



# Bajkul Milani Mahavidyalaya

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Estd.- 1964

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## Notice

All the HoDs hereby informed that we have to submit programme outcome of the syllabus of each department to NAAC. This consists of programme outcome of 1. U.G. Old Syllabus, 2. U.G. CBCS Syllabus, 3. P.G. old syllabus (if applicable) and P. G. CBCS Syllabus for each department. A sample for program outcome of physics department is attached herewith.

So you requested to prepare the programme outcome of your department and send the pdf. file to the email Id: [samanta.saurav@gmail.com](mailto:samanta.saurav@gmail.com) and [dasrabin0@gmail.com](mailto:dasrabin0@gmail.com) within 12.11.2021 positively.

Sd/- Dr. Saurav Samanta  
Co-ordinator  
IQAC  
Date: 30.10.2021.

Sd/- Dr. P. K. Dandapath,  
Teacher-in-charge

Attached Sample Copy of Programme Outcome

# DEPARTMENT OF PHYSICS

## Semester wise Course outcomes

### Honours

<b>Semester I</b>		
Sr. No.	Name of the Course	Outcomes
1	C1T: Mathematical Physics-I C1P: Mathematical Physics –I Lab	<ul style="list-style-type: none"><li>➤ Learn and understand Calculus, Vector Calculus, Orthogonal Curvilinear Coordinates, probability, Dirac Delta function</li><li>➤ The ability to identify, formulate, and solve physics problems using Python programming.</li></ul>
2.	C2T: Mechanics C2P:Mechanics Lab	<ul style="list-style-type: none"><li>➤ Provides basic knowledge regarding Fundamentals of Dynamics, Work and Energy, Collisions, Rotational Dynamics, Elasticity, Fluid Motion, Gravitation and Central Force Motion, Oscillations, Non-Inertial Systems, Special Theory of Relativity.</li><li>➤ The ability to formulate, conduct, analyze and interpret experiments in physics.</li><li>➤ The ability to use modern physics techniques and tools, including mathematical techniques, graphs and laboratory instrumentation.</li></ul>
3	GE- T: Elements of Modern Physics GE-1P:Elements of Modern Physics Lab	<ul style="list-style-type: none"><li>➤ Familiarizes students learn Problems with Rutherford model, Planck's quantum, Two slit interference experiment, One Dimensional infinitely Rigid Box, Size and structure of atomic nucleus and its relation with atomic weight, Radioactivity, Fission and fusion.</li><li>➤ The ability to use modern physics techniques and tools, including mathematical techniques, graphs and laboratory instrumentation..</li></ul>
<b>Semester II</b>		
1	C3 T - Electricity and Magnetism C3P – Electricity and Magnetism (Lab)	<ul style="list-style-type: none"><li>➤ This course aims to enlighten the students on the Electric Field and Electric Potential, Dielectric Properties of Matter, Magnetic Field, Magnetic Properties of Matter,</li></ul>

