Annai Hajira Women's College

Melapalayam, Tirunelveli-05

DEPARTMENT OF PHYSICS

Syllabus 2020-2023

POs, PSOs& COs of Physics

UG-Programme – CBCS –SEMESTER PATTERN

Course Code: 1522

Department of Physics

Email : physics@annaihajiracollege.com

UG -Programme - Course Structure under CBCS

B.Sc - Physics

(Applicable to the candidates admitted from the academic year 2020-2023 onwards)

FIRST SEMESTER

Sub – Code	Subject Title	Lecture Hours	Lab Hours	Credits
A1TL11	Part –I Language	6	---	4
A2EN11	Part –II Communicative English	6	---	4
AMPH11	Part III Core 1 : Properties of Matter and Mechanics	4	---	4
APPS11	Part III Add on Major : Professional English for Physical Sciences I	4	---	4
AMPHP1	Practical I	---	2	2
AAPH11	Allied Physics paper I	4	---	4
AAPHP1	Allied Practical I	---	2	2
AEVS11	Part IV : Environmental Studies	2	---	2
Total	(6T + 2P Courses)	26	4	26

SECOND SEMESTER

Sub – Code	Subject Title	Lecture Hours	Lab Hours	Credits
A1TL21	Part –I Language	6	---	4
A2EN21	Part –II English	6	---	4
AMPH21	Part III Core 2 :Optics and thermal physics	4	---	4
APPS21	Add on Major : Professional English for Physical Sciences II	4	---	4
AMPHP2	Major Practical II	---	2	2
AAPH21	Allied Physics paper II	4	---	4
AAPHP2	Allied Practical II	---	2	2
AVBE21	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
A1TL31	Part –I Language	6	---	4
A2EN31	Part –II English	6	---	4
AMPH31	Part III Core 3 : Electricity	4	---	4
AMPHP3	Major Practical III	---	2	2
AAPH11	Allied Physics paper I	4	---	3
AAPHP1	Allied Practical I	---	2	2
ASPH31	Skill Based Subject: (a)Maintenance of Electrical appliances	4	---	4
ASPH32	(b) Instrumentation Physics –I			
ANPH31	Non-Major Elective: (a) Basic Physics I	2	---	2
ANPH32	(b) Applied Physics			
AYOG3A	Part IV : Yoga	2	---	2
Total	(7T + 2P Courses)	28	4	27

FOURTH SEMESTER

Sub – Code	Subject Title	Lecture Hours	Lab Hours	Credits
A1TL41	Part –I Language	6	---	4
A2EN41	Part –II English	6	---	4
AMPH41	Part III Core 4 : Electromagnetism	4	---	4
AMPHP4	Major Practical IV	---	2	2
AAPH21	Allied Physics paper I	4	---	3
AAPHP2	Allied Practical I	---	2	2
ASPH41	Skill Based Subject: (a)Maintenance of Electronic equipments	4	---	4
ASPH42	(b) Instrumentation Physics -II			
ANPH41	Non-Major Elective: (a)Basic Physics II	2	---	2
ANPH42	(b)Space Physics			
SCDE4A	Part IV : Computer for digital era	2	---	2
	Part V : Extension activity	---	---	1
Total	(7T + 2P Courses)	28	4	28

FIFTH SEMESTER

Sub – Code	Subject Title	Lecture Hours	LAB Hours	Credits
AMPH51	Part III Core 5 : Basic Electronics	6	---	4
AMPH52	Part III Core 6 : Spectroscopy	5	---	4
AMPH53	Part III Core 7 : Atomic and Nuclear Physics	6	---	4
AEPH51	Part III Core Elective8 : (a)Programming in C++	5	---	4
AEPH52	(b)Communication Electronics			
AMPHP5	Practical V : General practical	---	3	3
AMPHP6	Practical VI : Electronics	---	3	3
ACSB5A	Part IV : Common Personality Development	2	---	2
Total	(5T+2P Courses)	24	6	24

