



# University of Pretoria Yearbook 2018

## Strength of materials 210 (SWK 210)

**Qualification** Undergraduate

**Faculty** [Faculty of Engineering, Built Environment and Information Technology](#)

**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.

**Module credits** 16.00

**Programmes** [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](#)

**Service modules** Faculty of Natural and Agricultural Sciences

**Prerequisites** 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.

**Contact time** 2 tutorials per week, 4 lectures per week

**Language of tuition** Separate classes for Afrikaans and English

**Department** Civil Engineering

**Period of presentation** Semester 1



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