



# **MUSLIM ARTS COLLEGE**

(Accredited by NAAC with B+ grade & Affiliated to Manonmaniam Sundaranar University,  
Tirunelveli; Recognized US 2(f) 12 (B) of UGC Act.)

Thiruvithancode, Kanyakumari District, Tamil Nadu - 629174.

## **DEPARTMENT OF PHYSICS**

### **CBCS SYLLABUS**

Learning Outcome-based Curriculum Framework for

### **PHYSICS (B.Sc.)**

*Applicable for students admitted from June 2026 as per the Resolutions of the Academic Council Meeting held  
on 01.06.2026*



## **Vision**

- To be a centre of excellence in teaching, research, and outreach, advancing knowledge in physics and preparing professionals who contribute meaningfully to society in a dynamic global environment.

## **Mission**

- To enhance and extend knowledge in physics through teaching and research
- To develop scientific thinking and analytical skills among students
- To promote research and innovation in emerging areas
- To prepare students to contribute effectively to society and industry

## **Academic and Professional Attributes of the Graduates**

1. **Knowledge and Scientific Competence**  
Acquire a strong foundation in fundamental and applied physics, mathematics, and related scientific disciplines with the ability to understand, analyze, and apply physical principles.
2. **Experimental and Technical Skills**  
Develop proficiency in conducting physics experiments, handling scientific instruments, collecting and analyzing data, and interpreting experimental results with precision.
3. **Critical Thinking and Problem Solving**  
Apply logical reasoning, quantitative methods, and scientific approaches to investigate, analyze, and solve theoretical and practical problems in physics.
4. **Research and Innovation**  
Develop research aptitude through scientific inquiry, experimentation, computational techniques, project work, and the ability to explore emerging areas of physics.
5. **Communication Skills**  
Communicate scientific concepts, experimental findings, and technical information effectively through oral presentations, written reports, and digital media.
6. **Ethical and Professional Responsibility**  
Demonstrate integrity, ethical values, environmental consciousness, laboratory safety practices, and professional responsibility in academic, research, and workplace settings.
7. **Digital and Computational Competence**  
Utilize modern computational tools, scientific software, programming, and information technology for data analysis, simulation, modeling, and scientific problem solving.
8. **Leadership and Teamwork**  
Work effectively as an individual and as a member or leader of multidisciplinary teams, exhibiting leadership, collaboration, and interpersonal skills.
9. **Employability and Entrepreneurship**  
Build competencies required for higher education, research, industry, teaching, scientific services, and entrepreneurship through innovation and lifelong skill development.
10. **Lifelong Learning and Global Perspective**  
Pursue continuous learning, adapt to advancements in science and technology,

appreciate global scientific developments, and contribute responsibly to society through scientific knowledge.

### **PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

| <b>PEOs</b> | <b>Upon completion of the B.Sc. Physics Degree Programme, graduates are expected to</b>                                                                                     | <b>Mapping with Mission</b> |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>PEO1</b> | Develop a strong foundation in physics through independent learning, scientific thinking, and analytical skills for lifelong learning.                                      | M1 & M2                     |
| <b>PEO2</b> | Apply physics knowledge, experimental techniques, computational skills, and research aptitude to solve real-world scientific and technological problems through innovation. | M2 & M3                     |
| <b>PEO3</b> | Demonstrate ethical values, professionalism, leadership, and social responsibility while contributing effectively to society, industry, and sustainable development.        | M3 & M4                     |

### **Programme Outcomes (POs)**

| <b>POs</b> | <b>Upon completion of the B.Sc Physics Degree Programme, students will be able to:</b>                                                                                                                      | <b>Mapping with PEOs</b> |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>PO1</b> | <b>Physics Knowledge:</b> Demonstrate comprehensive knowledge of fundamental and applied physics concepts and communicate scientific ideas effectively in academic and professional settings.               | PEO1                     |
| <b>PO2</b> | <b>Critical Thinking and Problem Solving:</b> Analyze scientific data, apply mathematical and computational techniques, and solve theoretical and practical problems using scientific reasoning.            | PEO1, PEO2               |
| <b>PO3</b> | <b>Application of Scientific Methods:</b> Apply physical principles, laboratory techniques, computational tools, and modern technologies to investigate, design, and solve real-world scientific problems.  | PEO1, PEO2               |
| <b>PO4</b> | <b>Research and Lifelong Learning:</b> Develop scientific inquiry, research aptitude, reflective thinking, and self-directed learning for continuous professional and academic development.                 | PEO2                     |
| <b>PO5</b> | <b>Ethics and Social Responsibility:</b> Demonstrate ethical values, environmental consciousness, professional integrity, and social responsibility while appreciating cultural diversity.                  | PEO3                     |
| <b>PO6</b> | <b>Digital and Technological Competence:</b> Utilize modern digital technologies, computational tools, scientific software, and multiple information resources for learning, experimentation, and research. | PEO2, PEO3               |
| <b>PO7</b> | <b>Leadership and Teamwork:</b> Function effectively as an individual and as a member or leader of multidisciplinary teams, exhibiting leadership, collaboration, and professional responsibility.          | PEO3                     |

