



University of Pretoria Yearbook 2023

Electrical engineering 221 (EIR 221)

Qualification Undergraduate

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

Module credits 16.00

NQF Level 06

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 161/164

Contact time 1 practical per week, 1 tutorial per week, 3 lectures per week

Language of tuition Module is presented in English

Department Electrical, Electronic and Computer Engineering

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.

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