BARASAT GOVT COLLEGE

POST GRADUATE DEPARTMENT OF PHYSICS

B.Sc. Physics (Hons) CBCS Syllabus

With effect from 2018-19

Program Outcome (PO)

PO 1	Scientific reasoning
PO 2	Critical thinking
PO 3	Disciplinary knowledge
PO 4	Problem solving
PO 5	Analytical reasoning
PO 6	Research-related skills
PO 7	Information/digital literacy
PO 8	Scientific mindset
PO 9	Skilled project manager

BARASAT GOVT COLLEGE

POST GRADUATE DEPARTMENT OF PHYSICS

B.Sc. Physics (Hons) CBCS Syllabus

With effect from 2018-19

Programme Specific Outcomes (PSO)

➤ **PSO1**: After completion of the UG Physics course, the students will be able to learn not only the basic knowledge of the subject but also get knowledge in the working of different scientific as well as engineering instruments, which will help the students in their profession in the future. The very basic nature of Physics is to illuminate a student in the development of analytical mind, who never believes in anything without logic.

➤ **PSO-2**: The outcome lies in the daily life of human being. Here a person learns basic principles of the properties of matter and the relationship between different principles. To know this the students are exposed to mathematical and analytical physics. The basic properties of matter are unveiled to them in the name of mechanics, general properties of matter, sound, optics, etc.

➤ **PSO-3**: This activates the students to perform experiments in mechanics, general properties of matter, optics, electronics, etc and compare the values with theoretical results.

➤ **PSO-4**: This course is designed in such a way that students can learn different Laboratory Experiments on each theoretical concept which may help to built a clear concept on the subject and it helps the students to motivate on experimental physics.

➤ **PSO-5**: Students are being motivated to study some special topics in Physics such as astrophysics, nuclear and particle physics, communication electronics, etc. They are also motivated to equip themselves for facing competitive examinations.

➤ **PSO-6**: This grounding in the subject equipped them to pursue higher studies and research

➤ **PSO7**: The undergraduate course in Physics also opened many career opportunities like a career in teaching, scientist or the field of Industry

BARASAT GOVERNMENT COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. Degree Course
Under CBCS semester system
HONOURS COURSE IN PHYSICS
With effect from the session: 2018 – 2019

Course Name: Core Course-1

Course Code: PHSACOR01T & PHSACOR01P

Topic Name: MATHEMATICAL PHYSICS

Course Outcome:

		CO, PO & PSO Mapping			
	Sl No	**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
	CO1	Recollect and Learn concepts of Calculus for clear Estimation of Infinitesimal Dynamical Variations in Space and Time domain.	L1 Remembering	1,2,3,4,5,6	1,2,6,7
	CO2	Understand the knowledge of Vector Calculus which refers to direction specific variations in 1D, 2D and 3D Space with time dependent coordinate system.	L2 Understanding	1,2,3,4,5,6	1,2,6,7
	CO3	Apply the Introduction to Probability reflecting on the Statistical behavior for very large Data base systems.	L3 Applying	1,2,3,4,5,6	1,2,6,7
	CO4	Analyze and understand this course, using specific Mathematical tools to probe and understand any Physical, Chemical and Biological issues along with Theoretical concepts.	L4 Annalysing	1,2,3,4,5,6	1,2,6,7
	CO5	Understand the basics of programming in Python, which is a universally accepted open-source programming language.	L2 Understanding	1,2,3,4,5,6	1,2,6,7
	CO6	Recognize the open-source advanced operating system Linux.	L2 Understanding	1,2,3,4,5,6	1,2,6,7
	CO7	Apply the Gnu-plot for graph plotting which helps the students to analyze different problems graphically.	L3 Applying	1,2,3,4,5,6	1,2,6,7

Program Articulation Matrix (CO-PO Matrix)																			
PO, PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	3	3	2	3					3	2				3	2		
CO2	3	2	3	2	3	2					2	2				2	3		
CO3	2	3	3	1	2	3					1	3				3	2		
CO4	3	2	3	3	3	2					2	2				2	3		
CO5	2	3	3	2	2	3					3	3				2	2		
CO6	1	1	3	3	1	1					2	2				2	2		
CO7	3	3	3	3	2	3					3	3				3	2		
Average	2.43	2.43	3.00	2.43	2.14	2.43					2.29	2.43				2.43	2.29		

BARASAT GOVERNMENT COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. Degree Course
Under CBCS semester system
HONOURS COURSE IN PHYSICS
With effect from the session: 2018 – 2019

Course Name: Core Course-2

Course Code: PHSACOR02T & PHSACOR02P

Topic Name: MECHANICS

Course Outcome:

		CO, PO & PSO Mapping			
	Sl No	**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
	CO1	Understand about Gravitation and Identify its impact on the dynamic Universe.	L1 Remembering	1,2,3,5,6,8	1,2,6,7
	CO2	Comprehend the elastic properties of matter and Apply to construction field, bending of beam and to measure different types of elastic constant.	L3 Applying	1,2,3,5,6,8	1,2,6,7
	CO3	Understand first that motion and rest are completely relative phenomenon. Realize that Speed of light is the highest speed in this universe.	L2 Understanding	1,2,3,5,6,8	1,2,6,7
	CO4	Understand about flow of fluid and conservation theorem.	L2 Understanding	1,2,3,5,6,8	1,2,6,7
	CO5	Acquire the hands-on experience of classical mechanical domain that they have learnt theoretically.	L3 Applying	1,2,3,5,6,8	1,2,3,6,7
	CO6	Understand different techniques for measuring different physical properties like (i) flexure method (ii) Searle's method (iii) Poiseuille's method etc	L2 Understanding	1,2,3,5,6,8	1,2,3,6,7
	CO7	Analyze the uses of different apparatus like (i) Torsional Pendulum (ii) Sextant (iii) Bar Pendulum (iv) Kater's Pendulum	L4 Annalysing	1,2,3,5,6,8	1,2,6,7

