

PHY7211: ADVANCED NUCLEAR PHYSICS

1. **Course Name:** Advanced Nuclear Physics

2. **Course Code:** PHY7211

3. **Credit Units:** 3

4. **Course Description:**

This course deals with nuclear reactions and elementary particle physics.

5. **Course Objectives:**

At the end of the course, the students should be able to:

- Discuss nuclear models in relation to stability of atoms.
- Determine conservation of physical quantities.
- Use elementary particle physics in nuclear analysis.

6. **Course Outline:**

Content	Hours
Review of fundamentals of Nuclear Physics- the nuclear atom (Rutherford's model and the Bohr's modifications).	7
Nuclear structure & models; Nuclear stability; Nuclear moment, parity and statistics.	8
Nuclear reactions (scattering, collisions)- conservation of physical quantities, Q-value determination, cross-sections, the Breit –Wigner formula.	8
Excited states of nuclei-nuclear decays (alpha, beta and gamma) and spontaneous fission;	8
Elementary particle physics	9
Total	45

7. **Mode of Delivery:**

This course will consist of lecture sessions and there will also be data analysis using theories learnt.

8. References:

1. K.S. Krane, Introductory Nuclear Physics. John Wiley. (Textbook)
2. S.W.C. Williams. Nuclear and Particle Physics. Oxford Science Publications
3. H Enge. Introduction to Nuclear Physics. Addison – Wesley
4. Cottingham. Introduction to Nuclear Physics. Cambridge Univ. Press.