## DEPARTMENT OF PHYSICS

Semester wise Course outcomes

Honours

		<p>Electromagnetic Induction, Electrical Circuits, Network theorems.</p> <ul style="list-style-type: none"> <li>➤ Student's skills about performing experiments on series RC Circuit, Potentiometer, Carey Foster's Bridge, Series LCR circuit.</li> </ul>
2	<p>C4 T - Waves and Optics C4 P – Wave and Optics Lab</p>	<ul style="list-style-type: none"> <li>➤ Provides basic knowledge regarding Superposition of Collinear Harmonic oscillations, Velocity of Waves, Interference, Interferometer, Diffraction and Holography.</li> <li>➤ Provides the knowledge regarding experiments Lissajous Figures, Michelson's interferometer, spectrometer, Fresnel Biprism, Newton's Rings, diffraction grating.</li> </ul>
3	<p>GE2 T - Thermal Physics and Statistical Mechanics GE2 P – Thermal Physics and Statistical (Lab)</p>	<ul style="list-style-type: none"> <li>➤ Imparts knowledge about Laws of Thermodynamics, Thermodynamical Potentials, Kinetic Theory of Gases, Theory of Radiation, Statistical Mechanics etc.</li> <li>➤ Updates students about some experiments on Thermal Physics and Statistical Mechanics.</li> </ul>
<b>Semester-III</b>		
1	<p>C5T: Mathematical Physics-II C5P: Mathematical Physics II Lab</p>	<ul style="list-style-type: none"> <li>➤ Creates understanding about Fourier Series, Frobenius Method and Special Functions, Special Integrals, Variational calculus, Partial Differential Equations etc.</li> <li>➤ Enables writing Python programs to solve different mathematical problems.</li> </ul>
2	<p>C6T: Thermal Physics C6P: Thermal Physics Lab</p>	<ul style="list-style-type: none"> <li>➤ Imparts knowledge about Laws of Thermodynamics, Thermodynamical Potentials, Kinetic Theory of Gases, Theory of Radiation, Statistical Mechanics etc.</li> <li>➤ Updates students about some experiments on Thermal Physics and Statistical Mechanics.</li> </ul>
3	<p>C7T: Digital Systems and Applications C7P: Digital Systems and Applications Lab</p>	<ul style="list-style-type: none"> <li>➤ Provides ideas about Integrated Circuits, Digital Circuits, Boolean algebra, Data processing circuits, Timers, Shiftregisters, Counters etc.</li> <li>➤ Students perform practicals on Digital</li> </ul>

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Semester wise Course outcomes

Honours

		Systems and Applications
4	GE3T: Solid State Physics GE3 P: Solid State Physics Lab	<ul style="list-style-type: none"> <li>➤ Provides basic ideas about Crystal Structure, Elementary Lattice Dynamics, Magnetic Properties of Matter, Dielectric Properties of Materials, Elementary band theory, Superconductivity etc.</li> <li>➤ To perform experiments on Magnetic susceptibility, piezoelectric crystal, Dielectric Constant, Surface Plasmon resonance, Ferroelectric Crystal etc.</li> </ul>
5	SEC1T – Physics Workshop Skill	<ul style="list-style-type: none"> <li>➤ Provides hands-on experience on Mechanical Skill, Electrical and Electronic Skill, prime movers etc.</li> </ul>
	SEC1T: Electrical Circuits and Network Skills	<ul style="list-style-type: none"> <li>➤ Provides ideas on Basic Electricity Principles, Understanding Electrical Circuits, Electrical Drawing and Symbols, Generators and Transformers, Electric Motors, Solid-State Devices, Electrical Protection etc.</li> </ul>
<b>Semester-IV</b>		
1	C8T: Mathematical Physics III C8P: Mathematical Physics III Lab	<ul style="list-style-type: none"> <li>➤ To understand Basic Complex Analysis, Integrals Transforms, Matrices, Eigen-values and Eigenvectors etc.</li> <li>➤ Enables writing Python programs to solve different mathematical problems.</li> </ul>
2	C9T: Elements of Modern Physics C9P: Elements of Modern Physics Lab	<ul style="list-style-type: none"> <li>➤ Familiarizes students learn Problems with Rutherford model, Planck's quantum, Two slit interference experiment, One Dimensional infinitely Rigid Box, Size and structure of atomic nucleus and its relation with atomic weight, Radioactivity, Fission and fusion.</li> <li>➤ The ability to use modern physics techniques and tools, including mathematical techniques, graphs and laboratory instrumentation.</li> </ul>
3	C10T: Analog Systems and Applications C10P: Analog Systems and Applications Lab	<ul style="list-style-type: none"> <li>➤ Students learn about Semiconductor Diodes, Two-terminal Devices and their Applications, Bipolar Junction transistors, Field Effect transistors, Amplifiers etc.</li> <li>➤ Students perform experimnts with the above</li> </ul>

