# University of Pretoria Yearbook 2016

# Thermodynamics 311 (MTX 311)

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| **Qualification** | Undergraduate |
| **Faculty** | Faculty of Engineering, Built Environment and Information Technology |
| **Module credits** | 16.00 |
| **Programmes** | BEng Mechanical Engineering |
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| **Prerequisites** | MTX 221 |
| **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 |

**Module content**

Third Law of Thermodynamics, availability and useful work. Ideal and real gases. Compressible flow: conservation laws, characteristics of compressible flow, normal shock waves, nozzles and diffusers. Power cycles: classification, internal combustion engine cycles (Otto and Diesel), vapour power cycles (Brayton, Rankine), refrigeration cycles (Reversed Carnot cycle, Reversed Brayton cycle, ammonia absorption cycle) and heat pump cycles. Mixtures of gases: perfect gas mixture, water/air mixtures and processes (psychrometry). Heating and cooling load calculations, basic refrigeration and air-conditioning systems. Combustion: fuels, air-fuel ratios, heat of formation, combustion in internal combustion engines.