UNIVERSITI TEKNOLOGI MARA

BIO082: BIOLOGY II

Course Name (English)	BIOLOGY II APPROVED
Course Code	BIO082
MQF Credit	4
Course Description	This course will interactively engage students cognitively and scientifically in basic concepts and principles in microbiology, ecology, respiration, reproduction, growth and development, coordination and transportation system of plant and animal. Students will perform experiments related to basic concepts and principles in biology.
Transferable Skills	Reflective learner
Teaching Methodologies	Lectures, Lab Work, Tutorial
CLO	CLO1 Explain the terminologies, basic concepts and principles in microbiology, ecology, respiration, reproduction, growth and development, coordination and transportation system of plant and animal. CLO2 Respond to the observation and complete the laboratory datasheet in experiment related to basic concepts and principles in biology. CLO3 Demonstrate values, ethics and professionalism in both the laboratory and classroom.
Pre-Requisite Courses	No course recommendations

Topics
1. Microbiology 1.1) 1.1 Introduction to microbiology and microorganisms 1.2) 1.2 History of microbiology 1.3) Anton Van Leeuwenhoek 1.4) Lazarro Spallanzani 1.5) Edward Jenner 1.6) Louis Pasteur 1.7) Robert Koch 1.8) Joseph Lister 1.9) Alexander Fleming 1.10) 1.3 The biology of microorganisms 1.11) 1.4 Bacteria - Characteristics of bacteria 1.12) Bacterial growth and reproduction 1.13) Bacterial classification 1.14) 1.5 The Viruses – Characteristics and structure of viruses 1.15) – Viral reproduction 1.16) (Example : bacteriophages) 1.17) 1.6 Fungi - Characteristics and structure of fungi 1.18) Fungal Life Cycle 1.19) Example : Yeast and Mucor 1.20) 1.7 The importance of microorganisms: 1.21) Nitrogen cycle, medicine, food industries, agriculture, biotechnology. 1.22) Examples of diseases caused by viruses, bacteria and fungi.
2. Respiration System 2.1) 2.1 Respiration and energy release 2.2) 2.2 Respiration 2.3) Internal and external respiration 2.4) 2.3 Aerobic and anaerobic respiration 2.5) 2.4 Invertebrate Respiration – structure and mechanism 2.6) 2.5 Aquatic habitats: Flatworms 2.7) 2.6 Insects: Grasshopper

2.8) 2.7 Vertebrate Respiration – structure and mechanism Gills of fishes and amphibians
2.9) 2.8 Human Respiratory System
2.10) 2.9 Structure of the respiratory system
2.11) 2.10 Functions of the respiratory system
2.12) 2.11 Inhalation and exhalation
2.13) 2.12 Gas exchange and transport
2.14) 2.13 Lungs

3. Transportation System
3.1) 3.1 Circulatory system in human
3.2) 3.1.1 Blood system
3.3) Blood composition
3.4) Functions of blood
3.5) Blood circulation in human
3.6) 3.1.2 Cardiovascular System
3.7) Heart structure
3.8) Circulatory pathway (oxygenated and deoxygenated)
3.9) 3.1.3 Lymphatic System
3.10) Lymphoid Organs and tissues
3.11) Lymphoid composition, functions and circulation
3.12) 3.2 Plant Transportation System
3.13) 3.2.1 Types of plant tissues
3.14) Structures and functions of xylem and phloem
3.15) 3.2.2 Water and mineral transportation system
3.16) Definition of transpiration
3.17) Root pressure
3.18) Capillary action
3.19) Guttation
3.20) 3.2.3 Translocation
3.21) Definition of translocation
3.22) Mass flow theory