SIXTH SEMESTER

Sub – Code	Subject Title	Lecture Hours	LAB Hours	Credits
AMPH61	Part III Core 9 : Quantum Mechanics	5	---	4
AMPH62	Part III Core 10 : Digital Electronics	5	---	4
AMPH63	Part III Core 11 : Solid State Physics	5	---	4
AEPH61	Part III CoreElective 16 : (a) Energy Physics	5	---	4
AEPH62	(b) Medical Physics			
	Project	4	---	4
AMPHP7	Practical VII : General Practical	---	3	3
AMPHP8	Practical VIII : Electronics	---	3	3
Total	(4T+2P+1 Project Courses)	24	6	26

Programme Outcomes

Programme Outcomes	
PO1	Acquire knowledge in Physics, including the major premises of properties of matter, thermal physics, mechanics, optics, Professional English for Physical Sciences etc.,
PO2	Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions
PO3	Enhance the subject knowledge with rich vocabulary in English.
PO4	Apply conceptual understanding of physics to general real – world situations.
PO5	Develop the creativity in Physics by employing LSRW skills.
PO6	Create an awareness of the impact of Physics on the society, and development outside the scientific community.
PO7	Develop a basis for future learning and work experience.
PO8	Demonstrate written and oral communication skills in communicating Physics related topics.
PO9	Attain analytical and consistent skill for higher Education.
PO10	Solve the problem and also think methodically, independently and draw a logical conclusion
PO11	Educated to seize jobs in allied fields.

Program Specific outcomes

The scheme defined outcome for students after obtaining a Bachelor of Science degree in Physics are that they will be:	
PSO1	Gain the knowledge of Physics through theory and practical
PSO2	Understand good laboratory practices and safety.
PSO3	Develop research oriented skills.
PSO4	Discover new interdisciplinary concepts.
PSO5	Develop the persuasive communication skill.

Course outcomes ***First Semester***

The students are able to

AMPH11	**Part III: Core 1.** Properties of Matter and Mechanics	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: Analyze the concepts like motion in inclined plane, motion of rocket. CO5: Expose the concept of relativity in different frames of reference.
APPS11	**Part III Add on Major: Professional English for Physical Sciences I**	CO1: Heighten their awareness of correct usage of English grammar in writing and speaking CO2: Improve their speaking ability in English both in terms of fluency and comprehensibility CO3: Give oral presentations and receive feedback on their performance CO4: Increase their reading speed and comprehension of academic articles CO5: Improve their reading fluency skills through extensive reading
AMPHP1	**Practical I**	CO1: Understand the concepts of properties of matter and Mechanics through experiments CO2: Acquire the basic skills and realize Physics concepts through experiments
AAPH11	**Allied Physics paper I**	CO1: Acquire basic knowledge about elastic moduli, stretching and bending moment CO2: 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. CO5: Relate the concept of free, damped and forced simple harmonic vibrations.
AAPHP1	**Allied Practical I**	CO1: Acquire basic understanding of laboratory techniques CO2: Understand the concepts of Properties of Matter and Optics through experiments.
AEVS11	**Part IV : Environmental Studies**	CO1:Understand concepts and methods from ecological and physical sciences and their application in environmental problem solving CO2: Appreciate the ethical, cross-cultural and historical context of environmental issues and the links between human and natural systems

		CO3: Analyze the transnational character of environmental problems and ways of addressing those including interactions across local to global scales. CO4: Criticize the social related issues like climate change, global warming and environmental protection act.

