PPH435 RADIATION TECHNOLOGY

L	T	P	Cr
3	1	0	3.5

Course Objectives: To impart knowledge in depth about nuclear radiation, its detection, nuclear spectrometry and related aspects

Interactions of Nuclear Radiations: Origin and energy spectra, Brief discussion of interactions of gamma rays, Electron and heavy charged particles with matter, Different types of neutron sources, Interaction of neutron with matter, Neutron detectors.

Nuclear Radiation Detector: Gas filled detectors; Ionization chamber, Proportional counter and GM counter, Scintillation detector, semiconductor detector, Radiation exposure & monitoring.

Nuclear Spectrometry and Applications: Measurement of nuclear energy levels, spins, parities, moments, internal conversion coefficients, Angular correlation, Perturbed angular correlation, measurement of g-factor and hyperfine fields.

Mossbauer Effect: Positron annihilation, particle and photon induced x-ray emission, Elemental concentration analysis by charged particles and neutron activation analysis, Diagnostic nuclear medicine, Therapeutic nuclear medicine.

Safety Aspects: Radiation dose unit, Safety limits, Dose calculations, Design consideration of simple shields.

Course learning outcomes: Students will have achieved the ability to:

1. describe nuclear radiation interactions.
2. explain the working of various radiation detectors.
3. explain various aspects of nuclear spectrometry
4. explain the recoilless nuclear resonance fluorescence
5. identify the concepts of radiation doses and related safety measures

Recommended Books:

1. *Knoll G. F., Radiation Detection and Measurement, John Wiley & Sons, (2010).*
2. *Singuru R. M., Introduction to experimental nuclear physics, Wiley Eastern Publications, (1987).*
3. *Muraleedhara V. Nuclear radiation Detection, measurement and Analysis, Narosa Publishing House, (2009).*

Evaluation Scheme:

Sr. No.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	45
3	Sessionals (May include assignments/quizzes)	25