BTCH90006 Bioprocess Engineering

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	This subject is not offered in 2013.
Time Commitment:	Contact Hours: 3 x one hour lectures + 1 x one hour tutorial per week + 2 x two hour practical work sessions per semester Total Time Commitment: Estimated 120 hours
Prerequisites:	Students should have completed the following subject prior to enrolling in this subject: **CHEN30001 Reactor Engineering (../../view/2012/CHEN30001)** (Prior to 2010 CHEN40003 Reactor Engineering) CHEN30001 may also be taken concurrently
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Credit will not be given for both this subject and the following subjects: **CHEN90009 Fermentation Processes (../../view/2012/CHEN90009)** **CHEN90031 Bioprocess Engineering (../../view/2012/CHEN90031)** CHEN30014 Bioprocess Engineering
Core Participation Requirements:	For the purposes of considering applications for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005) and Students Experiencing Academic Disadvantage Policy, this subject requires all students to actively and safely participate in laboratory activities. Students who feel their disability may impact upon their participation are encouraged to discuss this with the Subject Co-ordinator and the Disability Liaison Unit http://www.services.unimelb.edu.au/disability/
Contact:	Email: **davided@unimelb.edu.au (mailto:davided@unimelb.edu.au)**
Subject Overview:	Introduction to Microbiology. 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 # 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 contributing 70% to the assessment One written assignment worth 20% Two practical work assignments not exceeding a total of 1000 words contributing 10% to the assessment A grade greater than 50% in the exam is required to pass the subject

Prescribed Texts:	None
Recommended Texts:	Schuler, M.L. and Kargi F. *Bioprocess Engineering – Basic Concepts*, 2002 2nd edition, Prentice hall PTD, Upper Saddle River NY Bailey J.E. and Ollis, D.F. *Biochemical Engineering Fundamentals*, 1986, 2nd edition, McGraw-Hill NY
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):	Master of Biotechnology