

# University of Pretoria Yearbook 2021

## Electrical engineering 221 (EIR 221)

<b>Qualification</b>	Undergraduate
<b>Faculty</b>	<a href="#">Faculty of Engineering, Built Environment and Information Technology</a>
<b>Module credits</b>	16.00
<b>NQF Level</b>	06
<b>Programmes</b>	<a href="#">BEng Chemical Engineering</a> <a href="#">BEng Chemical Engineering ENGAGE</a> <a href="#">BEng Mechanical Engineering</a> <a href="#">BEng Mechanical Engineering ENGAGE</a> <a href="#">BEng Metallurgical Engineering</a> <a href="#">BEng Metallurgical Engineering ENGAGE</a>
<b>Prerequisites</b>	EBN 111 or EBN 122 and WTW 161/164
<b>Contact time</b>	1 practical per week, 1 tutorial per week, 3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Electrical, Electronic and Computer Engineering
<b>Period of presentation</b>	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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