

In.M.Sc. Applied Physics, 5 years

6th Semester

FPYC - 604: Fundamentals of Nuclear & Particle Physics	3 - 0 - 0	3
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UNIT –I

General nuclear properties:

Nuclear structure, Nuclear forces, Nuclear stability, Nuclear radius, mass, binding energy, mass defect, packing fraction, Nuclear spin, angular momentum and parity, Nuclear electric quadrupole moment.

UNIT – II

Nuclear models:

Liquid drop model, semi empirical mass formula, Nuclear shell models, predictions of Nuclear shell model, collective model.

UNIT - III

Nuclear Reactions:

Conservation laws in Nuclear reactions, energetic of Nuclear reaction: Q value, Nuclear reaction cross section, types of Nuclear reactions, mechanism of Nuclear reactions.

UNIT - IV

Nuclear Energy and Nuclear decay:

Nuclear fission, energy released in fission, Nuclear chain reaction, Nuclear reactor, Nuclear fusion, properties of α , β , γ rays. Rutherford and Soddy theory of radioactive disintegration mean life, half life period, decay constant. α decay, β decay, γ decay.

UNIT - V

Particle physics:

The Standard model of particle physics, particle classification, fermions and bosons, lepton, quark Flavours, electromagnetic, weak and strong processes, Spin and parity, Isospin, strangeness, hypercharge, and baryon number, lepton number, Gell - Mann - Nishijima Scheme, Quarks in hadrons: Meson and baryon octet, Elementary ideas of SU (3) symmetry, charmonium, charmed mesons and B mesons, Quark spin and colour (15)

BOOKS

1. Nuclear physics, Satyaprakash.
2. Nuclear and Particle Physics, Mital, Verma, Gupta.
3. Nuclear Physics, Dr.S.N.GHOSAL.
4. Atomic and Nuclear physics, Shatendra Sharma.
5. Nuclear and particle physics, D C Toyal