## DEPARTMENT OF PHYSICS

Semester wise Course outcomes

Honours

		mentioned devices.
4	GE4T: Electricity and Magnetism GE4P: Electricity and Magnetism Lab	<ul style="list-style-type: none"> <li>➤ This course aims to enlighten the students on the Electric Field and Electric Potential, Dielectric Properties of Matter, Magnetic Field, Magnetic Properties of Matter, Electromagnetic Induction, Electrical Circuits, Network theorems.</li> <li>➤ Student's skills about performing experiments on series RC Circuit, Potentiometer, Carey Foster's Bridge, Series LCR circuit.</li> </ul>
	GE4T: Digital, Analog Circuits and Instrumentation GE4P: Digital, Analog Circuits and Instruments Lab	<ul style="list-style-type: none"> <li>➤ Students learn about Digital Circuits, Semiconductor Devices and Amplifiers, Operational Amplifiers, Instrumentations etc.</li> <li>➤ Students perform experiments with the above mentioned devices.</li> </ul>
5	SEC2T: Computational Physics SEC2P: Practical	<ul style="list-style-type: none"> <li>➤ To develop knowledge about Scientific Programming, Control Statements, Scientific word processing: Introduction to LaTeX, Visualization etc.</li> <li>➤ To motivate students to perform hands on exercise with Fortran, Gnuplot and Python.</li> </ul>
	SEC2T: Basic of Measurement SEC2P: Practical	<ul style="list-style-type: none"> <li>➤ This course enables the students to gain knowledge about Basic of Measurement, Electronic Voltmeter, Cathode Ray Oscilloscope, Signal Generators and Analysis Instruments, Impedance Bridges &amp; Q-Meters, Digital Instruments, Digital Multimeter etc.</li> <li>➤ Students perform experiments with the above mentioned devices.</li> </ul>
	SEC2T: Renewable Energy and Energy Harvesting SEC2P: Practical	<ul style="list-style-type: none"> <li>➤ To develop knowledge about Fossil fuels and Alternate Sources of energy, Solar energy, Wind Energy harvesting, Ocean Energy, Geothermal Energy, Hydro Energy, Piezoelectric Energy harvesting, Electromagnetic Energy Harvesting etc.</li> <li>➤ To demonstrate and perform experiments with solar energy, wind energy, piezoelectric materials etc.</li> </ul>

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Semester wise Course outcomes

Honours

<b>Semester-V</b>		
1	C11T: Quantum Mechanics and Applications C11P: Quantum Mechanics and Applications Lab	<ul style="list-style-type: none"> <li>➤ To learn about Schrodinger equation, General discussion of bound states in an arbitrary potential, Quantum theory of hydrogen-like atoms, Atoms in Electric &amp; Magnetic Fields, Atoms in External Magnetic Fields, Many electron atoms etc.</li> <li>➤ To solve Schroedinger equation problems for different systems using Python programming.</li> <li>➤ To perform experiments on Electron spin resonance, Zeeman effect, tunnel diode etc.</li> </ul>
2	C12T: Solid State Physics C12P: Solid State Physics Lab	<ul style="list-style-type: none"> <li>➤ Provides basic ideas about Crystal Structure, Elementary Lattice Dynamics, Magnetic Properties of Matter, Dielectric Properties of Materials, Elementary band theory, Superconductivity etc.</li> <li>➤ To perform experiments on Magnetic susceptibility, piezoelectric crystal, Dielectric Constant, Surface Plasmon resonance, Ferroelectric Crystal etc.</li> </ul>
3	DSE1T: Classical Dynamics	<ul style="list-style-type: none"> <li>➤ Enables understanding of Classical Mechanics of Point Particles, Small Amplitude Oscillations, Special Theory of Relativity, Fluid Dynamics etc.</li> </ul>
	DSE1T: Applied Dynamics DSE1P: Applied Dynamics Lab	<ul style="list-style-type: none"> <li>➤ Acquaints the students with basic techniques of Dynamical systems, Chaos and Fractals, Elementary Fluid Dynamics etc.</li> <li>➤ Laboratory/Computing and visualizing trajectories using software such as Maple, Octave,</li> <li>➤ XPPAUT based on Applied Dynamics problems</li> </ul>
	DSE1T: Atmospheric Physics DSE1P: Atmospheric Physics Lab	<ul style="list-style-type: none"> <li>➤ Basic understanding about General features of Earth's atmosphere, Atmospheric Dynamics, Atmospheric Waves, Atmospheric Radar and Lidar, Atmospheric Aerosols.</li> <li>➤ C++ based simulations experiments based on Atmospheric Physics problems</li> </ul>