### **Programme Specific Outcomes (PSOs)**

| <b>PSOs</b> | <b>Upon completion of the B.Sc. Physics Degree Programme, students will be able to:</b>                                                          | <b>Mapping with POs</b> |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>PSO1</b> | <b>Disciplinary Knowledge:</b> Prepare the students for a successful career and work with values for social concern. Understand the concepts and | PO1, PO2, PO4, PO5      |

|             |                                                                                                                                                                                                                                                                                                       |                         |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
|             | applications in the field of Physics viz. Mechanics, Thermodynamics, Optics, Electricity and electromagnetism, Quantum Mechanics, Electronics etc. Perform experiments with accuracy and precision using standard laboratory equipment.                                                               |                         |
| <b>PSO2</b> | <b>Critical Thinking:</b> Analyze experimental data and interpret results in terms of physical laws and concepts. Develop logical reasoning and critical thinking skills to solve theoretical and practical problems in Physics.                                                                      | PO1, PO2, PO3, PO4, PO5 |
| <b>PSO3</b> | <b>Problem Solving:</b> Apply mathematical methods and analytical techniques to solve quantitative physics problems. Use mathematical tools to analyze physical concepts.                                                                                                                             | PO2, PO4                |
| <b>PSO4</b> | <b>Analytical &amp; Scientific Reasoning:</b> Develop and apply analytical and scientific reasoning to understand interpret and solve problems related to physical phenomena using fundamental principles of physics.                                                                                 | PO1, PO2, PO3, PO4, PO5 |
| <b>PSO5</b> | <b>Research related skills:</b> Design and execute a Project to solve real-world problems in accordance to the need of the industry and society.                                                                                                                                                      | PO2, PO3, PO4, PO5      |
| <b>PSO6</b> | <b>Self-directed &amp; Lifelong Learning:</b> Build a strong conceptual and analytical foundation for higher-level courses in physics and related disciplines, including quantum mechanics, electronics, and materials science.                                                                       | PO2, PO3                |
| <b>PSO7</b> | <b>Employability and Entrepreneurship:</b> Develop skills for employability, entrepreneurship, and career readiness in industry, research organizations, education, information technology, and technology-driven sectors through problem solving, innovation, teamwork, and effective communication. | PO4, PO5                |

### Mapping of Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

| POs / PSOs | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 | PSO7 |
|------------|------|------|------|------|------|------|------|
| <b>PO1</b> | 3    | 3    | 1    | 3    | 3    | 3    | 3    |
| <b>PO2</b> | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| <b>PO3</b> | 2    | 3    | 2    | 3    | 2    | 2    | 3    |
| <b>PO4</b> | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| <b>PO5</b> | 1    | 3    | 3    | 3    | 3    | 3    | 3    |
| <b>PO6</b> | 2    | 3    | 3    | 3    | 3    | 3    | 3    |
| <b>PO7</b> | 3    | 2    | 2    | 3    | 3    | 3    | 3    |

●3 – High Correlation

●2 – Moderate Correlation

●1 – Low Correlation

## COURSES OFFERED

### SEMESTER I

| Part     | Course Code                  | Title of the Course                               | Credits | Hours / Week |
|----------|------------------------------|---------------------------------------------------|---------|--------------|
| Part I   | AGTL11/<br>AGMY11/<br>AGAB11 | Language: Tamil /Malayalam/Arabic                 | 3       | 6            |
| Part II  | AGEN11                       | English                                           | 3       | 6            |
| Part III | AMPH11                       | Core Course I: Properties of Matter and Acoustics | 5       | 5            |
|          | AMPHP1                       | Core Practical I- Physics Practical I             | 3       | 3            |
|          | AAPH11                       | Allied Theory 1–Allied Mathematics I              | 5       | 6            |
| Part IV  | ASPH11                       | SEC 1 Practical – Physics For Everyday Life       | 2       | 2            |
|          | AFPH11                       | Foundation Course: Introductory Physics           | 2       | 2            |
| Total    |                              |                                                   | 23      | 30           |

