



DR. D. Y. PATIL VIDYAPEETH

PIMPRI, PUNE – 411 018

DR. D. Y. PATIL BIOTECHNOLOGY & BIOINFORMATICS INSTITUTE

TATHAWADE, PUNE

SYLLABUS FOR

SEMESTER I

**B. TECH BIOTECHNOLOGY, B. TECH MEDICAL BIOTECHNOLOGY, M. TECH
(INT.) BIOTECHNOLOGY**

(BATCH 2018-19)

DR. D.Y. PATIL VIDYAPEETH, PUNE
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B. TECH BIOTECHNOLOGY, B. TECH MEDICAL BIOTECHNOLOGY, M. TECH (INT.)
BIOTECHNOLOGY

Academic year 2018-2019

SEMESTER I						
Course Code	Course Name	L	T	P	Hr	Cr
BS 101	Physics	3	0	2	5	4
BS 102	Chemistry	3	0	4	7	5
BT 101	Electronics & Instrumentation Engineering	3	0	2	5	4
BI 101	Computers & C Programming	3	0	4	7	5
HU 101	Communication Skills	1	2	0	3	3
BS 103	Maths I – Mathematics	3	1	0	4	4
BT 102	Engineering Graphics	2	0	2	4	3
HU 102	Disaster Management*	0	1	0	1	-
Total		18	4	14	36	28
<i>*Audit course, attendance is must</i>						

TITLE OF THE COURSE: PHYSICS**COURSE CODE: BS 101****MARKS: 150****L T P Hr C****3 0 2 5 4****OBJECTIVE**

The objective of this course is:

- To create general understanding regarding basic physical principles involved in living systems.
- To familiarize the student with basic concepts in physics as: classical optics used in microscopes and telescopes, thermometry and heat, mechanical, fluid and solid state properties.
- To familiarize students with concepts in digital electronics, lasers, sound waves, electricity.
- To introduce them to concepts in modern physics such as: production of X-ray, X-ray crystallography, quantum mechanics etc.

LEARNING OUTCOME

At the end of the course, the students will have sufficient scientific understanding of the basic concepts in classical and modern physics, laser sources, concepts and laws applicable to quantum-mechanical particles. This would enable him to understand use of physical methods in understanding Biomolecular structure and interactions

PREREQUISITES

This is an introductory course. School level knowledge of physics is sufficient. There are no prerequisites.

COURSE DESCRIPTION

Sr. No.	Topics	Detail syllabus	No. of Lectures
1	Optics: Interference Diffraction & Polarization	Introduction to optics, Principles of superposition, Constructive & Destructive Interference, Types of Interference, Newton's rings. Diffraction- Types of diffraction, Diffraction grating, Rayleigh's criterion, Resolving power of Microscope and Telescope. Polarization of light waves, Polaroid, Optical activity.	08
2	Thermometry and Heat	Principles of Thermometry, Temperature and it's measurements, Platinum resistance Thermometer, Thermocouple and Thermistors, Modes of Heat Transfer.	05
3	Properties of Fluid: Surface Tension & Viscosity	Surface Tension, Surface Energy, Angle of Contact, Capillarity action, Determination of Surface tension by	07

		capillary rise method, Jaeger's method, Temperature dependence of surface tension and its applications. Viscosity, Coefficient of viscosity, streamline and turbulent flow, Reynold's number, Stoke's law, Terminal velocity, Determination of ' η ' by falling sphere method.	
4	Elasticity	Stress and Strain, Hook's law, Stress-strain curve, Young's modulus, Determination of Young's modulus.	03
5	Solids and Semiconductor Devices	Classification of Solids (Conductor, Semiconductor and Insulators), intrinsic and extrinsic semiconductors, PN Junction Diode, Zener Diode, Junction Transistors (CE, CB mode)	05
6	Introduction to Digital Electronics	Introduction to Binary mathematics, BCD numbers, Basic logic gates, De-Morgan's Theorem	02
7	Lasers	Properties of Lasers, Production mechanism, Ruby Laser, Helium Neon Laser, applications of Lasers.	03
8	Sound waves	Types of sound waves (Longitudinal and Transverse), Audible, Ultrasonic and Infrasonic waves, Beats, Doppler effect, Applications of Ultrasonic waves.	03
9	Electricity	Heating effect of electric current, Joule's law, Transformers, Types of Transformers.	02
10	Modern Physics: X-rays, Crystallography, Introduction to Quantum Mechanics	Introduction to X-Rays : Introduction, Production of X-rays, X-Ray diffraction and its Applications. Introduction to crystal structure, Unit cell, seven crystal systems. Plank's Quantum Theory, Properties of Photon, Photoelectric effect, wave particle duality of radiation, de Broglie's hypothesis, Heisenberg's Uncertainty principle.	07
Total Lectures			45

METHODOLOGY

The course will be covered through lectures supported by practical's.

EVALUATION SCHEME (THEORY)

Examination	Duration	Marks
I Internal	60 minutes	20
II Internal	45 minutes	15
Attendance		5
End Semester Exam	2 hours 30 minutes	60
Total		100

BOOKS RECOMMENDED:

1. Physics by D. Haliday and R. Resnik 5th edition, Wiley Eastern Pub, 2007.
2. Perspectives of Modern Physics by A. Beiser, 6th edition, Mc Graw Hill, 2003.
3. Fundamentals of optics by F. A. Jenkins and H. E. White, 4th edition, Mc Graw Hill, 1976.
4. Optics by A. Ghatak, 3rd edition, Tata Mc Graw Hill, 2006.
5. Digital Principles and Applications by A. P. Malvino, G. Saha and D. P. Leach, 7th edition, Mc Graw Hill, 2011.

6. PRACTICAL IN PHYSICS (TWO HOURS PER WEEK) Marks 50

The practical training would be in the area of optics, electronics, thermometry, calorimeter, conductivity, measurement of physical properties as: viscosity and surface tension.

LIST OF EXPERIMENTS

1. Diffraction Grating: Use of diffraction grating for determination of wavelength of spectral lining.
2. Resolving Power: To determine the resolving power of Microscope or telescope.
3. Diode Characteristics: Study of forward and reverse characteristics of Diode.
Transistor Characteristics: Study of characteristics of Photocell.
4. Band gap of semiconductor: Study of input and output characteristics of a transistor and determination of band gap of a semiconductor.
5. Ultrasonic Interferometer: Determination of velocity of ultrasonic waves by ultrasonic
6. Study of logic gates (OR, AND, NOT).
7. Thermocouple: Study of variation of thermo emf (electromotive force) with temperature.
8. Surface Tension: Determination of the surface tension of a given solution.
11. Viscosity: Determination the coefficient of viscosity by Stoke's method and its practical application.
12. Joule's Law: Determine of Joule's constant.
13. Determination of wavelength of monochromatic light by Newton's rings experiments.
14. Thermal Conductivity: Determination of coefficient of thermal conductivity of given specimen.

PRACTICAL EVALUATION SCHEME

Examination

Practical	: 10 marks
Attendance	: 5 marks
Journal writing	: 5 marks
End semester examination	: 30
Total	:50