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Semester wise Course outcomes

Honours

4	DSE2T:Nuclear and Particle Physics	<ul style="list-style-type: none"> <li>➤ To give the students knowledge about General Properties of Nuclei, Nuclear Models, Radioactivity decay, Nuclear Reactions, Interaction of Nuclear Radiation with matter, Detector for Nuclear Radiations, Particle Accelerators, Particle physics etc.</li> </ul>
	DSE2T: Astronomy and Astrophysics	<ul style="list-style-type: none"> <li>➤ Students gain insight about Astronomical Scales, Astronomical techniques, Physical principles, The sun and solar family, The milky way, Galaxies, Large scale structure &amp; expanding universe</li> </ul>
	DSE2T: Physics of Earth	<ul style="list-style-type: none"> <li>➤ Students learn about The Earth and the Universe, Structure, Dynamical Processes, Evolution, Disturbing the Earth– Contemporary dilemmas etc.</li> </ul>
	DSE2T: Advanced Mathematical Physics - II	<ul style="list-style-type: none"> <li>➤ Basic understanding about Calculus of Variations, Group Theory, Advanced Probability Theory etc.</li> </ul>
<b>Semester-VI</b>		
1	CC-13T: Electromagnetic Theory C13P: Electromagnetic Theory Lab	<ul style="list-style-type: none"> <li>➤ Students will be versed in the fundamental concepts of Maxwell Equations, EM Wave Propagation in Unbounded Media, EM Wave in Bounded Media, Polarization of Electromagnetic Waves, Wave guides, Optical Fibres etc.</li> <li>➤ To give knowledge about experiments on the above mentioned topics.</li> </ul>
2	CC-14T: Statistical Mechanics C14P: Statistical Mechanics Lab	<ul style="list-style-type: none"> <li>➤ An overview of Classical Statistical Mechanics, Classical Theory of Radiation, Quantum Theory of Radiation, Bose-Einstein Statistics, Fermi-Dirac Statistics etc.</li> <li>➤ Provides an in-depth study on computationally solve related problems.</li> </ul>
3	DSE3T: Medical Physics DSE3P: Medical Physics Lab	<ul style="list-style-type: none"> <li>➤ Provides an practical approach learn Physics of the Body, Acoustics of the body, Electrical system of the body, Physics of Diagnostic and Therapeutic Systems,</li> </ul>

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Semester wise Course outcomes

Honours

		Radiation Physics, Medical Imaging Physics, Radiation Oncology Physics, Radiation and Radiation Protection etc.
	DSE3T: Nano Materials and Applications DSE3P: Nano Materials and Applications Lab	<ul style="list-style-type: none"> <li>➤ Learn about Nanoscale Systems, Synthesis of Nanostructure Materials, Characterization, Optical Properties, Electron Transport, Applications.</li> <li>➤ Perform related experiments.</li> </ul>
	DSE3T: Communication Electronics DSE3P: Communication Electronics Lab	<ul style="list-style-type: none"> <li>➤ Know about Electronic communication, Analog Modulation, Analog Pulse Modulation, Digital Pulse Modulation, Introduction to Communication and Navigation systems etc.</li> <li>➤ Perform related experiments.</li> </ul>
4	DSE4T: Digital Signal Processing DSE4P: Digital Signal Processing Lab	<ul style="list-style-type: none"> <li>➤ Creates understanding on Discrete-Time Signals and Systems, Discrete-Time Fourier Transform, Filter Concepts, Discrete Fourier Transform, Fast Fourier Transform, Realization of Digital Filters etc.</li> <li>➤ Perform related experiments.</li> </ul>
	DSE4T: Biological Physics	<ul style="list-style-type: none"> <li>➤ Know about Molecules of life, The complexity of life, Evolution etc.</li> </ul>
	DSE4T: Experimental Techniques DSE4P: Experimental Techniques Lab	<ul style="list-style-type: none"> <li>➤ Learn about Measurements, Signals and Systems, Shielding and Grounding, Transducers &amp; industrial instrumentation, Digital Multimeter, Impedance Bridges and Q-meter, Vacuum Systems etc.</li> <li>➤ Perform experiments with the above mentioned instruments.</li> </ul>



