

#### GOVERNMENT GENERAL DEGREE COLLEGE, RANIBANDH

Vill. + P.O.: Rautara \*P.S.: Barikul \*Dist.: Bankura \*Pin Code: 722135 \*West Bengal \*India

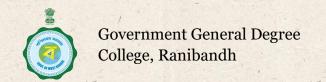
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## **Program Outcome of Physics Major**

### (under NEP curriculum of the Bankura University)

The NEP 2020 strongly emphasizes outcome-based education, prioritizing clear learning outcomes for each course. For the FYUGP in Physics, the policy outlines specific program learning outcomes, including:

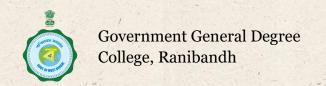
- **PO1. Knowledge and Comprehension:** Students will gain a solid understanding of core physics principles such as classical mechanics, electromagnetism, thermodynamics, quantum mechanics, and statistical mechanics.
- **PO2.** Analytical and Problem-Solving Skills: Students will learn to apply their physics knowledge to analyze and solve problems using mathematical tools, experimental techniques, and computational methods.
- **PO3. Research and Inquiry Skills**: Students will develop the ability to engage in research by designing and conducting experiments, analyzing data, and effectively communicating their findings.
- **PO4.** Communication and Presentation Skills: Students will be able to articulate their ideas and findings clearly through both written and oral presentations, using appropriate scientific language and tools.
- **PO5. Ethics and Values:** Students will understand their work's ethical and social implications and demonstrate a commitment to conducting research and practice responsibly.
- **PO6.** Interdisciplinary and Multidisciplinary Learning: Students will be equipped to integrate their physics knowledge with other disciplines and participate in multidisciplinary research and innovation.



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## Link for the syllabus of Physics honours course

https://www.bankurauniv.ac.in/uploads/tempimagepdflink/1724646690.pdf

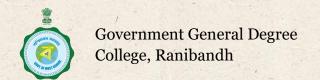


## **Course Outcome of Physics Major**

# (under NEP curriculum of the Bankura University)

Core Courses	Course Outcomes
Mechanics and	1. Develop the concepts of classical mechanics,
General	vector, vector differentiation and integration.
Properties of	2. Acquire knowledge about the elasticity of the
Matter	material and the streamline and turbulent
(Course Code:	motion. Understand the relationship between
S/PHS/101/MJC-1)	elastic constants.
	3. Understand how major concepts developed
	and changed over time.
	4. Capable of analyzing and solving problems
	using oral and written reasoning skills based on
	the concepts of classical mechanics.
	5. Ability to prepare and organize a presentation
	on the application of fundamental dynamics
	6. Students will learn to use the screw gauge,
	slide callipers, microscope, telescope.
L. C.	7. They will know how to experimentally
	measure the Young's modulus, coefficient of
	viscosity of liquid, acceleration due to gravity,
	spring constant.
Basics of Computer and	1. There is a scope to know the computer
Python Programming	architecture.
(Course Code:	2. There is a scope to study the Python
S/PHS/104/SEC-1)	programming language.
	3. The students will be able to learn how can
	solve any physical problem in Python.
	4. There is a scope to learn the graph plotting.
Electricity and Magnetism	The course will help the students to understand
(S/PHS/201/MJC-2)	the basic concepts of electrostatics including
	electric field, potential, electrostatic energy,
	electric dipole etc. They should be able to
	understand Laplace's equation, Poisson's
	equation, method of images and their application
	to simple electrostatic problems. The students
	will also acquire knowledge about dielectric





**Basic Instrumentation** 

S/PHS/204/SEC-2)

Mathematical

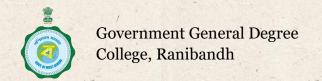
S/PHS/301/MJC-3)