Second Semester

The students are able to

AMPH21	**Part III Core 2 : Optics and Thermal Physics**	CO1: Acquire the knowledge in the field of low temperature physics which explain the working of refrigerators and air containing machines. CO2: Understand the concept of kinetic theory of gases and some gas equations. CO3: Apply thermodynamic laws, Carnot's theorem and scale of temperature in solving problems. CO4: Articulate the concept of diffraction and polarization. CO5: Apply the concept of interference in design and working of interferometers. CO6: Acquire skills to identify and apply formulas of optics and wave physics
APPS21	**Part III Add on Major: Professional English for Physical Sciences II**	CO1: Improve the English Communication Skills. CO2: use personal strategies to think, organize, learn and behave. CO3: Recognize, explain, and use the rhetorical strategies and the formal elements of these specific genres of technical communication: technical abstracts, data based research reports, instructional manuals, technical descriptions, web pages, and wikis. CO4: Develop professional work habits, including those necessary for effective collaboration and cooperation with other students, instructors, and service
AMPHP2	**Major Practical II**	CO1: Understand the concepts of Optics and Thermal Physics through experiments CO2: Acquire the basic skills and realize Physics concepts through experiments
AAPH21	**Allied Physics paper II**	CO1: Understand the basic concepts of Electricity, Electromagnetism CO2: Develop basic knowledge about the diodes and transistors. CO3: Know about various number system and logic gates circuits.
AAPHP2	**Allied Practical II**	CO1: Acquire deep knowledge about Electromagnetism and Basic Electronics through experiments. CO2: Describe laboratory techniques and safety measures to handle the equipments.

AVBE21	**Part IV : Value Based Education**	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

AMPH31	**Part III Core 3 : Electricity**	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.
AMPHP3	**Major Practical III**	CO1: Understand the concepts of Electricity and Electromagnetism through experiments. CO2: Attain the skills to handle the equipment and circuits.
AAPH11	**Allied Physics paper I**	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.
AAPHP1	**Allied Practical I**	CO1: Acquire basic understanding of laboratory techniques CO2: Understand the concepts of Properties of Matter and Optics through experiments.
ASPH31	**Skill Based Subject: (a)Maintenance of Electrical appliances**	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.

ASPH32	**(b) Instrumentation Physics - I**	
ANPH31	**Non-Major Elective: (a) Basic Physics I**	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.
ANPH32	**(b) Applied Physics**	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

AMPH41	**Part III Core 4 : Electromagnetism**	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.
AMPHP4	**Major Practical IV**	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.
AAPH21	**Allied Physics paper I**	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.
AAPHP2	**Allied Practical I**	CO1: Acquire deep knowledge about Electromagnetism and Basic Electronics through experiments. CO2: Understand laboratory techniques and safety measures to handle the equipments

ASPH41	**Skill Based Subject: (a)Maintenance of Electronic equipments**	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.
ASPH42	**(b) Instrumentation Physics - II**	CO1: Recall the use of multimeters. CO2: Compare the analog & digital technique CO3: Deduct the use of measurements of frequency & time interval CO4: Compare optical & electron microscope Define their uses CO5: Conclude the uses of SEM & TEM
ANPH4A	**Non-Major Elective: (a)Basic Physics II**	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 Sate operations.
ANPH4B	**(b)Space Physics**	CO1: Understand the celestial objects. CO2: Gain knowledge about big-bang theory.

Fifth Semester

The students are able to

AMPH51	**Part III Core 5 : Basic Electronics**	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.
AMPH52	**Part III Core 6: Spectroscopy**	CO1: Achieve advanced knowledge about the interactions of electromagnetic radiation and matter and their applications in spectroscopy CO2: Develop the knowledge of basic spectroscopic methods and principles to determine the structure of organic compounds. CO3: Analyse the vibrations for a triatomic molecule and identify whether they are infrared-active.

