ELEN90056 Electronic Circuit Design

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2016, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours of lectures (3 x one hour lectures per week) and up to 30 hours of workshops Total Time Commitment: 200 hours
Prerequisites:	The prerequisites for this subject are:

Subject	Study Period Commencement:	Credit Points:
ELEN30009 Electrical Network Analysis and Design	Semester 1	12.50
ELEN30011 Electrical Device Modelling	Semester 2	12.50

Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Anti-requisite for this subject is:

Subject	Study Period Commencement:	Credit Points:
ELEN30007 Electronic Circuit Design 2	Not offered 2016	12.50

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 Ranjith Rajasekharan Unnithan
Contact:	Dr Ranjith Rajasekharan Unnithan Email: **ranjith.rajasekharan@unimelb.edu.au (mailto:ranjith.rajasekharan@unimelb.edu.au)**
Subject Overview:	**AIMS** This subject provides an in-depth coverage of transistor (MOSFET and BJT) devices and their use in common circuits. In particular, students will study topics including: transistor operating modes and switching; principles of CMOS circuits; transistor biasing; current-source/emitter-amplifiers; low-frequency response; followers; class B amplifiers; current limiting; current sources and mirrors; differential pairs; feedback in amplifiers and stability; operational amplifiers; operational amplifier circuits; and voltage regulation. This material will be complemented by exposure to circuit simulation software tools and the opportunity to further develop circuit construction/test skills in the laboratory. **INDICATIVE CONTENT**

	Design-focused field-effect and bipolar elementary transistor models, and design of elementary amplifier stages and biasing circuits. Static and dynamic behaviour of amplifier circuits including frequency response, feedback and stability, slew-rate and clipping. Operational amplifiers and opamp based circuits; voltage regulators, references and voltage converters. Verification of electronic circuits using simulation.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** On completing this subject the student should be able to: 1 Model and quantitatively analyse circuits with transistors and other nonlinear devices 2 Design and test amplifier circuits 3 Construct and test complex electronic circuits in the laboratory 4 Use software tools to simulate the behaviour of electronic circuits
Assessment:	One written examination, not exceeding three hours at the end of semester, worth 70% Continuous assessment of submitted group project work(2- 3 students), not exceeding 30 pages over the semester (approximately 25-30 hours of work per student), worth 20% A one-hour mid-semester test, worth 10%. Hurdle requirement: Students must pass the written exam to pass the subject.Intended Learning Outcomes (ILOs) 1, 2 and 4 are assessed in the final written examination, the mid-semester test, and continuous assessment of submitted project work. ILOs 3 and 4 are assessed as part of submitted laboratory exercise, and project work.
Prescribed Texts:	TBA
Recommended Texts:	B. Razavi, *Fundamental of Microelectronics*, John Wiley & Sons, January 2008
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:	Upon completion of this subject, students will have developed the following skills: # Ability to apply knowledge of basic science and engineering fundamentals # In-depth technical competence in at least one engineering discipline # Ability to undertake problem identification, formulation and solution # Ability to utilise a systems approach to design and operational performance # Capacity for independent critical thought, rational inquiry and self-directed learning # Ability to communicate effectively, with the engineering team and with the community at large
Notes:	Credit may not be obtained for both ELEN30007(431-331) Electronic Circuit Design 2 and ELEN90056 Electronic Circuit Design **LEARNING AND TEACHING METHODS** In class lectures will alternate subject exposition by the reader with interactive discussion and problem solving. Laboratory experience will focus on solving meaningful design problems through circuit design and implementation, and verifying completed designs using real-world testing and simulation infrastructure. **INDICATIVE KEY LEARNING RESOURCES** Lecture and lab notes developed by instructors, textbook. Some material (lecture notes from other institutions etc.) publicly available through online resources. Students will be using Digilent's Analog Discovery Kit in the laboratory for circuit implementation and testing. ***Students will need to buy the Analog Discovery Kit and further information will be given in the lectures during Week 1.*** **CAREERS / INDUSTRY LINKS** Subject will also incorporate guest lectures from industry to provide an industry context to the topics covered.

Related Majors/Minors/ Specialisations:	B-ENG Electrical Engineering stream Master of Engineering (Electrical with Business) Master of Engineering (Electrical) Master of Engineering (Mechatronics)