

MANAV RACHNA UNIVERSITY

DEPARTMENT OF PHYSICS

B.Sc. Mapping of COs with POs and PSOs

B.Sc SEMESTER 1

Courses Code	Courses	Course Outcome	CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	
PHH104B-T&P	Mathematical Physics-I	CO1	solve differential equations of first and second orders	✓	✓	✓	X	X	✓	✓	X	X	✓	X	X	X	X	
		CO2	solve problems based on vector differentiation	✓	✓	✓	X	X	✓	✓	X	X	✓	X	X	X	X	X
		CO3	Apply Green and Stokes theorem, line, surface and volume integrals and Dirac-Delta function to solve different problems	✓	✓	✓	X	X	✓	✓	X	X	✓	X	X	X	X	X
		CO4	Apply gradient, divergence and Laplacian to solve different problems	✓	✓	✓	X	X	✓	✓	X	X	✓	X	X	X	X	X
PHH105B-T & P	Mechanics	CO1	CO1: Students would be able to demonstrate fundamentals of dynamics of a particle/system of particles, apply work and energy concepts to daily life problems	✓	✓	✓	X	X	✓	✓	X	✓	✓	X	✓	✓	✓	
		CO2	CO2: Students will be able to explain rotational dynamics and apply its concepts to solve related problems	✓	✓	✓	X	✓	X	X	✓	✓	X	✓	✓	✓	✓	✓
		CO3	CO3: Students will be able to explain oscillations and apply its concepts to solve related problems	✓	✓	✓	✓	✓	X	X	✓	X	✓	✓	✓	X	✓	✓
		CO4	CO4: Students will be able to explain concepts of central force motion and STR and hence apply them on planetary problems and solve everyday problems related to central forces	✓	✓	✓	X	✓	X	✓	X	✓	✓	X	✓	✓	✓	✓
CHH105B-T & P	Essential of chemistry	CO1	Gain knowledge of concepts and phenomenon related to electronic structure of atom.	✓	X	✓	✓	X	X	X	X	X	X	X	X	X	✓	
		CO2	Analyze the concentration of solutions.	✓	X	✓	✓	X	X	X	X	X	X	✓	✓	✓	X	✓
		CO3	Understand various types of titration and their applications.	✓	X	✓	✓	X	X	X	X	X	X	✓	✓	✓	X	✓
		CO4	Evaluate the pH of hydrolysis of salts.	✓	X	✓	✓	X	X	X	X	X	X	✓	✓	✓	X	✓
		CO5	Remember the concept and application of colloids and catalysis.	✓	X	✓	✓	X	X	X	X	X	X	X	X	X	X	✓
		CO6	Synthesize and create adsorption isotherms.	✓	X	✓	✓	X	X	X	X	X	X	✓	✓	✓	X	✓
CSH105B-T&P	Programming for Problem solving using C	CO1	Analyse and apply Test Driven Development approach to design programs.	✓	✓	✓	X	X	X	X	X	✓	✓	✓	✓	✓	✓	
		CO2	Understand and apply programming language constructs as per given problems	✓	✓	✓	X	X	X	X	X	✓	✓	✓	✓	✓	✓	
		CO3	Understand and apply C programming language constructs on opensource platform	✓	✓	✓	X	X	X	X	X	✓	✓	✓	✓	✓	✓	
		CO4	learn to work in a team using different online platform for program development	✓	✓	✓	X	X	X	X	X	✓	✓	✓	✓	✓	✓	
HLS102	Communicative English	CO1	To know about all the words and phrases of English language.	X	X	X	X	X	X	X	X	X	X	*	*	X	*	
		CO2	To build the basic skills	X	X	X	X	X	X	X	X	X	X	*	*	X	*	
		CO3	To know about the importance of Listening	X	X	X	X	X	X	X	X	X	X	*	*	X	*	
		CO4	To use basic skills of presentation.	X	X	X	X	X	X	X	X	X	X	*	*	X	*	

