



# Annai Hajira Women's College

Melapalayam, Tirumelveli-627 005

## DEPARTMENT OF PHYSICS

Syllabus 2016-2019

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 2016-2019 onwards)**

**FIRST SEMESTER**

Sub - Code	Subject Title	Lecture Hours	Lab Hours	Credits
J1TL11	Part –I Language	6	---	3
J2EN11	Part –II English	6	---	3
JMPH11	Part III Core 1 :Properties of Matter and Acoustics	4	---	4
JMPH12	Part III Core 2 :Optics	4	---	4
JMPHP1	Core Practical I	---	2	---
JAPH11	Allied Physics paper I	4	---	4
JAPHP1	Allied Practical I	---	2	---
JEVS11	Part IV : Environmental Studies	2	---	2
Total	(6T + 2P Courses)	26	4	20

**SECOND SEMESTER**

Sub - Code	Subject Title	Lecture Hours	Lab Hours	Credits
J1TL21	Part –I Language	6	---	3
J2EN21	Part –II English	6	---	3
JMPH21	Part III Core 3 :Mechanics and Relativity	4	---	4
JMPH22	Part III Core 4 :Thermal Physics and Statistical Mechanics	4	---	4
JMPHP1	Core Practical I	---	2	2
JAPH21	Allied Physics paper II	4	---	4
JAPHP1	Allied Practical I	---	2	2
JVBE21	Part IV : Value Based Education	2	---	2
Total	(6T + 2P Courses)	26	4	24

### THIRD SEMESTER

Sub - Code	Subject Title	Lecture Hours	Lab Hours	Credits
J1TL31	Part –I Language	6	---	3
J2EN31	Part –II English	6	---	3
JMPH31	Part III Core 5 : Electricity and Magnetism	4	---	4
JMPHP2	Major Practical II	---	2	---
JAPH11	Allied Physics paper I	4	---	4
JAPHP1	Allied Practical I	---	2	---
JSPH3A	Skill Based Subject: (a)Maintenance of Electrical appliances	4	---	4
JSPH3B	(b) Astrophysics			
JNPH3A	Non-Major Elective: (a)Basic Physics I	2	---	2
JNPH3B	(b)Applied Physics			
Total	(6T + 2P Courses)	28	4	20

### FOURTH SEMESTER

Sub - Code	Subject Title	Lecture Hours	Lab Hours	Credits
J1TL41	Part –I Language	6	---	3
J2EN41	Part –II English	6	---	3
JMPH41	Part III Core 6 :Programming with C++	4	---	4
JMPHP2	Major Practical IV	---	2	2
JAPH21	Allied Physics paper I	4	---	4
JAPHP1	Allied Practical I	---	2	2
JSPH4A	Skill Based Subject: (a)Maintenance of Electronic equipments	4	---	4
JSPH4B	(b)Physics of Human Anatomy			
JNPH4A	Non-Major Elective: (a)Basic Physics II	2	---	2
JNPH4B	(b)Space Physics			
	Part V : Extension activity	---	---	1
Total	(6T + 2P Courses)	28	4	25

### FIFTH SEMESTER

Sub - Code	Subject Title	Lecture Hours	LAB Hours	Credits
JMPH51	Part III Core7 : Basic Electronics	4	---	4
JMPH52	Part III Core 8 : Solid State Physics	4	---	4
JMPH5A	Part III-Elective1 : (a) Spectroscopy	5	---	5
JMPH5B	(b) Mathematical Physics			
JMPH5C	Part III-Elective 2 : (a)Communication Electronics	5	---	5
JMPH5D	(b) Numerical Methods			
JMPHP3	Practical III : Non-Electronics	---	3	---
JMPHP4	Practical IV : Electronics	---	3	---
JMPHP5	Practical V : Computer Programming with C++	---	2	---
SCSB5A	Part IV : Common Personality Development	4	---	4
Total	(5T+3P Courses)	22	8	22

### SIXTH SEMESTER

Sub - Code	Subject Title	Lecture Hours	LAB Hours	Credits
JMPH61	Part III Core9 : Digital Electronics	6	---	4
JMPH62	Part III Core10 : Atomic and Nuclear Physics	6	---	4
JMPH63	Part III Core11 : Quantum Mechanics	5	---	4
JMPH6A	Part III CoreElective 3 : (a)Medical Physics	5	---	5
JMPH6B	(b)Energy Physics			
JMPHP3	Practical III : Non-Electronics	---	3	4
JMPHP4	Practical IV : Electronics	---	3	4
JMPHP5	Practical V : Computer Programming with C++	---	2	4
Total	(4T+2P Courses)	22	8	29

