



# Annai Hajira Women's College

Melapalayam, Tirunelveli – 627 005

## DEPARTMENT OF PHYSICS

Syllabus 2017-2020

POs, PSO & COs of Physics

UG-Programme – CBCS – SEMESTER PATTERN

Course Code: 1522



Department of  
Physics

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**UG -Programme - Course Structure under CBCS**  
**B.Sc - Physics**  
**(Applicable to the candidates admitted from the academic year 2017-2020 onwards)**

**FIRST SEMESTER**

Sub – Code	Subject Title	Lecture Hours	Lab Hours	Credits
S1TL11	Part –I Language	6	---	4
S2EN11	Part –II English	6	---	4
SMPH11	Part III Core 1 : Mechanics and Relativity	4	---	4
SMPH12	Part III Core 2 : Properties of Matter and Acoustics	4	---	4
SMPHP1	Practical I	---	2	2
SAPH11	Allied Physics paper I	4	---	4
SAPHP1	Allied Practical I	---	2	2
SEVS11	Part IV : Environmental Studies	2	---	2
Total	(6T + 2P Courses)	26	4	26

**SECOND SEMESTER**

Sub – Code	Subject Title	Lecture Hours	Lab Hours	Credits
S1TL21	Part –I Language	6	---	4
S2EN21	Part –II English	6	---	4
SMPH21	Part III Core 3 : Thermal Physics and Statistical Mechanics	4	---	4
SMPH22	Part III Core 4 : Optics	4	---	4
SMPHP2	Major Practical II	---	2	2
SAPH21	Allied Physics paper II	4	---	4
SAPHP2	Allied Practical II	---	2	2
SVBE21	Part IV : Value Based Education	2	---	2
Total	(6T + 2P Courses)	26	4	26

### THIRD SEMESTER

Sub – Code	Subject Title	Lecture Hours	Lab Hours	Credits
S1TL31	Part –I Language	6	---	4
S2EN31	Part –II English	6	---	4
SMPH31	Part III Core 5 : Electricity	4	---	4
SMPHP3	Major Practical III	---	2	1
SAPH11	Allied Physics paper I	4	---	3
SAPHP1	Allied Practical I	---	2	1
SSPH3A	Skill Based Subject: (a)Maintenance of Electrical appliances	4	---	4
SSPH3B	(b) Astrophysics			
SNPH3A	Non-Major Elective: (a)Basic Physics I	2	---	2
SNPH3B	(b)Applied Physics			
SYOG3A	Part IV : Yoga	2	---	2
Total	(7T + 2P Courses)	28	4	23

### FOURTH SEMESTER

Sub – Code	Subject Title	Lecture Hours	Lab Hours	Credits
S1TL41	Part –I Language	6	---	4
S2EN41	Part –II English	6	---	4
SMPH41	Part III Core 6 : Electromagnetism	4	---	4
SMPHP4	Major Practical IV	---	2	1
SAPH21	Allied Physics paper I	4	---	4
SAPHP2	Allied Practical I	---	2	1
SSPH4A	Skill Based Subject: (a)Maintenance of Electronic equipments	4	---	2
SSPH4B	(b) Physics of Human Anatomy			
SNPH4A	Non-Major Elective: (a)Basic Physics II	2	---	2
SNPH4B	(b)Space Physics			
SCDE4A	Part IV : Computer for digital era	2	---	2
	Part V : Extension activity	---	---	1
Total	(7T + 2P Courses)	28	4	24

### FIFTH SEMESTER

Sub – Code	Subject Title	Lecture Hours	LAB Hours	Credits
SMPH51	Part III Core 7 : Basic Electronics	4	---	4
SMPH52	Part III Core 8 : Programming in C++	4	---	4
SMPH53	Part III Core 9 : Atomic Physics	4	---	4
SEPH5A	Part III Core Elective 10 : (a)Mathematical Physics	4	---	4
SEPH5B	(b)Spectroscopy			
SEPH5C	Part III Core Elective 11 : (a)Communication Electronics	4	---	4
SEPH5D	(b) Numerical Methods			
SMPHP5	Practical V : Non-Electronics	---	4	2
SMPHP6	Practical VI : Electronics	---	4	2
SCSB5A	Part IV : Common Personality Development	2	---	2
Total	(6T+2P Courses)	22	8	26

