

<b>Module Code</b>	<b>EEU33C08</b>
<b>Module Name</b>	Digital Circuits Design
<b>ECTS Weighting<sup>2</sup></b>	5 ECTS
<b>Semester taught</b>	Semester 2
<b>Module Coordinator/s</b>	Mr. Eugene O'Rourke
<b><a href="#">Module Learning Outcomes</a> with reference to the <a href="#">Graduate Attributes</a> and how they are developed in discipline</b>	<p>On successful completion of this module, students should be able to:</p> <ul style="list-style-type: none"> <li>• Describe and plan a project involving digital electronics.</li> <li>• Construct a hardware solution for a digital electronics problem.</li> <li>• Sketch a block diagram of the circuit along with user interfaces.</li> <li>• Select a definite test strategy to check each stage of the design.</li> <li>• Obtain and describe timing waveforms.</li> <li>• Write a structured comprehensive technical report on the project.</li> <li>• Work as part of a team.</li> </ul> <p><b>Graduate Attributes: levels of attainment</b></p> <p>To act responsibly - Enhanced</p> <p>To think independently - Enhanced</p> <p>To develop continuously - Enhanced</p> <p>To communicate effectively - Enhanced</p>
<b>Module Content</b>	<p>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.</p> <ul style="list-style-type: none"> <li>• Fundamental building blocks of digital circuits from gates to system level devices.</li> <li>• Frequently used important blocks like decoders, multiplexors, flip-flops, shift registers, counters and timers.</li> <li>• Use of block diagrams, circuit schematics with MULTISIM, circuit simulation &amp; testing.</li> <li>• Use of micro-controllers (Arduino) to implement tests of various stages of the electronic circuit.</li> <li>• Analysis and design of combinational &amp; synchronous digital systems.</li> <li>• Design partitioning</li> <li>• Planning &amp; scheduling a project</li> <li>• Maintaining good engineering documentation.</li> </ul>

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<sup>1</sup> [An Introduction to Module Design](#) from AISHE provides a great deal of information on designing and re-designing modules.

<sup>2</sup> [TEP Glossary](#)

<b>Teaching and Learning Methods</b>	<p>Lecture &amp; laboratory, practice-based.</p> <p>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.</p>				
<b>Assessment Details<sup>3</sup></b> <b>Please include the following:</b> <ul style="list-style-type: none"> <li>• <b>Assessment Component</b></li> <li>• <b>Assessment description</b></li> <li>• <b>Learning Outcome(s) addressed</b></li> <li>• <b>% of total</b></li> <li>• <b>Assessment due date</b></li> </ul>	<b>Assessment Component</b>	<b>Assessment Description</b>	<b>LO Addressed</b>	<b>% of total</b>	<b>Week due</b>
	Project 1 Report	<b>Individual</b> 5 page Report	ALL	10%	Week 26
	Project 2 Demo	<b>Group</b> Demonstration & Interview	ALL	40%	Week 33
	Project 2 Report	<b>Individual</b> 10 page Report	ALL	50%	Week 34
<b>Reassessment Requirements</b>	<p>Exam and/or Repeat Project (8 hour day in EE-AAP Undergraduate laboratory, 9AM to 1PM &amp; 2PM to 6PM to design, capture, simulate &amp; verify, build &amp; test, demonstrate &amp; present a project arbitrarily chosen by course coordinator)</p>				
<b>Contact Hours and Indicative Student Workload<sup>3</sup></b>	<p><b>Contact hours:</b> 30 Hours(Normally 33, but lose a day to 2020 Bank Holiday)</p> <hr/> <p><b>Independent Study (preparation for course and review of materials):</b> 10 Hours</p> <hr/> <p><b>Independent Study (preparation for assessment, incl. completion of assessment):</b> 80 Hours</p>				
<b>Recommended Reading List</b>	<p><b>1: Horowitz, P &amp; Hill, Winfield, <i>The Art of Electronics</i>, 3<sup>rd</sup> ed. Cambridge University Press. 2015.</b></p> <p><b>2: Katz, R. &amp; Boriello, G., <i>Contemporary Logic Design</i>, 2<sup>nd</sup> ed. Pearson Education. 2005.</b></p> <p><b>3: Hodges D. A. &amp; Jackson H. G., <i>Analysis &amp; Design of Digital Integrated Circuits</i>, 2<sup>nd</sup> ed. McGraw-Hill; 1988.</b></p>				

<sup>3</sup> [TEP Guidelines on Workload and Assessment](#)

<b>Module Pre-requisite</b>	Intermediate Multisim Proficiency
<b>Module Co-requisite</b>	Intermediate Breadboard, Multimeter & Oscilloscope Debugging Proficiency
<b>Module Website</b>	<a href="https://www.tcd.ie/Engineering/undergraduate/baiyear3/modules/3C8.pdf">https://www.tcd.ie/Engineering/undergraduate/baiyear3/modules/3C8.pdf</a>
<b>Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.</b>	NO
<b>Module Approval Date</b>	
<b>Approved by</b>	
<b>Academic Start Year</b>	
<b>Academic Year of Date</b>	