

Subject Description Form

Subject Code	ABCT4104
Subject Title	Recent Developments in Medical Biotechnology
Credit Value	3
Level	4
Pre-requisite	Cell Biology
Objectives	The subject aims to provide students in the up-to-date knowledge and the techniques involved in the recent developments in medical biotechnology.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ul style="list-style-type: none"> (a) learn the fundamentals of modern cell biotechnology (b) critically evaluate the recent developments in cancer biology, medical biotechnology and stem cell technology (c) explore scientific background and experimental techniques employed in medical genetics, diagnostic, stem cells, clinical and cancer research laboratories (d) practice good technical skills with updated knowledge in medical biotechnology
Subject Synopsis/ Indicative Syllabus	<p><u>Recent updates on cancer diagnosis and therapy</u></p> <ul style="list-style-type: none"> - Introduction of cancer, diagnosis and therapy - Cancer stem cells - Cell free DNA testing (Plasma RNA – prenatal and cancer Diagnosis) - Next generation sequencing technology and personalized medicine - Cancer screening via protein biomarker analysis (circulating cancer cells and single cell) - Mouse model for cancer research - Health and safety ethical issues in animal handling and stem cell technology - Cancer immunology <p><u>Contemporary concept and applications of stem cells</u></p> <ul style="list-style-type: none"> - Stem cell technologies – basics and applications - Induced pluripotent stem cell technology <p><u>Genome editing</u></p> <ul style="list-style-type: none"> - CRISPR technology and its application
Teaching/Learning Methodology	<p><u>Lectures</u> Acquire general and basic understandings and concepts of the subject using an interactive approach.</p> <p><u>Term paper presentation</u> Students in a group would learn to put together a term-paper presentation regarding one of the hot topics in medical biotechnology.</p> <p><u>Laboratory</u> Students would learn important experimental techniques and be trained to develop their ability in designing experiments, data interpretation and report writing.</p>

	<p><u>Self-study</u> Students will be given a reading list for their own self-study. Reading list will be extracted from the recommended textbooks.</p>																																																																							
<p>Assessment Methods in Alignment with Intended Learning Outcomes</p>	<table border="1" data-bbox="483 389 1430 976"> <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></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>1. Examination</td> <td>50</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2. Quiz</td> <td>20</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3. Term-paper presentation</td> <td>15</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4. Lab report</td> <td>10</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td>5. Attendance</td> <td>5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td>100%</td> <td colspan="6"></td> </tr> </tbody> </table> <p>Assessments include laboratory report write-up, quiz, term paper presentation and examination. These assessments are in line with the content of the interactive lectures taught in class. Examination is focused on analytical skills and problem solving skills involved in the experimental techniques employed in medical genetics, stem cells, clinical and cancer research laboratories.</p> <p>Students are required to attend at least 75% of scheduled sessions for the subject. Students fail to fulfill the attendance requirement will lose the 5% attendance score.</p>								Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c				1. Examination	50	✓	✓	✓				2. Quiz	20	✓	✓	✓				3. Term-paper presentation	15	✓	✓	✓				4. Lab report	10	✓	✓	✓				5. Attendance	5							Total	100%								
Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)																																																																						
		a	b	c																																																																				
1. Examination	50	✓	✓	✓																																																																				
2. Quiz	20	✓	✓	✓																																																																				
3. Term-paper presentation	15	✓	✓	✓																																																																				
4. Lab report	10	✓	✓	✓																																																																				
5. Attendance	5																																																																							
Total	100%																																																																							
<p>Student Study Effort Expected</p>	<table border="1" data-bbox="483 1308 1430 1711"> <tr> <td colspan="2">Class contact:</td> <td colspan="6"></td> </tr> <tr> <td>▪ Lecture</td> <td></td> <td colspan="6">21 Hrs.</td> </tr> <tr> <td>▪ Tutorial</td> <td></td> <td colspan="6">12 Hrs.</td> </tr> <tr> <td>▪ Laboratory</td> <td></td> <td colspan="6">6 Hrs.</td> </tr> <tr> <td colspan="2">Other student study effort:</td> <td colspan="6"></td> </tr> <tr> <td>▪ Lab reports and other assignments</td> <td></td> <td colspan="6">16 Hrs.</td> </tr> <tr> <td>▪ Self study</td> <td></td> <td colspan="6">50 Hrs.</td> </tr> <tr> <td colspan="2">Total student study effort</td> <td colspan="6">105 Hrs.</td> </tr> </table>								Class contact:								▪ Lecture		21 Hrs.						▪ Tutorial		12 Hrs.						▪ Laboratory		6 Hrs.						Other student study effort:								▪ Lab reports and other assignments		16 Hrs.						▪ Self study		50 Hrs.						Total student study effort		105 Hrs.					
Class contact:																																																																								
▪ Lecture		21 Hrs.																																																																						
▪ Tutorial		12 Hrs.																																																																						
▪ Laboratory		6 Hrs.																																																																						
Other student study effort:																																																																								
▪ Lab reports and other assignments		16 Hrs.																																																																						
▪ Self study		50 Hrs.																																																																						
Total student study effort		105 Hrs.																																																																						
<p>Reading List and References</p>	<p>Articles and review papers from NCBI Pubmed.</p> <ol style="list-style-type: none"> 1. Cancer Stem Cells 1st Edition by Vinagolu K. Rajasekhar (Author) 2. Primer to the Immune Response, Second Edition ISBN: 9780123852458 by Tak. W. Mak and Mary E. Saunders and Bradley D. Jett 3. Stem Cell Technologies: Basics and Applications 1st Edition/2010/ ISBN: 978-1-118-35616-6 by Satish Totey and Kaushik Deb 																																																																							