## SEMESTER I

### CORE COURSE I: Properties of Matter and Acoustics

| Subject Code | Category | L | T | P | S | Credits | Inst. Hours | Marks |          |       |
|--------------|----------|---|---|---|---|---------|-------------|-------|----------|-------|
|              |          |   |   |   |   |         |             | CIA   | External | Total |
| AMPH11       | Core     | Y | Y | - | Y | 5       | 5           | 25    | 75       | 100   |

#### Pre-requisite

Basic idea of the properties of matter leads to information which is of practical value to both the physicist and the engineers.

#### Learning Objectives

1. It gives us information about the internal forces which act between the constituent parts of the substance.
2. Students who undergo this course are successfully bound to get a better insight and understanding of the subject.

#### Course Outcomes (COs)

Upon successful completion of the course, students will be able to:

| CO No. | Course Outcomes                                                                                                                                                                                                                                           | BT Level |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| CO1    | Relate elastic behavior in terms of three moduli of elasticity and working of torsion pendulum.                                                                                                                                                           | K2       |
| CO2    | Able to appreciate concept of bending of beams and analyze the expression, quantify and understand nature of materials.                                                                                                                                   | K2       |
| CO3    | Explain the surface tension and viscosity of fluid and support the interesting phenomena associated with liquid surface, soap films provide an analogue solution to many engineering problems.                                                            | K5&K6    |
| CO4    | Analyze simple harmonic motions mathematically and apply them. Understand the concept of resonance and use it to evaluate the frequency of vibration. Set up experiment to evaluate frequency of ac mains.                                                | K4       |
| CO5    | Understand the concept of acoustics, importance of constructing buildings with good acoustics. Able to apply their knowledge of ultrasonics in real life, especially in medical field and assimilate different methods of production of ultrasonic waves. | K1       |

#### Bloom's Taxonomy Levels

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

### Course Content

| Units | Contents                                                                                                                                                                                                                                                                                                                                                                                                | No. of Hours |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| I     | <b>ELASTICITY:</b> Hooke's law – stress-strain diagram – elastic constants<br>Poisson's ratio – relation between elastic constants and Poisson's ratio –<br>work done in stretching a wire –Twisting couple on a cylinder – Rigidity<br>modulus by torsion pendulum (with and without masses).                                                                                                          | 15           |
| II    | <b>BENDING OF BEAMS:</b> Expression for the bending moment – Expression<br>for depression at the loaded end of the cantilever–Experiment to determine<br>Young's modulus by cantilever depression. Experiment to find Young's<br>modulus by non uniform bending. Uniform bending – Expression for<br>elevation – Experiment to determine Young's modulus by uniform bending<br>method using microscope. | 15           |
| III   | <b>FLUID DYNAMICS:</b> Surface tension: definition –molecular forces -<br>Excess pressure over curved surface – application to spherical and<br>cylindrical drops and bubbles. Viscosity: definition – streamline and<br>turbulent flow – rate of flow of liquid in a capillary tube – Poiseuille's<br>formula –terminal velocity and Stoke's formula.                                                  | 15           |
| IV    | <b>WAVES AND OSCILLATIONS:</b> Simple Harmonic Motion (SHM) –<br>composition of two SHM in a straight line and at right angles– Lissajous's<br>figures- free, damped, forced vibrations –resonance and Sharpness of<br>resonance. Laws of transverse vibration in strings –sonometer –<br>determination of AC frequency using sonometer–determination of<br>frequency using Melde's string apparatus.   | 15           |
| V     | <b>ACOUSTICS OF BUILDINGS AND ULTRASONICS:</b> Intensity of<br>sound – decibel – loudness of sound –reverberation – factors affecting the<br>acoustics of buildings. Ultrasonic waves: Production of ultrasonic waves –<br>Piezoelectric crystal method – Detection of ultrasonic waves-application of<br>ultrasonic waves.                                                                             | 15           |
|       | <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                            | <b>75</b>    |

