**SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020**

**For candidates admitted from academic year 2013-14 onwards Under New CBCS**

Programme : B. Sc Physics Subject Code: 6CT11

Course Title : **NUCLEAR PHYSICS**

Core : 11

Year : III Semester: VI

5 Hours/Week 5 Credits

**UNIT – I: RADIO ACTIVITY**

Radio activity - Fundamental laws of Radio activity - Laws of Radioactive disintegration - Half life - Mean life - Laws of Successive disintegration – Radioactive dating – The age of earth – radioactive series – Alpha emission – properties of alpha particles – alpha spectrum – Geiger Nuttal law – Beta decay – Properties of Beta decay – Gamma ray spectrum – Determination of the wavelength of gamma rays.

**UNIT – II: NUCLEAR ACCELERATORS AND DETECTORS**

Linear accelerator (LINAC) – Betatron – Synchroton – Proton Synchroton – Ionization chamber – GM counter – Wilson’s cloud chamber – Bubble chamber – Spark chamber - Scintillation counter – cerenkov counter

**UNIT- III: NUCLEAR PROPERTIES AND MODELS**

Classification of nuclei - General properties of nucleus – Binding energy – Nuclear stability - Theories of nuclear composition – Nuclear forces - Proton-electron hypothesis – Proton-neutron hypothesis – Models of nuclear structure – The Liquid drop model – The Shell model – The Collective model.

**UNIT – IV: NUCLEAR REACTIONS**

The Discovery of artificial transmutation – The Q-value equation for a Nuclear reaction – Types of nuclear reactions – Energy balance in nuclear reactions and the Q-value – Threshold energy of an endoergic reaction – Nuclear fission – critical mass – chain reaction – Nuclear fusion – source of stellar energy - Transuranic elements.

**UNIT- V: COSMIC RAYS AND ELEMENTARY PARTICLES**

Discovery of cosmic rays – latitude effect – Azimuth effect – Altitude effect – Primary and Secondary cosmic rays – cosmic ray showers – Discovery of positron – the measons – Van allen belts.

Elementary Particles: Classification – Particles and anti particles – the fundamental interactions.

|  |  |
| --- | --- |
| **TEXT BOOK:** | **REFERENCE BOOK:** |
| 1.Author : Murugesan. R  Book Name: Modern physics  Publication: S.Chand & co.,  Year: 2007  Edition: 13th  UNIT CHAPTER  I 31  II 29,30  III 27,28  IV 33,35  V 37,38 | 1.Author : Pandiya and Yadav ,  Book Name: Elements of Nuclear Physics  Publication: Kedar Nath , Ram Nath, Meerut  Year: 1997  Edition:7th  2. Author : D. C. Tayal,  Book Name: Nuclear Physics  Publication: Himalaya Publishing ,  Year: 2003  Edition: 9th |