Academic Council

Item No:_____

Devrukh Shikshan Prasarak Mandal's

Nya. TATYASAHEB ATHALYE ARTS, Ved. S.R. SAPRE COMMERCE & Vid. DADASAHEB PITRE SCIENCE COLLEGE, DEVRUKH [AUTONOMOUS]

Syllabus for F.Y. B.Sc.
Program: B.Sc.
Course: Physics
Credit Based Semester and Grading System with the Effect from
Academic Year 2019-20

Syllabus for B.Sc. Physics (Theory &Practical)
As per credit based system
First Year B.Sc. 2019–2020.

The revised syllabus in Physics as per credit based system for the First Year B.Sc. Course will be implemented from the academic year **2019–2020.**

Preamble:

The systematic and planned curricula from these courses shall motivate and encourage learners to understand basic concepts of Physics.

Objectives:

- To develop analytical abilities towards real world problems
- To familiarize with current and recent scientific and technological developments
- To enrich knowledge through problem solving, hands on activities, study visits, projects etc.

Course code	Title	Credits
Semester I		
ASPUSPHY101	Classical Physics, Optics and Thermodynamics	2
ASPUSPHY 102	Modern Physics and Digital Electronics	2
ASPUSPHYP 1	Practical I	2
		Total= 06
Semester II		
ASPUSPHY 201	Mathematical Physics, Optics and Wave Mechanics	2
ASPUSPHY 202	Electronics, Modern Physics and Electrostatics	2
ASPUSPHYP 2	Practical II	2
		Total=06

Semester II: Paper I

Name of the Programme	Duration	Semester	Subject
B.Sc. in Physics	Six semesters	II	Physics
Course Code	Title	Credits	
ASPUSPHY 201	Mathematical Physics, Optics and Wave Mechanics	2	

Learning Outcomes:

On successful completion of this course students will be able to:

1. Understand the basic mathematical concepts and applications of them in physical situations.

2. Demonstrate quantitative problem solving skills in all the topics covered.

3. Understanding optics and their applications.

Unit I **15 lectures**

1. Vector Algebra :

Vectors, Scalars, Vector algebra, Laws of Vector algebra, Unit vector, Rectangular unit vectors, Components of a vector, Scalar fields, Vector fields, Problems based on Vector algebra.

Dot or Scalar product, Cross or Vector product, Commutative and Distributive Laws, Scalar Triple product, Vector Triple product (Omit proofs). Problems and applications based on Dot, Cross and Triple products.

2. Gradient, divergence and curl:

The • Þ operator, Definitions and physical significance of Gradient, Divergence and Curl; Distributive Laws for Gradient, Divergence and Curl (Omit proofs); Problems based on Gradient, Divergence and Curl.

Unit: II **15lectures**

1. Laser : Introduction, transition between Atomic energy states (without derivation), Principle of Laser, Properties of Laser, Helium–Neon Laser, Application of Laser, Holography

2) FibreOptics : Light propagation through Fibres, Fibre Geometry, Internal reflection, Numerical Aperture, Step-Index and Graded-Index Fibres, Applications of Fibres.

Unit:III **15lectures**

1. Superposition of Collinear Harmonic oscillations: Linearity and Superposition Principle. Superposition of two collinear oscillations having (1) equal frequencies and (2) different frequencies (Beats).
2. Superposition of two perpendicular Harmonic Oscillations: Graphical and Analytical Methods. Lissajous Figures with equal an unequal frequency and their uses
3. Wave Motion: Transverse waves on string, Travelling and standing waves on a string. Normal modes of a string, Group velocity, Phase velocity, Plane waves, Spherical waves, Wave intensity.

References:

1.MS:Murray R Spiegel, Schaum's outline of Theory and problems of Vector Analysis, Asian Student Edition
2. Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, Tata McGraw-Hill.
3. The Physics of Vibrations and Waves, H. J. Pain, 2013, John Wiley and Sons.
4. The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill.
5. Brijlal,Subramanyam and Avadhanulu A Textbook of Optics, 25th revised ed.(2012) S. Chand

Additional References:

1. BrijLal**,N. Subrahmanyam , JivanSeshan**, Mechanics and Electrodynamics, , (S. Chand) (Revised & Enlarged ED. 2005)
2. A K Ghatak, Chua, Mathematical Physics, 1995, Macmillan India Ltd.
3. Ken Riley**, Michael Hobson and Stephen Bence, Mathematical Methods for Physics and Engineering, Cambridge (Indian edition).**
4. H. K. Dass, Mathematical Physics, S. Chand & Co.
5. Jon Mathews & R. L. Walker, Mathematical Methods of Physics: W A Benjamin Inc.