| S. No. | Text Book                                                                                                 |
|--------|-----------------------------------------------------------------------------------------------------------|
| 1      | D.S.Mathur, 2010, Elements of Properties of Matter, S.Chand and Co.                                       |
| 2      | BrijLaland N. Subrahmanyam, 2003, Properties of Matter, S.Chand and Co.                                   |
| 3      | D.R.Khanna andR.S.Bedi, 1969, Textbook of Sound, AtmaRamand sons.                                         |
| 4      | Brijlal and N.Subrahmanyam, 1995, A Text Book of Sound, Second revised<br>edition,Vikas Publishing House. |
| 5      | R.Murugesan, 2012, Properties of Matter, S.Chandand Co.                                                   |

| S. No. | Reference Books                                                                                 |
|--------|-------------------------------------------------------------------------------------------------|
| 1      | C.J. Smith, 1960, General Properties of Matter, Orient Longman Publishers                       |
| 2      | H.R. Gulati, 1977, Fundamental of General Properties of Matter, Fifth edition, R. Chand and Co. |
| 3      | A.P French, 1973, Vibration and Waves, MIT Introductory Physics, Arnold Heinmann India.         |

### Mapping with Programme Outcomes

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|-------|-----|-----|-----|-----|-----|-----|-----|
| CO1   | 3   | 2   | 2   | 3   | 2   | 3   | 3   |
| CO2   | 2   | 3   | 3   | 2   | 2   | 3   | 3   |
| CO3   | 3   | 3   | 2   | 3   | 2   | 2   | 3   |
| CO4   | 3   | 3   | 3   | 3   | 3   | 3   | 3   |
| CO5   | 3   | 3   | 3   | 3   | 3   | 3   | 3   |

3 – Strong, 2 – Medium, 1 - Low

### Mapping with Programme Specific Outcomes

| CO /PO                                            | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 | PSO7 |
|---------------------------------------------------|------|------|------|------|------|------|------|
| CO1                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| CO2                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| CO3                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| CO4                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| CO5                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Weightage                                         | 15   | 15   | 15   | 15   | 15   | 15   | 15   |
| Weighted percentage of Course Contribution to POs | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  |

### Core Practical 1: Physics Practical I

| Subject Code | Category | L | T | P | S | Credits | Inst. Hours | Marks |          |       |
|--------------|----------|---|---|---|---|---------|-------------|-------|----------|-------|
|              |          |   |   |   |   |         |             | CIA   | External | Total |
| AMPHP1       | Core     | - | - | Y | Y | 3       | 3           | 50    | 50       | 100   |

### Learning Objectives

The course aims to:

1. To understand the principles of experimental physics and the properties of matter, acoustics, heat, and optics through laboratory experiments.
2. To develop practical skills in handling scientific instruments and performing precise measurements.
3. To analyze experimental data, estimate errors, and interpret results using appropriate scientific methods.
4. To verify physical laws and concepts through systematic experimentation.
5. To develop scientific attitude, critical thinking, and laboratory safety practices.

### Course Outcomes

Upon successful completion of the course, students will be able to:

| CO No. | Course Outcomes                                                                                                                    | BT Level |
|--------|------------------------------------------------------------------------------------------------------------------------------------|----------|
| CO1    | Understand the principles of physical measurements, experimental methods, and the concepts underlying physics experiments.         | K2       |
| CO2    | Perform experiments related to Properties of Matter, Acoustics, Heat, and Optics using standard laboratory instruments.            | K3       |
| CO3    | Analyze experimental observations, calculate physical parameters, and estimate experimental errors.                                | K4       |
| CO4    | Evaluate experimental results by comparing them with theoretical values and interpret the observed physical phenomena.             | K5       |
| CO5    | Design, conduct, and document physics experiments independently while applying scientific methods and laboratory safety practices. | K6       |

### Bloom's Taxonomy Levels

**K1** – Remember, **K2** – Understand, **K3** – Apply, **K4** – Analyse, **K5** – Evaluate, **K6** – Create  
Course Content

| PRACTICAL 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Minimum of Six Experiments from the list:</p> <ol style="list-style-type: none"> <li>1. Determination of rigidity modulus without mass using a Torsional pendulum.</li> <li>2. Determination of rigidity modulus with masses using a Torsional pendulum.</li> <li>3. Determination of moment of inertia and 'g' using a Bifilar pendulum.</li> <li>4. Determination of Young's modulus by uniform bending using pin and microscope.</li> <li>5. Determination of Young's modulus by non-uniform bending using scale and telescope.</li> <li>6. Determination of Young's modulus by the cantilever depression method.</li> <li>7. Determination of rigidity modulus by static torsion.</li> <li>8. Determination of Y, n and K by Searle's double bar method.</li> <li>9. Determination of the frequency of AC by using a sonometer.</li> <li>10. Determination of surface tension and interfacial surface tension by the drop weight</li> </ol> |

method.

