CHEN90016 Metabolic Engineering

Credit Points: 12.50

Level: 9 (Graduate/Postgraduate)

Dates & Locations:

2012, Parkville

This subject commences in the following study period/s:
Semester 2, Parkville - Taught on campus.

Time Commitment: Contact Hours: 3 x one hour lectures + 1 x one hour tutorial per week + 2 x 5 hours of laboratory work per semester Total Time Commitment: Estimated 120 Hours

Prerequisites:

Students must have completed the following subjects (or equivalent) prior to enrolling in this subject:

Subject	Study Period Commencement:	Credit Points:
MAST10007 Linear Algebra	Summer Term, Semester 1, Semester 2	12.50
CHEM10004 Chemistry 2	Summer Term, Semester 2	12.50

As well as ONE of the following three biology subject combinations, either (i), (ii) or (iii):

(i) The following subject:

Subject	Study Period Commencement:	Credit Points:
CHEN90008 Biology for Engineers	Semester 1	12.50

OR (ii) both of the following subjects:

Subject	Study Period Commencement:	Credit Points:
BIOL10004 Biology of Cells and Organisms	Semester 1	12.50
BIOL10005 Genetics & The Evolution of Life	Semester 2	12.50

OR (iii) both of the following subjects:

Subject	Study Period Commencement:	Credit Points:
BIOL10003 Genes and Environment	Semester 2	12.50
BIOL10002 Biomolecules and Cells	Semester 1	12.50

Corequisites: None

Recommended Background Knowledge: None

Non Allowed Subjects: None

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/
Coordinator:	Dr Sally Louise Gras
Contact:	Email: **sgras@unimelb.edu.au (mailto:sgras@unimelb.edu.au)**
Subject Overview:	Metabolism in microbial, plant and animal cells. Control of metabolism and its application to bioprocessing and bioproduct process development. Pathways of catabolism and anabolism in heterotrophs. Photosynthesis. Chemoautotrophs and their role in biological waste treatment. Genetic control of metabolism. Genetic manipulation by mutation and recombinant DNA techniques. Case studies in the development of bioprocesses employing recombinant microorganisms. Control at the enzyme level. Enzyme inhibition kinetics. Immobilised enzymes, mass transfer and kinetic effects. Protein and enzyme engineering. Metabolic engineering. Practical work (enzyme kinetics).
Objectives:	On completion of this subject students should be able to: # Describe cell metabolism and the control of cell metabolism for aerobic and anaerobic organisms # Apply systems approaches to describe and model cell metabolism # Develop creative strategies to decouple and remove metabolic regulatory controls in order to increase product yield or develop new products # Discuss the role of metabolic engineering in product development, the regulatory standards that apply to such products and the business drivers for product development # Discuss the synergies between biochemistry and chemical engineering # Work in teams to process primary scientific information # Perform laboratory assignments # Communicate their knowledge and findings to their peers and to broader audiences
Assessment:	Two assignments not exceeding 4000 words, one due around Week 4 and one due around Week 8 of the semester (20% of the total mark) One 3 hour written end of semester examination (80% of total mark) A mark of 40% or more in the end of semester examination is required to pass the subject
Prescribed Texts:	None
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:	# Capacity for independent thought # The ability to comprehend complex concepts and communicate lucidly this understanding # Awareness of advanced technologies in the discipline # Ability to work in a team, including with professionals from different discipline areas
Related Course(s):	Bachelor of Engineering
Related Majors/Minors/ Specialisations:	B-ENG Chemical and Biomolecular Engineering stream Master of Engineering (Biomolecular)