Physics-I (Course

Skills (Course

	properties of matter and application of laws of electrostatics for dielectric materials. This course will provide the students with basic knowledge of magnetostatics i.e. magnetic effect of current and related laws of physics. On completion of the course students will learn about electromagnetic induction, magnetic properties of matter, operation of different ac electrical circuits, network theorem, etc.  On performing the laboratory experiments students should have a rudimentary grasp on how experimental equipment related to electricity and magnetism can be used. They will have a better insight by experimentally verifying some of the laws/theorems of electricity and magnetism.
1	Through this course, the students will develop
	the ideas about the basics of measurements.
Code:	They learn the uses of various instruments like
	electronic voltmeter, cathode ray oscilloscope
	(CRO), Signal Generators and Analysis
$r^{-1}$	Instruments, Impedance Bridges & Q-Meters and some digital instruments.
	1.Students will develop the concepts of First
	Order and Second Order Differential equations.
Code:	2.Acquire knowledge on Particular Integral,
	Partial derivatives, and Integrating factor.
	3.Learn about vector integration and related
, - , , -	theorems like Divergence and Green theorem
	etc.  A Acquire Knowledge about the orthogonal
	4.Acquire Knowledge about the orthogonal curvilinear coordinate systems and their
1	transformation relation with special emphasis on
	spherical polar system.
	5. Able to think about the mathematical
	formulation of Fourier series, half range series,
100	Fourier transformation etc.
	6.Get knowledge about ODE learn to solve
	series solution of 2nd order ODE, Bessel's





			differential equation, Legendre's differential
			equation, Partial differential equations,
			7. Solution of Laplace's equation in different
			coordinate systems by the method of separation
7			of variables.
			8. Understand and visualize different coordinate
Į,			systems.
			9. Implement basic vector operations in Python.
	1 .		10. Solve first- and second-order differential
			equations using Python.
			11. Implement numerical solutions for ordinary
. 1			and partial differential equations.
			12. Compute Fourier series for different
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			functions.
			13. Understand and visualize the impact of
			harmonics in periodic functions.
			14. Explore special functions like Legendre and
			Bessel functions using Python.
	and the second second		
Waves	and	Oscillation	The course will provide the students with
	and		The course will provide the students with knowledge of various aspects of simple
(Course		Code:	knowledge of various aspects of simple
		Code:	knowledge of various aspects of simple harmonic oscillation including damped and
(Course		Code:	knowledge of various aspects of simple harmonic oscillation including damped and forced oscillations, resonance, superposition
(Course		Code:	knowledge of various aspects of simple harmonic oscillation including damped and forced oscillations, resonance, superposition under different conditions, Lissajous figures etc.
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resonator

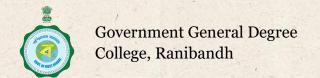
and

sonometer

respectively. Verify the laws of transverse vibrations in a stretched string using sonometer

experiments





	and comment on the relation between frequency, length and tension of a stretched string under vibration. Demonstrate the formation of stationary waves on a string in Melde's string experiment. Observe the motion of coupled oscillators and normal modes. Examine phenomena of simple harmonic motion and the distinction between undamped, damped and forced oscillations and the concepts of resonance and quality factor with reference to damped harmonic oscillator.
Introduction to LASER and	On completion of this course a student should be
Fibre Optics	able to demonstrate understanding of and be able
(Course Code:	to solve problems on:
S/PHS/305/SEC-3)	1) absorption and spontaneous and stimulated
	emission in two level, three level, four level
	systems, and the conditions for laser
	amplification.
	2) the four-level laser system, the simple
	homogeneous laser and its output behavior and
L. Comments	optimal operating conditions.
	3) spectral properties of a single longitudinal
	mode, mode locked laser operation, schemes for
	active and passive mode locking in real laser system.
	4) operations and basic properties of the most
	common laser types- He-Ne, ruby.
Mathematical Physics II	1. Students will develop the concept about
(Course Code:	Argand diagram and know the algebraic
S/PHS/401/MJC-5)	operation on complex number
	2. Know about different types of singularity and
	able to know simplest way of integration over a
	closed contour.
	3. Able to solve simultaneous equations using
	matrix method and learn the properties of matrix.
L.	4. Develop the idea about probability,
	probability distribution and central limit
	theorem.
	5. Gain knowledge about Dirac-delta function
	and Kronecker delta functions.

