

# University of Pretoria Yearbook 2022

## Electromagnetism 310 (EMZ 310)

<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>	07
<b>Programmes</b>	<a href="#">BEng (Electrical Engineering)</a> <a href="#">BEng (Electrical Engineering) ENGAGE</a> <a href="#">BEng (Electronic Engineering)</a> <a href="#">BEng (Electronic Engineering) ENGAGE</a>
<b>Prerequisites</b>	WTW 238 GS, WTW 263 GS, EIR 211/221 GS
<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 1

### Module content

This module introduces transmission lines (wave propagation, lossless line input impedance, power flow), electrostatics (Maxwell's equations, charge and current distributions, Coulomb's law and Gauss's law, electric potential, electric properties of materials, electric boundary conditions, capacitance, electrostatic potential energy), magnetostatics (Biot-Savart law and Ampère's law, vector magnetic potential, magnetic properties of materials, magnetic boundary conditions, inductance, magnetic energy), time-varying fields (Faraday's law, stationary loop in varying field, moving conductor in static field, moving conductor in varying field, displacement current, electromagnetic boundary conditions, charge-current continuity, electromagnetic potentials), plane-wave propagation (time harmonic fields, wave propagation in lossless media, polarisation, wave propagation in lossy media, power density), and wave reflection and transmission (normal incidence, Snell's law, oblique incidence).

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be accepted as an excuse for any transgression, or basis for an exception to any of the aforementioned regulations.