CHEN90015 Biomolecular Process Principles

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: Thirty-eight hours of lectures, 6 hours of tutorials and 4 hours of practical work Total Time Commitment: Estimated 120 hours
Prerequisites:	411-303 Reactor Engineering
Corequisites:	411-303 Reactor Engineering
Recommended Background Knowledge:	None
Non Allowed Subjects:	411-392 Fermentation Process Engineering
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:	Structure and function of biological macromolecules; biochemical pathways; genetics and cellular control processes; cell structure and function; microbial diversity and survey of microbial groups methods for characterisation, cultivation and enumeration of microorganisms; and survey of applications in biochemical and environmental engineering. Enzymic process. Michaelis-Menten approach. Kinetics of enzyme inhibition. Immobilised enzymes. Batch microbial growth and product formation. Continuous culture. Microbial growth kinetics. Application of Monod model to batch and chemostat culture. Kinetics of product formation. Maintenance energy and endogenous respiration. Design of fermentation processes. Medium formulation and inoculum preparation. Industrial sterilisation processes. Calculation of sterility level. HTST sterilisation. Design of continuous sterilisers. Air sterilisation. Vessel design for aseptic operation. Fermenter design configurations. Aeration of fermenters. Oxygen requirements of microorganisms. Mixing in fermenters. Biochemical separation processes. Practical work (Microbiology laboratory).
Objectives:	Upon completion of this subject, students will be able to # Describe the biological and kinetic concepts underlying bioprocesses engineering and # To describe procedures for the design and control of industrial scale fermentation and biological waste treatment processes.

Assessment:	One three-hour examination at the end of semester 1 contributing 90% to the assessment, one written assignment worth 20% and Two practical work assignments not exceeding a total of 1000 words contributing 10% to the assessment.
Prescribed Texts:	Madigan, M.T. and Martinko, J.M, 2006. Brock Biology of Microorganisms. Eleventh Edition. Pearson Prentice Hall, Upper Saddle River, N.JBailey J.E. and Ollis, D.F. Biochemical Engineering Fundamentals, 1986, 2nd edition, McGraw-Hill NYSchuler, M.L. and Kargi F. Bioprocess Engineering – Basic Concepts, 2002 2nd edition, Prentice hall PTD, Upper Saddle River NY.
Recommended 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:	The subject will enhance the following generic skills: # Capacity for independent thought # The ability to analyse and solve open-ended problems # The ability to comprehend complex concepts and communicate lucidly this understanding # Awareness of advanced technologies in the discipline # Ability to work in a team (practical work component)
Related Course(s):	Bachelor of Engineering