11. Determination of the co-efficient of viscosity by Stokes' method.
12. Determination of Poisson's ratio of a rubber tube.
13. Determination of viscosity by Poiseuille's flow method.
14. Determination of frequency of an electrically maintained tuning fork.
15. Determination of 'g' using a compound pendulum.

### **Mapping with Programme Outcomes**

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|-----|-----|-----|-----|-----|-----|-----|-----|
| CO1 | 3   | 3   | 3   | 3   | 3   | 3   | 2   |
| CO2 | 2   | 3   | 3   | 3   | 2   | 3   | 3   |
| CO3 | 3   | 3   | 3   | 2   | 3   | 2   | 3   |
| CO4 | 3   | 3   | 3   | 3   | 3   | 3   | 3   |
| CO5 | 3   | 2   | 3   | 3   | 3   | 3   | 3   |

### **Mapping with Programme Specific Outcomes**

| CO /PO                                            | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 | PSO7 |
|---------------------------------------------------|------|------|------|------|------|------|------|
| CO1                                               | 3    | 2    | 2    | 3    | 3    | 2    | 3    |
| CO2                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| CO3                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| CO4                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| CO5                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Weightage                                         | 15   | 14   | 14   | 15   | 15   | 14   | 15   |
| Weighted percentage of Course Contribution to POs | 3.0  | 2.8  | 2.8  | 3.0  | 3.0  | 2.8  | 3.0  |

3 – Strong, 2 – Medium, 1 – Low

## Allied Theory 1–Allied Mathematics I

| Subject Code | Category | L | T | P | S | Credits | Inst. Hours | Marks |          |       |
|--------------|----------|---|---|---|---|---------|-------------|-------|----------|-------|
|              |          |   |   |   |   |         |             | CIA   | External | Total |
| AAPH11       | Core     | Y | - | - | Y | 5       | 6           | 25    | 75       | 100   |

### Learning Objectives

The course aims to:

1. To explain the simple concepts of the theory of equations.
2. To find the roots of the equations by using techniques in various methods.

### Course Outcomes

Upon successful completion of the course, students will be able to:

| CO No. | Course Outcomes                                                                                               | BT Level |
|--------|---------------------------------------------------------------------------------------------------------------|----------|
| CO1    | Form the equation, relation between the roots and classify and solve reciprocal equations.                    | K2       |
| CO2    | Find approximate solution to equations by Horner's method.                                                    | K5       |
| CO3    | Find Eigen values and Eigen vectors for given square matrix and find inverse by using Cayley-Hailton theorem. | K2,K5    |
| CO4    | Find solution of differential equation and partial equation.                                                  | K4       |
| CO5    | Find Laplace transformation and Laplace transformation for a given function.                                  | K3       |

### Bloom's Taxonomy Levels

**K1** – Remember, **K2** – Understand, **K3** – Apply, **K4** – Analyse, **K5** – Evaluate, **K6** – Create

### Course Content

| Unit | Contents                                                                                                                                                           | No. of Hours |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| I    | Theory of Equations-Formation of Equations-Relation between roots and coefficients-Reciprocal equations.                                                           | 12           |
| II   | Transformation of Equations-Approximate solution to equations-Newton's method and Horner's method.                                                                 | 12           |
| III  | Matrices-Characteristic equation of a matrix-Eigen values and Eigen vectors-Cayley Hamilton theorem and simple Problems.                                           | 12           |
| IV   | Differential equation of first order but of higher degree-Equations solvable for p,x,y-Partial differential equations-formations-solutions-Standard form $Pp+Qq=R$ | 12           |
| V    | Laplace transform-Inverse Laplace transform.                                                                                                                       | 12           |
|      | <b>Total</b>                                                                                                                                                       | <b>60</b>    |

| S. No. | Text Books                                                                                                                 |
|--------|----------------------------------------------------------------------------------------------------------------------------|
| 1      | Dr.S.Arumugam and A.Thangapandi Issac-Allied Mathematics Paper –I, New Gamma Publishing House,2012.                        |
| S. No. | Reference Books                                                                                                            |
| 1      | S.Narayanan and T.K.Manikavachagom Pillay-Differential Equations and its applications,S.Viswanathan Printers Pvt.Ltd,2006. |
| 2      | T.Veerarajan-Algebra and Trigonometry-Yes Dee Publishing Pvt.Ltd,2009                                                      |

| S. No. | WEB SOURCES                                           |
|--------|-------------------------------------------------------|
| 1      | <a href="https://nptel.ac.in">https://nptel.ac.in</a> |

