

CHEN90016 Metabolic Engineering

Credit Points:	12.50																																			
Level:	9 (Graduate/Postgraduate)																																			
Dates & Locations:	2011, 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 4 hours of laboratory work per semester Total Time Commitment: Estimated 120 Hours																																			
Prerequisites:	<p>Students must have taken the following subjects (or equivalent) prior to enrolling in this subject:</p> <table><tr><th>Subject</th><th>Study Period Commencement:</th><th>Credit Points:</th></tr><tr><td>MAST10007 Linear Algebra</td><td>Summer Term, Semester 1, Semester 2</td><td>12.50</td></tr><tr><td>CHEM10004 Chemistry 2</td><td>January, Semester 2</td><td>12.50</td></tr></table> <p>As well as ONE of the following three biology subject combinations, either (i), (ii) or (iii):</p> <p>(i) The following subject:</p> <table><tr><th>Subject</th><th>Study Period Commencement:</th><th>Credit Points:</th></tr><tr><td>CHEN90008 Biology for Engineers</td><td>Semester 1</td><td>12.50</td></tr></table> <p>OR (ii) both of the following subjects:</p> <table><tr><th>Subject</th><th>Study Period Commencement:</th><th>Credit Points:</th></tr><tr><td>BIOL10004 Biology of Cells and Organisms</td><td>Semester 1</td><td>12.50</td></tr><tr><td>BIOL10005 Genetics & The Evolution of Life</td><td>Semester 2</td><td>12.50</td></tr></table> <p>OR (iii) both of the following subjects:</p> <table><tr><th>Subject</th><th>Study Period Commencement:</th><th>Credit Points:</th></tr><tr><td>BIOL10003 Genes and Environment</td><td>Semester 2</td><td>12.50</td></tr><tr><td>BIOL10002 Biomolecules and Cells</td><td>Semester 1</td><td>12.50</td></tr></table>			Subject	Study Period Commencement:	Credit Points:	MAST10007 Linear Algebra	Summer Term, Semester 1, Semester 2	12.50	CHEM10004 Chemistry 2	January, Semester 2	12.50	Subject	Study Period Commencement:	Credit Points:	CHEN90008 Biology for Engineers	Semester 1	12.50	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	Subject	Study Period Commencement:	Credit Points:	BIOL10003 Genes and Environment	Semester 2	12.50	BIOL10002 Biomolecules and Cells	Semester 1	12.50
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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/																																			
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:	<p>On completion of this subject students should be able to:</p> <ul style="list-style-type: none"> • 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) and 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:	<ul style="list-style-type: none"> • 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 Majors/Minors/ Specialisations:	B-ENG Chemical and Biomolecular Engineering stream Master of Engineering (Biomolecular)