# DEPARTMENT OF PHYSICS

## Semester wise Course outcomes

### General

<b>Semester I</b>		
Sr. No.	Name of the Course	Outcomes
1.	DSC-1A: Mechanics DSC-1A:Mechanics Lab	<ul style="list-style-type: none"><li>➤ Provides basic knowledge regarding Fundamentals of Dynamics, Work and Energy, Collisions, Rotational Dynamics, Elasticity, Fluid Motion, Gravitation and Central Force Motion, Oscillations, Non-Inertial Systems, Special Theory of Relativity.</li><li>➤ The ability to formulate, conduct, analyzes and interprets experiments in physics.</li><li>➤ The ability to use modern physics techniques and tools, including mathematical techniques, graphs and laboratory instrumentation.</li></ul>
<b>Semester II</b>		
1	DSC-1B - Electricity and Magnetism DSC-1B– Electricity and Magnetism (Lab)	<ul style="list-style-type: none"><li>➤ This course aims to enlighten the students on the Electric Field and Electric Potential, Dielectric Properties of Matter, Magnetic Field, Magnetic Properties of Matter, Electromagnetic Induction, Electrical Circuits, Network theorems.</li><li>➤ Student's skills about performing experiments on series RC Circuit, Potentiometer, Carey Foster's Bridge, Series LCR circuit.</li></ul>
<b>Semester-III</b>		
1	DSC-1C: Thermal Physics and Statistical Mechanics DSC-1C: Thermal Physics and Statistical Mechanics Lab	<ul style="list-style-type: none"><li>➤ Imparts knowledge about Laws of Thermodynamics, Thermodynamical Potentials, Kinetic Theory of Gases, Theory of Radiation, Statistical Mechanics etc.</li><li>➤ Updates students about some experiments on Thermal Physics and Statistical Mechanics.</li></ul>
2	SEC1T – Physics Workshop Skill	<ul style="list-style-type: none"><li>➤ Provides hands-on experience on Mechanical Skill, Electrical and Electronic Skill, prime movers etc.</li></ul>
	SEC1T: Computational Physics	<ul style="list-style-type: none"><li>➤ To develop knowledge about Scientific</li></ul>

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### Semester wise Course outcomes

#### General

	SEC1P: Practical	<p>Programming, Control Statements, Scientific word processing: Introduction to LaTeX, Visualization etc.</p> <ul style="list-style-type: none"> <li>➤ To motivate students to perform hands on exercise with Fortran, Gnuplot and Python.</li> </ul>
<b>Semester-IV</b>		
1	DSC-1D- Waves and Optics DSC-1D – Wave and Optics Lab	<ul style="list-style-type: none"> <li>➤ Provides basic knowledge regarding Superposition of Collinear Harmonic oscillations, Velocity of Waves, Interference, Interferometer, Diffraction and Holography.</li> <li>➤ Provides the knowledge regarding experiments Lissajous Figures, Michelson’s interferometer, spectrometer, Fresnel Biprism, Newton’s Rings, diffraction grating.</li> </ul>
2	SEC2T: Electrical Circuits and Network Skills	<ul style="list-style-type: none"> <li>➤ Provides ideas on Basic Electricity Principles, Understanding Electrical Circuits, Electrical Drawing and Symbols, Generators and Transformers, Electric Motors, Solid-State Devices, Electrical Protection etc.</li> </ul>
<b>Semester-V</b>		
1	DSE-1: Quantum Mechanics and Applications DSE-1: Quantum Mechanics and Applications Lab	<ul style="list-style-type: none"> <li>➤ To learn about Schrodinger equation, General discussion of bound states in an arbitrary potential, Quantum theory of hydrogen-like atoms, Atoms in Electric &amp; Magnetic Fields, Atoms in External Magnetic Fields, Many electron atoms etc.</li> <li>➤ To solve Schroedinger equation problems for different systems using Python programming.</li> <li>➤ To perform experiments on Electron spin resonance, Zeeman effect, tunnel diode etc.</li> </ul>
	DSE-1: Elements of Modern Physics DSE-1: Elements of Modern Physics Lab	<ul style="list-style-type: none"> <li>➤ Familiarizes students learn Problems with Rutherford model, Planck’s quantum, Two slit interference experiment, One</li> </ul>

