

University of Pretoria Yearbook 2025

Power system analysis 410 (EKK 410)

Qualification Undergraduate

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

Module credits 16.00

NQF Level 08

Programmes [BEng in Electrical Engineering 4-year programme](#)

[BEng in Electrical Engineering 5-year programme](#)

Prerequisites EKK 320 GS and admission into relevant programme.

Contact time 3 lectures per week, 9 hours practical per semester, 1 tutorial per week

Language of tuition Module is presented in English

Department Electrical, Electronic and Computer Engineering

Period of presentation Semester 1

Module content

This second module on power systems covers power flow (bus admittance matrix, bus impedance matrix, Gauss-Seidel and Newton Raphson methods), fault analysis (balanced fault analysis, symmetrical components, unbalanced fault analysis), power system protection (definite time, inverse-definite-minimum-time (IDMT), introduction to over-current and earth fault protection), sizing of protection devices, power system control (frequency control and voltage control), economical operation of power systems (optimal incremental cost of generation and penalty factor) and renewable energy (solar power, current and voltage curves, and maximum power point tracking (MPPT)).

General Academic Regulations and Student Rules

The [General Academic Regulations \(G Regulations\)](#) and [General Student Rules](#) apply to all faculties and registered students of the University, as well as all prospective students who have accepted an offer of a place at the University of Pretoria. On registering for a programme, the student bears the responsibility of ensuring that they familiarise themselves with the General Academic Regulations applicable to their registration, as well as the relevant faculty-specific and programme-specific regulations and information as stipulated in the relevant yearbook. Ignorance concerning these regulations will not be accepted as an excuse for any transgression, or basis for an exception to any of the aforementioned regulations. The G Regulations are updated annually and may be amended after the publication of this information.

Regulations, degree requirements and information

The faculty regulations, information on and requirements for the degrees published here are subject to change

and may be amended after the publication of this information.

University of Pretoria Programme Qualification Mix (PQM) verification project

The higher education sector has undergone an extensive alignment to the Higher Education Qualification Sub-Framework (HEQSF) across all institutions in South Africa. In order to comply with the HEQSF, all institutions are legally required to participate in a national initiative led by regulatory bodies such as the Department of Higher Education and Training (DHET), the Council on Higher Education (CHE), and the South African Qualifications Authority (SAQA). The University of Pretoria is presently engaged in an ongoing effort to align its qualifications and programmes with the HEQSF criteria. Current and prospective students should take note that changes to UP qualification and programme names, may occur as a result of the HEQSF initiative. Students are advised to contact their faculties if they have any questions.