### Module title

**Analogue Electronics (ELE00004C)**

| Credit value | 20 |
| Module credit level | Level 4 |
| Stream | Electronics & Electromagnetics |

**Module coordinator (if known) and department(s) involved in delivery of the module**

Dr John Dawson

**Other Electronics teaching staff:** Dr John Szymanski, Dr Steven Johnson, Dr Eugene Avrutin, Dr Atsufumi Hirohata, Mr Jonathan Dell, Dr Dave Pearce + Lab Staff

**Indicative JACS subject code for the module**

H600 (Electronic Engineering)

**Teaching cycle**

Spring & Summer Terms. Annually taught.

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

Maths and Programming (Stage 1: Autumn Term)
Introduction to Electronic Hardware (Stage 1: Autumn Term)

**Shared teaching (if known)**

Analogue Electronics for BSc Music Technology (Stage 2)

**Breakdown of the module workload**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Total hours</th>
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</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>50</td>
</tr>
<tr>
<td>Practicals</td>
<td>30</td>
</tr>
<tr>
<td>Workshops</td>
<td>15</td>
</tr>
<tr>
<td>Assessment</td>
<td>26</td>
</tr>
<tr>
<td>Private Study</td>
<td>79</td>
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</tbody>
</table>
## Module aims

- To introduce:
  - Further circuit analysis skills
  - The operational amplifier
  - To provide reinforcement of learning using laboratory investigations
  - To introduce and develop fluency in mathematical tools suitable for describing single and multiple loop analogue circuits

## Module learning outcomes

- Improve their professional laboratory working practices (logbooks, experimental record keeping and measurement techniques).

Be able to:

- Analyse simple circuits in the time and frequency domains
- Explain the operation and limitations of basic operational amplifier circuits
- Use a range of mathematical techniques for the analysis of dynamic systems, networks and multiple input and output systems

## Further information about the module content

### Operational Amplifiers

Review of operational amplifier circuits; filters; bandwidth, Bode plots; bias currents; offset voltages; performance specification; input impedance; output impedance; positive feedback.

### Circuits:


### Mathematics

Supporting Mathematics for dynamic systems, networks and multiple-input, multiple-output systems:

- Further integration - integration by parts, integration by partial fractions partial fractions. Differential equations: first order, second order; free and driven systems - transient and steady state components. Matrices: Circuit network applications; Multiple input/output systems - sets of equations; definition and properties of matrices and determinants; matrix inverse - solution of sets of equations; Contradictory or insufficient equations; Ill-conditioning; The Gaussian elimination algorithm; definition and geometrical properties of vectors; the vector equation of a line. Vector equation of a plane; Time-varying vectors
### Laboratories

LC circuits, Power supplies, Operational Amplifiers. Amplifier module.

### Assessment

<table>
<thead>
<tr>
<th>Method</th>
<th>Details</th>
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<tbody>
<tr>
<td>Examination</td>
<td>Please refer to the Statement of Assessment</td>
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<tr>
<td>Continuous Assessment</td>
<td>Please refer to the Statement of Assessment and the Assessment &amp; Feedback Summary</td>
</tr>
<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 with appropriate comments.
- Self assessment - complete worked examples and 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

Nov 11th 2009