Program Articulation Matrix (CO-PO Matrix)																			
PO, PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	1	3		1	3		1			2	3				3	2		
CO2	3	2	3		3	2		2			3	2				2	3		
CO3	2	3	3		2	3		3			1	3				3	2		
CO4	1	2	3		1	1		2			2	1				2	3		
CO5	2	2	3		3	2		3			3	3	3			2	2		
CO6	3	3	3		2	3		2			2	1	2			2	3		
CO7	3	3	3		3	3		2			3	3				3	2		
Average	2.43	2.29	3.00		2.14	2.43		2.14			2.29	2.29	2.50			2.43	2.43		

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HONOURS COURSE IN PHYSICS
With effect from the session: 2018 – 2019

Course Name: Core Course-3

Course Code: PHSACOR03T & PHSACOR03P

Topic Name: ELECTRICITY AND MAGNETISM

Course Outcome:

		CO, PO & PSO Mapping			
Sl No		**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
CO1		Understand Electrostatics, Gauss Law and Concepts of Capacitance along with application to Capacitors.	L1 Remembering	1,2,3,5,6	1,2,6,7
CO2		Identify Dielectric Properties of Materials and concept of Polarization in various media along with their applications.	L3 Applying	1,2,3,5,6	1,2,6,7
CO3		Comprehend existence and generation of Magnetic Field and Force, Concepts of Magnetic Dipole formation, Amperes Circuital Law and its applications.	L3 Applying	1,2,3,5,6	1,2,6,7
CO4		Understand Magnetic properties of matter, Magnetization, Magnetic susceptibility and permeability. Ferromagnetism and development of Hysteresis phenomenon.	L2 Understanding	1,2,3,5,6	1,2,6,7
CO5		Apply Practical knowledge of Electromagnetic Induction, Lenz's Law, Reciprocity theorem.	L3 Applying	1,2,3,5,6,9	1,2,4,6,7
CO6		Recall and understand - Electrical circuits - Their types and applications. Development of Network theorem and their uses. Develop insights for motors, dynamos, etc. and their design along with fabrication of large and small scale	L2 Understanding	1,2,3,5,6,9	1,2,4,6,7
CO7		Comprehend experiments on various topics of electricity and magnetism associated with the course.	L3 Applying	1,2,3,5,6	1,2,6,7

	Program Articulation Matrix (CO-PO Matrix)																		
PO, PSO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**	**PSO8**	**PSO9**
CO1	3	2	3		3	2					2	3				3	3		
CO2	2	3	3		1	3					3	2				2	3		
CO3	3	2	3		2	2					1	2				3	2		
CO4	2	3	3		3	1					2	3				2	1		
CO5	3	2	3		2	3			3		3	2		2		1	2		
CO6	1	1	3		2	3			2		2	3		3		2	3		
CO7	3	3	3		2	3					3	2				3	2		
Average	2.43	2.29	3.00		2.14	2.43			2.50		2.29	2.43		2.50		2.29	2.29		

BARASAT GOVERNMENT COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. Degree Course
Under CBCS semester system
HONOURS COURSE IN PHYSICS
With effect from the session: 2018 – 2019

Course Name: Core Course-4

Course Code: PHSACOR04T & PHSACOR04P

Topic Name: WAVE AND OPTICS

Course Outcome:

CO, PO & PSO Mapping					
Sl No	**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
CO1	Understand and Recollect concepts on Simple Harmonic Motion (SHM) and related topics.	L1 Remembering	1,2,3,5,6,8	1,2,6,7
CO2	Comprehend Superposition of waves and associated topics.	L3 Applying	1,2,3,5,6,8	1,2,6,7
CO3	Understand and Correlate the Physical properties of Optics.	L2 Understanding	1,2,3,5,6,8	1,2,6,7
CO4	Solve the problems for Interference, Diffraction and Polarization.	L3 Applying	1,2,3,5,6,8	1,2,6,7
CO5	Apply the concepts to distinguish between Diffraction and Holography.	L3 Applying	1,2,3,5,6,8	1,2,6,7
CO6	Understand and experience different instruments in Optics Laboratory – Spectrometer, EDF Prism, Diffraction Grating, Optical sources.	L3 Applying	1,2,3,5,6,8	1,2,4,6,7
CO7	Create different optical experimental setups like - (i) Fresnel Biprism (ii) Newton's Rings (iii) Michelson's interferometer, etc.	L6 Creating	1,2,3,5,6,8	1,2,4,6,7

Program Articulation Matrix (CO-PO Matrix)																			
PO, PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	2	3		2	2		1			2	3				3	2		
CO2	1	3	3		1	1		2			3	2				2	3		
CO3	2	2	3		2	3		3			2	3				3	2		
CO4	3	3	3		3	2		2			3	1				2	3		
CO5	3	3	3		2	3		3			1	3				3	2		
CO6	1	1	3		3	3		2			3	2		3		2	3		
CO7	3	3	3		3	3		3			2	3		2		2	2		
Average	2.29	2.43	3.00		2.29	2.43		2.29			2.29	2.43		2.50		2.43	2.43		

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HONOURS COURSE IN PHYSICS
With effect from the session: 2018 – 2019

Course Name: Core Course-5

Course Code: PHSACOR05T & PHSACOR05P

Topic Name: MATHEMATICAL METHODS II

Course Outcome:

		CO, PO & PSO Mapping			
Sl No		**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
CO1		Understand the mathematical modelling. and then solving the different physical problems.	L2 Understanding	1,2,3,4,5,6	1,2,6,7
CO2		Comprehend to solve the different physical problems.	L3 Applying	1,2,3,4,5,6	1,2,6,7
CO3		Evaluate problems in advance topics of mathematical physics like Fourier series, some special functions, special integrals, integral transforms, partial differential equations and probability.	L5 Evaluating	1,2,3,4,5,6	1,2,6,7
CO4		Create various numerical analysis techniques like use of array, numerical solution of problems of matrix algebra.	L6 Creating	1,2,3,4,5,6	1,2,6,7
CO5		Assimilate numerical integration, interpolation, solution of differential equation and curve fitting.	L4 Annalysing	1,2,3,4,5,6	1,2,6,7
CO6		Solve Real-Time problems.	L3 Applying	1,2,3,4,5,6	1,2,6,7

