Annexure-III
SPL BOS, APS: 27.3.2019

<table>
<thead>
<tr>
<th>Section Designation</th>
<th>Year/Semester</th>
<th>Course No.</th>
<th>Course Title</th>
<th>Course Type</th>
<th>Total Marks</th>
<th>Contact Hours</th>
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<tr>
<td>Applied Sciences and Humanities</td>
<td>Diploma in Engineering</td>
<td>First Year (I-Semester)</td>
<td>BPH-101</td>
<td>Applied Physics-I</td>
<td>Theory</td>
<td>50</td>
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**Course Assessment Method**
1. Assignments, Oral Quizzes and Class Work-------- (5 Marks)
2. Mid-Semester Examination------------------------ (10 Marks) – 1 Hour
3. End-Semester Examination------------------------ (35 Marks) – 2 Hours

**Course Objectives**
1. To impart knowledge of basic Physics relevant to the Diploma in Engineering.
2. To explain how physics applies to phenomena in the world around them.
3. To enhance the thinking capabilities in line with the modern trends in engineering and technology.
4. To enthusiastically engage in learning what is known about our world.

**Course Outcomes**
After the completion of the course, the learner would be able to:
1. Demonstrate understanding of principles of physics in general, and mechanics, thermal physics, properties of matter, and optics in particular.
2. Apply this knowledge to analyze a variety of physical phenomena.
3. Recognize how and when physics methods and principles can help address problems in their major and then apply those methods and principles to solve them.
4. Solve diverse problems by using experimental, and/or theoretical methods and applying the relevant laws to the problem.
5. Develop a passion for participating in pushing the bounds of our knowledge even further.

**Topics to be covered**

**Unit-I**
Scalar and vector quantities, Type of vectors: zero vector, unit vector, equal vectors. Resolution of vectors, Vectors expressed in terms of position vectors, Multiplication of a vector by a scalar. Scalar and vector products of two vectors. Applications of scalar and vector products in mechanics and electrodynamics. Rigid body, rotational motion of a rigid body, moment of inertia and radius of gyration, kinetic energy of a rotating body, theorems of moment of inertia, calculation of moment of inertia of a thin uniform rod and a circular disc.


**Unit-II**
Molecular structure of material, elasticity, stress, strain, Hooke’s law, Young’s modulus of elasticity, Bulk modulus, modulus of rigidity, Poisson’s ratio, relation between elastic constants (without proof). Torsional rigidity. Determination of Young’s modulus of elasticity in laboratory.

**Unit-III**

**Text Books and/or Reference Books**
3. NCERT “Physics for class XI”

**Additional Learning Source**
https://www.khanacademy.org/science
Course Assessment Method

4. Assignments, Oral Quizzes and Class Work-------- (5 Marks)
5. Mid-Semester Examination------------------------ (10 Marks) – 1 Hour
6. End-Semester Examination------------------------ (35 Marks) – 2 Hours

Course Objectives

1. To impart knowledge of basic Physics relevant to the Diploma in Engineering.
2. To explain how physics applies to phenomena in the world around them.
3. To enhance the thinking capabilities in line with the modern trends in engineering and technology.
4. To enthusiastically engage in learning what is known about our world.

Course Outcomes

After the completion of the course, the learner would be able to:
1. Demonstrate understanding of principles of physics in general, and Electromagnetism, Condensed Matter Physics, Nuclear Physics, and Modern Physics in particular.
2. Apply this knowledge to analyze a variety of physical phenomena.
3. Recognize how and when physics methods and principles can help address problems in their major and then apply those methods and principles to solve them.
4. Solve diverse problems by using experimental, and/or theoretical methods and applying the relevant laws to the problem.
5. Develop a passion for participating in pushing the bounds of our knowledge even further.

Topics to be covered

Unit-I
Matter and charge, conservation of charges, quantization of charge, Coulomb law. Electric field \( \mathbf{E} \) (definition, units and representations by lines of forces), \( \mathbf{E} \) due to an isolated charge. Flux of electric field. Gauss’s law of electrostatics, derivation of Coulomb’s law from Gauss’s law. Determination of \( \mathbf{E} \) due to an infinite line of charges using Gauss’s law. Electric dipole. Definition of electric potentials \( V \) and its derivation at a point due to an isolated charge, general relation between \( \mathbf{E} \) and \( V \), electrical potential energy.

Electromagnetism. Definition of magnetic flux, flux of magnetic induction, Magnetic field \( \mathbf{B} \) and its unit. Bio-Savart Law, Magnetic field due to a straight current carrying conductor, Force between two parallel current carrying conductors, Definition of Ampere, Magnetic field of a flat circular coil. Ampere’s law (\( \oint \mathbf{B} \cdot d\mathbf{l} = \mu_0 I \)), Lorentz force \( \mathbf{F} = q(\mathbf{E} + \mathbf{v} \times \mathbf{B}) \). Magnetic moment of a magnet and Tangent law.

Unit-II
Rutherford atomic model, Failure of Rutherford atomic model. Bohr’s theory of hydrogen atom, expression for energy of electron in different states. Excitation and ionization energies and potentials. Structure of solids, crystalline and amorphous solids, idea of lattice, packing in crystals (calculations of packing factor for sc, bcc, fcc structures), conductors, insulators, semi-conductors, p and n type semi conductors, superconductors. Mechanism of production of X-rays, continuous and characteristics X-rays, Duane and Hunt rule. Applications of X-rays.

Unit-III

Text Books and/or Reference Books

6. NCERT “Physics for class XII”

Additional Learning Source

https://www.khanacademy.org/science