### SIXTH SEMESTER

Sub – Code	Subject Title	Lecture Hours	LAB Hours	Credits
SMPH61	Part III Core 12 : Digital Electronics	5	---	4
SMPH62	Part III Core 13 : Quantum Mechanics	5	---	4
SMPH63	Part III Core 14 : Nuclear Physics	4	---	4
SMPH64	Part III Core 15 : Solid State Physics	4	---	4
SEPH6A	Part III Core Elective 16 : (a)Medical Physics	4	---	4
SEPH6B	(b)Energy Physics			
SMPHP7	Practical VII	---	4	2
SMPHP8	Practical VIII : Computer Programming with C++	---	4	2
Total	(5T+2P Courses)	22	8	24

## Programme Outcomes

Programme Outcomes	
<b>PO1</b>	Acquire knowledge in Physics, including the major premises of properties of matter, thermal physics, mechanics, optics, electricity and magnetism, electronics, atomic and nuclear physics, numerical methods, solid state physics and spectroscopy.
<b>PO2</b>	Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions
<b>PO3</b>	Express proficiency in the acquisition of data using wide variety of laboratory instruments.
<b>PO4</b>	Apply conceptual understanding of physics to general real – world situations.
<b>PO5</b>	Reveal their perceptive in the application of numerical techniques for modelling physical systems.
<b>PO6</b>	Create an awareness of the impact of Physics on the society, and development outside the scientific community.
<b>PO7</b>	Develop a basis for future learning and work experience.
<b>PO8</b>	Demonstrate written and oral communication skills in communicating Physics related topics.
<b>PO9</b>	Attain analytical and consistent skill for higher Education.
<b>PO10</b>	Solve the problem and also think methodically, independently and draw a logical conclusion
<b>PO11</b>	Educated to seize jobs in allied fields.

## Program Specific outcomes

The schemedefinedoutcome for students after obtaining a Bachelor of Science degree in Physics are that they will be:

<b>PSO1</b>	Gain the knowledge of Physics through theory and practical
<b>PSO2</b>	Understand good laboratory practices and safety.
<b>PSO3</b>	Develop research oriented skills.
<b>PSO4</b>	Discover new interdisciplinary concepts.

## Course outcomes

### First Semester

The students are able to

SMPH11	<b>Part III: Core 1. Mechanics and Relativity</b>	<p>CO1: Identify the behaviour of physical bodies, it provides the basic concepts related to the motion of all the objects around us in our daily life.</p> <p>CO2: Builds a foundation of various applied field in science and technology; especially in the field of mechanical engineering.</p> <p>CO3: Understand the concept of vectors, laws of motion, momentum, energy, rotational motion, gravitation, fluids, elasticity and special relativity.</p> <p>CO4: Analyze the concepts like motion in inclined plane, motion of rocket.</p> <p>CO5: Expose the concept of relativity in different frames of reference.</p>
SMPH12	<b>Part III Core 2 : Properties of Matter and Acoustics</b>	<p>CO1: Understand the basic properties of different types of matter using various techniques.</p> <p>CO2: Explain and elastic and plastic nature of materials through some experiments.</p> <p>CO3: Acquire the basic knowledge in fluid science by adopting some explanations given by the scientists.</p> <p>CO4: Demonstrate the important parameters of acoustics the branch of science which deals with sound.</p> <p>CO5: Interpret the applications of ultrasonics in various fields.</p>
SMPHP1	<b>Practical I</b>	<p>CO1: Understand the concepts of properties of matter and Mechanics through experiments</p> <p>CO2: Acquire the basic skills and realize Physics concepts through experiments</p>
SAPH11	<b>Part III: Allied Physics paper I</b>	<p>CO1: Acquire basic knowledge about elastic moduli, stretching and bending moment</p> <p>CO2: Educate and motivate the students in the field of science.</p> <p>CO3: Understand the principles of polarization, interference and diffraction.</p> <p>CO4: Familiarize in depth about thermal conductivity, simple harmonic oscillator.</p> <p>CO5: Relate the concept of free, damped and forced simple harmonic vibrations.</p>
SAPHP1	<b>Allied Practical I</b>	<p>CO1: Acquire basic understanding of laboratory techniques</p> <p>CO2: Understand the concepts of Properties of Matter and Optics through experiments.</p>