### **Mapping with Programme Outcomes**

|     | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|-----|------|------|------|------|------|------|------|
| CO1 | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| CO2 | 2    | 3    | 3    | 3    | 2    | 3    | 3    |
| CO3 | 3    | 3    | 3    | 2    | 3    | 3    | 3    |
| CO4 | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| CO5 | 3    | 2    | 3    | 3    | 3    | 3    | 3    |

3 – Strong, 2 – Medium, 1 - Low

### **Mapping with Programme Specific Outcomes**

| CO /PO                                            | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 | PSO7 |
|---------------------------------------------------|------|------|------|------|------|------|------|
| CO1                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| CO2                                               | 3    | 3    | 3    | 2    | 3    | 3    | 2    |
| CO3                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| CO4                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| CO5                                               | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Weightage                                         | 15   | 15   | 15   | 14   | 15   | 15   | 14   |
| Weighted percentage of Course Contribution to POs | 3.0  | 3.0  | 3.0  | 2.8  | 3.0  | 3.0  | 2.8  |

## SEC-1- PHYSICS FOR EVERYDAY LIFE

| Subject Code | Category | L | T | P | S | Credits | Inst. Hours | Marks |          |       |
|--------------|----------|---|---|---|---|---------|-------------|-------|----------|-------|
|              |          |   |   |   |   |         |             | CIA   | External | Total |
| ASPH11       | Core     | Y | - | - | Y | 2       | 2           | 25    | 75       | 100   |

### Learning Objectives

The course aims to:

1. To know where all physics principles have been put to use in daily life and appreciate the concepts with a better understanding also to know about Indian scientists who have made significant contributions to Physics

### Course Outcomes

Upon successful completion of the course, students will be able to:

| CO No. | Course Outcomes                                                                                                                         | BT Level |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------|----------|
| CO1    | Explain the fundamental principles of physics involved in common natural phenomena and everyday technologies.                           | K2       |
| CO2    | Illustrate the applications of physics concepts in household appliances, transportation, communication, healthcare, and energy systems. | K3       |
| CO3    | Analyze real-life situations using the principles of mechanics, optics, electricity, magnetism, sound, and heat.                        | K4       |
| CO4    | Evaluate the role of physics in technological advancements, environmental sustainability, and societal development.                     | K5       |
| CO5    | Appreciate the contributions of Indian and global physicists and apply scientific reasoning to everyday problems and decision-making.   | K5       |

### Bloom's Taxonomy Levels

**K1** – Remember, **K2** – Understand, **K3** – Apply, **K4** – Analyse, **K5** – Evaluate, **K6** – Create

### Course Content

| Unit | Contents                                                                                                                 | No. of Hours |
|------|--------------------------------------------------------------------------------------------------------------------------|--------------|
| I    | MECHANICAL OBJECTS: Spring scales – bouncing balls– bicycles –rockets and space travel.                                  | 6            |
| II   | OPTICAL INSTRUMENTS AND LASER: vision corrective lenses – Polaroid glasses – UV protective glass – holography and laser. | 6            |
| III  | PHYSICS OF HOME APPLIANCES: filament bulb – ceiling fan – hair drier – refrigerator – wet grinder.                       | 6            |

|           |                                                                                                                                                                                                      |           |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>IV</b> | <b>SOLAR ENERGY:</b> Solar constant – General applications of solar energy – Solar water heaters – Solar Photovoltaic cells – online- offline solar power system.                                    | <b>6</b>  |
| <b>V</b>  | <b>INDIAN PHYSICIST AND THEIR CONTRIBUTIONS:</b> C.V.Raman, Homi Jehangir Bhabha, Vikram Sarabhai, Subrahmanyam Chandrasekhar, Dr. APJ Abdul Kalam and their contribution to science and technology. | <b>6</b>  |
|           | <b>Total</b>                                                                                                                                                                                         | <b>30</b> |

| <b>S. No.</b> | <b>Text Books</b>                                                                 |
|---------------|-----------------------------------------------------------------------------------|
| <b>1</b>      | The Physics in our Daily Lives, Umme Ammara, Gugucol Publishing, Hyderabad, 2019. |
| <b>2</b>      | For the love of physics, Walter Lawin, Free Press, New York, 2011.                |

