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# University of Pretoria Yearbook 2019

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## Modulation systems 310 (EMS 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>Programmes</b>	<a href="#">BEng Electronic Engineering</a> <a href="#">BEng Electronic Engineering Engage</a>
<b>Prerequisites</b>	ELI 220 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

Spectral analysis using the Fourier and Z-transforms. Transform identities. Convolution and correlation. Linear system theory. Analog and hybrid modulation systems: AM, PM, FM, PAM, PCM, Delta-modulation, PWM. Carrier synchronisation. Communication channels and transmission effects. Sampled Systems. Source digitisation (D/A conversion), quantisation noise. Introduction to information theory and source coding. Formatting and line codes. Spectral characteristics of random data signals. Introduction to digital modulation. Binary modulation techniques: PSK, FSK and ASK. Symbol synchronisation. PLL theory. Matched filter concepts. Analysis of digital modulation systems in AWGN. Simulation and practical implementation of simple digital communication building blocks and subsystems. The focus will be on analog modulation techniques as applied to radio communication systems.

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