GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	All
Semester	I/II	Version	1.0.0.0
Effective from Academic Year	2026-27	Effective from the batch admitted in	July 2026
Course Code	2BSC1106	Course Name	Engineering Physics
Course Category	Basic Science Courses (BSC)		

Teaching Scheme						Examination scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	50	50	100
Hours	3	0	2	0	5	Practical	25	25	50

Pre-requisites:

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Course Outcomes

COs	Description
CO1	Analyze acoustic and electromagnetic wave phenomena for engineering applications.
CO2	Explain principles of wave optics, lasers, and fiber optics in communication systems.
CO3	Apply thermodynamic laws and heat transfer concepts to engineering systems.
CO4	Understand semiconductor and modern physics concepts for advanced engineering technologies.

Theory Syllabus

Unit	Content	Hours
1	**Acoustics** Periodic motion and oscillatory motion, Simple Harmonic Motion (SHM): Definition, equation, velocity and acceleration, Damped and forced oscillations (qualitative), Resonance and its applications, Wave motion: Types of waves, Longitudinal waves, Sound waves and their characteristics, Ultrasonic waves: production, properties, and engineering applications, Doppler effect and various cases with examples, Sound sensors.	7
2	**Electromagnetics** Magnetic moment, Magnetic dipole, Magnetic Field strength, Magnetic flux density, Intensity of magnetization, Magnetic dipole moment, Magnetic field Intensity, magnetic permeability, magnetic susceptibility, Bohr magnetron, classification of magnetic materials, hysteresis, Skin effect, application of magnetic materials, Electromagnetic waves – origin, properties, EM spectrum	5
3	**Lasers and Fiber Optics** Interference of light, Diffraction – introduction and types, Difference between interference and diffraction, Coherence – temporal and spatial coherence, Polarization of light – plane, circular, elliptical, Interaction of radiation with matter, Einstein's A and B coefficients, Population inversion and stimulated	10

	emission, Types of lasers: Ruby laser, CO_2 laser, Semiconductor laser, Properties of laser light, LED, Optical fiber: Principle of operation, Types of optical fibers, Classification of optical fibers, Numerical Aperture, Applications in communication and computing.	
4	**Modern Physics** Plasma physics – introduction and engineering applications, Superconductivity – basic concepts and applications, Superconductive materials, Nanomaterials – types, properties, and applications, Biomaterials – classification and applications, X-rays – production, properties, and applications, Quantum physics – Need, basic concepts, plank's hypothesis, Quantization of energy, Origin of Quantum theory, Applications of quantum physics in engineering	8
5	**Semiconductor Physics** Conductors, semiconductors and insulators, Energy band theory, Intrinsic and extrinsic semiconductors, Charge carriers: electrons and holes, Drift and diffusion currents (conceptual) **PN junction diode:** Formation of PN junction, Depletion region, Forward and reverse bias, V–I characteristics, Applications of PN junction diode	9
6	**Thermodynamics** Zeroth law of thermodynamics, First law of thermodynamics and its applications, Second law of thermodynamics, Entropy and entropy change, Heat engines and efficiency, Engineering applications of thermodynamics (cooling systems, computing hardware), thermometry and types, resistance thermometer, thermoelectric conduction, convection, radiation, thermal conductivity of material.	6
Practical and Self Learning Content		
Practical, assignments, quiz, industrial visit, field survey and tutorials are based on the above syllabus.		
Text Books		
1	Engineering Physics – M.N. Avadhanulu, P.G. Kshirsagar & T.V.S. Arun Murthy	
2	Engineering Physics – S. P. Basavaraju	
Reference Books		
1	Principles of Physics – Halliday, Resnick & Walker	
2	Physics for Scientists and Engineers with Modern Physics 4thEdition" by by Douglas C. Giancoli	
3	Electronic Principles, by Albert P. Malvino, David J. Bates, Patrick E. Hoppe,9thEdition(Tata McGrawHill Education).	
ICT/MOOCs Reference		
1	https://onlinecourses.nptel.ac.in/noc25_ph03/preview	
2	https://onlinecourses.swayam2.ac.in/aic22_ts58/preview	

Mapping of COs, POs, and PSOs														
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	2	1	-	-	-	-	-	-	3	2	1
CO2	3	2	2	1	2	-	-	-	-	1	-	3	3	2
CO3	3	2	1	1	-	1	2	-	-	-	-	2	1	-
CO4	3	2	2	1	2	-	-	-	-	-	-	3	3	3

Bloom's Taxonomy Level				
Unit	**Unit Title**	**Aligned COs**	**Learning Hours**	**BTL Level**
1	Acoustics	CO1	7	Apply
2	Electromagnetics	CO1, CO2	5	Apply
3	Lasers and Fiber Optics	CO2	10	Apply
4	Modern Physics	CO3	6	Apply
5	Semiconductor Physics	CO4	9	Apply
6	Thermodynamics	CO4	8	Understand

Note:

- Version 1.0.0.0 (First Digit= New syllabus/Revision in Full Syllabus, Second Digit=Revision in Teaching Scheme, Third Digit=Revision in Exam Scheme, Forth Digit= Content Revision)
- 1 Hour Lecture = 1 Credit, 1 Hour Tutorial = 1 Credit, 2 Hours Practical = 1 Credit, 2 Hours Internship/Project/Seminar = 1 Credit
- Bloom's Taxonomy Level (BTL): R: Remember, U: Understand, A: Apply, N: Analyze, E: Evaluate, and C: Create