### **Mapping with Programme Outcomes**

|            | <b>PO 1</b> | <b>PO 2</b> | <b>PO 3</b> | <b>PO 4</b> | <b>PO 5</b> | <b>PO 6</b> | <b>PO 7</b> |
|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>CO1</b> | 3           | 3           | 3           | 3           | 3           | 3           | 3           |
| <b>CO2</b> | 2           | 3           | 3           | 3           | 2           | 3           | 3           |
| <b>CO3</b> | 3           | 3           | 3           | 2           | 3           | 3           | 3           |
| <b>CO4</b> | 3           | 3           | 3           | 3           | 3           | 3           | 3           |
| <b>CO5</b> | 3           | 2           | 3           | 3           | 3           | 3           | 3           |

**3 – Strong, 2 – Medium, 1 - Low**

### **Mapping with Programme Specific Outcomes**

| <b>CO /PO</b>                                            | <b>PSO1</b> | <b>PSO2</b> | <b>PSO3</b> | <b>PSO4</b> | <b>PSO5</b> | <b>PSO6</b> | <b>PSO7</b> |
|----------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>CO1</b>                                               | 3           | 3           | 3           | 3           | 3           | 3           | 3           |
| <b>CO2</b>                                               | 3           | 3           | 3           | 2           | 3           | 3           | 3           |
| <b>CO3</b>                                               | 3           | 3           | 3           | 3           | 3           | 3           | 3           |
| <b>CO4</b>                                               | 3           | 3           | 3           | 3           | 3           | 3           | 3           |
| <b>CO5</b>                                               | 3           | 3           | 3           | 3           | 3           | 3           | 3           |
| <b>Weightage</b>                                         | 15          | 15          | 15          | 14          | 15          | 15          | 15          |
| <b>Weighted percentage of Course Contribution to POs</b> | 3.0         | 3.0         | 3.0         | 2.8         | 3.0         | 3.0         | 3.0         |

## FOUNDATION COURSE- Introductory Physics

| Subject Code | Category          | L | T | P | S | Credits | Inst. Hours | CIA | External | Total |
|--------------|-------------------|---|---|---|---|---------|-------------|-----|----------|-------|
| AFPH11       | Foundation Course | Y | - | - | Y | 2       | 2           | 25  | 75       | 100   |

### Learning Objectives

The course aims to:

1. To help students get an overview of Physics before learning their core courses.
2. To serve as a bridge between the school curriculum and the degree programme.

### Course Outcomes

Upon successful completion of the course, students will be able to:

| CO No. | Course Outcomes                                                                                                        | BT Level |
|--------|------------------------------------------------------------------------------------------------------------------------|----------|
| CO1    | Apply concept of vectors to understand concepts of Physics and solve problems.                                         | K1       |
| CO2    | Appreciate different forces present in Nature while learning about phenomena related to these different forces.        | K3       |
| CO3    | Quantify energy in different process and relate momentum, velocity and energy.                                         | K4       |
| CO4    | Differentiate different types of motions they would encounter in various courses and understand their basis.           | K3       |
| CO5    | Relate various properties of matter with their behaviour and connect them with different physical parameters involved. | K2       |

### Bloom's Taxonomy Levels

**K1** – Remember, **K2** – Understand, **K3** – Apply, **K4** – Analyse, **K5** – Evaluate, **K6** – Create

### Course Content

| Unit       | Contents                                                                                                                                                                                                          | No. of Hours |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>I</b>   | Vectors, Scalars : Examples for scalars and vectors from physical quantities – addition, subtraction of vectors – resolution and resultant                                                                        | <b>6</b>     |
| <b>II</b>  | Different types of forces : Gravitational, Electrostatic, Magnetic, Electromagnetic, Nuclear forces –Mechanical Forces like, centripetal, centrifugal forces.                                                     | <b>6</b>     |
| <b>III</b> | Work, Power and Energy : Work done by the force Power Kinetic energy – potential energy – work energy theorem – principle of conservation of Energy Work Energy Theorem - Conservation laws of momentum, –angular | <b>6</b>     |

