



University of Pretoria Yearbook 2016

Strength of materials 210 (SWK 210)

Qualification Undergraduate

Faculty Faculty of Engineering, Built Environment and Information Technology

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 Chemistry

BSc Environmental and Engineering Geology

BSc Environmental Sciences

BSc Geoinformatics

Service modules Faculty of Natural and Agricultural Sciences

Prerequisites SWK 122, WTW 164/WTW 124

Contact time 4 lectures per week, 2 tutorials per week

Language of tuition Both Afr and Eng

Academic organisation Civil Eng

Period of presentation 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 ν . Design of beams from section characteristics. Deflection of beams: The elastic curve, integration method, Macaulay's method and superposition.



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