UNIVERSITI TEKNOLOGI MARA

BMS531: METHODS IN MOLECULAR BIOLOGY I

Course Name (English)	METHODS IN MOLECULAR BIOLOGY I APPROVED
Course Code	BMS531
MQF Credit	4
Course Description	This course introduces students to the basic molecular biology toolbox. Techniques such as DNA extraction, gel electrophoresis, gene cloning, restriction enzyme mapping,DNA hybridization, DNA sequencing and polymerase chain reaction are taught and the mechanism behind them explained. The course is very much hands-on in nature, supplemented by lectures and tutorial. This will ensure that students have the necessary skills and understanding to learn more esoteric techniques and to understand the applications of molecular biology in research. Practicals will be ran workshop-style for maximal hands-on benefits.
Transferable Skills	Sample preparation, reaction setup, experimental design, data analysis, report writing
Teaching Methodologies	Lectures, Blended Learning, Practical Classes
CLO	CLO1 Explain concepts relating to basic methods in molecular biology. CLO2 Illustrate using specific examples the concepts relating to molecular biology of how it can be used to solve real problems. CLO3 Conduct experiments related to basic molecular biology techniques such as DNA/plasmid extraction, agarose gel electrophoresis, DNA digestion and ligation, PCR and transformation. CLO4 Prepare scientific reports using data on experiments performed.
Pre-Requisite Courses	No course recommendations

Topics
1. DNA and RNA extraction 1.1) 1.1 Genomic DNA extraction- cell lysis, purification and precipitation 1.2) 1.2 Plasmid extraction 1.3) 1.3 RNA extraction
2. Amplification of DNA and cDNA 2.1) 2.1 Conventional PCR 2.2) 2.2 Real-time PCR 2.3) 2.3 Reverse transcriptase PCR 2.4) 2.4 Other PCR
3. Vectors and Restriction Enzymes digestion 3.1) 3.1 Different type of cloning vectors 3.2) 3.2 Restriction Endonucleases 3.3) 3.3 Restriction mapping
4. DNA ligation 4.1) 4.1 DNA ligase 4.2) 4.2 Maximising ligation efficiency
5. Gene delivery 5.1) 5.1 Transformation 5.2) 5.2 Selection for positive transformants 5.3) 5.3 Transfection and Transduction
6. Analysis of DNA 6.1) 6.1 Sanger dideoxy sequencing method 6.2) 6.2 NGS and other sequencing methods 6.3) 6.3 DNA hybridization; Northern blotting, Southern blotting and FISH

7. Application of molecular biology method
7.1) 7.1 DNA fingerprinting using PCR
7.2) 7.2 16S rDNA using PCR
7.3) 7.3 Disease diagnosis using FISH

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	Assignment on application of molecular biology	15%	CLO4
Test	Test on the basic concepts of molecular biology	20%	CLO1
Written Report	Lab report	15%	CLO3

Reading List

Recommended Text

- **Robert F. Weaver 2011, *Molecular Biology*, 5th Ed., McGraw-Hill Education [ISBN: 978-007352532]**
- **Robert Brooker 2014, *GENETICS*, 5TH Ed., McGraw Hill [ISBN: 978-00735253]**

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

Other References: This Course does not have any other resources