



## UNIVERSITI TEKNOLOGI MARA

### BIO411: CELL BIOLOGY

<b>Course Name (English)</b>	CELL BIOLOGY APPROVED
<b>Course Code</b>	BIO411
<b>MQF Credit</b>	3
<b>Course Description</b>	This course covers basic and advanced cellular studies of living organism, emphasising the relationship between sub-cellular structures, biochemical and physiological functions of cells as the fundamental unit of life. It will engage students through cognitive approach on fundamental knowledge and facts in cell biology and active participations in developing laboratory skills in basic and advanced techniques in cell biology. Students will demonstrate the ability to define, discuss, design and relate the concepts in cell biology to solve problems, analyse data, make predictions, explain and make conclusions pertaining to topics and issues described in the course outlines. Students will demonstrate the skills in laboratory practises to design and conduct experiment and communicate well on topics given. The outcomes shall be assessed through a variety of tools which include the closed-book exams, tests, quizzes, laboratory reports and poster presentation.
<b>Transferable Skills</b>	Students will be trained to be versed in cell biological techniques.
<b>Teaching Methodologies</b>	Lectures, Lab Work
<b>CLO</b>	CLO1 Explain cell theory, concepts, facts and physiology in cell biology. CLO2 Display skills in experimental laboratory related to Cell Biology. CLO3 Demonstrate teamwork skills in experimental procedure for Cell's Mini Project.
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	
<b>1. Overview of Cell Biology</b> 1.1) 1.1 Development of the cell theory 1.2) 1.2 Microscopes and microscopy techniques 1.3) Independent learning on types of microscopes 1.4) 1.3 Prokaryotic and eukaryotic cell structures and functions 1.5) 1.4 Biogenesis and evolutionary origin- The Endosymbiotic Theory	
<b>2. Biological Membranes</b> 2.1) 2.1 Organisation and fluidity of membrane components 2.2) 2.2 Membrane excitation 2.3) 2.3 Membrane transport 2.4) 2.4 Special membrane structures	
<b>3. Cell Communication</b> 3.1) 3.1 Cell signalling and cell recognition 3.2) 3.2 Protein Receptors and transduction pathways 3.3) 3.3 Second messengers and examples of cell processes	
<b>4. Cell Cycle</b> 4.1) 4.1 Mitosis- Interphase, M-phase and cytokinesis 4.2) 4.2 Meiosis via Independent Assortment of Chromosomes 4.3) 4.3 Stem cells-Embryonic and adult stem cells	
<b>5. Cell Cycle and It's Control</b> 5.1) 5.1 Cell-cycle check-points and the regulatory proteins 5.2) 5.2 Apoptosis 5.3) 5.3 Characteristics and causes of cancer	

**6. Energy Transduction Pathways**

- 6.1) 6.1 Electron carrier molecules-Redox reactions
- 6.2) 6.2 Energy transduction pathways in mitochondria-Cellular respiration
- 6.3) 6.3 Energy transduction pathways in chloroplasts-Photosynthesis

**7. The Extracellular and Intracellular Matrices**

- 7.1) 7.1 Overview and functions of extracellular matrix
- 7.2) 7.2 Composition and structural diversity of extracellular matrix
- 7.3) 7.3 Cytoskeletal types and protein compositions
- 7.4) 7.4 Cytoskeletal functions

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Group Project	Group Project	20%	CLO3
	Lab Exercise	Lab exercise	20%	CLO2
	Test	Test	20%	CLO1

Reading List	Recommended Text	<ul style="list-style-type: none"> <li>• Jeff Hardin, Gregory Paul Bertoni, Lewis J. Kleinsmith 2017, <i>Becker's World of the Cell, Global Edition</i>, 8th Ed., Pearson Higher Ed [ISBN: 9781292177779]</li> </ul>
	Reference Book Resources	<ul style="list-style-type: none"> <li>• Jane B. Reece, Martha R. Taylor, Eric J. Simon, Kelly A. Hogan, Jean L. Dickey 2017, <i>Campbell Biology</i>, 7th Ed., 18, Pearson [ISBN: 0134240685]</li> <li>• Eldra Solomon, Charles Martin, Diana W. Martin, Linda R. Berg 2014, <i>Biology</i>, Cengage Learning [ISBN: 1305179897]</li> <li>• Robert J. Brooker 2017, <i>Biology</i>, 4th Ed., McGraw-Hill Education [ISBN: 9781260084115]</li> </ul>

Article/Paper List	This Course does not have any article/paper resources
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Other References	<ul style="list-style-type: none"> <li>• Website <i>Virtual Cell Tour</i> <a href="http://learn.genetics.utah.edu/content/begin/cells/insideacell/">http://learn.genetics.utah.edu/content/begin/cells/insideacell/</a></li> <li>• Website <i>Topic 1 tryout quiz</i> <a href="http://www.zerobio.com/target_practice_quiz/target_practice_quiz_cells.htm">http://www.zerobio.com/target_practice_quiz/target_practice_quiz_cells.htm</a></li> <li>• Website <i>Topic 2 Propagation of Action Potential</i> <a href="https://www.inkling.com/read/medical-physiology-boron-boulpaep-2nd/chapter-7/propagation-of-action-potentials">https://www.inkling.com/read/medical-physiology-boron-boulpaep-2nd/chapter-7/propagation-of-action-potentials</a></li> <li>• Website <i>Topic 3- subtopic Stem cell</i> <a href="http://www.eurostemcell.org/films">http://www.eurostemcell.org/films</a></li> </ul>
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