B.Sc SEMESTER 2

Courses Code	Courses	Course Outcome	CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	
PHH107B-T	Electricity and Magnetism	CO1	Acquire the knowledge of vector calculus to be applied to electromagnetism	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		CO2	Apply vector calculus for the computation of various parameters of electrostatics	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		CO3	Analyze the variation of magnetic fields due to current flowing in different forms and due to dipole	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		CO4	Appreciate various characteristics and properties of magnetic field in electromagnetic applications.	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PHH108B-T & F	Wave Optics	CO1	produce and analyze the interference pattern due to division of amplitude & wave front.	✓	✓	x	x	x	✓	x	✓	x	✓	x	✓	x	x	
		CO2	produce required quality Spectrum and analyze it using appropriate diffraction grating	✓	✓	✓	x	✓	✓	x	✓	x	✓	x	x	x	x	x
		CO3	measure the concentration/purity of optically active materials using optical devices.	✓	✓	✓		✓	✓		✓	✓	✓	x	✓	✓	✓	✓
		CO4	explain the construction, working and applications of Lasers and Optical Fibers.	x	x	✓	✓	✓	✓	x	✓	x	✓	x	✓	✓	✓	✓
PHH109B-T	Mathematical Physics II	CO1	Apply Beta and Gamma function and Frobenius method to solve different problems.	✓	✓	✓	x	x	✓	✓	x	x	✓	x	x	x	x	
		CO2	Apply Fourier series and Laplace Transforms.	✓	✓	✓	x	x	✓	✓	x	x	✓	x	x	x	x	x
		CO3	Apply partial differential equations for different problems	✓	✓	✓	x	x	✓	✓	x	x	✓	x	x	x	x	x
		CO4	Apply tensors in fluid flow and relativity	✓	✓	✓	x	x	✓	✓	x	x	✓	x	x	x	x	x
CHH137	Environmental Science	CO1	Explain the multidisciplinary dimensions of environmental issues and suggest potential solutions	x	x	✓	x	x	x	x	x	x	x	✓	✓	x	✓	
		CO2	Discuss about the various types of organisms and draw inferences about their interactions in different ecosystems	x	x	✓	x	x	x	x	x	x	x	x	✓	✓	x	✓
		CO3	Defend the principles governing the interactions between social and environmental factors	x	x	✓	x	x	x	x	x	x	x	x	✓	✓	x	✓

B.Sc SEMESTER 3

Courses Code	Courses	Course Outcome	CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	
PHH2018-T	QuantumMechanics	CO1	Acquire and demonstrate knowledge of quantum phenomena like Photoelectric Effect, Compton Effect and concept of wave packet.	✓	✓	X	X	X	✓	X	✓	X	✓	X	✓	X	✓	
		CO2	Discuss time dependent and independent form of Schrodinger wave equation and apply them for one dimensional potential.	✓	✓	✓	X	✓	✓	X	✓	X	✓	X	X	X	X	✓
		CO3	Apply Schrodinger equation to spherically symmetric potential of one electron atom	✓	✓	✓		✓	✓	X	✓	✓	✓	X	✓	✓	✓	✓
		CO4	Discuss tunnel effect to explain fundamental phenomena like alpha decay and working of electronic devices based on the phenomenon	X	X	X	✓	✓	✓	X	✓	X	✓	X	✓	✓	✓	✓
PHH2028-T	Mathematical Physics III	CO1	Apply the concept of complex analysis and evaluate the different problem problems based on complex analysis.	✓	✓	✓	X	X	✓	✓	X	X	✓	X	X	X	X	
		CO2	Apply Fourier transform to differential equations.	✓	✓	✓	X	X	✓	✓	X	X	✓	X	X	X	X	
		CO3	Apply the concept of Probability to some physics problems.	✓	✓	✓	X	X	✓	✓	X	X	✓	X	X	X	X	
		CO4	Apply the theory of bifurcation and fractals to natural patterns	✓	✓	✓	X	X	✓	✓	X	X	✓	X	X	X	X	
PHH2038-T	Electromagnetic theory	CO1	Conversion to different coordinate system	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X	X	X	
		CO2	Understanding of Maxwell equations and apply to simple systems.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X	X	X	
		CO3	Explain transmission of EM waves in transmission lines	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X	X	X	
		CO4	Explain the smith chart in transmission line	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X	X	X	
FLS103	French I	CO	1 Exchange greetings and do introductions using formal and informal expressions 2. Understand and use interrogative and answer simple questions	✓	✓	X	X	✓	X	✓	X	✓	✓	✓	✓	X	✓	
				✓	✓	X	X	✓	X	✓	X	✓	✓	✓	✓	X	✓	
				✓	✓	X	X	✓	X	✓	X	✓	✓	✓	✓	✓	X	✓
				✓	✓	X	X	✓	X	✓	X	✓	✓	✓	✓	✓	X	✓
FLS101	Spanish I	CO	1 Exchange greetings and do introductions using formal and informal expressions 2. Understand and use interrogative and answer simple questions	✓	✓	X	X	✓	X	✓	X	✓	✓	✓	✓	X	✓	
				✓	✓	X	X	✓	X	✓	X	✓	✓	✓	✓	X	✓	
				✓	✓	X	X	✓	X	✓	X	✓	✓	✓	✓	✓	X	✓
				✓	✓	X	X	✓	X	✓	X	✓	✓	✓	✓	✓	X	✓
FLS102	German I	CO	1 Exchange greetings and do introductions using formal and informal expressions 2. Understand and use interrogative and answer simple questions	✓	✓	X	X	✓	X	✓	X	✓	✓	✓	✓	X	✓	
				✓	✓	X	X	✓	X	✓	X	✓	✓	✓	✓	X	✓	
				✓	✓	X	X	✓	X	✓	X	✓	✓	✓	✓	✓	X	✓
				✓	✓	X	X	✓	X	✓	X	✓	✓	✓	✓	✓	X	✓
BHMID-003	Quantitative Aptitude 1	CO		✓	✓	✓	✓	X	X	✓	X	✓	✓	✓	✓	✓	X	
				✓	✓	✓	✓	X	X	✓	X	✓	✓	✓	✓	✓	✓	
				✓	✓	✓	✓	X	X	✓	X	✓	✓	✓	✓	✓	✓	✓
				✓	✓	✓	✓	X	X	✓	X	✓	✓	✓	✓	✓	✓	✓