Program Articulation Matrix (CO-PO Matrix)																		
PO, PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	1	2	3	1	2	1					2	3				2	2		
CO2	2	3	3	2	3	3					3	2				2	3		
CO3	3	1	3	3	2	3					2	3				3	2		
CO4	2	3	3	2	1	2					3	2				2	3		
CO5	3	3	3	3	2	3					2	3				3	2		
CO6	3	3	3	3	3	3					3	2				2	3		
Average	2.33	2.50	3.00	2.33	2.17	2.50					2.50	2.50				2.33	2.50		

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Course Outcome or Learning Outcome
Three year B.A. /B.Sc. Degree Course
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HONOURS COURSE IN PHYSICS
With effect from the session: 2018 – 2019

Course Name: Core Course-6

Course Code: PHSACOR06T & PHSACOR06P

Topic Name: THERMAL PHYSICS

Course Outcome:

		CO, PO & PSO Mapping			
Sl No		**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
CO1		Understand the first law of thermodynamics and get the idea of Work-Energy equivalence.	L2 Understanding	1,2,3,5,6,8	1,2,6,7
CO2		Comprehend the concept of Entropy to give the idea of the directionality of the natural processes.	L3 Applying	1,2,3,5,8,6	1,2,6,7
CO3		Corelate overall concepts of thermodynamics to understand the thermal properties of the system macroscopically.	L4 Annalysing	1,2,3,5,6,8	1,2,6,7
CO4		Analyze the study of kinetic theory, to know the elementary idea of formulating the microscopic theory associated with the thermal properties of matter.	L4 Annalysing	1,2,3,5,6,8	1,2,6,7
CO5		Create proper mind frame through laboratory course to measure various physical parameters related to the thermal properties of matter.	L6 Creating	1,2,3,5,6,9	1,2,4,6,7
CO6		Apply to real-time problems – Mechanism in Thermal Engines, electronic circuits for measuring thermal parameters and designing of prototype machines.	L3 Applying	1,2,3,4,5,6,9	1,2,4,6,7

Program Articulation Matrix (CO-PO Matrix)																		
PO, PSO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**	**PSO8**	**PSO9**
CO1	3	3	3	2	2	1		3			3	2				3	2		
CO2	2	3	3		2	2		2			2	3				2	3		
CO3	3	2	3		3	3		3			3	1				3	2		
CO4	2	1	3		1	3		2			2	3				2	3		
CO5	1	3	3		3	3			2		3	2		3		1	2		
CO6	3	3	3		2	3			3		1	3		2		2	2		
Average	2.33	2.50	3.00	2.00	2.17	2.50		2.50	2.50		2.33	2.33		2.50		2.17	2.33		

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HONOURS COURSE IN PHYSICS
With effect from the session: 2018 – 2019

Course Name: Core Course-7

Course Code: PHSACOR07T & PHSACOR07P

Topic Name: DIGITAL SYSTEMS AND APPLICATIONS

Course Outcome:

		CO, PO & PSO Mapping			
	Sl No	**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
	CO1	Understand the method of IC construction and also the history of IC formation.	L1 Remembering	1,2,3,5,6,7	1,2,5,6,7
	CO2	Comprehend the different number systems and Boolean Algebra.	L3 Applying	1,2,3,5,6,7	1,2,5,6,7
	CO3	Understand the development of different combinational digital circuits (like, Adder, Subtractor, Multiplexer, De- Multiplexer, Encoder, Decoder etc) and how they work.	L2 Understanding	1,2,3,5,6,7	1,2,5,6,7
	CO4	Construct the different application oriented digital circuits by using of Karnaugh Map simplification as per requirement.	L6 Creating	1,2,3,5,6,7	1,2,5,6,7
	CO5	Differentiate between synchronous & asynchronous counters and their formation techniques.	L4 Annalysing	1,2,3,5,6,7	1,2,5,6,7
	CO6	Solve the use of shift register as random sequence generator along with simplifying a digital circuit using the method of Boolean Expression.	L3 Applying	1,2,3,5,6,7	1,2,5,6,7
	CO7	Create digital circuit using simplified method of Boolean Expression.Know about different discrete components/accessories like resistance, breadboard, ICs, Voltmeter, Multimeter, DC power supply etc.	L6 Creating	1,2,3,5,6,7	1,2,5,6,7

Program Articulation Matrix (CO-PO Matrix)																			
PO, PSO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**	**PSO8**	**PSO9**
CO1	3	3	3		2	3	3				2	3			3	2	3		
CO2	2	3	3		3	3	2				3	2			1	3	2		
CO3	3	2	3		2	2	3				1	2			2	2	3		
CO4	1	2	3		2	2	2				2	3			2	1	2		
CO5	3	3	3		3	3	3				3	2			3	2	3		
CO6	2	1	3		2	1	3				2	3			2	3	2		
CO7	3	2	3		1	3	3				3	2			3	2	2		
Average	2.43	2.29	3.00		2.14	2.43	2.71				2.29	2.43			2.29	2.14	2.43		

BARASAT GOVERNMENT COLLEGE
Course Outcome or Learning Outcome
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HONOURS COURSE IN PHYSICS
With effect from the session: 2018 – 2019

Course Name: Core Course-8

Course Code: PHSACOR08T & PHSACOR08P

Topic Name: MATHEMATICAL PHYSICS III

Course Outcome:

