431-324 Control 1 (Classical Control)

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 1, - Taught on campus.
Time Commitment:	Contact Hours: Thirty-six hours of lectures, 12 hours of tutorials and 12 hours of laboratory work Total Time Commitment: Not available
Prerequisites:	431-221 Fundamentals of Signals and Systems and 431-202 Engineering Analysis B (prior to 2001, 421-205 Engineering Analysis B) or 431-226 Engineering Analysis B (old) or equivalent
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 Isaac Kao
Subject Overview:	On completion of this subject students should have a good understanding of classical continuous-time controller design methods, controller implementation and the MATLAB software package to perform such design. Topics include: motivation for control engineering; open versus closed loop control; examples of plants from engineering practice with their modelling; revision: transfer function, poles, zeros, stability, frequency and time domain representation of signals and systems, relationships between the time and frequency response of a system; feedback and feed-forward structures; sensitivity and complementary sensitivity functions; root locus; PID control; tuning of PID controllers; Nyquist stability criterion (with a proof); Bode plots, gain and phase margins; minimum phase systems; limits of performance and Bode integral constraints; lead and lag compensation; time-delay and its Pade approximation; actuator saturation and anti-windup; discretisation of continuous-time controllers. All tutorials are MATLAB based; project involves modelling, controller design and implementation for a given plant.
Objectives:	On completing this subject the student should be able to: 1. Qualitatively and quantitatively describe the benefits of feedback in engineering systems; 2. Apply fundamental frequency-domain techniques in the analysis and design of linear feedback control systems, as they arise in a variety of contexts; 3. Use software tools to simulate and design the linear behaviour of automatic control systems.
Assessment:	One 3-hour end of semester examination, practice classes, tests, laboratory and project reports and notebooks. Students will be notified of the weighting of assessment components at the beginning of the semester.

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 # in-depth technical competence in at least one engineering discipline # ability to undertake problem identification, formulation and solution # expectation of the need to undertake lifelong learning, capacity to do so # capacity for independent critical thought, rational inquiry and self-directed learning # intellectual curiosity and creativity, including understanding of the philosophical and methodological bases of research activity # openness to new ideas and unconventional critiques of received wisdom
Related Course(s):	Bachelor of Engineering (Biomedical)Biosignals Bachelor of Engineering (Electrical Engineering)