UNIVERSITI TEKNOLOGI MARA

BIO300: BIOLOGICAL TECHNIQUES AND SKILLS

Course Name (English)	BIOLOGICAL TECHNIQUES AND SKILLS APPROVED
Course Code	BIO300
MQF Credit	3
Course Description	This course emphasizes the laboratory techniques and methods commonly applied in biological studies. A theory on the application of the technology and instruments used is also included. The topics include techniques in fieldwork investigation, techniques in microbiology, histological methods, biochemical analysis and instrumentation, and DNA technology.
Transferable Skills	In the future, the students can adapt the appropriate scientific methods and display skills learned in the class in their research project.
Teaching Methodologies	Lectures, Blended Learning, Lab Work, Discussion, Presentation, Journal/Article Critique, Supervision
CLO	CLO1 Explain the concepts and theories in biological techniques and skills. CLO2 Examine different biological techniques and skills to obtain data. CLO3 Propose experimental studies to address chosen problems with reference to relevant literature. CLO4 Discussing experimental report based on standard structure format which contains the Preface, Text, and Supplementary sections. CLO5 Explain experimental studies through verbal and written presentation in group.
Pre-Requisite Courses	No course recommendations

Topics
1. Techniques in Microbiology 1.1) 1.1 Introduction to microbiology 1.2) 1.2 Safety rules 1.3) 1.3 Microorganism control (sterilization and aseptic technique) 1.4) 1.4 Media preparation (type of media and bacterial cultures
2. Techniques in Histology 2.1) 2.1 Introduction to histology 2.2) 2.2 Safety rules 2.3) 2.3 Fixative chemicals 2.4) 2.4 Histological preparation for tissues and cells (fixation, dehydration, embedding, sectioning, staining and mounting)
3. Techniques in Field Investigation 3.1) 3.1 Introduction to field investigation 3.2) 3.2 Safety rules in field investigation 3.3) 3.3 Sampling techniques and sampling equipment 3.4) 3.4 The preservation and mounting techniques in plants 3.5) 3.5 The preservation and mounting techniques in animals
4. Techniques in Biochemical Analysis 4.1) 4.1 Introduction to biochemical analysis 4.2) 4.2 Safety rules 4.3) 4.3 Extraction methods 4.4) 4.4 Chromatography principles and techniques [Thin Layer Chromatography (TLC), High Performance Liquid Chromatography (HPLC) and Gas Chromatography (GC)] 4.5) 4.5 Spectrophotometry (Beer's Law)

5. Techniques in DNA Technology 5.1) 5.1 Introduction to DNA technology 5.2) 5.2 Safety rules and bioethical 5.3) 5.3 DNA Cloning and recombinant DNA 5.4) 5.4 DNA Sequencing (conventional enzymatic sequencing and automated enzymatic sequencing) 5.5) 5.5 Polymerase Chain Reaction (PCR)
6. Mini Project 6.1) n/a
7. Mini Project Presentation 7.1) n/a

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Final Project	Project Presentation (10%)	10%	CLO5
Final Project	Project implementation (20%).	20%	CLO3
Final Project	Project report writing (20%).	20%	CLO4
Lab Exercise	Assessment will be conducted on student performance on their laboratory skills (10%) and laboratory report (10%).	20%	CLO2
Test	This test will cover chapter 1 (Techniques in Microbiology) and some part of chapter 2 (Techniques in Histology) of this course.	10%	CLO1
Test	This test will cover the remaining of chapter 2 and chapter 3 (Techniques in Field Investigation).	10%	CLO2
Test	This test will cover chapter 4 (Techniques in Biochemical Analysis) and chapter 5 (Techniques in DNA Technology).	10%	CLO2

Reading List

Recommended Text

- **Jones, A., Reed, R. & Weyers, J. 2003, *Practical Skill in Biology*, 3 Ed., , Pearson Prentice Hall. [ISBN:]**
- **Wan Omar, W. S. A., Hashim, S. and Musa, N. L. W 2012, *Biological Techniques and Skills: A Laboratory Manual*, Universiti Teknologi MARA (UiTM) Pahang Malaysia**

Reference Book Resources

- **Wan Ramlee, Sulaiman Shaari, Fauziah Ismail, 2007, *Guidelines on Supervision, Assessment, Evalua*, 2 Ed., , University Publication Centre (UPENA), Univer [ISBN:]**
- **Langford, A., Dean, J., Reed, R., Holmes, D., 2005, *Practical Skill in Forensic Science*, Ed., , Pearson Prentice Hall. [ISBN:]**
- **Henderson, P. A. 2003, *Practical Methods in Ecology*, Ed., , Blackwell Publishing [ISBN:]**
- **Campbell, N. A., Reece, J. B., Urry, L.A., Cain, M. L., Wasserman, S. A., Minorsky, P. V., and Jackson, R. B. 2008, *Biology*, 8th Ed., Person Benjamin Cummings USA**
- **Seidman, L. A. 2008, *Basic Laboratory Calculations for Biotechnology*, Pearson Benjamin Cummings USA**
- **Dubey, R.C and Maheswari D. K. 2006, *Practical Microbiology (Revised Edition)*, S. Chand & Company LTD New Delhi**

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

Other References: This Course does not have any other resources