### Module title

**Maths and Programming**  *(ELE00002C)*

<table>
<thead>
<tr>
<th>Credit value</th>
<th>20</th>
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<tbody>
<tr>
<td><strong>Module credit level</strong></td>
<td><strong>Level 4</strong></td>
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<tr>
<td><strong>Stream</strong></td>
<td>Digital &amp; Electronics</td>
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**Module coordinator** *(if known) and department(s) involved in delivery of the module*

Dr John Szymanski

**Other teaching staff:** Dr Steve Smith, Dr Atsufumi Hirohata, Dr Eugene Avrutin

**Indicative JACS subject code for the module**

H600 *(Electronic Engineering)*

**Teaching cycle**

Autumn Term. Annually taught.

**Pre-requisite modules/co-requisite modules/prohibited combinations**

A-level maths OR Maths Fundamentals *(BSc Music Technology – Stage 1)*

**Shared teaching**

BSc Stage 2 students take this module alongside B/MEng *(Stage 1)* students.

**Breakdown of the module workload**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Total hours</th>
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<tbody>
<tr>
<td>Lectures</td>
<td>54</td>
</tr>
<tr>
<td>Practicals</td>
<td>54</td>
</tr>
<tr>
<td>Workshops</td>
<td>9</td>
</tr>
<tr>
<td>Assessment</td>
<td>25</td>
</tr>
<tr>
<td>Private Study</td>
<td>58</td>
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### Module aims

- To develop an understanding of the importance of mathematical tools for the modelling and analysis of engineering systems.
- To develop familiarity and fluency in a range of fundamental areas (including basic algebra, complex numbers and calculus).
- Introduce the concepts of software design and the techniques of computer programming.
- Study an appropriate programming language to allow for the understanding of basic programming principles.

### Module learning outcomes

- Display knowledge of a range of mathematical methods and be familiar with a number of basic formulae, relationships and their application.
- Identify the appropriate mathematical tools required to solve a range of problems involving single-variable algebra and calculus.
- Apply those methods, and carry out the associated calculations and manipulations required to work towards a solution.
- Demonstrate the ability to design and implement simple programs
- Test software solutions to practical problems against target specifications.

### Further information about the module content

**Introduction to Computer Programming**

Overview of appropriate software design methodologies and the underlying principles of program operation. Introduce object oriented programming and simple user interface design using the Java programming language.

**Mathematics**

Mathematics for single-input and single-output systems: Interpreting data; graphs - normal, log-log, log-linear, polar and Bode; series expansions of exp, sin, cos and log; trigonometric relationships; combining two periodic signals; advanced properties of complex numbers - exponential form, De Moivre's theorem, roots of a complex number, rotations and phasors; methods and types of differentiation; applications of differentiation, including Taylor series expansion; fundamentals of integration; standard integrals and substitutions.
### Assessment

<table>
<thead>
<tr>
<th>Continuous Assessment</th>
<th>Please refer to the Statement of Assessment and the Assessment &amp; Feedback Summary</th>
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<tbody>
<tr>
<td>Reassessment</td>
<td>Please refer to the Statement of Assessment</td>
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### Feedback to students

Weekly workshops - Immediate feedback provided to problems raised by individual students.

Assignments will be marked and returned within 4 weeks.

Self assessment - complete worked examples incomplete examples for students to complete.

### Reading List

**Key to recommended books:**

- **Strongly recommended for purchase (available from the University bookshop)**
- * Recommended purchase
- ++ Essential library reading
- + Supportive library reading


### Date on which the module template was last updated

4th September 2012

### Date approved by BoS

3rd March 2010