

# University of Pretoria Yearbook 2018

## Thermal and fluid machines 420 (MTV 420)

<b>Qualification</b>	Undergraduate
<b>Faculty</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Module credits</b>	16.00
<b>Programmes</b>	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
<b>Prerequisites</b>	MTV 310, (MTX 311)
<b>Contact time</b>	1 practical per week, 3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Mechanical and Aeronautical Engineering
<b>Period of presentation</b>	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.

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