SEVS11	<b>Part IV : Environmental Studies</b>	<p>CO1: Understand concepts and methods from ecological and physical sciences and their application in environmental problem solving</p> <p>CO2: Appreciate the ethical, cross-cultural and historical context of environmental issues and the links between human and natural systems</p> <p>CO3: Analyze the transnational character of environmental problems and ways of addressing those including interactions across local to global scales.</p> <p>CO4: Criticize the social related issues like climate change, global warming and environmental protection act.</p>
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**Second Semester**

**The students are able to**

SMPH21	<b>Part III Core 3 : Thermal Physics and Statistical Mechanics</b>	<p>CO1: Acquire the knowledge in the field of low temperature physics which explain the working of refrigerators and air containing machines.</p> <p>CO2: Understand the concept of kinetic theory of gases and some gas equations.</p> <p>CO3: Apply thermodynamic laws, Carnot's theorem and scale of temperature in solving problems.</p> <p>CO4: Interpret the significance of entropy and concept of phase-space.</p> <p>CO5: Attain idea about three important statistics (M-B, F-D, B-E).</p>
SMPH22	<b>Part III Core 4 : Optics</b>	<p>CO1: Gain knowledge on various theories of light</p> <p>CO2: Acquire skills to identify and apply formulas of optics and wave physics</p> <p>CO3: Understand the properties of light like reflection, refraction, interference, diffraction etc</p> <p>CO4: Articulate the concept of diffraction and polarization.</p> <p>CO5: Apply the concept of interference in design and working of interferometers.</p> <p>CO6: Understand the resolving power of different optical instruments.</p> <p>CO7: Gain knowledge in optical fiber and their applications in communication</p>
SMPHP2	<b>Major Practical II</b>	<p>CO1: Understand the concepts of Optics and Thermal Physics through experiments</p> <p>CO2: Acquire the basic skills and realize Physics concepts through experiments</p>
SAPH21	<b>Allied Physics paper II</b>	<p>CO1: Understand the basic concepts of Electricity, Electromagnetism</p> <p>CO2: Develop basic knowledge about the diodes and transistors.</p> <p>CO3: Know about various number system and logic gates circuits.</p>

SAPHP2	<b>Allied Practical II</b>	CO1: Acquire deep knowledge about Electromagnetism and Basic Electronics through experiments. CO2: Describe laboratory techniques and safety measures to handle the equipments.
SVBE21	<b>Part IV : Value Based Education</b>	CO1: Summarize the social realities and to inculcate an essential value system towards building a healthy society. CO2: Infer the importance of value based living. CO3: Gain deeper understanding about the purpose of their life. CO4: Understand and start applying the essential steps to become good leaders CO5: Emerge as responsible citizens with clear conviction to practise values and ethics in life CO6: Become value based professional.

