University of Pretoria Yearbook 2016

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
	BEng Mechanical Engineering Engage
Prerequisites	MTV 310, (MTX 311)
Contact time	1 practical per week, 3 lectures per week
Language of tuition	English
Academic organisation	Mechanical and Aeronautical En
Period of presentation	Semester 1 or Semester 2

Module content

(i) Thermodynamics: Introductory thermodynamics with reference to power cycles. Energy systems and views, transformation of energy. Nuclear power.
(ii) Steam generators: Work fluids, fire-tube boilers, water-pipe boilers, heat exchange boilers, power nuclear reactors. Feedwater. Industrial uses of steam.
(iii) Combustion technique: Types of fuels – oil, coal, gas; their combustion methods. Ash and its properties. Air pollution.
(iv) Steam engines: Turbo machine theory; types of turbines – properties and uses. Blades, rotors, sealing, balancing. Parallel operation of turbo generators in a power network.
(v) Internal combustion engines: Spark ignition and compression ignition. Applications.
(i) Classification: kinetic and positive displacement pumps and compressors. Incompressible and compressible flow. Pump, compressor and fan theory.
(ii) Equipment: functioning, properties, characteristics and use of well-known pumps and compressors.
(iii) Applications: specific speed, cavitation, water hammer. Pump connections: pipe system connections. Pumping of solids. Air-pressure systems.
(iv) Turbo machines: turbo machine theory. Impulse and reaction turbines. Analytical analysis. Characteristics: applications; integration of hydroturbines with power systems.