		CO, PO & PSO Mapping			
Sl No		Course outcome	Knowledge level Blooms Level	POs Mapping	PSOs mapping
CO1		Understand the course of complex variable to apply it in electrical network theory, quantum mechanics etc. Contour integration allows to evaluate improper integrals, which appear in several problems of physics.	L2 Understanding	1,2,3,4,5,6	1,2,6,7
CO2		Comprehend the study of integral transform to visualize the correlation of the physical properties of a system in a given space along with its reciprocal space and Contour Integration.	L3 Applying	1,2,3,4,5,6	1,2,6,7
CO3		Solve boundary value problems to tackle the physical problems in electrostatic, wave mechanics and heat conduction, etc.	L3 Applying	1,2,3,4,5,6	1,2,6,7
CO4		Employing matrices to get the basic idea of linear operator, which has wide range of applications in theoretic	L4 Annalysing	1,2,3,4,5,6	1,2,6,7
CO5		This paper involves several numerical methods which are extremely important for the students to assimilate numerical techniques.	L3 Applying	1,2,3,4,5,6	1,2,6,7
CO6		Identify the numerical methods useful to visualize some mathematical techniques discussed in the associated theory paper.	L3 Applying	1,2,3,4,5,6	1,2,6,7
CO7		Evaluate improper integrals in physical problems, ability of writing computer codes.	L5 Evaluating	1,2,3,4,5,6	1,2,6,7

Program Articulation Matrix (CO-PO Matrix)																			
PO, PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	3	2	2	3					2	3				2	3		
CO2	2	3	3	1	2	3					3	2				3	2		
CO3	3	2	3	2	3	2					2	3				2	3		
CO4	2	3	3	2	2	2					3	2				3	2		
CO5	1	2	3	3	1	3					2	3				2	3		
CO6	2	1	3	3	3	3					2	1				3	2		
CO7	3	3	3	3	2	1					3	3				2	2		
Average	2.29	2.43	3.00	2.29	2.14	2.43					2.43	2.43				2.43	2.43		

BARASAT GOVERNMENT COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. Degree Course
Under CBCS semester system
HONOURS COURSE IN PHYSICS
With effect from the session: 2018 – 2019

Course Name: Core Course-9

Course Code: PHSACOR09T & PHSACOR09P

Topic Name: ELEMENTS OF MODERN PHYSICS AND LAB

Course Outcome:

<table>
<tr><th colspan="6">CO, PO & PSO Mapping</th></tr>
<tr><th>Sl No</th><th>Course outcome</th><th>Knowledge level Blooms Level</th><th>POs Mapping</th><th>PSOs mapping</th></tr>
<tr><td>CO1</td><td>Understand the idea in relativistic dynamics, by studying Dynamics from relativistic view point and know the 4-Vectors and their applications.</td><td>L2 Understanding</td><td>1,2,3,5,6,8</td><td>1,2,4,6,7</td></tr>
<tr><td>CO2</td><td>Realize the emergence of Quantum Theory and its importance.</td><td>L2 Understanding</td><td>1,2,3,5,6,8</td><td>1,2,4,6,7</td></tr>
<tr><td>CO3</td><td>Correlate the Ultraviolet- catastrophe to know about the famous hypothesis of Planck.</td><td>L4 Annalysing</td><td>1,2,3,5,6,8</td><td>1,2,4,6,7</td></tr>
<tr><td>CO4</td><td>Probe the particle and wave-dual nature inherent in quantum theory.</td><td>L3 Applying</td><td>1,2,3,5,6,8</td><td>1,2,4,6,7</td></tr>
<tr><td>CO5</td><td>Comprehend LASER as an important technology which came into existence due to the emergence of quantum theory.</td><td>L3 Applying</td><td>1,2,3,5,6,8</td><td>1,2,4,6,7</td></tr>
<tr><td>CO6</td><td>Apply the basic acquired knowledge in Nuclear and Particle Physics and associated fields (like fundamental forces in nature, formation of atomic nucleus and the existence of particles in the universe.</td><td>L3 Applying</td><td>1,2,3,5,6,8</td><td>1,2,4,6,7</td></tr>
<tr><td>CO7</td><td>Create a correlation of nuclear radiation and the detectors for the existing radiations (α, β and γ rays) and the appropriate detectors to contain the radiation. This is useful for medical physics also.</td><td>L6 Creating</td><td>1,2,3,5,6,8</td><td>1,2,4,6,7</td></tr>
</table>

<table>
<tr><th colspan="20">Program Articulation Matrix (CO-PO Matrix)</th></tr>
<tr><th>PO, PSO / CO</th><th>PO1</th><th>PO2</th><th>PO3</th><th>PO4</th><th>PO5</th><th>PO6</th><th>PO7</th><th>PO8</th><th>PO9</th><th>PO10</th><th>PSO1</th><th>PSO2</th><th>PSO3</th><th>PSO4</th><th>PSO5</th><th>PSO6</th><th>PSO7</th><th>PSO8</th><th>PSO9</th></tr>
<tr><td>CO1</td><td>3</td><td>3</td><td>3</td><td></td><td>2</td><td>3</td><td></td><td>3</td><td></td><td></td><td>2</td><td>3</td><td></td><td>3</td><td></td><td>2</td><td>3</td><td></td><td></td></tr>
<tr><td>CO2</td><td>2</td><td>3</td><td>3</td><td></td><td>1</td><td>3</td><td></td><td>2</td><td></td><td></td><td>3</td><td>2</td><td></td><td>2</td><td></td><td>3</td><td>2</td><td></td><td></td></tr>
<tr><td>CO3</td><td>3</td><td>2</td><td>3</td><td></td><td>2</td><td>2</td><td></td><td>2</td><td></td><td></td><td>2</td><td>3</td><td></td><td>3</td><td></td><td>2</td><td>1</td><td></td><td></td></tr>
<tr><td>CO4</td><td>2</td><td>2</td><td>3</td><td></td><td>2</td><td>1</td><td></td><td>3</td><td></td><td></td><td>3</td><td>2</td><td></td><td>2</td><td></td><td>3</td><td>2</td><td></td><td></td></tr>
<tr><td>CO5</td><td>1</td><td>3</td><td>3</td><td></td><td>2</td><td>3</td><td></td><td>1</td><td></td><td></td><td>1</td><td>3</td><td></td><td>2</td><td></td><td>2</td><td>3</td><td></td><td></td></tr>
<tr><td>CO6</td><td>2</td><td>1</td><td>3</td><td></td><td>3</td><td>2</td><td></td><td>2</td><td></td><td></td><td>3</td><td>1</td><td></td><td>2</td><td></td><td>3</td><td>2</td><td></td><td></td></tr>
<tr><td>CO7</td><td>3</td><td>3</td><td>3</td><td></td><td>2</td><td>3</td><td></td><td>3</td><td></td><td></td><td>3</td><td>3</td><td></td><td>2</td><td></td><td>2</td><td>3</td><td></td><td></td></tr>
<tr><td>Average</td><td>2.29</td><td>2.43</td><td>3.00</td><td></td><td>2.00</td><td>2.43</td><td></td><td>2.29</td><td></td><td></td><td>2.43</td><td>2.43</td><td></td><td>2.29</td><td></td><td>2.43</td><td>2.29</td><td></td><td></td></tr>
</table>