## 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

JMPH11	<b>Part III Core 1 : Properties of Matter and Acoustics</b>	CO1: Understand the basic properties of different types of matter using various techniques. CO2: Explain and elastic and plastic nature of materials through some experiments. CO3: Acquire the basic knowledge in fluid science by adopting some explanations given by the scientists. CO4: Demonstrate the important parameters of acoustics the branch of science which deals with sound. CO5: Interpret the applications of ultrasonics in various fields.
JMPH12	<b>Part III Core 2 : Optics</b>	CO1: Gain knowledge on various theories of light CO2: Acquire skills to identify and apply formulas of optics and wave physics CO3: Understand the properties of light like reflection, refraction, interference, diffraction etc CO4: Articulate the concept of diffraction and polarization. CO5: Apply the concept of interference in design and working of interferometers. CO6: Understand the resolving power of different optical instruments. CO7: Gain knowledge in optical fiber and their applications in communication
JMPHP1	<b>Practical I</b>	CO1: To acquire the basic skills and realize Physics concepts through experiments CO2: Understand the concepts of properties of matter and optics through experiments CO3: Understand the concepts of mechanics and thermal physics through experiments.
JAPH11	<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.
JAPHP1	<b>Allied Practical I</b>	CO1: Acquire basic understanding of laboratory techniques CO2: Understand the concepts of properties of Matter and Optics through experiments. CO3: Acquire deep knowledge about electromagnetism and basic Electronics through experiments. CO4: Understand laboratory techniques and safety measures to handle the equipments.

JEVS11	<p align="center"><b>Part IV : Environmental Studies</b></p>	<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: Understand the transnational character of environmental problems and ways of addressing those including interactions across local to global scales</p>
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**Second Semester**

The students are able to

JMPH21	<p align="center"><b>Part III: Core 3. Mechanics and Relativity</b></p>	<p>CO1: Learn about 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>
JMPH22	<p align="center"><b>Part III Core 4 : Thermal Physics and Statistical Mechanics</b></p>	<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: Learn thermodynamic laws, Carnot's theorem and scale of temperature and apply these concepts in solving problems.</p> <p>CO4: Understand 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>
JMPHP1	<p align="center"><b>Practical I</b></p>	<p>CO1: To acquire the basic skills and realize Physics concepts through experiments</p> <p>CO2: Understand the concepts of properties of matter and optics through experiments</p> <p>CO3: Understand the concepts of mechanics and thermal physics through experiments.</p>
JAPH21	<p align="center"><b>Allied Physics paper II</b></p>	<p>CO1: Understand the basic concepts of Electricity, Electromagnetism</p> <p>CO2: Acquire basic knowledge about the diodes and transistors.</p> <p>CO3: Know about various number system and logic gates circuits.</p>

JAPHP1	<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> <p>CO3: Acquire deep knowledge about electromagnetism and basic Electronics through experiments.</p> <p>CO4: Understand laboratory techniques and safety measures to handle the equipments.</p>
JVBE21	<b>Part IV : Value Based Education</b>	<p>CO1: Enable the students to understand the social realities and to inculcate an essential value system towards building a healthy society.</p> <p>CO2: Understand the importance of value based living.</p> <p>CO3: Gain deeper understanding about the purpose of their life.</p> <p>CO4: Understand and start applying the essential steps to become good leaders</p> <p>CO5: Emerge as responsible citizens with clear conviction to practise values and ethics in life</p> <p>CO6: Becomes value based professional.</p>

**Third Semester**

The students are able to

JMPH31	<b>Part III Core 5 : Electricity and Magnetism</b>	<p>CO1: Attain basic knowledge about electricity and various methods of analyzing electric circuits with d.c. and a.c. sources.</p> <p>CO2: Gain and apply knowledge to design and characterize electric circuits.</p> <p>CO3: Acquire knowledge about transient current and alternating current circuits.</p> <p>CO4: Solve problems related to application of Gauss law, Faraday's law.</p> <p>CO5: Gain knowledge about magnetic properties of materials.</p>
JMPHP2	<b>Practical II</b>	<p>CO1: Analyze the concepts of electricity and magnetism through experiments.</p> <p>CO2: Attain 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>
JAPH11	<b>Allied Physics paper I</b>	<p>CO1: Acquire basic knowledge about elastic moduli, stretching and bending moment</p> <p>CO2: To 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>

Fourth Semester

The Students are able to

JMPH41	<b>Part III Core 6 :Programming with C++</b>	CO1: Gain knowledge about the basics of programming in C++ and to solve problems by writing programs. CO2: Come out with the ability to apply the computer language C++ to solve problems. CO3: Describe and use software tools the in programming process
JMPHP2	<b>Major Practical II</b>	CO1: Analyze the concepts of electricity and magnetism 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.
JAPH21	<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.
JAPHP1	<b>Allied Practical I</b>	CO1: Acquire basic understanding of laboratory techniques CO2: Understand the concepts of properties of Matter and Optics through experiments. CO3: Acquire deep knowledge about electromagnetism and basic Electronics through experiments. CO4: Understand laboratory techniques and safety measures to handle the equipments.
JSPH4A	<b>Skill Based Subject: (a)Maintenance of Electronic equipments</b>	CO1: Understand commonly used electronic equipments. CO2: Attain knowledge about transducers, communication devices like antenna, DTH system and MODEM CO3: Explain the parts of camera, data transfer to computer and resolution of camera.
JSPH4B	<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.
JNPH4A	<b>Non-Major Elective: (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: Understand 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: Implement inter-conversion between digital number systems and explain logic gate operations.
JNPH4B	<b>(b)Space Physics</b>	CO1: Understand the celestial objects. CO2: Gain knowledge about big-bang theory.

