

**CH-426 Nuclear Chemistry**

**Credit Hours:** 3-0

**Prerequisite:** Nil

**Course Objectives**

1. Students will acquire knowledge about nuclear chemistry, nuclear reactions, tracers and their applications.

**Course Contents**

2. Composition of nucleus, nuclear stability, Neutron-to-proton ratio. Mass defect, Binding energy of a nucleus and its calculation, Binding energy per nucleon, radioactive series, radioactive disintegration, Laws of radioactive disintegration, radioactive equilibrium, Accelerators, advantages and disadvantages of accelerators, nuclear reactions, nuclear spin and parity, capture reactions, particle-particle reactions, Spallation reactions, Endo ergic and exo ergic nuclear reactions, Bohr s theory of nuclear reactions, Nuclear fission, Bohr yield curve, nuclear fission of U-235 by liquid drop model, Chain reaction, Fission Reaction, Nuclear atomic reactor, Nuclear power plant, Fusion reaction, solar energy, Proton-proton cycle, carbon-nitrogen cycle, hydrogen bomb, nuclear reactor, tracer in industry and chemistry and applications of nuclear chemistry.

**Course Outcomes**

3. Students will know about the nuclear reactions, accelerators, tracers, nuclear reactor and applications of the nuclear chemistry. They will have learnt about nuclear fission and fusion reactions, and how nuclear chemistry will be helpful for daily life.

**Recommended Books**

1. Friedlander, G., Kennedy, J. W., Miller, J. M. and Maciugas, E. S., Nuclear and Radiochemistry, 3rd ed., John-Wiley & Sons, Inc., (1981).
2. Choppin, G. R., Rydberg, J., Liljenzin, J., Radiochemistry and Nuclear Chemistry, 3rd ed., Butterworth-Heinemann Ltd., (2002).
3. Arnikar, H. J., Essentials of Nuclear Chemistry, 4th ed., New Age International Pvt. Ltd. Publishers, (1996).

4. Naqvi, I. I. and Farrukh, M. A., Radiotracers in Chemical Applications VDM Verlag Dr.Müller, Germany, (2010).
5. Loveland,W., Morrissey, D. J. and Seaborg, J. T., Modern Nuclear Chemistry, John Wileyand Sons, Inc.,(2006)