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With effect from the session: 2018 – 2019

Course Name: Core Course-10

Course Code: PHSACOR10T & PHSACOR10P

Topic Name: ANALOG SYSTEMS AND APPLICATIONS

Course Outcome:

		CO, PO & PSO Mapping			
	Sl No	Course outcome	Knowledge level Blooms Level	POs Mapping	PSOs mapping
	CO1	Understand the basic concepts of semiconductor physics and its application.	L2 Understanding	1,2,3,5,6,8	1,2,4,6,7
	CO2	Correlate the operation, characteristics and various applications of different type of Devices; like - diodes, transistors, field effect transistors, OPAMP and oscillators.	L4 Annalising	1,2,3,5,6,8	1,2,4,6,7
	CO3	Realize the working principle of amplifier, feedback amplifier and oscillator. Students can also be able to differentiate among different amplifiers and can choose a particular amplifier for a particular application/use.	L3 Applying	1,2,3,5,6,8	1,2,4,6,7
	CO4	Recognize different circuit components like, resistance, capacitor, inductor, diode, transistor, OP-AMP IC (741) etc.	L2 Understanding	1,2,3,5,6,8	1,2,4,6,7
	CO5	Construct the different analog circuits on breadboard.	L6 Creating	1,2,3,5,6,8	1,2,4,6,7
	CO6	Apply the Laboratory facilities like CRO, Function Generator, Regulated Power Supply etc.	L3 Applying	1,2,3,5,6,8	1,2,4,6,7
	CO7	Acquire Hands-On experience on different Trainer Kit like Diode Experiment, BJT & FET Characteristics study, CE- Amplifier Circuit, OP-AMP Expt.	L3 Applying	1,2,3,5,6,8	1,2,4,6,7

Program Articulation Matrix (CO-PO Matrix)																		
PO, PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	3		2	3		3			3	3		1		3	2		
CO2	3	2	3		2	3		2			3	2		3		1	3		
CO3	2	3	3		3	2		3			2	3		2		2	2		
CO4	2	1	3		2	2		2			3	1		3		3	1		
CO5	3	2	3		3	3		1			1	3		2		2	3		
CO6	1	3	3		2	1		2			3	2		3		3	2		
CO7	2	3	3		1	3		3			2	3		3		2	3		
Average	2.29	2.43	3.00		2.14	2.43		2.29			2.43	2.43		2.43		2.29	2.29		

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Course Name: Core Course-11

Course Code: PHSACOR11T & PHSACOR11P

Topic Name: QUANTUM MECHANICS AND ITS APPLICATIONS

Course Outcome:

		CO, PO & PSO Mapping			
	Sl No	**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
	CO1	Understand Basics of Quantum Mechanics (QM), formalism of Hamiltonian and necessity of Hermitian operators, development of wave- function, Eigen values, and critical applications of uncertainty principles.	L2 Understanding	1,2,3,4,5,6	1,2,5,6,7
	CO2	Correlate Time - Dependent and Time - Independent Schrodinger Equation, Quantum Mechanical Scattering and Tunnelling in 1D Step Potential, Rectangular Potential barrier and Tunnelling effect in Alpha Decay. Introduction to Scanning Tunnelling Microscopes (STM).	L3 Applying	1,2,3,4,5,6	1,2,5,6,7
	CO3	Solve problems on the existence of Bound states in an arbitrary Potential and Quantum Theory of Hydrogen-like atom, Helium ions, etc.	L3 Applying	1,2,3,5,6,8	1,2,5,6,7
	CO4	Apply Quantization rules in Atomic Physics - Zeeman Effect. It has been observed that this course has attracted special interest of students studying Quatum Mechanical Phenomena and Systems in Physics, Chemistry and specially Nano-materials.	L3 Applying	1,2,3,4,5,6	1,2,5,6,7
	CO5	Solve problems on Quantum Mechanics numerical practicals.	L3 Applying	1,2,3,5,6,9	1,2,5,6,7
	CO6	Learn to cast a time independent Schrodinger equation to ones involving dimensionless variables.	L2 Understanding	1,2,3,5,6,8	1,2,5,6,7
	CO7	Create and use of Python computer progamming language.	L6 Creating	1,2,3,4,5,6	1,2,5,6,7

Program Articulation Matrix (CO-PO Matrix)																		
PO, PSO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**	**PSO8**	**PSO9**
CO1	3	3	3	2	2	3					2	3			2	2	3		
CO2	2	3	3	3	2	3					3	2			3	2	2		
CO3	3	2	3		3	2		3			3	1			2	2	3		
CO4	2	3	3	2	2	2					3	3			2	3	1		
CO5	1	1	3		1	3			3		3	2			3	1	2		
CO6	2	2	3		3	1		2			2	3			1	2	3		
CO7	3	3	3	2	2	3					1	3			2	3	2		
Average	2.29	2.43	3.00	2.25	2.14	2.43		2.50	3.00		2.43	2.43			2.14	2.14	2.29		

