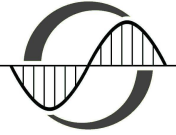




UNIVERSITÀ
degli STUDI
di CATANIA



DIPARTIMENTO DI FISICA E ASTRONOMIA
“ETTORE MAJORANA”

DOTTORATO DI RICERCA IN FISICA
ANNO ACCADEMICO 2021/2022

TITLE

Introduction to reactor kinetics

2 CFU

Teaching staff

Nome Cognome: Domiziano Mostacci

Email: domiziano.mostacci@unibo.it

Office: ...

Telephone: +39 051-208.77.19

Reception hours: by appointment (send e-mail)

Program of the course:

Basics of reactor kinetics: relation to reactor statics; prompt and delayed neutrons, characteristics times; controllability of nuclear reactors; effective multiplication factor.

The "point model": simplifying assumptions and derivation of point kinetics equations; constant reactivity; *Inhour* equation; simplified models (small, large reactivity, 2 groups of delayed neutrons).
Overview of space kinetics; adjoint flux.

Intrinsic reactivity change: reactivity temperature coefficients; reactivity feedback models; power excursions; small oscillations around equilibrium power.

Stability: linear stability of nuclear reactors.

Prerequisites: working knowledge of macroscopic cross sections and of the diffusion equation.

Bibliography:

David Hetrick: Dynamics of Nuclear Reactors, American Nuclear Society, 1993

Jeffrey Lewins: Nuclear Reactor Kinetics and Control, Pergamon Press, 1978

Robert Keepin: Physics of Nuclear Kinetics, Addison Wesley, 1965