

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 I: Paper II

Name of the Programme	Duration	Semester	Subject
B.Sc. in Physics	Six semesters	I	Physics
Course Code	Title	Credits	
ASPUSPHY102	Modern Physics and Digital Electronics	2for USPH102	

### Learning Outcomes:

After successful completion of this course students will be able to

1. Understand nuclear properties and nuclear behavior.
2. Understand the type isotopes and their applications.
3. Understand in detail basics of electronics and digital electronics
4. Demonstrate and understand the quantum mechanical concepts.
5. Demonstrate quantitative problem solving skills in all the topics covered.

### Unit I

**15lectures**

1. Structure of Nuclei: Basic properties of nuclei, Composition, Charge, Size, Rutherford's expt. for estimation of nuclear size, density of nucleus, Mass defect and Binding energy, Packing fraction, BE/A vs A plot, stability of nuclei (N Vs Z plot) and problems.
2. Radioactivity: Radioactive disintegration concept of natural and artificial radioactivity, Properties of  $\alpha$ ,  $\beta$ ,  $\gamma$ -rays, laws of radioactive decay, half-life, mean life (derivation not required), units of radioactivity, successive disintegration and equilibriums, radioisotopes. Numerical Problems.

### Unit II

**15 lectures**

1. DC power supply: Half wave rectifier, Full wave rectifier, Bridge rectifier, PIV and Ripple factor of full wave rectifier, Clipper and Clampers( Basic circuits only), Capacitor Filter. Zener diode as voltage stabilizer.
2. Digital electronics : Logic gates(Review), NAND and NOR as universal building blocks. EXOR gate: logic expression, logic symbol, truth table, Implementation using basic gates and its applications, Boolean algebra, Boolean theorems. De-Morgan theorems, Half adder and Full adder
3. Transistors: Basic consturctions, action, configuration CE and CB mode

### **Unit III**

**15 lectures**

1. Photoelectric effect, Black Body (definition), black body spectrum, Wien's displacement law
2. X-Rays production and properties. Continuous and characteristic X-Ray spectra, X-Ray Diffraction, Bragg's Law, Applications of X-Rays.
3. Compton Effect, Pair production,

#### References:

1. Kaplan: Nuclear Physics, Irving Kaplan, 2nd Ed. Narosa Publishing House
2. SBP: Dr. S. B. Patel, Nuclear Physics Reprint 2009, New Age International
3. BSS: N Subrahmanyam, Brijlal and Seshan, Atomic and Nuclear Physics Revised Ed. Reprint 2012, S. Chand
4. Arthur Beiser, Perspectives of Modern Physics : Tata McGraw Hill

#### Additional References:

1. S N Ghosal, Atomic Physics S Chand
2. S N Ghosal, Nuclear Physics 2nd ed. S Chand