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Undergraduate Programme in Physics

(With effect from the Academic Year 2020-21)

FEBRUARY 2020

Note: The Board of Studies is designed Learning Outcomes Based Curriculum Framework of B.Sc. Physics Programme prescribed by UGC

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1.Preamble

Physics is one of the basic and fundamental sciences. The curriculum for the graduate programme in Physics is revised as per the UGC guidelines on Learning Outcome based Course Framework. The learner- centric courses let the student progressively develop a deeper understanding of various aspects of Physics.

The new curriculum offers courses in the core areas of Mechanics, Acoustics, optics and spectroscopy, Atomic physics etc. The courses will train students with sound theoretical and experimental knowledge that suits the need of academics and industry .In addition to the theoretical course work, students also learn physics laboratory methods for different branches of physics, specialized measurement techniques, analysis of observational data, including error estimation.Students will have deeper understanding of laws of nature through the subjects like classical mechanics, quantum mechanics, statistical physics etc. Students' ability of problem solving will be enhanced. Students can apply principles in physics to real life problems. Subjects like Integrated electronics and Microprocessors will enhance the logical skills as well as employability skills. Numerical methods and Mathematical Physics provide analytical thinking and provides a better platform for higher level physics and research.

The restructured courses with well defined objectives and learning outcomes, provides guidance to prospective students in choosing the elective courses to broaden their skills in the field of physics and interdisciplinary areas.The elective modules of the framework offer students choice to gain knowledge and expertise in specialized domains of Physics like Astrophysics, Medical Physics, etc.

2. Programme Learning Outcome

a. Nature and Extent of the Programme

The main objective of science education has evolved to concern the education of future citizens being able to contribute to the growth of global issues. Physics is a unique training that provides a basis of key skills, develops innovative ways of tackling problems, addresses fundamental needs of industry and contributes to economic development.

Physics is the most fundamental of the experimental sciences, as it seeks to explain the universe itself from the very smallest particles—currently accepted as quarks, which may be truly fundamental—to the vast distances between galaxies. Classical physics, built upon the great pillars of Newtonian mechanics, electromagnetism and thermodynamics, went a long way in deepening our understanding of the universe. Maxwell’s theory of electromagnetism described the behaviour of electric charge and unified light and electricity, while thermodynamics described the relation between energy transferred due to temperature difference and work and described how all-natural processes increase disorder in the universe. However, experimental discoveries dating from the end of the 19th century eventually led to the demise of the classical picture of the universe as being knowable and predictable. Newtonian mechanics failed when applied to the atom and has been superseded by quantum mechanics and general relativity. However, observations remain essential to the very core of physics. The body of scientific knowledge has grown in size and complexity, and the tools and skills of theoretical and experimental physicists have become so specialized that the students need to be highly proficient in both areas. This is very critical in developing a scientific temperament and urge to innovate, create and discover in Physics.

The Degree Programme in physics course allows students to develop traditional practical skills and techniques and increase their abilities in the use of mathematics, which is the language of physics. It also allows students to develop interpersonal and digital communication skills which are essential in modern scientific endeavour and are important life-enhancing, transferable skills in their own right.

b. Aim of the Programme:

This Programme enables the students to develop scientific temper, observation skills, problem solving and critical thinking skills. It empowers them with knowledge leading to higher learning in applied sciences. It fosters research attitude among the students and helps them serve for the betterment of the society.

c. Graduate attributes:

After the completion of B.Sc Physics Programme, students will be able to

- ❖ Acquire a thorough understanding of physical phenomena, identify the principles and basic concepts in physics.
- ❖ Tests the validity of Physical theories in a Scientific Method.
- ❖ Use a methodical approach to compare the implications of a theory with the conclusions drawn from its related experiments.
- ❖ Use Observations to test the validity of a theory in a logical, unbiased and repeatable way.
- ❖ Apply Numerical methods and mathematical approach involved in Physics leading to research.
- ❖ Employ critical thinking and efficient problem solving skills in all the basic areas of Physics

3. COURSE STRUCTURE:

FIRST SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Max. Marks		
				Int.	Ext.	Total
Part – I	Language Paper – I	6	3	25	75	100
Part - II	BP2-ENG01-Communicative English I	3	3	50	50	100
Part III	BPS-CSC01-Properties of Matter and Sound	5	4	25	75	100
	Core Practical-I	3	Examination will be held in the end of second semester			
	Allied I – Choose any one*					
	Allied Theory	9	5	25	75	100
	(OR)					
Part III	Allied Theory / Practical	6	3	25	75	100
		3	2	Exam. will be held at the end of II semester		
Part IV	Basic Tamil/Adv. Tamil/NME**	-	2	25	75	100
	BP4-EPSC 01-English for Physical Sciences I	4	4	50	50	100
Semester-wise Credit Total			21			