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With effect from the session: 2018 – 2019

Course Name: Core Course-12

Course Code: PHSACOR12T & PHSACOR12P

Topic Name: SOLID STATE PHYSICS

Course Outcome:

CO, PO & PSO Mapping				
Sl No	Course outcome	Knowledge level Blooms Level	POs Mapping	PSOs mapping
CO1	Understand concepts on solid materials – such as, Amorphous and Crystalline.	L1 Remembering	1,2,3,5,6,8,9	1,2,4,5,6,7
CO2	Learn about X-Ray crystallography.	L2 Understanding	1,2,3,5,6,7	1,2,4,5,6,7
CO3	Comprehend lattice oscillations and correlate with the properties of the matter.	L3 Applying	1,2,3,5,6,8	1,2,4,5,6,7
CO4	Understand solid state Magnetic properties, Dielectric properties of matter, Drude's theory, etc	L2 Understanding	1,2,3,5,6,8	1,2,4,5,6,7
CO5	Solve problems on Electronic Band theory.	L3 Applying	1,2,3,4,5,6	1,2,4,5,6,7
CO6	Understand a newly emerged material properties called superconductivity and its application.	L2 Understanding	1,2,3,5,6,9	1,2,4,5,6,7
CO7	Evaluate Intrinsic semiconductor energy gap, Hall Coefficient, etc.; by performing Experiments.	L5 Evaluating	1,2,3,4,5,6	1,2,4,5,6,7

Program Articulation Matrix (CO-PO Matrix)																		
PO, PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	2	3	3		2	3		2	3		2	2		3	2	3	2		
CO2	3	3	3		2	3	2				3	3		2	3	2	3		
CO3	2	2	3		3	2		3			2	2		1	1	3	2		
CO4	3	3	3		2	3		2			3	3		2	2	2	3		
CO5	2	2	3	2	1	1					1	1		3	3	3	2		
CO6	1	3	3		3	2			2		3	3		3	3	2	3		
CO7	3	1	3	2	2	3					3	3		2	2	1	1		
Average	2.29	2.43	3.00	2.00	2.14	2.43	2.00	2.33	2.50		2.43	2.43		2.29	2.29	2.29	2.29		

BARASAT GOVERNMENT COLLEGE
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Course Name: **Core Course-13**

Course Code: **PHSACOR13T & PHSACOR13P**

Topic Name: **ELECTROMAGNETIC THEORY**

Course Outcome:

		CO, PO & PSO Mapping			
Sl No		**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
CO1		Recall Maxwell Equations and its behavior in free space & different media.	L1 Remembering	1,2,3,5,6,8	1,2,5,6,7
CO2		Understand Poynting Theorem & Vector, Energy density & Field Energy Density.	L2 Understanding	1,2,3,5,6,8	1,2,5,6,7
CO3		Comprehend Electromagnetic (EM) wave propagation in Bounded & Unbounded media, and Polarization of EM.	L3 Applying	1,2,3,5,6,8	1,2,5,6,7
CO4		Solve problems on Wave guides & Optical Fibers - Their concepts and applications.	L3 Applying	1,2,3,4,5,6	1,2,5,6,7
CO5		Evaluate optical properties from laboratory experiments.	L5 Evaluating	1,2,3,5,6,9	1,2,4,5,6,7
CO6		Apply to Optical Communication and Wave propagation along with Transmission Theory.	L3 Applying	1,2,3,5,6,9	1,2,4,6,5,7

Program Articulation Matrix (CO-PO Matrix)																			
PO, PSO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**	**PSO8**	**PSO9**
CO1	3	3	3		2	3		2			3	2			3	2	3		
CO2	2	3	3		3	1		3			2	3			2	3	2		
CO3	2	3	3		2	3		2			3	1			1	1	3		
CO4	3	2	3	3	3	2					1	2			3	2	1		
CO5	3	3	3		2	3			2		2	3		2	2	3	3		
CO6	1	1	3		1	3			3		3	2		3	3	2	3		
Average	2.33	2.50	3.00	3.00	2.17	2.50		2.33	2.50		2.33	2.17		2.50	2.33	2.17	2.50		

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HONOURS COURSE IN PHYSICS
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Course Name: Core Course-14

Course Code: PHSACOR14T & PHSACOR14P

Topic Name: STATISTICAL MECHANICS

Course Outcome:

		CO, PO & PSO Mapping			
	Sl No	**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
	CO1	Understand Statistical mechanics for physical systems microscopically and correlate with macroscopic properties.	L2 Understanding	1,2,3,4,5,6	1,2,5,6,7
	CO2	Comprehend Quantum Statistical Mechanics for low temperature behavior of system.	L3 Applying	1,2,3,4,5,6	1,2,5,6,7
	CO3	Evaluate basic formalism of statistical mechanics for a wide range of physical systems.	L5 Evaluating	1,2,3,4,5,6	1,2,5,6,7
	CO4	Solve problems on statistical physics.	L3 Applying	1,2,3,4,5,6	1,2,5,6,7
	CO5	Apply to Condensed Matter Physics, Particle Physics, etc.	L3 Applying	1,2,3,4,5,6	1,2,5,6,7
	CO6	Execute Computational Laboratory Course.	L2 Understanding	1,2,3,4,5,6	1,2,5,6,7
	CO7	Create primary ideas of doing numerical research associated with the statistical physics.	L6 Creating	1,2,3,4,5,6	1,2,5,6,7

Program Articulation Matrix (CO-PO Matrix)																			
PO, PSO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**	**PSO8**	**PSO9**
CO1	3	3	3	2	2	3					3	2			3	2	3		
CO2	3	3	3	3	2	3					2	3			2	3	2		
CO3	1	2	3	3	3	2					2	1			1	2	3		
CO4	2	2	3	3	2	3					3	3			3	3	2		
CO5	3	3	3	2	3	2					1	2			3	3	1		
CO6	1	1	3	1	1	1					2	3			2	1	3		
CO7	3	3	3	3	2	3					3	3			2	2	2		
Average	2.29	2.43	3.00	2.43	2.14	2.43					2.29	2.43			2.29	2.29	2.29		

