ELEN30014 Analog and Digital Electronics Concepts

Credit Points:	12.5
Level:	3 (Undergraduate)
Dates & Locations:	2016, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 x 1 hour lectures and 12 x 2 hour workshops Total Time Commitment: Estimated 170 hours
Prerequisites:	**ELEN20005 Foundations of Electrical Networks (../../view/2016/ELEN20005)**
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	

Subject	Study Period Commencement:	Credit Points:
ELEN30010 Digital System Design	Semester 1	12.5
ELEN30009 Electrical Network Analysis and Design	Semester 1	12.5

Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Coordinator:	Dr Gavin Buskes
Contact:	Dr Gavin Buskes Email: **gbuskes@unimelb.edu.au (mailto:gbuskes@unimelb.edu.au)**
Subject Overview:	AIMS This subject develops a fundamental understanding of the concepts behind and tools used for the analysis and design of analog and digital electronic systems. This is one of four subjects that define the Mechatronics Systems major in the Bachelor of Science and it is a core requirement of the Master of Engineering (Mechatronics). INDICATIVE CONTENT Topics include: Analog systems - time-domain differential equation models of RLC networks, initial conditions, transient response, frequency response, impedance functions, two-ports and dependent sources, matrix representations, transformer models, small-signal transistor models, op-amp models, active filter realisation; Digital systems – encoding information and digital data processing, CMOS realisation of basic logic gates, timing contracts, acyclic networks, switching algebra, combinational logic synthesis, cyclic networks and memory, finite-state machines, metastability, synchronous

	timing and synchronization, data-processing paths, control logic, stored-program machines and microprocessor based systems. Aspects of these topics will be explored through laboratory work involving simulation tools and hardware experiments.
Learning Outcomes:	**Intended Learning Outcomes (ILO's)** Having completed this subject it is expected that the student be able to: 1. Analyse and design passive and active analog circuits that achieve specified transfer function characteristics 2. Apply fundamental tools in the analysis of combinational and sequential logic systems, with an appreciation for the role and limitations of important digital abstractions 3. Apply fundamental concepts, including hardwired and programmed (e.g. microprocessor based) approaches, to implement digital systems that achieve specified functionality 4. Configure and test digital hardware development platforms in the laboratory.
Assessment:	One wrtitten 3 hour open book end of semester examination (60%). (Assesses ILO's 1 to 3) Attendance and participation in two laboratory classes, each requiring approximately 15 h ours work (15% each). (Assesses ILO's 1 to 4). One written 60 minute test held in week 5 (10%). (Assesses ILO's 1 to 3). Hurdle Requirement: Students must pass the end of semester written exam to pass the subject.
Prescribed Texts:	None
Breadth Options:	This subject is not available as a breadth subject.
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 skills: # The ability to apply knowledge of science and engineering fundamentals # The ability to undertake problem identification, formulation, and solution # The ability to utilise a systems approach to complex problems and to design and operational performance # Capacity for independent critical thought, rational inquiry and self-directed learning.
Related Majors/Minors/ Specialisations:	Master of Engineering (Mechatronics) Mechatronics Systems Science-credited subjects - new generation B-SCI and B-ENG. Selective subjects for B-BMED