* Choose any one – Mathematics or Chemistry

** Choose any one paper from the other department

SECOND SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Max. Marks		
				Int.	Ext.	Total
Part – I	Language Paper – II	6	3	25	75	100
Part - II	BP2-ENG02-Communicative English II	3	3	50	50	100
Part - III	BPS-CSC03-Thermal Physics	5	4	25	75	100
	BPS-CSC02-Practical-I	3	4	40	60	100
	Allied II –Choose any one*					
	Allied Theory	9	5	25	75	100
	(OR)					
Part - III	Allied Theory / Practical	6	3	25	75	100
		3	2	40	60	100
Part IV	Basic Tamil/Adv. Tamil/ NME**	-	2	25	75	100
	BP4-EPSC 02-English for Physical Sciences II	4	4	50	50	100
Semester-wise Credit Total			24			

** NME: Choose any one from the other department

THIRD SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Max. Marks		
				Int.	Ext.	Total
Part – I	Language Paper – III	6	3	25	75	100
Part - II	BP2-ENG03-Language Through Literature I	6	3	50	50	100
Part - III	BPS-DSC04-Mathematical Methods in Physics	5	4	25	75	100
	Core Practical-II	3	-	Examination will be held in Semester IV		
	Allied III-Choose any one * Allied Theory	8	5	25	75	100
	Allied Theory Practical	5	3	25	75	100
PART IV	Environmental Studies	2	Examination will be held in Semester IV			
	Soft Skills	-	3	50	50	100
Semester-wise Credit Total			18			

FOURTH SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Max. Marks		
				Int.	Ext.	Total
Part – I	Language Paper – IV	6	3	25	75	100
Part - II	BP2-ENG04-Language Through Literature II	6	3	50	50	100
Part - III	BPS-DSC06-Mechanics	5	4	25	75	100
	BPS-DSC05-Core Practical-II	3	4	40	60	100
	Allied IV-Choose any one * Allied Theory	8	5	25	75	100
	Allied Theory and Practical	5	3	25	75	100
Part-IV	Environmental Studies	2	2	25	75	100
	Soft Skills	-	3	50	50	100
Semester-wise Credit Total			24			

***ALLIED PAPERS I, II, III & IV**

Part – III	BMA-CSA01 - Allied Mathematics – I	9	5	25	75	100
	BMA-CSA02 - Allied Mathematics – II	8	5	25	75	100
	BCY-CSA1A - Allied Chemistry – I (Theory)	6	4	25	75	100
	BCY-CSA2A - Allied Chemistry – II (Theory)	5	4	25	75	100
	BCY-CSAP1 - Allied Chemistry – I & II (Practical)	6 (3+3)	2	40	60	100

FIFTH SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext. Marks	Total
Part-III	BPS-DSC07-Optics & Spectroscopy	5	4	25	75	100
	BPS-CSC08-Electricity and Electromagnetism	5	4	25	75	100
	BPS-CSC09-Quantum Mechanics	5	4	25	75	100
	BPS-DSC10-Basic Electronics	5	4	25	75	100
	BPS-DSE1A-Numerical Methods (OR) BPS-DSE1B-Problem Solving in Physics (OR) BPS-DSE1C-Geophysics	4	5	25	75	100
	Core Practical-III- General	6	Examinations will be held in Semester VI			
	Core Practical-IV- Basic Electronics	6				
	Core Practical-V- Applied Electronics	6				
	Part-IV	Value Education	1	2	25	75
Semester-wise Credit Total			23			

SIXTH SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext. Marks	Total	
Part-III	BPS-CSC11-Core Practical-III-General	2	4	40	60	100	
	BPS-CSC12-Core Practical-IV- Basic Electronics	2	4	40	60	100	
	BPS-CSC13-Core Practical-V-Applied Electronics	2	2	40	60	100	
	BPS-DSC14-Atomic Physics & Lasers	5	4	25	75	100	
	BPS-CSC15-Nuclear and Radiation Physics	5	4	25	75	100	
	BPS-CSC16-Solid State Physics	5	4	25	75	100	
	BPS-CSE2A-Integrated Electronics (OR) BPS-DSE2B-Medical Physics (OR) BPS-DSE2C-Fiber Optics	5	5	25	75	100	
	BPS-CSE3A-Microprocessor 8085 and Microcontroller (OR) BPS-DSE3B-Astrophysics (OR) BPS-DSE3C-Weather Forecasting	4	5	25	75	100	
	Part-V	Extension Activities	1	1			
	Semester-wise Credit Total			33			