<table>
<thead>
<tr>
<th><strong>Module Code</strong></th>
<th>EEU33C08</th>
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</thead>
<tbody>
<tr>
<td><strong>Module Name</strong></td>
<td>Digital Circuits Design</td>
</tr>
<tr>
<td><strong>ECTS Weighting</strong></td>
<td>5 ECTS</td>
</tr>
<tr>
<td><strong>Semester taught</strong></td>
<td>Semester 2</td>
</tr>
<tr>
<td><strong>Module Coordinator/s</strong></td>
<td>Mr. Eugene O’Rourke</td>
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**Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline**

On successful completion of this module, students should be able to:

- Describe and plan a project involving digital electronics.
- Construct a hardware solution for a digital electronics problem.
- Sketch a block diagram of the circuit along with user interfaces.
- Select a definite test strategy to check each stage of the design.
- Obtain and describe timing waveforms.
- Write a structured comprehensive technical report on the project.
- Work as part of a team.

**Graduate Attributes: levels of attainment**

To act responsibly - Enhanced
To think independently - Enhanced
To develop continuously - Enhanced
To communicate effectively - Enhanced

**Module Content**

Please provide a brief overview of the module of no more than 350 words written so that someone outside of your discipline will understand it.

- Fundamental building blocks of digital circuits from gates to system level devices.
- Frequently used important blocks like decoders, multiplexors, flip-flops, shift registers, counters and timers.
- Use of block diagrams, circuit schematics with MULTISIM, circuit simulation & testing.
- Use of micro-controllers (Arduino) to implement tests of various stages of the electronic circuit.
- Analysis and design of combinational & synchronous digital systems.
- Design partitioning
- Planning & scheduling a project
- Maintaining good engineering documentation.

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1. *An Introduction to Module Design* from AISHE provides a great deal of information on designing and re-designing modules.
2. *TEP Glossary*
Teaching and Learning Methods

Lecture & laboratory, practice-based.

The hardware construction of two real working circuits is required – one introductory project, and one more challenging circuit. The project is launched from introductory laboratory exercises with CMOS ICs. Support is on hand from the demonstrator and technical officers throughout the project.

Assessment Details

Please include the following:
- Assessment Component
- Assessment description
- Learning Outcome(s) addressed
- % of total
- Assessment due date

<table>
<thead>
<tr>
<th>Assessment Component</th>
<th>Assessment Description</th>
<th>LO Addressed</th>
<th>% of total</th>
<th>Week due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project 1 Report</td>
<td>Individual 5 page Report</td>
<td>ALL</td>
<td>10%</td>
<td>Week 26</td>
</tr>
<tr>
<td>Project 2 Demo</td>
<td>Group Demonstration &amp; Interview</td>
<td>ALL</td>
<td>40%</td>
<td>Week 33</td>
</tr>
<tr>
<td>Project 2 Report</td>
<td>Individual 10 page Report</td>
<td>ALL</td>
<td>50%</td>
<td>Week 34</td>
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Reassessment Requirements

Exam and/or Repeat Project (8 hour day in EE-AAP Undergraduate laboratory, 9AM to 1PM & 2PM to 6PM to design, capture, simulate & verify, build & test, demonstrate & present a project arbitrarily chosen by course coordinator)

Contact Hours and Indicative Student Workload

Contact hours:
30 Hours (Normally 33, but lose a day to 2020 Bank Holiday)

Independent Study (preparation for course and review of materials):
10 Hours

Independent Study (preparation for assessment, incl. completion of assessment):
80 Hours

Recommended Reading List


3 TEP Guidelines on Workload and Assessment
<table>
<thead>
<tr>
<th><strong>Module Pre-requisite</strong></th>
<th>Intermediate Multisim Proficiency</th>
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<tbody>
<tr>
<td><strong>Module Co-requisite</strong></td>
<td>Intermediate Breadboard, Multimeter &amp; Oscilloscope Debugging Proficiency</td>
</tr>
<tr>
<td><strong>Module Website</strong></td>
<td><a href="https://www.tcd.ie/Engineering/undergraduate/baiyear3/modules/3C8.pdf">https://www.tcd.ie/Engineering/undergraduate/baiyear3/modules/3C8.pdf</a></td>
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| **Are other Schools/Departments involved in the delivery of this module?** | NO |
| **If yes, please provide details.** | |

| **Module Approval Date** | |
| **Approved by** | |
| **Academic Start Year** | |
| **Academic Year of Date** | |