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	6 Students will be familiar with Sailah la
	6. Students will be familiar with Scilab language
	and be able to install and/or use the
	programming language.
	7. They will be able to write the program to
	determine the roots of complex number and
	unity.
L. L. Company	8. Students will gain sufficient knowledge to plot
	2D/3D graph and able to plot data and functions.
	9. Students will be able to solve differential
	equations and can determine the value of a
	definite integral.
	10. They gain knowledge about least square
	fitting and may be apply this concepts to plot
Heat and Theres 1	best graph in their laboratory work.
Heat and Thermodynamics	1. Know about the kinetic of gases, the zeroth
(Course Code:	law of thermodynamics, 1st and 2nd law of
S/PHS/402/MJC-6)	thermodynamics.
	2. Gather knowledge about isothermal and
	adiabatic processes and learn how to solve
	thermodynamic problems.
	3. Able to understand the working principle of
k .	Heat engines – Carnot's engine and its
	applications.
	4. Learn about entropy and how the entropy of
	the universe is changing.
	5. Understand the interrelationship between
	thermodynamic functions and the ability to use
	such relationships to solve practical problems.
	6. Understand how statistics of the microscopic
	world can be used to explain the thermal features
	of the macroscopic world.
	7. Be able to use thermal and statistical
	6. 그림 [188] 이 아이는 그리고 있는 그리고 있는 그리고 있는 그리고 있는 그리고 있는 그리고 있다.
	principles in a wide range of applications.
	8. Able to learn how to experimentally measure
	the thermal conductivity in different methods.
	9. Also learn about the platinum resistance
	thermometer, thermocouple, etc.
Classical mechanics	Upon successful completion of this course it is
(Course Code:	intended that a student will be able to:
S/PHS/403/MJC-7)	

Analog

(Course

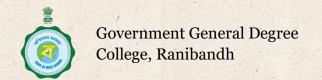
Applications

S/PHS/404/MJC-8)

systems

,	
,	1.Know how to impose constraints on a system in order to simplify the methods in solving
	physics problems. They will also understand the
	important of concepts such as generalized
	coordinates and constrained motion.
	2.Learn about Lagrangian and Hamiltonian
e	formulation of classical mechanics and get
	familiar with their applications to solve simple
TO CALL	physics problems.
	3. Distinguish between inertial and non-inertial frames.
	4. They will also get acquainted to the various
	aspects of Theory and application in the field of
	special theory of relativity
	5. Determine moment of inertia and elastic
	constants of different materials.
	6. Estimate the value of acceleration due to
E. C.	gravity and get familiar with the digital timing
	technique.
and	1. This course will help the students to get
	familiar with different topics of semiconductor
Code:	physics. 2. Acquire knowledge about three
	terminal devices, voltage-controlled devices and
	current controlled devices.
	3. They will able to know about different
	amplifier circuits. Gain Understand how major
	concepts developed and changed over time.
	4. The students will come to know about the
	operational amplifier and its uses in different
	aspects
	5. Overall, they will gain sufficient knowledge
	on the theories of electronic circuits.
	6. This course will help the students to get
	familiar electronic circuits, uses of bread board
	and discreate components.
	7. Students will learn experimentally the I-V
	characteristics of PN diode, LED and BJT.
	8. They will be able to design an amplifier using
	o. They will be dole to design an amplifier using

transistor.



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	9. They will be able to investigate the uses of Op.
1000000	Amp. as inverting, non-inverting, adder and
	subtractor.
	10. The students will be able to design Wien

bridge oscillator, integrator, and differentiator by employing Op. Amp.