

Principal characteristics of power reactors (power cycles, coolant systems, reactor cores, fuel assemblies, reactor types, principles of reactor thermal design and performance). Heat generation and distribution in the core of nuclear reactors. Heat removal from the core. Thermal-hydraulic response and feedback mechanisms. Inadequate heat removal and associated phenomena. Reactor emergency cooling systems. Boiling on heated surfaces, heterogeneous nucleation, bubble generation and departure, wall boiling models. Flow boiling analysis, mixture models, two-fluid models. Aerosol flows and dynamics in reactor containment. Basic principles of nuclear safety. Laboratory exercise.