Sagunthala, Dr. P. Yasotha	

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	L	S	S
CO2	S	S	M	S	L	M	S	M	M	S
CO3	M	S	S	L	S	M	L	M	S	M

*S-Strong; M-Medium; L-Low



SEMESTER II / IV

Course code	2AF/4AF	ALLIED PHYSICS-II	L	T	P	C
Allied paper			4	0	0	4
Pre-requisite		The students are expected to know the fundamentals of Nuclear Physics, Lasers, Semiconductors and electronics.	Syllabus Version		2021-22	
Course Objectives:						
The main objectives of this course are to:						
1.gain a well understanding of various physics concepts involved in day-to-day life.						
2.acquire knowledge in physics concepts and problem solving skills						
3.developing skills to meet competitive exams						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Acquire knowledge on basic concepts of photoelectric effect and fission, fusion and to get clear idea on wave mechanics.					K1
2	Understand the features of Nuclear forces,photoelectric cells,semiconductor diodes and their fundamental concepts.					K2
3	Understand the concept of Laser properties,digital electronics and to recognize their applications in real life.					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit: I						
Modern Physics					12 hours	
Photo electric effect – Laws of photo electric effect – Einstein’s photo electric equation – verification of Einstein’s photo electric equation by Millikan’s experiment – photo electric cells – applications.						
Wave mechanics: De Broglie matter waves – determination of De Broglie wave length – Experimental study of De Broglie matter wave by G.P.Thomson experiment.						
Unit: II						
Nuclear Physics					11 hours	
Characteristics of nuclear forces – nuclear structure by liquid drop model – Binding energy – mass defect – particle accelerators – cyclotron and betatron –nuclear fission: definition – energy released – chain reaction – atom bomb – nuclear fusion:definition – source of Stellar energy – Hydrogen bomb - elementary particles – Leptons, Mesons and Baryons						

Unit: III	Laser Physics	11 hours
Purity of spectral lines – Coherence length and time – spontaneous and induced emissions – population inversion – meta stable state – conditions for laser actions – Ruby laser – Helium – neon laser – applications of lasers – Raman effect – Raman shift – stokes and anti-stokes lines – Laser Raman Spectrometer.		
Unit: IV	Semiconductor Physics	12 hours
Volt – Ampere Characteristics of P-N junction Diode – Zener diode – applications of Zener diodes – photo diode – principle of LED– Frequency Modulation and Amplitude modulation – basic principle of antennas – block diagram of Superhetrodyne receiver – block diagram of monochrome TV receiver – basic principles and applications of RADAR		
Unit: V	Digital Electronics	12 hours
Integrated Electronics Steps in fabrication of Monolithic IC's – General applications of IC's. Analog and digital computers – organization of digital computers – number systems – conversion of binary into decimal – conversion of decimal to binary – binary addition and subtraction – Basic logic gates – NAND and NOR as an universal logic gates – Demorgan's theorems – Boolean algebra – applications of Demorgan's theorems – Half adder and full adder circuits.		
Unit: VI	Contemporary Issues	2 hours
Expert lectures, online seminars – webinars		
Total Lecture hours		60
Text Book(s)		
1	Modern Physics, R. Murugesan, Kiruthiga Sivaprasath, Twelfth Revised Edition, S. Chand & Co. Ltd. Reprint (2006)	
2	Principles of Electronics, V.K. Metha, Reprint, S. Chand & Co (2000)	
Reference Books		
1	A Text Book of electronics, R.S Sedha, S. Chand & Co. Ltd. Reprint (2008).	
2	Modern Physics, Sehgal, Chopra, Sehgal, S. Chand & Co	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://www.askiitians.com/revision-notes/physics/atomic-physics/	
2	https://www.askiitians.com/revision-notes/physics/nuclear-physics/	

3	https://www.askiitians.com/revision-notes/physics/solid-and-electronic-device/
Course Designed By: Dr. P. Sagunthala and Dr. P. Yasotha	

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	L	S	S
CO2	S	M	S	M	M	S	S	L	M	S
CO3	M	S	M	L	S	M	L	M	S	M

