

CCE1210 – Signals and Systems

<u>Lecturer(s):</u>	Dr Adrian Muscat
<u>Prerequisites:</u>	MAT1801
<u>Leads to:</u>	CCE2310, CCE3210
<u>ECTS Credits:</u>	6
<u>Labs / Tutorials:</u>	14 Hrs
<u>Lectures:</u>	28 Hrs
<u>Level:</u>	1

Objectives

To introduce the mathematical tools necessary to process continuous time signals and to analyse linear systems.

Syllabus

- Signals:
 - Signal Classification
 - Sinusoidal and Complex Exponential signals
- Linear Time-Invariant systems:
 - Continuous time systems.
 - Impulse response of systems.
 - The convolution integral.
- Fourier Series Analysis:
 - Trigonometric and exponential forms of the Fourier series for periodic signals.
 - Properties of the Fourier series.
 - The RMS of a complex waveform.
- Fourier Transform Analysis:
 - Continuous time Fourier transform for non-periodic signals.
 - Properties of the Fourier transform.
 - Analysis of linear circuits using the Fourier transform.
- The Laplace Transform:
 - Properties of the Laplace Transform
 - Analysis and Characterisation of LTI Systems using the Laplace Transform
- Simple Filters
- Power and Energy Spectral Density Functions
- Correlation.
- The Sampling theorem:
 - Aliasing.
 - Reconstruction

Laboratory Work

Using Matlab to

- visualise simple signals;
- determine the response of linear systems;
- illustrate the relationship between time and frequency;

Method of Assesment:

Practical: 10%

Exam: 90%

Textbook

Oppenheim A.V. & Willsky A.S., Signals & Systems, 2nd edition, Prentice Hall, ISBN
0-13-814757-4