**Third Semester**

The students are able to

SMPH31	<b>Part III Core 5 : Electricity</b>	CO1: Interpret basic knowledge about electricity and various methods of analyzing electric circuits with d.c.and a.c. sources. CO2: Gain and apply knowledge to design and characterize electric circuits. CO3: Understand the fundamentals of e.m.f, electric potential, current, resistance. CO4: Compare steady current, transient current and alternating current circuits. CO5: Analyze the functioning of secondary cells.
SMPHP3	<b>Major Practical III</b>	CO1: Understand the concepts of Electricity and Electromagnetism through experiments. CO2: Attain the skills to handle the equipments and circuits.
SAPH11	<b>Allied Physics paper I</b>	CO1: Acquire basic knowledge about elastic moduli, stretching and bending moment CO2: To educate and motivate the students in the field of science. CO3: Understand the principles of polarization, interference and diffraction. CO4: Familiarize in depth about thermal conductivity, simple harmonic oscillator.
SAPHP1	<b>Allied Practical I</b>	CO1: Acquire basic understanding of laboratory techniques CO2: Understand the concepts of Properties of Matter and Optics through experiments.
ASPH3A	<b>Skill Based Subject: (a)Maintenance of Electrical appliances</b>	CO1: Understand the operations and safety handling of certain commonly used domestic appliances. CO2: Acquire knowledge about transformer.. CO3: Gain knowledge to design and trouble shoot electrical circuits.

		CO4: Apply the knowledge about electrical energy and consumption of electrical power in day to day life.
SSPH3B	<b>(b) Astrophysics</b>	CO1: Extract concepts of Astrophysics, Astronomical instruments and the origin of the universe. CO2: Know about celestial objects.
SNPH3A	<b>Non-Major Elective: (a) Basic Physics I</b>	CO1: Understand the fundamental physics concepts like mechanics, optics and electricity. CO2: Recognize the applications of equations of motion and Newton's laws. CO3: Know the concept and uses of Bernoulli's principle and Archimedes principle. CO4: Apply their understanding in the acoustics of buildings and how recording and reproduction of sound can be done. CO5: Explain basic optical concepts, electrical resistance and applications of Kirchoff's laws.
SNPH3B	<b>(b) Applied Physics</b>	CO1: Understand the conventional energy sources CO2: Define the importance of renewable energy sources. CO3: Apply their knowledge in the development of energy resources.

**Fourth Semester**

The Students are able to

SMPH41	<b>Part III Core 6 : Electromagnetism</b>	CO1: Infer the magnetic effects of electric currents and the basics of electromagnetic waves. CO2: Know the device applications of electromagnetic induction. CO3: Explain propagation of electromagnetic waves in various environments. CO4: Apply Maxwell's equation to selected problems. CO5: Correlate electric fields and currents, magnetic fields and induction, simple electrical circuits, applications of electromagnetic waves.
SMPHP4	<b>Major Practical IV</b>	CO1: Analyze the concepts of electricity and electromagnetism through experiments. CO2: Attain the skills to handle the equipments and circuits. CO3: Able to solve simple circuit and apply this knowledge to construct complex circuits.
SAPH21	<b>Allied Physics paper I</b>	CO1: Understand the basic concepts of Electricity, Electromagnetism CO2: Acquire basic knowledge about the diodes and transistors. CO3: Know about various number system and logic gates circuits.
SAPHP2	<b>Allied Practical I</b>	CO1: Acquire deep knowledge about Electromagnetism and Basic Electronics through experiments. CO2: Understand laboratory techniques and safety measures to handle the equipments.

SSPH4A	<b>Skill Based Subject:</b> <b>(a)Maintenance of Electronic equipments</b>	CO1: Understand commonly used electronic equipments. CO2: Describe transducers, communication devices like antenna, DTH system and MODEM CO3: Explain the parts of camera, data transfer to computer and resolution of camera.
SSPH4B	<b>(b) Physics of Human Anatomy</b>	CO1: Understand the physics of human anatomy. CO2: Acquire knowledge about physics of breathing, energy of human body. CO3: Apply the knowledge to understand the physics of eye and acoustics of body.
SNPH4A	<b>Non-Major Elective:</b> <b>(a)Basic Physics II</b>	CO1: Expose the basic principles of nuclear physics like nuclear properties, binding energy and radiocarbon dating. CO2: Acquire knowledge on working of LASER, its types and applications. CO3: Infer how materials are classified based on their conductivity and the properties of magnetic materials. CO4: Describe the concept of relativity and the basics of quantum mechanics. CO5: Illustrate inter-conversion between digital number systems and explain logic gate operations.
SNPH4B	<b>(b)Space Physics</b>	CO1: Understand the celestial objects. CO2: Gain knowledge about big-bang theory.

