

411-393 Bioprocess Engineering

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-eight hours of lectures, 6 hours of tutorials and 4 hours of practical work. Total Time Commitment: Not available
Prerequisites:	411-303 Reactor Engineering
Corequisites:	411-303 Reactor Engineering
Recommended Background Knowledge:	-
Non Allowed Subjects:	411-392 Fermentation Process Engineering; BIEN30002 Fermentation Process Engineering
Core Participation Requirements:	-
Coordinator:	Prof David E Dunstan
Contact:	-
Subject Overview:	<p>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.</p> <p>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.</p> <p>Practical work (Microbiology laboratory).</p>
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 semester1 contributing 90% to the assessment and practical work assignments not exceeding a total of 1000 words contributing 10% to the assessment.
Prescribed Texts:	-
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:	The subject will enhance the following generic skills: <ul style="list-style-type: none"> # capacity for independent thought # the ability to analyse and solve open-ended problems

	<ul style="list-style-type: none"># 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)
Notes:	Students may only gain credit for one of 411-393 Bioprocess Engineering or 411-392 Fermentation Process Engineering.
Related Course(s):	Bachelor of Engineering (Chemical 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 Engineering (EngineeringManagement) Chemical