

## Subject Description Form

<b>Subject Code</b>	ABCT4110	
<b>Subject Title</b>	Microbial Biotechnology	
<b>Credit Value</b>	3	
<b>Level</b>	4	
<b>Pre-requisite</b>	Microbiology	
<b>Objectives</b>	The aim of this syllabus is to provide students with an awareness of the wide scope of applications of microorganisms in industry; the applications of fermentation technology and potentials for future development.	
<b>Intended Learning Outcomes</b>	<p>Upon completion of the subject, students will be able to:</p> <ul style="list-style-type: none"> <li>(a) Knowledgeable and understands the problems in isolation, strain improvement and growth of microorganisms in industrial processes</li> <li>(b) appreciate the different methods of culturing microorganisms and fermentation systems used</li> <li>(c) formulate fermentation media, identify and solve biomass or metabolite yield improvement problems</li> <li>(d) discuss the uses of microorganisms to produce a wide variety of products in different industries</li> <li>(e) understand, design and improve fermentation processes to meet practical needs</li> <li>(f) Appreciate the importance of team work through group projects which require literature searches and demonstrate communication skills through oral presentations of selected topics</li> </ul>	
<b>Subject Synopsis/ Indicative Syllabus</b>	Topic	<u>Hour</u>
	<b>Screening and development of microbial metabolites for commercial production</b>	2
	<b>Development of industrial microorganisms</b>	7
	<ul style="list-style-type: none"> <li>• isolation, screening and genetic development of industrial microbes</li> </ul>	
	<b>Microbial growth kinetics and Fermentation systems</b>	7
	<ul style="list-style-type: none"> <li>• batch, fed-batch and continuous culture</li> </ul>	
	<b>Fermentation media</b>	3
	<ul style="list-style-type: none"> <li>• media formulation and optimization</li> </ul>	
	<b>Microbes in the food industry</b>	7
	<ul style="list-style-type: none"> <li>• use of microorganisms in the production of food and food ingredients.</li> </ul>	
	<b>Pharmaceutical microbiology</b>	7
	<ul style="list-style-type: none"> <li>• use of microorganisms in the production of antibiotics, steroid hormones and health related products</li> </ul>	
	<b>Microorganisms in the chemical industry</b>	6
	<ul style="list-style-type: none"> <li>• use of microorganisms in the production of fuels,</li> </ul>	

	chemicals and new materials. Microbial leaching  <b>Agricultural Microbiology</b> 4 <ul style="list-style-type: none"> <li>• bioinsecticides, bioherbicides and related products</li> </ul> <p style="text-align: right;"><b>Total 43</b></p>																																																						
<b>Teaching/Learning Methodology</b>	The core information in different topics will be presented and explained to students in lectures. In tutorials, active participation is encouraged, key topics will be reviewed and related topics will be discussed to enhance their interest. Quizzes will be used to assess the students' knowledge and understanding of the subject expected from the learning outcomes. Laboratory sessions will require students to investigate, analyze, interpret and discuss results. A two day visit to industrial fermentation plants in Guangdong province will increase their understanding of commercial scale microbial processes.																																																						
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	<table border="1"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> <th>f</th> </tr> </thead> <tbody> <tr> <td>1. Written examination</td> <td>50</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> <td></td> </tr> <tr> <td>2. Quizzes-Continuous assessment</td> <td>35</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> <td></td> </tr> <tr> <td>3. Laboratory-Continuous assessment</td> <td>10</td> <td>x</td> <td>x</td> <td></td> <td></td> <td>x</td> <td>x</td> </tr> <tr> <td>4. Project report – Continuous assessment</td> <td>5</td> <td></td> <td>x</td> <td></td> <td>x</td> <td>x</td> <td>x</td> </tr> <tr> <td>Total</td> <td>100 %</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c	d	e	f	1. Written examination	50	x	x	x	x	x		2. Quizzes-Continuous assessment	35	x	x	x	x	x		3. Laboratory-Continuous assessment	10	x	x			x	x	4. Project report – Continuous assessment	5		x		x	x	x	Total	100 %						
Specific assessment methods/tasks	% weighting			Intended subject learning outcomes to be assessed (Please tick as appropriate)																																																			
		a	b	c	d	e	f																																																
1. Written examination	50	x	x	x	x	x																																																	
2. Quizzes-Continuous assessment	35	x	x	x	x	x																																																	
3. Laboratory-Continuous assessment	10	x	x			x	x																																																
4. Project report – Continuous assessment	5		x		x	x	x																																																
Total	100 %																																																						
<b>Student Study Effort Expected</b>	<table border="1"> <tr> <td>Class contact:</td> <td></td> </tr> <tr> <td> <ul style="list-style-type: none"> <li>▪ Lecture</li> <li>▪ Tutorial</li> <li>▪ Laboratory</li> <li>▪ Presentation</li> </ul> </td> <td>           26 Hrs.            13 Hrs.            9 Hrs.            3 Hrs.         </td> </tr> <tr> <td>Other student study effort:</td> <td></td> </tr> <tr> <td> <ul style="list-style-type: none"> <li>▪ Report writing</li> <li>▪ Self study</li> </ul> </td> <td>           10 Hrs.            50 Hrs.         </td> </tr> <tr> <td>Total student study effort</td> <td>111 Hrs.</td> </tr> </table>	Class contact:		<ul style="list-style-type: none"> <li>▪ Lecture</li> <li>▪ Tutorial</li> <li>▪ Laboratory</li> <li>▪ Presentation</li> </ul>	26 Hrs. 13 Hrs. 9 Hrs. 3 Hrs.	Other student study effort:		<ul style="list-style-type: none"> <li>▪ Report writing</li> <li>▪ Self study</li> </ul>	10 Hrs. 50 Hrs.	Total student study effort	111 Hrs.																																												
Class contact:																																																							
<ul style="list-style-type: none"> <li>▪ Lecture</li> <li>▪ Tutorial</li> <li>▪ Laboratory</li> <li>▪ Presentation</li> </ul>	26 Hrs. 13 Hrs. 9 Hrs. 3 Hrs.																																																						
Other student study effort:																																																							
<ul style="list-style-type: none"> <li>▪ Report writing</li> <li>▪ Self study</li> </ul>	10 Hrs. 50 Hrs.																																																						
Total student study effort	111 Hrs.																																																						
<b>Reading List and References</b>	References: Baltz, R.H., Davies, J.E., Demain, A.L. (ed.) Manual of Industrial Microbiology and Biotechnology, 3rd edition, ASM Press, 2010 Lee, Y.K. (ed.) Microbial Biotechnology, 2nd edition, World Scientific, 2006																																																						