University of Pretoria Yearbook 2022

Optimum design 420 (MOO 420)

Qualification	Undergraduate
Faculty	Faculty of Engineering, Built Environment and Information Technology
Module credits	16.00
NQF Level	08
Programmes	BEng (Mechanical Engineering)
	BEng (Mechanical Engineering) ENGAGE
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Elements of optimisation, optimization problem identification and classification, optimisation formulations for physics-based models, model identification, data-driven models, optimisation background mathematics, loss functions, regularisation, constrained and unconstrained real-parameter optimisation. Optimisation solution philosophies: minimisation, optimality criteria, non-negative gradient projection points. Optimisation algorithms: gradient-based, derivative-free, gradient-only. Compute using a high-level programming language.