



# University of Pretoria Yearbook 2019

## 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 Engineering and Environmental Geology BSc Geology
<b>Service modules</b>	Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	Faculty of Engineering, Built Environment and Information Technology: SWK 122 and WTW 164 OR SWK 122, WTW 161 and WTW 168. Faculty of Natural and Agricultural Sciences: SWK 122 and WTW 124 OR SWK 122, WTW 126 and WTW 128.
<b>Contact time</b>	2 tutorials per week, 4 lectures per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Civil Engineering
<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.



The information published here is subject to change and may be amended after the publication of this information. The [General Regulations \(G Regulations\)](#) apply to all faculties of the University of Pretoria. It is expected of students to familiarise themselves well with these regulations as well as with the information contained in the [General Rules](#) section. Ignorance concerning these regulations and rules will not be accepted as an excuse for any transgression.