

1. Subject Code: **EP-421** Course Title: **Principles of Nuclear Engineering**  
 2. Contact Hours : L : 3 T : 1 P : 0  
 3. Examination Duration (Hrs.) : Theory : 3 Practical : 0  
 4. Relative Weight : CWS : 25 PRS : 0 MTE : 25 ETE : 50 PRE : 0  
 5. Credits : 4  
 6. Semester : Odd  
 7. Subject Area : DEC-6  
 8. Pre-requisite: NIL  
 9. Objective: To impart the knowledge on Nuclear Physics, Nuclear Reactions, Nuclear Reactors and safety.  
 10. Details of Course :

S.No.	Contents	Contact Hours
1.	<b>Nuclear Physics</b> - Nuclear model of the atom - Equivalence of mass and energy - Binding - Radio activity - Half life - Neutron interactions - Cross sections.  <b>Nuclear Reactions and Reactor Materials</b> - Mechanism of nuclear fission and fusion - Radio activity - Chain reactions - Critical mass and composition - Nuclear fuel cycles and its characteristics - Uranium production and purification - Zirconium, thorium, beryllium.	15
2.	<b>Reprocessing</b> - Nuclear fuel cycles - spent fuel characteristics - Role of solvent extraction in reprocessing - Solvent extraction equipment.  <b>Nuclear Reactors</b> - Reactors - Types of fast breeding reactors - Design and construction of fast breeding reactors - heat transfer techniques in nuclear reactors - reactor shielding.	15
3.	<b>Safety, Disposal and Proliferation</b> - Nuclear plant safety- Safety systems - Changes and consequences of an accident - Criteria for safety - Nuclear waste - Type of waste and its disposal - Radiation hazards and their prevention - Weapons proliferation.	12
	<b>Total</b>	<b>42</b>

### 11. Suggested Books

### DRAFT SCHEME OF STUDY

S.No.	Name of Books/ Authors	Year of Publication/ Reprint
1.	Fundamentals of Nuclear Engineering by Thomas J.Cannoly/John Wiley	1978
2.	Introduction to Nuclear Power by Collier J.G., and G.F.Hewitt/Hemisphere Publishing, New York	1987
3.	Introduction to Nuclear Engineering by Lamarsh U.R/Second Edition, Addison Wesley M.A	1983
4.	Radioactive Waste - Politics, Technology and Risk by Lipschutz R.D. Ballinger, Cambridge. M.A.	1980