University of Pretoria Yearbook 2024

Manufacturing planning systems 782 (BPZ 782)

Qualification	Postgraduate
Faculty	Faculty of Engineering, Built Environment and Information Technology
Module credits	32.00
NQF Level	08
Programmes	BEngHons *Industrial Engineering*
	BScHons (Applied Science) *Industrial Systems*
Prerequisites	Operations Management and Operations Research (advisable but not mandatorily required)
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

1. Review of the general framework for the planning and control of manufacturing and service systems
2. Deterministic Lot Sizing Models of Inventory Management
   a. Basic single item EOQ/EPQ, shortage, all unit and marginal discount models
   b. Discrete time and quantity models and their solution approaches
   c. Multi item models including shared resource with constraints, common cycle, basic cycle, power of two and Economic Lot Scheduling models
   d. Multi echelon and foundational supply chain inventory models
   e. Models with building blocks for contemporary research areas in deterministic inventory models: deterioration, non-linear demand rate, non-linear production rate, growing items, demand-, time-, stock and price- dependent models and other emerging model block areas
3. Finite Job Scheduling Models and their Solution Techniques
   a. Scheduling notation, dispatch rules and their solution characteristics
   b. Flow shop models, job shop models, selected variants and their solution algorithms
   c. Formulation of basic mathematical programming models for scheduling problems
   d. Solution techniques for scheduling LP models and analysis of solution heuristics: review of general mathematical proof techniques; growth functions and asymptotic bounds of solution algorithms; NPcompleteness, orst- and average-case behaviour of algorithms and illustration with some basic problems; analysis of selected exact scheduling solution algorithms; discussion of selected heuristic and meta heuristic alternatives and their time complexity; design and analysis of hybrid-solutions for NP-hard scheduling problems; scheduling solution/result analysis
4. Structural Models of Supply Chain Factors and their Relationships
   a. Review of descriptive statistics, statistical inference, estimation and hypothesis testing principles
   b. Multivariate statistical problems and foundational regression analysis
   c. Foundations of Structural Equation Modelling (SEM) and its representations
   d. Foundational Principal Component Analysis (PCA) and Factor Analysis (FA)
   e. Introduction to Covariance Based (CB) and Partial Least Square (PLS) SEM approaches
   f. Procedure for implementing PLS SEM and interpretation of solution output
   g. Cases of Supply Chain SEM models and their analysis with PLS SEM using Smart PLS

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.