

Introduction to Nuclear Engineering - Web course

COURSE OUTLINE

Nuclear Engineering is generally taught as an elective course in the curriculum of IIT Bombay. Recently several post graduate nuclear engineering programs have been initiated at many places in India. This course can become a foundation course that gives a complete overview of the various aspects involved with nuclear power reactors. A good blend of mathematical treatment and elaboration of application principles is intended to be brought out. Several problems have been formulated to illustrate the applications.

Contents: Introduction to nuclear engineering, Elements of nuclear power reactor system, A short review of nuclear physics, Basic concepts in neutron reactions, Neutron moderation and diffusion, Nuclear reactor theory, Nuclear reactor dynamics and control, Nuclear reactor thermal-hydraulics, Nuclear instrumentation, Health physics, Radiation shielding, Power reactors, Nuclear reactor safety and licensing, Principles of costing.

COURSE DETAIL

Sl. No	Topic	Hours
1.	Introduction – World Energy Sources, Indian Power Scenario, Nuclear Power Scenario in the World, Nuclear Power Scenario in India, Scope of the Present Course.	1
2.	Elements of Nuclear Power Stations.	2
3.	Review of Nuclear Physics.	3
4.	Basic Concepts in Neutron Reactions.	3
5.	Neutron Moderation and Diffusion.	3
6.	Nuclear Reactor Theory.	5
7.	Nuclear Reactor Dynamics and Control.	4
8.	Nuclear Reactor Thermal-Hydraulics.	6
9.	Nuclear Instrumentation.	2
10.	Health Physics.	2



NP-TEL

NPTEL

<http://nptel.iitm.ac.in>

Mechanical Engineering

Pre-requisites:

- Exposure to undergraduate mathematics (calculus and differential equations)

Coordinators:

Prof. Kannan.N.Iyer
Department of Mechanical Engineering IIT Bombay

11.	Radiation Shielding.	2
12.	Nuclear Reactor Safety and licensing.	2
13.	Power Reactors.	3
14.	Principles of Costing.	3

References:

1. Lamarsh, J.R. and Baratta, A.J., "Introduction to Nuclear Engineering", 3rd Edition, Prentice Hall, 2001.
2. Duderstadt, J.J. and Hamilton, L.J., "Nuclear Reactor Analysis", John Wiley and Sons, 1976.
3. Glasstone, S. and Sesonske, A, "Nuclear Reactor Engineering Vol-1: Reactor Design Basics", 4th Edition, Elsevier, 1996.
4. Glasstone, S. and Sesonske, A, "Nuclear Reactor Engineering Vol-2: Reactor System Engineering", 4th Edition, Elsevier, 1996.