CHEN30009 Process Dynamics and Control

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
Time Commitment:	Contact Hours: Forty-eight hours. Total Time Commitment: Estimated 120 hours
Prerequisites:	# 620-293 Engineering Mathematics or 431-202 Engineering Analysis B or equivalent # 411-257 Chemical Process Analysis 2 or 411-102 Chemical Process Analysis
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 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/
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Subject Overview:	This subject covers the dynamics and control of process systems. Topics covered in process dynamics include examples of controlled and manipulated variables and control schemes in process plants. Time domain, Laplace and frequency domain analyses of process dynamics are modelled by linear ordinary differential equations. Students are introduced to the concepts of transfer functions, amplitude ratio and phase angle and Bode plots. Complex process plants are modeled by a series of first, second order and dead time processes. Other topics include process identification by step response and frequency response, pulse testing and the use of commercial software packages such as HYSYS for dynamic simulation. Topics covered in process control include the use of PID controller transfer functions, closed loop transfer functions, the effects of varying proportional gain, derivative and integral times on control response, the effects of measurement lag. Other topics include Routh stability analysis, Bode stability criterion, gain and phase margins, Ziegler-Nichols tuning, and cascade control and improvements arising from cascade control
Objectives:	On completion of this subject students should be able to: • Understand the factors influencing the dynamic response of chemical processes to process system changes • Analyse and implement effective and efficient process control strategies for chemical processes.

Assessment:	Two assignments, due Week 4 and due Week 8 of the semester (20% of total mark). One three hour written examination at the end of semester (80% of total mark).
Prescribed Texts:	None
Recommended Texts:	Process Dynamics and Control, Second Edition. D. E. Seborg, T. F. Edgar, D. A. Mellichamp
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 be able to demonstrate an: • 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 use a systems approach to design and operational performance.
Related Course(s):	Bachelor of Engineering Bachelor of Engineering (Chemical) and Bachelor of Arts Bachelor of Engineering (Chemical) and Bachelor of Commerce Bachelor of Engineering (Chemical) and Bachelor of Laws Bachelor of Engineering (Chemical) and Bachelor of Science Bachelor of Science
Related Majors/Minors/ Specialisations:	Chemical Systems