#### Fifth Semester

The students are able to

SMPH51	<b>Part III Core 7 : Basic Electronics</b>	CO1:Understand the circuit analysis, semiconductor diode and transistor circuits and the basics of operational amplifier. CO2: Gain knowledge to analyse and design electronic circuits. CO3: Compare power amplifiers like Class A, Class B and Class C. CO4: Describe oscillators and wave shaping circuits. CO5: Apply the characteristics of Op-Amp in designing amplifier circuits, arithmetic operator circuits and filters.
SMPH52	<b>Part III Core 8 : Programming in C++</b>	CO1: Infer the basics of Computer programming in C++. CO2: Solve research oriented problems by writing programs. CO3: Apply the computer language C++ to solve real time problems. CO4: Plan the managing console i/o operations for effective display. CO5:Describe and use software tools in the programming process.
SMPH53	<b>Part III Core 9 : Atomic Physics</b>	CO1:Develop the concepts of atomic physics: basic knowledge of properties of atom, different atomic models, etc.

		<p>CO2:Relate observation, theory and their uses in building the basic concepts of atomic physics.</p> <p>CO3: Acquire knowledge in the area of x-rays.</p> <p>CO4: Correlate the area of band theory of solids in order to understand the atomic structure.</p> <p>CO5:Employ conceptual understanding of behaviour of atom.</p>
SEPH5A	<p><b>Part III Core Elective 10 :</b> <b>(a)Mathematical Physics</b></p>	<p>CO1: Understand the basic concept of vectors.</p> <p>CO2: Acquire knowledge about ordinary and partial differential equation, matrix and Laplace transformation.</p> <p>CO3: Analyze the mathematical concepts in Physical systems.</p>
SEPH5B	<p><b>(b)Spectroscopy</b></p>	<p>CO1: Achieve advanced knowledge about the interactions of electromagnetic radiation and matter and their applications in spectroscopy</p> <p>CO2: Develop the knowledge of basic spectroscopic methods and principles to determine the structure of organic compounds.</p> <p>CO3: Analyse the vibrations for a triatomic molecule and identify whether they are infrared-active.</p> <p>CO4: Justify the difference in intensity between Stokes and anti-Stokes lines.</p> <p>CO5:Interpret UV-Visible spectroscopy.</p>
SEPH5C	<p><b>Part III Core Elective 11 :</b> <b>(a)Communication Electronics</b></p>	<p>CO1:Understand various modulation and demodulation techniques used for communication.</p> <p>CO2: Acquires basic knowledge in electronics and mathematics.</p> <p>CO3: Choose proper modulation techniques.</p> <p>CO4: Illustrate digital modulation techniques in coding and encoding.</p> <p>CO5: Classify amplitude modulation and frequency modulation, transmission and reception of FM waves.</p>
SEPH5D	<p><b>(b) Numerical Methods</b></p>	<p>CO1: Understand various approximation methods.</p> <p>CO2: Apply knowledge of mathematics and able to use approximation methods.</p> <p>CO3: Find solution to problems which do not have exact solutions.</p> <p>CO4: Analyse and evaluate the accuracy of common numerical methods.</p> <p>CO5: Identify errors and roots of equation.</p>
SMPHP5	<p><b>Practical V : Non-Electronics</b></p>	<p>CO1: Apply the concepts of electricity and electromagnetism through experiments.</p> <p>CO2: Gain the skills to handle the equipments and circuits.</p> <p>CO3: Able to solve simple circuit and apply this knowledge to construct complex circuits.</p>
SMPHP6	<p><b>Practical VI : Electronics</b></p>	<p>CO1: Attain knowledge to handle simple electronic components through experiments.</p>

		CO2: Construct simple oscillators, multivibrators, gates. CO3: Gain deep knowledge about wave shaping circuits, filters.
SCSB5A	<b>Part IV : Common Personality Development</b>	CO1: Develop, exhibit and accurate sense of self. CO2: Develop and nurture a deep understanding of personal Motivation. CO3: Develop an understanding and practice personal and Professional responsibility. CO4: Demonstrate knowledge of personal beliefs and values and a commitment to continue personal reflection and reassessment. CO5: Learn to balance confidence with humility. CO6: Assert strengthened personal character and further an enhanced ethical sense.