		CO4: Justify the difference in intensity between Stokes and anti-Stokes lines. CO5: Interpret UV-Visible spectroscopy. CO6: Analyse the fundamentals of NMR phenomenon, relation between NMR spectra and molecular structure.
AMPH53	**Part III Core 7 : Atomic Physics and Nuclear Physics**	CO1: Develop the concepts of atomic physics: basic knowledge of properties of atom, different atomic models, etc. CO2: Relate observation, theory and their uses in building the basic concepts of atomic physics. CO3: Acquire knowledge in the area of x-rays. CO4: Correlate the area of band theory of solids in order to understand the atomic structure. CO5: Employ conceptual understanding of behaviour of atom. CO6: Develop and communicate analytical skills in nuclear physics. CO7: Apply the perception of nuclear physics in particle accelerators. CO8: Explore the knowledge in the areas of cosmic rays concerned.
AEPH51	**Part III Core Elective 8 : (a) Programming in C++**	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.
AEPH52	**Part III Core Elective (b)Communication Electronics**	CO1: Understand various modulation and demodulation techniques used for communication. CO2: Acquires basic knowledge in electronics and mathematics. CO3: Choose proper modulation techniques. CO4: Illustrate digital modulation techniques in coding and encoding. CO5: Classify amplitude modulation and frequency modulation, transmission and reception of FM waves.
AMPHP5	**Practical V : General Practical**	CO1: Apply the concepts of electricity and electromagnetism through experiments. CO2: Gain the skills to handle the equipments and circuits. CO3: Able to solve simple circuit and apply this knowledge to construct complex circuits.
AMPHP6	**Practical VI : Electronics**	CO1: Attain knowledge to handle simple electronic components through experiments.

		CO2: Construct simple oscillators, multivibrators, gates. CO3: Gain deep knowledge about wave shaping circuits, filters.
ACSB51	**Part IV : Common Personality Development**	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

AMPH61	**Part III Core 9 : Quantum Mechanics**	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.
AMPH62	**Part III Core 10 : Digital Electronics**	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.
AMPH63	**Part III Core 11 : Solid State Physics**	CO1:Develop an understanding of the lattice, different types of crystal structures, symmetries. CO2:Gain insight about the interior of the substances using X-ray diffraction in crystals.

		CO3: Understand elastic waves, phonons, and lattice vibrational properties. CO4: Apply theoretical basis of experimental material science and technology. CO5: Expose the techniques used in synthesis of nanomaterials such as sol-gel, vapour deposition, ball-milling methods.
AEPH61	**Part III Core Elective 12 :** **(a) Energy Physics**	CO1: Comprehend about conventional and non-conventional energy sources. CO2: Infer about biomass energy, wind energy, tidal energy, geothermal energy and its applications. CO3: Acquire knowledge about basic principle of energy conversion system. CO4: Know more about other non-conventional energy sources like Ocean thermal energy and chemical energy resources. CO5: Realize the physical principle of solar energy and its applications.
AEPH62	**(b) Medical Physics**	CO1: Understand the Physics concept used in Medical field. CO2: Know the applications of x-rays. CO3:Acquire knowledge about biomedical instrumentation and essential physics of medical imaging. CO4: Extract the knowledge of laser applications in medical therapy and diagnosis.
AMPHP7	**Practical VII**	CO1:Apply the concepts of electricity and electromagnetism through experiments. CO2: Gain knowledge to handle optical instruments and equipments. CO3: Understand the non-electronic CO4: Analyze d.c and a.c circuits.
AMPHP8	**Practical VIII :**	CO1: Attain knowledge to handle simple electronic components through experiments. CO2: Construct simple oscillators, multivibrators, gates. CO3: Gain deep knowledge about wave shaping circuits, filters.

	Project	CO1: Develop a deeper understanding of specific physics concepts and theories related to the chosen project topic. CO2: Acquire hands-on experience in setting up and conducting experiments, including data collection, analysis, and interpretation. CO3: Develop the ability to critically evaluate scientific literature, experimental procedures, and results to draw meaningful conclusions. CO4: Enhance teamwork and collaboration skills by working with peers on experimental design, data collection, and analysis. CO5: Develop effective time management skills to plan and execute various project stages within given deadlines.

05/08/2020

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