**Fifth Semester**

The students are able to

JMPH51	<b>Part III Core 7 : Basic Electronics</b>	<p>CO1: Understand the circuit analysis, semiconductor diode and transistor circuits and the basics of operational amplifier.</p> <p>CO2: Gain knowledge to analyse and design electronic circuits.</p> <p>CO3: Compare power amplifiers like Class A, Class B and Class C.</p> <p>CO4: Describe oscillators and wave shaping circuits.</p> <p>CO5: Apply the characteristics of Op-Amp in designing amplifier circuits, arithmetic operator circuits and filters.</p>
JMPH52	<b>Part III Core 8 : Solid State Physics</b>	<p>CO1: Understand various types of crystal structures and symmetries and</p> <p>CO2: Understand the relationship between the real and reciprocal space and learn the Bragg's ray diffraction in crystals.</p> <p>CO3: Learn about phonons and lattice.</p> <p>CO4: Acquires practical knowledge of various physical phenomena such as: magnetism, dielectrics, ferroelectrics and semiconductors.</p> <p>CO5: Gain a hands-on learning experience by performing experiments on these properties of materials.</p>
JMPH5A	<b>Part III-Elective 1 : (a) Spectroscopy</b>	<p>CO1: Achieve advanced knowledge about the interactions of electromagnetic radiation and matter and their applications in spectroscopy.</p> <p>CO2: Apply formalisms based on molecular symmetry to predict spectroscopic properties.</p> <p>CO3: Interpret UV-Visible spectroscopy,</p> <p>CO4: Identify structure of molecules on the basis of dipole moment</p> <p>CO5: Define terms used in rotational, vibrational &amp; Raman spectroscopy</p> <p>CO6: Know conditions for obtaining pure rotational spectrum, vibrational spectrum and rotational vibrational spectrum and selection rule.</p>
JMPH5B	<b>(b) Mathematical Physics</b>	<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>
JMPH5C	<b>Part III-Elective 2 : (a) Communication Electronics</b>	<p>CO1: Understand various modulation and demodulation techniques used for communication.</p> <p>CO2: Come out with the ability to choose proper modulation techniques.</p>

JMPH5D	<b>(b) Numerical Methods</b>	CO1: Understand various approximation methods. CO2: Apply knowledge of mathematics and able to use approximation methods. CO3: Find solution to problems which do not have exact solutions. CO4: Analyse and evaluate the accuracy of common numerical methods.
JMPHP3	<b>Practical III: Non-Electronics</b>	CO1: Attain deep knowledge about the experiments and circuit construction in electricity and magnetism CO2: Achieve hands-on experience in experiments related to basic principles of non-electronics.
JMPHP4	<b>Practical IV: Electronics</b>	CO1: Acquires in-depth knowledge about the circuits in basic electronics and digital electronics.
JMPHP5	<b>Practical V : Computer Programming with C++</b>	CO1: This course gives the deep understanding of usage of software tool in the real time problems.
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

JMPH61	<b>Part III Core 9 : 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.
JMPH62	<b>Part III Core 10 : Atomic and Nuclear Physics</b>	CO1: Understand the structure of atom by explaining the different atomic models. CO2: Acquire the knowledge in the basic advanced concept of nuclear physics. CO3: Develop the knowledge in the area of radioactivity. CO4: Understand the principle and working of nuclear reactors and detectors.

		CO5: Explore the knowledge of in the areas of cosmic rays concerned.
JMPH63	<b>Part III Core 11 : Quantum Mechanics</b>	CO1: Understand wave- particle duality of matter and the formation of Quantum mechanics. CO2: 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: Attain working knowledge of the quantum mechanics postulate on the physical systems.
JMPH6A	<b>Part III Core Elective 3 : (a)Medical Physics</b>	CO1: Understand the Physics concept used in Medical field. CO2: Analyze the applications of x-rays. CO3: Acquire knowledge about biomedical instrumentation and essential physics of medical imaging.
JMPH6B	<b>(b)Energy Physics</b>	CO1: Develop a comprehensive technological understanding in solar PV system components. CO2: Indicate the main energy products that are derived from biomass. CO3: Understand basic techniques of biomass utilization according to conversion type: mechanical, biochemical, and thermo chemical. CO4: Achieve a clear conceptual understanding of technical and commercial aspects of wind and alternative Sources of Energy. CO5: Develop managerial skills to assess feasibility of alternative approaches and drive strategies regarding wind and alternative sources of energy.
JMPHP3	<b>Practical III : Non- Electronics</b>	CO1: Attain deep knowledge about the experiments and circuit construction in electricity and magnetism CO2: Achieve hands-on experience in experiments related to basic principles of non-electronics.
JMPHP4	<b>Practical IV : Electronics</b>	CO1: Acquires in-depth knowledge about the circuits in basic electronics and digital electronics.
JMPHP5	<b>Practical V : Computer Programming with C++</b>	CO1: This course gives the deep understanding of usage of software tool in the real time problems.

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