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 ?. Design of beams from section characteristics. Deflection of beams: The elastic curve, integration method, Macaulay’s method and superposition.

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