

# University of Pretoria Yearbook 2016

## Strength of materials 210 (SWK 210)

<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 Chemical Engineering BEng Chemical Engineering Engage BEng Civil Engineering BEng Civil Engineering Engage BEng Mining Engineering BEng Mining Engineering Engage BSc Chemistry BSc Environmental and Engineering Geology BSc Environmental Sciences BSc Geoinformatics
<b>Service modules</b>	Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	SWK 122, WTW 164/WTW 124
<b>Contact time</b>	4 lectures per week, 2 tutorials per week
<b>Language of tuition</b>	Both Afr and Eng
<b>Academic organisation</b>	Civil Eng
<b>Period of presentation</b>	Semester 1

### Module content

Stresses, strains and the mechanical properties of materials: Normal stress and shear stress, tension and compression, equilibrium in shear, factor of safety, design, shear strain, stress/strain diagram, Hooke's Law, Poisson's Ratio and the shear stress/strain diagram. Axial loads: Elastic deformation, displacements, statically determinate and indeterminate structures and thermal effects. Torsion: Torsion of circular bars and power transmission bending of straight members and composite beams. Transverse shear: Shear in straight members and shear flow. Combined loads: Thin walled pressure vessels and stresses as a result of combined loads. Stress transformation: Plane stress transformation, principle stresses, maximum values and stress variation in prismatic beams. Strain transformation: Plane strain transformation, principle strains, maximum values, strain gauges and rosettes and the relationship between E, G and  $\nu$ . Design of beams from section characteristics. Deflection of beams: The elastic curve, integration method, Macaulay's method and superposition.



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