B.Sc SEMESTER 4

Courses Code	Courses	Course Outcome	CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	
MAH411-T	Numerical Analysis	CO1	Identify and compute the interpolating polynomial for equispaced and unequispaced intervals.	✓	X	✓	X	X	✓	X	✓	X	X	✓	✓	X	X	
		CO2	Find roots of non linear and transcendental equation. and fit a curve to the given data	✓	X	✓	X	X	✓	X	✓	X	X	X	✓	✓	X	X
		CO3	Differentiate and integrate numerical data.	✓	X	✓	X	X	✓	X	✓	X	X	X	✓	✓	X	X
		CO4	Solve system of linear equation by using direct and iterative methods and Compute Eigen values and Eigen vectors for symmetric and non symmetric matrices	✓	X	✓	X	X	✓	X	✓	X	X	X	✓	✓	X	X
		CO5	Solutions of initial value problems of differential equations by single and multiple steps methods.)	✓	X	✓	X	X	✓	X	✓	X	X	X	✓	✓	X	X
		CO6	Solve & analyze the Mathematical problems related to Numerical Analysis and its applications using software	✓	X	✓	X	X	✓	X	✓	X	X	X	✓	✓	X	X
PHH205B-T	Thermodynamics	CO1	Define , demonstrate and apply first law of thermodynamics. Compare different thermodynamic processes	✓	✓	✓	✓	✓	✓	X	✓	X	✓	✓	✓	✓	X	
		CO2	Demonstrate a clear understanding of second and third law of thermodynamics. Apply basic concept of heat and entropy in real life problems.	✓	✓	✓	✓	✓	✓	X	✓	X	✓	✓	✓	✓	✓	X
		CO3	Derive Maxwell's thermodynamic relations. Explain various thermodynamical potentials and second order phase transitions in daily life scenario	✓	✓	✓	✓	✓	✓	X	✓	X	✓	✓	✓	✓	✓	X
		CO4	Explain and compare different distribution of velocities in gases. Able to compare the concepts of ideal and real gas	✓	✓	✓	✓	✓	✓	X	✓	X	✓	✓	✓	✓	✓	X
PHH206B-T	Solid State Physics	CO1	identify and analyze different types of crystal structures & determine the structure of crystalline materials by X-ray diffraction	✓	✓	X	X	✓	✓	X	✓	X	X	✓	X	X	X	
		CO2	describe and measure the electrical properties of materials.	✓	✓	✓	X	✓	✓	X	✓	X	✓	X	✓	✓	✓	✓
		CO3	describe and measure the magnetic properties of materials.	✓	✓	✓	X	✓	✓	X	✓	X	✓	X	✓	✓	✓	✓
		CO4	Describe the dielectric and superconducting properties of materials	✓	✓	✓	X	✓	✓	X	✓	X	✓	X	✓	✓	✓	✓

B.Sc. SEMESTER 6

Courses Code	Courses	Course Outcome	CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	
PHH306B-T	Electronic Devices	CO1	Students would be able to understand, explain and demonstrate about semiconductors, various types of diodes and its applications in electronics with problems and circuit diagram.	✓	✓	X	✓	X	✓	X	X	X	✓	X	X	X	X	
		CO2	Students would be able to understand, construction and working of power handling devices such as SCR, UJT. Also will be able to understand construction and working of BJT with circuit diagram.	✓	✓	X	✓	✓	X	X	X	X	X	X	X	X	X	X
		CO3	Students would be able to understand construction and working of JFET and MOSFET with circuit diagram.	✓	✓	X	✓		✓	X	X	X	X	X	X	X	X	X
		CO4	Students would be able to understand about methods and steps for IC fabrication technology.	✓	✓	✓	X	✓	✓	X	X	X	X	X	X	X	X	X
PHN307	Project	CO	Understand and adopt the ethical practice that are to be followed in the research activities. Work in groups with guidance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
PHH310B-T/P	Atmospheric Physics	CO1	Students would be able to understand, explain and demonstrate various laws and concepts of essentials of Atmospheric Physics and further analyze and solve related problems.	✓	✓	✓	X	✓	✓	✓	✓	X	✓	✓	X	✓	✓	
		CO2	Students would be able to compare and explain various laws and concepts of atmospheric thermodynamics and solve related problems. They would further be able to formulate new problems related to atmospheric physics	✓	✓	✓	X	✓	✓	✓	X	✓	✓	X	✓	✓	✓	✓
		CO3	Students would be able to understand, compare and analyze the concepts cloud microphysics of warm and cold clouds, their formation and solve various related problems. They would be able to hypothesize new related problems	✓	✓	✓	X	✓	✓	✓	X	✓	✓	X	✓	✓	✓	✓
		CO4	Students would be able to understand, explain and demonstrate concepts of ionosphere, its structure, formation, importance and analyze and solve problems related to various navigation and communication systems via ionosphere. They would be able to hypothesize new related problems	✓	✓	✓	X	✓	✓	✓	X	✓	✓	X	✓	✓	✓	✓