4. Reproduction, Growth and Development
4.1) 4.1 Reproduction (sexual/asexual)
4.2) Animal sexual reproduction
4.3) Internal and external fertilization
4.4) Definition of oviparity, ovoviviparity, viviparity
4.5) Role of the sexual reproduction
4.6) 4.1.1 Plant sexual reproduction
4.7) Reproductive structure of flowering plants
4.8) Self and cross pollination and fertilization
4.9) 4.2 Growth
4.10) 4.2.1 Defining the growth processes
4.11) Cell division
4.12) Cell elongation
4.13) Cell development
4.14) 4.2.2 Patterns of an early growth of animals and plants
4.15) Growth curve
4.16) Growth rate
4.17) Growth percentages
4.18) 4.2.3 Growth location
4.19) Primary growth (apical meristems)
4.20) Secondary growth (lateral meristems)
4.21) 4.3 Development
4.22) 4.3.1 Animal development
4.23) Complete and incomplete metamorphosis
4.24) Life cycle and development of insects and frogs
4.25) 4.3.2 Development in flowering plants
4.26) embryo structure
4.27) germination of hypogeal and epygeal

5. Coordination in organisms
5.1) 5.1 Coordination in human
5.2) 5.1.1 Nerves coordination
5.3) 5.1.2 Nervous system
5.4) Central nervous system (CNS – Brain/Spinal cord)
5.5) Peripheral nervous system(PNS – somatic/autonomic nerves)
5.6) Reflex action
5.7) 5.1.3 Chemical coordination
5.8) Endocrine system
5.9) Hormone and functions
5.10) 5.2 Plants responses
5.11) 5.2.1 Types of responses
5.12) Tropism, nastic and taxis: definition and examples
5.13) 5.2.2 Plants hormone
5.14) Hormone types and functions

6. Ecology
6.1) 6.1 Definition of ecology, species, habitat, population, community, biotic and abiotic environment, ecosystem, biosphere, ecological niche.
6.2) 6.2 The flow of energy through ecosystem
6.3) 6.2.1 Food chain
6.4) 6.2.2 Food web
6.5) 6.2.3 Ecological pyramids – Pyramid of energy, biomass, number and inversed number.
6.6) 6.3 Interactions between organisms
6.7) 6.3.1 Amensalism
6.8) 6.3.2 Saprotism
6.9) 6.3.3 Commensalism
6.10) 6.3.4 Parasitism
6.11) 6.3.5 Mutualism

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	Assignment	5%	CLO1 , CLO2 , CLO3
Lab Exercise	Lab 1	2%	CLO1 , CLO2 , CLO3
Lab Exercise	Lab 2	2%	CLO1 , CLO2 , CLO3
Lab Exercise	Lab 3	2%	CLO1 , CLO2 , CLO3
Lab Exercise	Lab 4	2%	CLO1 , CLO2 , CLO3
Lab Exercise	Lab 5	2%	CLO1 , CLO2 , CLO3
Practical	Practical Skill	10%	CLO1 , CLO2 , CLO3
Quiz	Quiz 1	2%	CLO1 , CLO2 , CLO3
Quiz	Quiz 3	2%	CLO1 , CLO2 , CLO3
Quiz	Quiz 2	2%	CLO1 , CLO2 , CLO3
Quiz	Quiz 4	2%	CLO1 , CLO2 , CLO3
Quiz	Quiz 5	2%	CLO1 , CLO2 , CLO3
Test	Test 1	10%	CLO1 , CLO2 , CLO3
Test	Test 2	10%	CLO1 , CLO2 , CLO3
Visual Asssessment	Values, ethics & professionalism	5%	CLO1 , CLO2 , CLO3

Reading List

Recommended Text

- **Lee Ching 2005, *Text Pre-U STPM Matriculation Biology Vol.2.*, Ed., , Pearson-Longman Malaysia Sdn. Bhd. [ISBN:]**

Reference Book Resources

- **Campbell, N.A. and Reece, J.B 2007, *Biology*, 7 Ed., , Pearson [ISBN:]**
- **Solomon, E. P. Berg, L. R. and Martin, D. W. 2005, *Biology*, 7 Ed., , Thomson Learning, Inc. [ISBN:]**
- **Starr, C. and Taggart, R. 2000, *Biology: The Unity and Diversity of life*, 9 Ed., , Brooks & Cole**

Article/Paper List: This Course does not have any article/paper resources

Other References: This Course does not have any other resources