University of Pretoria Yearbook 2017

Electrical engineering 221 (EIR 221)

Qualification	Undergraduate
Faculty	Faculty of Engineering, Built Environment and Information Technology
Module credits	16.00
Programmes	BEng Chemical Engineering
	BEng Chemical Engineering ENGAGE
	BEng Mechanical Engineering
	BEng Mechanical Engineering ENGAGE
	BEng Metallurgical Engineering
	BEng Metallurgical Engineering ENGAGE
Prerequisites	EBN 111 or EBN 122 and WTW 164
Contact time	1 tutorial per week, 1 practical per week, 3 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Academic organisation	Electrical, Electronic and Com
Period of presentation	Semester 2

Module content

Transient response phenomena in RC, RL and RLC circuits: Natural response and step response. Alternating current (AC) circuits: Phasors, impedances, and power in AC circuits. The application of Ohm’s law, Kirchoff’s circuit theorems, matrix methods, and Thevenin and Norton equivalents to sinusoidal steady-state analysis. Three-phase circuits: Balanced three-phase circuits, star/delta configurations, and three-phase power transfer calculations. Magnetically coupled circuits: Mutual inductance, coupling factor, transformers, ideal transformers and autotransformers. Application of circuit theory to induction motors: basic principles of induction motors, equivalent circuit and analysis thereof, calculation of power and torque through application of Thevenin's theorem. Synoptic introduction to other types of motors.