ELEN30010 Digital System Design

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 3 one hour lectures and 1 two hour workshop per week Total Time Commitment: 120 hours
Prerequisites:	The prerequisite for this subject is

Subject	Study Period Commencement:	Credit Points:
ELEN20005 Foundations of Electrical Networks	January, Semester 2	12.50

Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	431-204 Digital Systems 2: System Design
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements of this entry. The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: http://www.services.unimelb.edu.au/disability/
Coordinator:	Assoc Prof Michael Cantoni
Contact:	Melbourne School of Engineering Office Building 173, Grattan Street The University of Melbourne VIC 3010 Australia General telephone enquiries + 61 3 8344 6703 + 61 3 8344 6507 Facsimiles + 61 3 9349 2182 + 61 3 8344 7707 Email **eng-info@unimelb.edu.au (mailto:eng-info@unimelb.edu.au)** **(http://eng-unimelb.custhelp.com/)**
Subject Overview:	This subject develops a fundamental understanding of the concepts that underpin the analysis and design of digital systems. Topics include: # Digital systems – digital-data encoding and information processing, switching algebra, spatial and temporal composition of digital building-blocks, finite-state machines, data-processing versus control logic, and hardwired-logic versus programmed-logic implementations; # Realisation and timing issues – electrical encoding of digital symbols, noise margins, electronic gates, propagation and switching delays, metastability, timing contracts, the synchronous timing discipline and constraint analysis, synchronisation, and pipelining; # Microprocessor based systems – operational and architectural aspects of general-purpose microprocessors, instruction set and addressing architectures, the role of imperative (assembly and high-level) programming languages, I/O interfacing, and interrupt mechanisms;

	# Interconnection structures – shared versus dedicated connections, addressing, contention and arbitration, asynchronous open-ended and request-acknowledge exchange protocols, and synchronous serial protocols. These topics will be complemented by exposure to the hardware description language VHDL and the use of engineering design automation tools and configurable devices (e.g. FPGAs) in the laboratory.
Objectives:	On completing this subject the student should be able to: # Apply fundamental tools in the analysis of combinational and sequential logic systems, with an appreciation for the role and limitations of important abstractions; # Apply fundamental concepts, including the programmed (e.g. microprocessor based) approach, to implement digital systems that achieve specified functionality; # Assess tradeoffs within the context of digital system design; # Use a hardware description language (VHDL) for the documentation, simulation and synthesis of reasonably complex digital systems; # Configure and test digital hardware development platforms in the laboratory.
Assessment:	One written examination, not exceeding three hours at the end of semester, worth 60% (must pass written exam to pass subject); Continuous assessment of project work, not exceeding 30 pages in total over the semester, worth 30%; A one hour mid-semester test, worth 10%.
Prescribed Texts:	TBA
Breadth Options:	This subject potentially can be taken as a breadth subject component for the following courses: # **Bachelor of Arts (https://handbook.unimelb.edu.au/view/2010/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2010/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2010/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2010/B-MUS)** You should visit **learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html)** and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	On completion of this subject students should have developed the following generic skills: # Ability to apply knowledge of basic science and engineering fundamentals # Ability to undertake problem identification, formulation and solution # Ability to utilise a systems approach to design and operational performance # Ability to communicate effectively, with the engineering team and with the community at large # Capacity for independent critical thought, rational inquiry and self-directed learning # Expectation of the need to undertake lifelong learning, capacity to do so
Related Course(s):	Bachelor of Engineering Bachelor of Science
Related Majors/Minors/ Specialisations:	Electrical Systems Master of Engineering (Electrical)