### Sixth Semester

The students are able to

SMPH61	<b>Part III Core 12 : Digital Electronics</b>	CO1: Understand concepts of Boolean algebra and digital circuits. CO2: Acquires basic knowledge to design electronic circuits. CO3: Know about shift registers, counters, flip –flop and multivibrators. CO4: Ascertain the electronic circuits using combinational circuit applications. CO5: Describe arithmetic operations and memory storage functions using binary adder, subtractor and flip-flop circuits.
SMPH62	<b>Part III Core 13 : Quantum Mechanics</b>	CO1: Understand wave-particle duality of matter and the formation of Quantum mechanics. CO2: Acquires basic knowledge in Mathematics and Modern physics and the learners are expected to know the application of basic equations in quantum mechanics to various states. CO3: Understand the role of uncertainty in quantum physics. CO4: Solve the Schrödinger equation for standard systems with both analytical and numerical methods, and then interpret the results. CO5: Explain the physical states of elementary particles and atoms in different systems based on quantum mechanics. CO6: Describe working knowledge of the quantum mechanics postulate on the physical systems.

SMPH63	<b>Part III Core 14 : Nuclear Physics</b>	<p>CO1: Attain knowledge in the areas of nuclear and particle physics focusing on concepts that are commonly used in this area.</p> <p>CO2: Understand the principles and working of different nuclear reactors.</p> <p>CO3: Develop and communicate analytical skills in nuclear physics.</p> <p>CO4: Apply the perception of nuclear physics in particle accelerators.</p> <p>CO5: Explore the knowledge in the areas of cosmic rays concerned.</p>
SMPH64	<b>Part III Core 15 : Solid State Physics</b>	<p>CO1: Develop an understanding of the lattice, different types of crystal structures, symmetries.</p> <p>CO2: Gain insight about the interior of the substances using X-ray diffraction in crystals.</p> <p>CO3: Understand elastic waves, phonons, and lattice vibrational properties.</p> <p>CO4: Apply theoretical basis of experimental material science and technology.</p> <p>CO5: Expose the techniques used in synthesis of nanomaterials such as sol-gel, vapour deposition, ball-milling methods.</p>
SEPH6A	<b>Part III Core Elective 16 : (a) Medical Physics</b>	<p>CO1: Understand the Physics concept used in Medical field.</p> <p>CO2: Know the applications of x-rays.</p> <p>CO3: Acquire knowledge about biomedical instrumentation and essential physics of medical imaging.</p> <p>CO4: Extract the knowledge of laser applications in medical therapy and diagnosis.</p>
SEPH6B	<b>(b) Energy Physics</b>	<p>CO1: Comprehend about conventional and non-conventional energy sources.</p> <p>CO2: Infer about wind energy, tidal energy, geothermal energy and its applications.</p> <p>CO3: Acquire knowledge about basic principle of energy conversion system.</p> <p>CO4: Know more about other non-conventional energy sources like Ocean thermal energy and chemical energy resources.</p> <p>CO5: Realize the physical principle of solar energy and its applications.</p>
SMPHP7	<b>Practical VII</b>	<p>CO1: Gain knowledge to handle optical instruments and equipments.</p> <p>CO2: Understand the non-electronic and electronic circuits.</p> <p>CO3: Analyzed.c and a.c circuits.</p>

SMPHP8	<b>Practical VIII : Computer Programming with C++</b>	CO1: Understand the usage of software tool in the real time problems. CO2: Perform arithmetic operations, handle matrix operations using programming in C++. CO3: Solve physics related research problems by writing C++ programs.
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*Aysha A*  
21/6/17

**Head of the Department  
PHYSICS  
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*Lajal Datta* -  
21/6/17

**PRINCIPAL  
ANNAI HAJIRA WOMEN'S COLLEGE  
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