BARASAT GOVERNMENT COLLEGE
Course Outcome or Learning Outcome
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Course Name: **Discipline Specific Elective-1**

Course Code: **PHSADSE02T**

Topic Name: **ADVANCED DYNAMICS**

Course Outcome:

		CO, PO & PSO Mapping			
Sl No		**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
CO1		Understand the dynamics and formation of Lagrange's equation	L2 Understanding	1,2,3,4,5,6	1,2,5,6,7
CO2		Solve the related dynamics problems with both time-dependent and time independent constraints.	L3 Applying	1,2,3,4,5,6	1,2,5,6,7
CO3		Comprehend the behavior of rigid body dynamics and fluid dynamics	L3 Applying	1,2,3,4,5,6	1,2,5,6,7
CO4		Apply the concept of phase space, Autonomous and non-autonomous systems.	L3 Applying	1,2,3,4,5,6	1,2,5,6,7
CO5		Analyze the behavior of one-dimensional autonomous system, two dimensional dynamical systems, etc.	L4 Annalysing	1,2,3,4,5,6	1,2,5,6,7
CO6		Create the idea of limit cycle, Discrete time dynamical systems, iterative map, Logistic map	L6 Creating	1,2,3,4,5,6	1,2,5,6,7
CO7		Formulate about the Parameter dependence- steady, periodic and chaos states.	L6 Creating	1,2,3,4,5,6	1,2,5,6,7

	Program Articulation Matrix (CO-PO Matrix)																		
PO, PSO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**	**PSO8**	**PSO9**
CO1	3	3	3	3	2	3					3	3			3	2	3		
CO2	2	2	3	2	2	3					3	3			2	3	2		
CO3	2	3	3	3	2	2					2	2			3	3	1		
CO4	3	2	3	2	3	3					3	3			1	2	3		
CO5	2	1	3	2	2	2					3	3			3	1	2		
CO6	1	3	3	3	3	1					2	2			2	2	3		
CO7	3	3	3	1	1	3					1	1			3	3	2		
Average	2.29	2.43	3.00	2.29	2.14	2.43					2.43	2.43			2.43	2.29	2.29		

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HONOURS COURSE IN PHYSICS
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Course Name: **Discipline Specific Elective-2**

Course Code: **PHSADSE03T**

Topic Name: **NUCLEAR AND PARTICLE PHYSICS**

Course Outcome:

		CO, PO & PSO Mapping			
Sl No		**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
CO1		Comprehend the basic concepts of nuclear.	L2 Understanding	1,2,3,5,6,8	1,2,5,6,7
CO2		Understand particle physics.	L2 Understanding	1,2,3,5,6,8	1,2,5,6,7
CO3		Analyze knowledge on advanced nuclear.	L4 Annalysing	1,2,3,5,6,8	1,2,5,6,7
CO4		Acquire Particle Physics.	L2 Understanding	1,2,3,5,6,8	1,2,5,6,7
CO5		Apply the ideas of nuclear.	L3 Applying	1,2,3,5,6,8	1,2,5,6,7
CO6		Solve problems particle physics to the sustainable development of nation.	L3 Applying	1,2,3,5,6,8	1,2,5,6,7

Program Articulation Matrix (CO-PO Matrix)																		
PO, PSO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**	**PSO8**	**PSO9**
CO1	3	3	3		2	3		3			3	3			2	2	2		
CO2	3	2	3		2	3		2			2	2			3	3	3		
CO3	2	3	3		3	2		3			3	3			2	2	2		
CO4	3	3	3		2	3		2			2	2			2	2	2		
CO5	2	3	3		1	3		1			2	2			3	3	3		
CO6	1	1	3		2	1		2			3	3			3	2	2		
Average	2.33	2.50	3.00		2.00	2.50		2.17			2.50	2.50			2.50	2.33	2.33		

Course Outcome or Learning Outcome
Three year B.A. /B.Sc. Degree Course
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HONOURS COURSE IN PHYSICS
With effect from the session: 2018 – 2019

Course Name: Discipline Specific Elective-3

Course Code: PHSADSE04T

Topic Name: ADVANCED MATHEMATICAL PHYSICS

CO, PO & PSO Mapping					
Course Outcome:	Sl No	Course outcome	Knowledge level Blooms Level	POs Mapping	PSOs mapping
	CO1	Understand different problems involving modern mathematics.	L2 Understanding	1,2,3,4,5,6	1,2,4,5,6,7
	CO2	Comprehend Statistics and related phenomena.	L3 Applying	1,2,3,5,6,8	1,2,4,5,6,7
	CO3	Solve problems in Calculus.	L3 Applying	1,2,3,4,5,6	1,2,4,5,6,7
	CO4	Acquire a good amount of knowledge.	L2 Understanding	1,2,3,5,6,8	1,2,4,5,6,7
	CO5	Skill to develop formulation of scientific laws of interdisciplinary subjects.	L6 Creating	1,2,3,5,6,8	1,2,4,5,6,7
	CO6	Create new functional areas.	L6 Creating	1,2,3,4,5,6	1,2,4,5,6,7

Program Articulation Matrix (CO-PO Matrix)																		
PO, PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	3	3	2	3					3	3		3	2	3	3		
CO2	2	3	3		2	2		1			1	1		2	3	2	2		
CO3	2	1	3		2	3					2	2		3	3	3	3		
CO4	3	3	3		3	2		3			3	3		3	3	2	2		
CO5	1	2	3		2	1		2			3	3		2	2	2	2		
CO6	2	3	3	2	1	3					2	2		1	1	3	3		
Average	2.17	2.50	3.00	2.50	2.00	2.33		2.00			2.33	2.33		2.33	2.33	2.50	2.50		

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HONOURS COURSE IN PHYSICS
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Course Name: **Discipline Specific Elective-4**

