



UNIVERSITI TEKNOLOGI MARA

CBE667: INDUSTRIAL BIOPROCESS TECHNOLOGY

Course Name (English)	INDUSTRIAL BIOPROCESS TECHNOLOGY APPROVED
Course Code	CBE667
MQF Credit	3
Course Description	In this course, most of the important products of primary microbial metabolism, their large-scale production and use as raw materials for industrial application are covered. Products covered include Ethanol, Glycerol, Acetone, Butanol, Isopropanol, 2,3-Butanediol, Lactic Acid, Citric Acid, Gluconic Acid, Acetic Acid, other Organic Acids, Polyhydroxyalkanoic Acids, Amino Acids, Extracellular Polysaccharides and Biosurfactants. Besides classical methods, many aspects of new applications and their importance as renewable resources are covered. Products of secondary metabolism will be introduced briefly. These are mainly pharmaceuticals, ranging from traditional antibacterials like beta-lactams, new generation compounds like dalbaheptides and lantibiotics to immunomodulators and antitumor drugs. This course includes laboratory exercises on the microbial production.
Transferable Skills	Industrial application of bioprocess technology available.
Teaching Methodologies	Lectures, Tutorial
CLO	CLO1 Ability to describe principles of a primary and secondary microbial metabolism and apply the principles to develop synthetic schemes. CLO2 Ability to outline the industrial applications of primary metabolism products and describe the physical and chemical structure of these products. CLO3 Ability to explain organic-chemical reactions that occur in biosynthesis and organic synthesis and solve problems associated with those processes.
Pre-Requisite Courses	No course recommendations
Topics	
1. Raw materials for fermentation.	
2. Production of Ethanol 2.1) n/a	
3. Microbial Production of alcohol and its derivative 3.1) n/a	
4. Production of organic acids 4.1) n/a	
5. Production of amino acids 5.1) n/a	
6. Extracellular Polysaccharides 6.1) n/a	
7. Biosurfactants 7.1) n/a	
8. Overview of products from secondary metabolism and its application. 8.1) n/a	

Assessment Breakdown	%
Continuous Assessment	40.00%
Final Assessment	60.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	n/a	10%	CLO1 , CLO2 , CLO3
	Quiz	n/a	10%	CLO1 , CLO2 , CLO3
	Test	n/a	20%	CLO1 , CLO2 , CLO3

Reading List	Recommended Text
	<ul style="list-style-type: none"> • <i>Rehm, Hans-Jürgen, Reed, Gerald, Pühler, Alfred and Stadler, Peter (ed). (1997) Biotechnology: Products of Secondary Metabolism Vo. 7 (2nd edition). Wiley-VCH, Weinheim</i> • <i>Alexander S.(Ed), Sang Ki Rhee (Ed) (2005) Polysaccharides and Polyamides in the Food Industry: Properties, Production, and Patents, J.W. Wiley and Sons</i> • <i>Mann, J. Davidson, R.S. Hobbs, J.B. Banthorpe D.V. and Harborne J.B (1994) Natural products. Their chemistry and biological significance. Prentice Hall</i> • <i>Korasik N, Cairns W L and Neil C.C (1987) Biosurfactants and Biotechnology M. Dekker, N.Y</i> • <i>Naim K. (1993) Biosurfactants : production, properties, applications: M. Dekker. New York</i> • <i>Lynn Ellen Doxon (2001)The Alcohol Fuel Handbook, Infinity Pub</i>
Article/Paper List	This Course does not have any article/paper resources
Other References	This Course does not have any other resources