

### Summary Information

Module Code	7450MWCS
Formal Module Title	Advanced Signal Processing
Owning School	Engineering
Career	Postgraduate Taught
Credits	20
Academic level	FHEQ Level 7
Grading Schema	50

### Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

### Learning Methods

Learning Method Type	Hours
Lecture	22
Practical	11
Tutorial	11

### Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-CTY	CTY	September	12 Weeks

### Aims and Outcomes

Aims	This module aims to develop an advanced understanding of techniques and practical experience in applications of digital signal processing (DSP).
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**After completing the module the student should be able to:**

**Learning Outcomes**

Code	Number	Description
MLO1	1	Analyse advanced concepts and analytical tools for DSP systems
MLO2	2	Design and implement a range of complex digital filters
MLO3	3	Apply high level techniques for a stochastic signal
MLO4	4	Use DSP to implement a range of complex engineering applications

**Module Content**

Outline Syllabus	Digital Signal Processing (DSP) and Systems – Fundamentals, Architectures and Characteristics Analysis Tools and Transforms – Fourier: Continuous Time Fourier Transform (CTFT), Discrete Time Fourier Transform (DTFT), Discrete Fourier Transform (DFT), Fast Fourier Transform (FFT); Laplace and Z-transforms Digital Filters: Design and Implementation – Finite Impulse Response (FIR), Infinite Impulse Response (IIR), Analogue Prototypes & Algorithms A/D and D/A Conversions – Quantization, Sample and Hold, Antialiasing, Acquisition Speech Processing – Linear predictive coding (LPC), Synthesis, Coding and Recognition DSP Hardware Architecture Efficient Implementation of DSP algorithms on Hardware Stochastic signal processing, Random Processes, Spectrum, Power Spectral Density (PSD), white noise
Module Overview	
Additional Information	This module aims to develop an advanced understanding of techniques and practical experience in industry-oriented applications of digital signal processing. United Nations Sustainable Development Goals: 3. Good Health and Wellbeing 7. Affordable and Clean Energy 9. Industry, Innovation and Infrastructure 11. Sustainable Cities and Communities 12. Responsible Consumption and Production

**Assessments**

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Examination	70	2	MLO1, MLO3, MLO4
Report	Case study	30	0	MLO2, MLO4

**Module Contacts**

**Module Leader**

Contact Name	Applies to all offerings	Offerings
Gerard Edwards	Yes	N/A

**Partner Module Team**

Contact Name	Applies to all offerings	Offerings