



UNIVERSITI TEKNOLOGI MARA

BIO091: FOUNDATION BIOLOGY I

Course Name (English)	FOUNDATION BIOLOGY I APPROVED
Course Code	BIO091
MQF Credit	5
Course Description	This is the first of the two-semester course in Foundation Biology for students at the Centre of Foundation Studies. This 5-credit course is focuses on the structure of life and some of the fundamental processes that characterize living things. It includes macromolecules, cells, plasma membrane transport, enzymes, cellular respiration, photosynthesis, biodiversity and ecology. This course is designed with a logical progression of topics arranged for students, who are entering tertiary education with different learning styles and varied stages of preparedness to further their studies at higher level.
Transferable Skills	<p>The purpose of this course is to provide students with a sound mastering of biological concepts and problem-solving skills to develop long-term retention of principles and practice needed in their future studies.</p> <p>The goal will be accomplished by thorough guidance methods, in-class exercises, and a systematic problem-solving approach. By the end of this course, students are expected to acquire and apply knowledge of biology to respective fields of medicine, health, environment, agriculture, industry and engineering.</p>
Teaching Methodologies	Lectures, Lab Work, Tutorial, Presentation
CLO	<p>CLO1 Explain the influence of living organisms on its ecosystem in cell biology and ecology.</p> <p>CLO2 Display basic scientific skills in cell biology and ecology.</p> <p>CLO3 Analyze the impact of man-made environmental disaster on cell biology and ecology.</p> <p>CLO4 Demonstrate information retrieval and management in searching for information related to man-made environmental disasters affecting cell biology and ecology.</p>
Pre-Requisite Courses	No course recommendations
Topics	<p>1. Macromolecules</p> <p>1.1) Functional groups</p> <p>1.2) Water</p> <p>1.3) Introduction to macromolecules</p> <p>1.4) Amino acids, peptides and proteins</p> <p>1.5) Structure and function of carbohydrates</p> <p>1.6) Structure and function of lipids</p> <p>1.7) Structure and function of nucleic acids</p> <p>2. Cells</p> <p>2.1) Cell theories</p> <p>2.2) Differences between prokaryotes and eukaryotes</p> <p>2.3) Structure and function of organelles</p> <p>2.4) Specialised animal tissues</p> <p>2.5) Specialised plant tissues</p>

3. Plasma Membrane Transport

- 3.1) Membrane components and its organization
- 3.2) Structure of plasma membrane - Fluid Mosaic Model
- 3.3) The role of membrane proteins
- 3.4) Membrane structure results in selective permeability
- 3.5) Passive transport
- 3.6) Active transport

4. Enzymes

- 4.1) Catalysis and concept of activation energy
- 4.2) Mechanisms of enzyme action
- 4.3) Factors affecting the rate of enzyme reactions
- 4.4) Michaelis-Menten kinetics and Lineweaver-Burke plot
- 4.5) Cofactors
- 4.6) Enzyme inhibition
- 4.7) Regulation of enzyme activity
- 4.8) Classification of enzymes
- 4.9) Enzyme technology

5. Cellular Respiration

- 5.1) Cellular respiration

6. Photosynthesis

- 6.1) Autotrophic and heterotrophic nutrition
- 6.2) Photosynthesis

7. Biodiversity

- 7.1) Taxonomy
- 7.2) Biodiversity in Malaysia

8. Ecology

- 8.1) Ecology
- 8.2) Ecosystem concept
- 8.3) Population ecology
- 8.4) Biogeochemical cycle

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Final Test	Final Test. Covers chapter 3 to 8 which are plasma membrane transport, enzymes, cellular respiration, photosynthesis, biodiversity and ecology for this semester.	50%	CLO1
	Group Project	Mini Project Presentation. Students are required to carry out a scientific mini project based on any topics related to the course Foundation Biology I. Students must prepare a scientific report and do presentation for the mini project.	5%	CLO4
	Group Project	Mini Project Report. Students are required to carry out a scientific mini project based on any topics related to the course Foundation Biology I. In order to carry out the mini project, students must plan out the experimental design of the investigation thoroughly. After all the results and data have been collected, these data have to be analysed and reported in scientific report.	10%	CLO4
	Lab Exercise	Lab practical: Experiment 1: Identification of Biological Molecules in Food. Students do hands on experiments on determining type of biological molecules presence in food sample given by using food tests. Students need to write and submit report. Experiment 2: Cell Staining and Measuring Cell Size. Students observe plant, animal and prokaryotic cells under the microscope and do structure identification. Students need to write and submit report. Experiment 3: Investigating Cell Membrane Permeability using Turmeric. Students do hands on experiment on investigating the effect of ethanol on the structure of turmeric. Students need to write and submit report.	5%	CLO2
	Presentation	Presentation. Students need to do a group presentation on chapter biodiversity. They can choose any animal or plant and present the topic based on threats and actions taken for conservation of the species.	5%	CLO3
	Quiz	Multiple Choice Questions and Written quiz. 10 - 15 questions with 20 minutes duration time for each quiz. Individual assessment. Covers three chapters, Macromolecules, Plasma Membrane Transport and Cellular Respiration.	5%	CLO1
	Test	Mid-sem Test. One and a half hour examination. One seating. Cover two chapters which are Macromolecules and Cells.	15%	CLO1
	Visual Assessment	Lab Observation	5%	CLO2

Reading List	Reference Book Resources	<ul style="list-style-type: none"> • Solomon P. Eldra, Martin E. Charles, Martin W. Diana, Berg R. Linda 2018, <i>Biology</i>, 11th Ed., 57, Cengage Singapore [ISBN: 9789814834] • Lisa A. Urry, Michael L. Cain, Steven A. Wasserman, Peter V. Minorsky, Jane B. Reece, Neil A. Campbell 2017, <i>Campbell Biology</i>, 11th Ed., Pearson Education [ISBN: 9781292170435] • Gerald Audesirk, Teresa Audesirk, Bruce E. Byer 2017, <i>Biology</i>, 11th Ed., Pearson Education [ISBN: 9781292158167]
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	