

# University of Pretoria Yearbook 2019

## Nuclear engineering 420 (MKI 420)

**Qualification** Undergraduate

**Faculty** [Faculty of Engineering, Built Environment and Information Technology](#)

**Module credits** 16.00

**Programmes** [BEng Mechanical Engineering](#)  
[BEng Mechanical Engineering Engage](#)

**Prerequisites** No prerequisites.

**Contact time** 3 lectures per week, 1 discussion class per week, 1 practical per week

**Language of tuition** Module is presented in English

**Department** Mechanical and Aeronautical Engineering

**Period of presentation** Semester 2

### Module content

Basic nuclear physics: definitions and concepts (nuclear reaction, binding energy, cross-sections, moderator, reflector, etc.). Basic reactor physics: diffusion equation and boundary equations, group-diffusion methods, reactor kinetics. Reactor types: pressurised water reactors, boiling water reactors, gas-cooled reactors. Nuclear fuel cycle (including waste disposal). Reactor materials: fuels, moderators, coolants, reflectors, structures, systems or components. Reactor safety: biological effects of radiation, radiation shielding, principles of nuclear plant safety, atmospheric dispersion of radioactive contamination, event-tree and fault-tree analyses of reactor systems.

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