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# University of Pretoria Yearbook 2021

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## Thermal and fluid machines 420 (MTV 420)

<b>Qualification</b>	Undergraduate
<b>Faculty</b>	<a href="#">Faculty of Engineering, Built Environment and Information Technology</a>
<b>Module credits</b>	16.00
<b>NQF Level</b>	08
<b>Programmes</b>	<a href="#">BEng Mechanical Engineering</a> <a href="#">BEng Mechanical Engineering ENGAGE</a>
<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

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

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