431-466 RF, Microwave and Optoelectronic Systems

Credit Points:	12.50
Level:	4 (Undergraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 2, - Taught on campus.
Time Commitment:	Contact Hours: Twenty-four hours of lectures, 12 hours of tutorials and 12 hours of laboratory or project work Total Time Commitment: Not available
Prerequisites:	431-329 Electromagnetics, 431-222 Electronic Circuit Design 1 (prior to 2005 Electronic Devices)
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
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:	Assoc Prof William Shieh
Subject Overview:	On completion of this subject students should be able to describe the operation of a wide range of RF, microwave and optoelectronic devices. They should be able to design and analyse the performance of a variety of wireless and optoelectronic systems, including communication links. Topics include: Part 1: architecture of wireless systems; modulation/demodulation; noise figure (definition, measurement, calculation); operation, implementation and characteristics of various microwave and RF devices (attenuators, power combiners/splitters, couplers, switches, amplifiers and oscillators); antenna types and characteristics; calculating performance of transmitters and receivers; calculating wireless link performers; applications of RF and microwaves (communications, radar, remote sensing). Part 2: review of direct and indirect semiconductors; light-emitting diodes; lasers (principles and operation, types - Fabry-Perot and DFB); photogenerative absorption; photodiodes (pn, pin and avalanche devices: structure, operation, characteristics); transimpedance, amplifier; solar cells; optical fibre (multimode and singlemode - principle of operation, manufacture, optical transmission characteristics - attenuation, dispersion); simple photonic link design (receiver noise and bit-error rate, receiver sensitivity, power budget, margin, dispersion penalty); application of optical communications; introduction to optical transmission formats and protocols.
Objectives:	On completing this subject the student should be able to: 1. Explain the physical principles that underpin the operation of a variety of radio frequency, microwave and optoelectronic devices; 2. Model and analyse the performance of systems comprising such devices, including communication links.

Assessment:	One final examination (duration three hours) (70%), one mid-semester test (duration one hour) (10%), laboratory work and written reports not exceeding 6000 words (20%).
Prescribed Texts:	None
Recommended Texts:	Information Not Available
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:	# ability to apply knowledge of basic science and engineering fundamentals # ability to communicate effectively, not only with engineers but also with the community at large # 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 # understanding of the principles of sustainable design and development # understanding of professional and ethical responsibilities and commitment to them # intellectual curiosity and creativity, including understanding of the philosophical and methodological bases of research activity
Related Course(s):	Bachelor of Engineering (Computer Engineering) Bachelor of Engineering (Electrical Engineering) Bachelor of Engineering (Software Engineering)