

- Nuclear fuel
- Steady heat conduction: temperature distribution
- Transient heat conduction: lumped parameter model, fuel response during LOCA
- Reactor fuel design limits: CHF, LOCA

7. Power conversion:

First and second laws of thermodynamics
Carnot cycle, Rankine cycle
Thermal and frictional irreversible processes
Thermodynamic efficiency of LWRs
Balance Of Plant (BOP) design

8. Thermodynamic design of reactor components:

Dry containments: PWRs
Pressure suppression pool system: BWRs
PWR pressurizer
SBWR vessel

9. Thermal-hydraulics of LWRs:

Pressure drop for one and two phase flows
Heat transfer and critical heat flux

10. Nuclear reactor safety:

Power Excursions (Chernobyl)
Loss of Coolant Accidents (TMI)
Emergency Core Cooling System (ECCS)
Advanced Water Reactor Design
Accidents –TMI and Chernobyl

11. Additional Topics

PRA
Licensing
Decommissioning