# Aston University
# Quality and Standards Committee
**Module Specification**

**REG/03/53(2)**

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| School and Subject Group | | School of Engineering and Applied Science, Electronic Engineering | |
| Module Code | | EE7001 | |
| Module Title | | Signal Processing | |
| Module Type | | Taught | |
| Date of introduction of new module | | 2010 | |
| Level | | 7 | Credit Value: 10 |
| Programme(s) in which module is available | | MSc in Sensing | |
| Involvement of Other Schools | | None | |
| Resource Split | | | |
| Name of Module Co-ordinator | | Dr. V. Mezentsev | |
| Name of Module Advisor | | Dr. Haitao Ye, Dr. Alex Rozhin | |
| Related Modules | Pre-requisites | None | |
| | Co-requisites | None | |
| | Prohibited Combinations | None | |
| Minimum and Maximum Intake Sizes | | None – None | |

Aims of the Module

To provide the analytical basis of discrete time and digital signal processing. To introduce the design and implementation of real-time digital signal processing systems. To extend the concepts to other areas such as image processing and signal processing for sensing applications.

Summary of Content

- Analytical methods for signal processing in the continuous and discrete domains: Fourier transforms; convolution, correlation; sampling: aliasing; windows; Laplace transform and the z-transform; frequency responses; placing of poles and zeros in the z-plane; canonic forms.
- Analogue and digital filters. Design of digital implementations of analogue prototypes.
- Building filters using sequential real-time digital signal processing systems; architectures; algorithms. Typical applications.
- Sampling and reconstruction of signals. Implementation issues in ADCs and DACs: sampling, noise, quantisation, tracking.
- Two- and higher dimensional signal processing; image processing.

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| Summary of Methods and Frequency of Teaching | **Lectures** 12 hours.<br>**Laboratory** 9 hours.<br>**Tutorials** 6 hours. |

Summary of Methods of Assessment and Feedback including Formative Feedback

| *Assessment Type* | *Status* | *%* | *Requirements* | *Due* |
|---|---|---|---|---|
| Written Report | Compulsory | 20.0 | Coursework on problem solving | - |
| Laboratory | Compulsory | 20.0 | Laboratory Report | - |
| Formal Examination | Compulsory | 60.0 | Formal Examination 1.5hr Marks released via local online grades page prior to examination board. | - |

| Module Outcomes - what the student should gain from successful completion of the module: | Learning and Teaching and Assessment Strategies to enable outcomes to be achieved and demonstrated | |
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| | Learning and Teaching Methods | Assessment Methods |

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| A. Knowledge and Understanding | | |
| the analytical basis of discrete time and digital signal processing. | Laboratory, Lectures, Tutorials | Formal Examination, Laboratory, Written Report |
| B. Intellectual Skills | | |
| convey complex ideas in a structured scholarly manner and to perform independent work in problem solving | Laboratory, Tutorials | Laboratory, Written Report |
| C. Professional Skills | | |
| D. Transferable Skills | | |

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| Please provide either or both of: | |
| (i) Introductory Learning Resources | 1. Blackboard |
| (ii) Core Texts | 1. B.P. Lathi, Signal Processing and Linear Systems, Oxford University Press, 2000, ISBN 0195219171<br>2. R.G. Lyons, Understanding Digital Signal Processing, 2nd Edition, Prentice Hall, 2004, ISBN 0131089897<br>3. J.G. Proakis and D.G. Manolakis, Digital Signal Processing, 4th Edition, Prentice Hall, 2006, ISBN 0131873741 |
| Reading Lists | Attached |
| Specification completed by: | Dr. John A.R. Williams |
| Date | 10-Nov-2009 |
| Date module approved by Teaching Committee(s) | |
| Date module approved by School Board(s) | |