

		ion/ Reprint
1.	Robert J.Schilling, Fundamentals of Robotics – Analysis & Control (Chapters 1 to 9 – UNIT I, II, III, V) Prentice Hall of India Pvt. Ltd.	2002
2.	Saeed B.Niku, Introduction to Robotics – Analysis, Systems, Applications (Chapters 6 & 7 – UNIT IV) /Prentice Hall of India Pvt. Ltd.	2003

1. Subject Code: **EP-412** Course Title:**Nuclear Materials for Engineering Applications**
 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 : Even
 7. Subject Area : DEC-7
 8. Pre-requisite: Fundamentals of Nuclear Physics
 9. Objective: To impart the knowledge on Nuclear materials, Mechanical properties, Dislocations and radiation effects.
 10. Details of Course :

S.No.	Contents	Contact Hours
1.	Overview of Nuclear Systems- Various types [LWR, PHWR, GCR, FBR, Fusion], Materials – Selection, Nature of Materials, Crystal Structure, Imperfections, Diffusion in Solids, Radiation Damage, Binary Elastic Collisions, Displacements due to PKA.	13
2.	Properties of Materials, Mechanical Properties, Fracture, Fatigue and Creep, SCC (& corrosion), Dislocation Theory, Types, Stress Fields and Strain Energy, Forces on Dislocations, Dislocation Interactions, Dislocation Sources and Pile-ups, Hardening: Dislocation, Precipitation, Grain-boundary, Solution, Strain.	15
3.	Radiation Effects, Microstructural Changes, Friction and Source Hardening, Fracture and DBTT, Embrittlement and Fracture, Reactor Materials, LWR Core Materials Radiation Growth – Zircaloys, Void Swelling (Stainless Steels), Radiation Induced vs Radiation Enhanced Creep, Pressure Boundary Materials, Fusion Materials	14
Total		42

11. Suggested Books

S.No.	Name of Books/Authors DRAFT SCHEME OF STUDY (Year 2,3,4 B.Tech Program)	Year of Publication/ Reprint
1.	Fundamental Aspects of Nuclear Reactor Elements by D.R. Olander NTIS, ERDA	1975
2.	Introduction to Dislocations by D.Hull and D.J. Bacon Pergamon Press	1965
3.	Nuclear Reactor Materials by C.O. Smith/Addison-Wesley	1967
4.	Materials Science and Engineering by W.D. Callister/Wiley	1991
5.	Fundamentals of Radiation Materials Science by G.S. Was/Springer	2007