University of Pretoria Yearbook 2019

Thermal and fluid machines 420 (MTV 420)

Qualification	Undergraduate
Faculty	Faculty of Engineering, Built Environment and Information Technology
Module credits	16.00
Programmes	BEng Mechanical Engineering
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Prerequisites	MTV 310, (MTX 311)
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 1 or Semester 2

Module content

Rotary Turbomachines: Fundamental principles of fluid dynamics and thermodynamics applicable to the rotating turbomachinery components i.e. gas and steam turbines, compressors, hydraulic turbines, and pumps. Classifications and basic components in turbomachines. Euler equations for turbines, compressors, and pumps. Estimations of work and power, and thermal energy losses and efficiencies in turbomachinery components. Basic theory for wind turbine power and Betz's method.
Power Cycles: Fundamental principles of fluid dynamics and thermodynamics applicable to the steam and gas turbine power cycles, internal combustion engine cycles, and reciprocating compressor cycles. Basic components in steam and gas turbine power plants. Power estimations in conventional power cycles, combined cycles, binary cycles, cogeneration plants, and organic Rankine cycles. Thermal energy losses and efficiencies in power cycles. Air-flow duct network and fan selection curves for duct system