## DEPARTMENT OF PHYSICS

### Semester wise Course outcomes

#### General

		<p>Dimensional infinitely Rigid Box, Size and structure of atomic nucleus and its relation with atomic weight, Radioactivity, Fission and fusion.</p> <ul style="list-style-type: none"> <li>➤ The ability to use modern physics techniques and tools, including mathematical techniques, graphs and laboratory instrumentation.</li> </ul>
	DSE-1: Mathematical Physics DSE-1: Mathematical Physics Lab	<ul style="list-style-type: none"> <li>➤ Creates understanding about Fourier Series, Frobenius Method and Special Functions, Special Integrals, Variational calculus, Partial Differential Equations etc.</li> <li>➤ Enables writing Python programs to solve different mathematical problems.</li> </ul>
	DSE1T: Medical Physics DSE1P: Medical Physics Lab	<ul style="list-style-type: none"> <li>➤ Provides an practical approach learn Physics of the Body, Acoustics of the body, Electrical system of the body, Physics of Diagnostic and Therapeutic Systems, Radiation Physics, Medical Imaging Physics, Radiation Oncology Physics, Radiation and Radiation Protection etc.</li> </ul>
2	SEC3T: Renewable Energy and Energy Harvesting SEC3P: Practical	<ul style="list-style-type: none"> <li>➤ To develop knowledge about Fossil fuels and Alternate Sources of energy, Solar energy, Wind Energy harvesting, Ocean Energy, Geothermal Energy, Hydro Energy, Piezoelectric Energy harvesting, Electromagnetic Energy Harvesting etc.</li> <li>➤ To demonstrate and perform experiments with solar energy, wind energy, piezoelectric materials etc.</li> </ul>
<b>Semester-VI</b>		
1	DSE-2: Solid State Physics DSE-2: Solid State Physics Lab	<ul style="list-style-type: none"> <li>➤ Provides basic ideas about Crystal Structure, Elementary Lattice Dynamics, Magnetic Properties of Matter, Dielectric Properties of Materials, Elementary band theory, Superconductivity etc.</li> <li>➤ To perform experiments on Magnetic susceptibility, piezoelectric crystal, Dielectric Constant, Surface Plasmon resonance, Ferroelectric Crystal etc.</li> </ul>

## DEPARTMENT OF PHYSICS

Semester wise Course outcomes

### General

	DSE2T:Nuclear and Particle Physics	<ul style="list-style-type: none"><li>➤ To give the students knowledge about General Properties of Nuclei, Nuclear Models, Radioactivity decay, Nuclear Reactions, Interaction of Nuclear Radiation with matter, Detector for Nuclear Radiations, Particle Accelerators, Particle physics etc.</li></ul>
2	SEC4T: Weather Forecasting	<ul style="list-style-type: none"><li>➤ Students learn about Introduction to atmosphere, Measuring the weather, Weather systems, Climate and Climate Change, Basics of weather forecasting etc.</li><li>➤ Perform corresponding experiments.</li></ul>