|           |                                                                                                                                                                                                       |           |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|           | momentum.                                                                                                                                                                                             |           |
| <b>IV</b> | Types of motion : Linear, Projectile, Circular, Angular, Simple Harmonic motions – stream line and turbulent motions – wave motion – comparison of light and sound waves .                            | <b>6</b>  |
| <b>V</b>  | Properties and types of materials: Conductors, Semi-Conductors and Insulators – Thermal And Electric Properties – Introduction to Super Conductors. and Security, Future Trends in AI, Generative AI. | <b>6</b>  |
|           | <b>Total</b>                                                                                                                                                                                          | <b>30</b> |

| <b>S. No.</b> | <b>Text Books</b>                                                                                                                        |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2        | D.S.Mathur, 2010, Elements of Properties of Matter, S.Chand & Co<br>BrijLal & N. Subrahmanyam, 2003, Properties of Matter, S.Chand & Co. |

| <b>S. No.</b> | <b>Reference Books</b>                                                                       |
|---------------|----------------------------------------------------------------------------------------------|
| 1             | H.R. Gulati, 1977, Fundamental of General Properties of Matter, Fifth edition, S.Chand & Co. |

| <b>S. No.</b> | <b>Web Resources</b>                                                                                                                                          |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1             | <a href="http://hyperphysics.phy-astr.gsu.edu/hbase/permot/">http://hyperphysics.phy-astr.gsu.edu/hbase/permot/</a>                                           |
| 2             | <a href="https://science.nasa.gov/ems/">https://science.nasa.gov/ems/</a>                                                                                     |
| 3             | <a href="https://eesc.columbia.edu/courses/eesc/climate/lectures/radiation_hays/">https://eesc.columbia.edu/courses/eesc/climate/lectures/radiation_hays/</a> |

#### **MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES (POs)**

| <b>CO / PO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> | <b>PO6</b> | <b>PO7</b> |
|----------------|------------|------------|------------|------------|------------|------------|------------|
| <b>CO1</b>     | 3          | 2          | 2          | 1          | 1          | 3          | 3          |
| <b>CO2</b>     | 3          | 2          | 2          | 2          | 1          | 3          | 3          |
| <b>CO3</b>     | 2          | 2          | 3          | 2          | 1          | 3          | 3          |
| <b>CO4</b>     | 2          | 2          | 3          | 2          | 1          | 3          | 3          |
| <b>CO5</b>     | 2          | 2          | 2          | 2          | 1          | 3          | 3          |

#### **Mapping Scale**

**3** – Strong Correlation, **2** – Moderate Correlation, **1** – Low Correlation

**MAPPING OF COURSE OUTCOMES WITH PROGRAMME SPECIFIC OUTCOMES (PSOs)**

| <b>CO / PSO</b>                                           | <b>PSO1</b> | <b>PSO2</b> | <b>PSO3</b> | <b>PSO4</b> | <b>PSO5</b> | <b>PSO6</b> | <b>PSO7</b> | <b>PSO8</b> |
|-----------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>CO1</b>                                                | 3           | 2           | 1           | 1           | 2           | 1           | 3           | 2           |
| <b>CO2</b>                                                | 3           | 2           | 1           | 1           | 2           | 1           | 3           | 2           |
| <b>CO3</b>                                                | 2           | 3           | 2           | 1           | 3           | 1           | 3           | 3           |
| <b>CO4</b>                                                | 2           | 3           | 3           | 1           | 3           | 2           | 3           | 3           |
| <b>CO5</b>                                                | 2           | 3           | 2           | 2           | 3           | 2           | 3           | 3           |
| <b>Weightage</b>                                          | <b>12</b>   | <b>13</b>   | <b>9</b>    | <b>6</b>    | <b>13</b>   | <b>7</b>    | <b>15</b>   | <b>13</b>   |
| <b>Weighted Percentage of Course Contribution to PSOs</b> | <b>2.4</b>  | <b>2.6</b>  | <b>1.8</b>  | <b>1.2</b>  | <b>2.6</b>  | <b>1.4</b>  | <b>3.0</b>  | <b>2.6</b>  |

**Mapping Scale**

**3** – Strong Correlation, **2** – Moderate Correlation, **1** – Low Correlation