Course Code: **PHSADSE06T**

Topic Name: **COMMUNICATION ELECTRONICS**

Course Outcome:

		CO, PO & PSO Mapping			
Sl No		**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
CO1		Understand the modern communication system (analog & digital) and its practical use.	L2 Understanding	1,2,3,5,6,8	1,2,5,6,7
CO2		Comprehend different types of modulation technique like AM, FM, PM, FSK, PSK, ASK, BPSK etc. to develop idea for the students for research areas.	L3 Applying	1,2,3,5,6,8	1,2,5,6,7
CO3		Acquire the satellite communication technique.	L2 Understanding	1,2,3,5,6,8	1,2,5,6,7
CO4		Design circuits on Communication Electronics.	L6 Creating	1,2,3,5,6,8	1,2,5,6,7
CO5		Construct the modulator and de-modulator circuit to calculate different parameters of modulated wave.	L6 Creating	1,2,3,5,6,8	1,2,5,6,7
CO6		Apply to and realize the practical Transmitter circuit.	L3 Applying	1,2,3,5,6,8	1,2,5,6,7

Program Articulation Matrix (CO-PO Matrix)																			
PO, PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	3		2	3		3			3	3			3	2	3		
CO2	1	2	3		2	2		1			2	2			3	3	2		
CO3	3	3	3		3	1		3			3	3			2	2	3		
CO4	2	2	3		2	3		2			3	3			2	3	2		
CO5	1	1	3		3	3		1			1	1			1	1	1		
CO6	3	3	3		1	3		2			3	3			3	2	3		
Average	2.17	2.33	3.00		2.17	2.50		2.00			2.50	2.50			2.33	2.17	2.33		

BARASAT GOVERNMENT COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. Degree Course
Under CBCS semester system
HONOURS COURSE IN PHYSICS
With effect from the session: 2018 – 2019

Course Name: Skill Enhancement Course-1

Course Code: PHSSSEC01M

Topic Name: BASIC INSTRUMENTATION SKILLS

Course Outcome:

		CO, PO & PSO Mapping			
Sl No		**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
CO1		Develop skill in different instruments which are highly required in physical measurements.	L6 Creating	1,2,3,5,6,8	1,2,4,6,7
CO2		Create new experimental setups.	L6 Creating	1,2,3,5,6,8	1,2,4,6,7
CO3		Comprehend concepts on the basics of cathode ray oscilloscope (CRO), construction of CRT, electron gun, electrostatic focusing and acceleration, brief discussion on screen phosphor, etc.	L3 Applying	1,2,3,5,6,8	1,2,4,6,7
CO4		Understand the principle and working of digital meters.	L2 Understanding	1,2,3,5,6,8	1,2,4,6,7
CO5		Compare Analog and Digital instruments and working principles of digital voltmeter.	L3 Applying	1,2,3,5,6,8	1,2,4,6,7
CO6		Apply to the working of digital multimeter, measuring of current, voltage, frequency etc.	L3 Applying	1,2,3,5,6,8	1,2,4,6,7

Program Articulation Matrix (CO-PO Matrix)																		
PO, PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	3		2	3		2			3	3		3		2	3		
CO2	2	2	3		3	1		2			3	3		2		3	2		
CO3	1	2	3		2	3		3			2	2		3		1	3		
CO4	2	3	3		1	2		2			1	1		1		2	1		
CO5	1	1	3		3	3		3			2	2		2		2	3		
CO6	3	2	3		2	2		2			2	2		3		3	2		
Average	2.00	2.17	3.00		2.17	2.33		2.33			2.17	2.17		2.33		2.17	2.33		

BARASAT GOVERNMENT COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. Degree Course
Under CBCS semester system
HONOURS COURSE IN PHYSICS
With effect from the session: 2018 – 2019

Course Name: **Skill Enhancement Course-2**

Course Code: **PHSSSEC02M**

Topic Name: **COMPUTATIONAL PHYSICS**

Course Outcome:

		CO, PO & PSO Mapping			
Sl No		**Course outcome**	**Knowledge level Blooms Level**	**POs Mapping**	**PSOs mapping**
CO1		Understand applications of some fundamental Linux commands.	L2 Understanding	1,2,3,4,5,6	1,2,4,6,7
CO2		Comprehend LaTeX word processor to prepare a basic LaTeX file, document, input file for LaTeX, compiling LaTeXfile, LaTeX tags for creating different environments, defining LaTeX commands and environments, changing the	L3 Applying	1,2,3,4,5,6	1,2,4,6,7
CO3		Apply graphical analysis and its limitations, importance of visualization of computational and computational data, basic- gnu-plot commands: simple plots, plotting data from a file, saving and exporting etc.	L3 Applying	1,2,3,4,5,6	1,2,4,6,7
CO4		Formulate of some commonly needed Linux commands.	L6 Creating	1,2,3,4,5,6	1,2,4,6,7
CO5		Perform course for F90 programming and to write elementary codes. All the course-based programming were done by them. They prepared also e Note Book and submitted for evaluation.	L3 Applying	1,2,3,4,5,6	1,2,4,6,7
CO6		Evaluate F90 programming to some elementary projects works as like numerical solution of central force orbit, projectile motion, simple harmonic motion among some of these.	L5 Evaluating	1,2,3,4,5,6	1,2,4,6,7

Program Articulation Matrix (CO-PO Matrix)																		
PO, PSO \ CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**	**PSO8**	**PSO9**
CO1	3	3	3	3	2	3					2	3		2		2	3		
CO2	1	3	3	2	1	1					3	2		3		3	2		
CO3	2	2	3	3	3	3					3	3		1		1	3		
CO4	2	2	3	2	2	2					2	2		2		3	1		
CO5	3	3	3	2	3	3					3	3		3		2	3		
CO6	2	1	3	1	2	2					1	2		3		3	2		
Average	2.17	2.33	3.00	2.17	2.17	2.33					2.33	2.50		2.33		2.33	2.33		