

University of Pretoria Yearbook 2023

Systems engineering 780 (BSS 780)

Qualification	Postgraduate
Faculty	Faculty of Engineering, Built Environment and Information Technology
Module credits	32.00
NQF Level	08
Prerequisites	No prerequisites.
Contact time	36 contact hours per semester
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Systems engineering is a multidisciplinary engineering profession that focuses on the conception, design and development, integration, architecture and management of complex systems over their life cycle. It does this by creating, executing and coordinating an interactive platform for all stakeholders viz: clients, consumers, design team/technical crew and management team amongst others. Complexity of systems hinges on diversity, multiplicity and intricacy of intra and interconnectivity of system entities. This module will commence briefly with some introductory knowledge prior to diverting to intermediate and advanced concepts with specific attention given to case studies, development and application of models and emergence of research opportunities.

Case-based systems engineering management:

- Concept design: identifying requirements; exploring concepts; evaluating concepts; defining concepts.
- Engineering design: deployment of CORE9 for systems architecting and integrating.
- Post-development considerations: production systems design; operations and logistics in a systems life cycle.

Systems engineering analysis:

- Modelling of case study dynamical systems
- Risk modelling throughout a system's life cycle
- Adaptive and predictive behaviour of systems
- Optimal network selection and complexity issues in system dynamics.

Complexity of interaction in systems:

- Internet of things (IoT)
- Relationship of things (RoT)
- Interaction dynamics
- Social engineering
- System's performance-failure dynamics
- Human-machine systems interaction and AI systems.

Regulations and rules

The regulations and rules for the degrees published here are subject to change and may be amended after the publication of this information.

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.

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 (HEQF) 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.