UNIVERSITI TEKNOLOGI MARA

BMS414: GENES AND HEREDITY

Course Name (English)	GENES AND HEREDITY APPROVED
Course Code	BMS414
MQF Credit	3
Course Description	This course will address on Mendelian genetics, chromosomal inheritance, modified Mendelian ratios, chromosome mapping, linkage, gene and chromosomal mutations, recombination, Students will define the vocabulary in genetics and explain the rules of inheritance. Students will apply critical thinking skills in analyzing genetic data and determining mode of inheritance. The course will also discuss how subtle changes in the genetic makeup can affect human life and well being, including hereditary genetic diseases.
Transferable Skills	Demonstrate information retrieval and management skills in tasks related in human genetics
Teaching Methodologies	Lectures, Case Study, Tutorial, Discussion, Presentation, Role Play, Collaborative Learning
CLO	CLO1 Illustrate the principal mechanisms of genetic information flow in relation to human health and natural variation. CLO2 Demonstrate ethics and professionalism related to human genetics CLO3 Demonstrate information retrieval and management skills in tasks related in human genetics
Pre-Requisite Courses	No course recommendations

Topics
1. 1.0 Introduction to Genetics 1.1) 1.1 Historical Concepts of Genetics 1.2) 1.2 The Search of Genetic Material 1.3) 1.3 Discovery of the Double Helix Structure 1.4) 1.4 The Genetic Code 1.5) 1.5 Fields of Genetics – Classical, Molecular and Population Genetics 1.6) 1.6 Genetics and Society – Eugenics and Euphenics, Genetic Advances in Medicine and Agriculture, GMO's, Gene Therapy, Gene Testing, Ethics in Genetics (Human Genome Project).
2. 2.0 Genotypes and Phenotypes 2.1) 2.1 Chromosomes 2.2) 2.2 Mendelian Genetics 2.3) a. Law of Segregation 2.4) b. Law of Independent Assortment 2.5) 2.3 Application of Mendelian Principles: Punnett Square, Forked Line Method, Chi Square Test. 2.6) 2.7) 2.8) 2.9) 2.4 Extension of Mendelian Inheritance 2.10) a. Incomplete Dominance 2.11) b. Codominance 2.12) c. Multiple Alleles 2.13) d. Gene Interaction and Modified Mendelian Ratios (Epistasis) 2.14) e. Lethal Genes 2.15) f. Pleiotropy 2.16) g. Expressivity vs Penetrance 2.17) h. Nature vs Nurture

3. 2.0 Genotypes and Phenotypes 3.1) 2.5 Sex Determination and Sex Linkage 3.2) a. Sex Chromosomes 3.3) b. Sex Determination in Human Beings, Drosophila and Other Animals. 3.4) c. Sex-Linked Genes 3.5) d. Dosage Compensation of X-Linked Genes: The Lyon Hypothesis 3.6) e. Hyperactivation of X-Linked Genes in Male Drosophila 3.7) f. Temperature Variation and Sex Determination in Reptiles. 3.8) g. Sex Limited and Sex Influenced Traits.
4. 2.0 Genotypes and Phenotypes 4.1) 2.6 Human Pedigrees 4.2) 4.3) 2.7 Variations in Chromosome Structure and Number 4.4) 4.5) 2.8 Mutations and their consequences and roles inheritable diseases

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Case Study	One case study (grouping) written report related to ethical use of science to emphasize the attribute of " ethics and professionalism "	10%	CLO2
Presentation	Narrative presentation/role play based on novel related to ethic and professionalism to demonstrate ability information retrieval and management.	20%	CLO3
Test	Test on mechanisms of genetics Structured question to demonstrate the ability to apply knowledge for "prolem solving" in MQF6	20%	CLO1

Reading List

Recommended Text

- **R.J, Brooker 2015, *Genetics: Analysis and Principles*, 5th Ed., 1-8, Mc Graw-Hill education N york, USA [ISBN: 9780073525341]**
- **2. D.P Snustad and M.J. Simmons 2015, *Principles of Genetics*, 7th Ed., 24, John Wiley & Sons. USA [ISBN: 978-111914228]**

Article/Paper List

This Course does not have any article/paper resources

Other References

- **Book P.J. Rusell 2014, *Genetics : a molecular approach.9th ed.*, Pearson International., USA**
- **Book 2. J.D. Watson 2014, *Molecular Biology of the gene. 7th ed.*, Pearson,, Boston**
- **Book 3. M.Stubbs, N Suleyman and J Evans 2013, *Cell Biology and genetics. 4th ed.*, Mosby/Elsevier., USA**
- **Book 4. J.E. Krebs, B. Lewin, E.S. Goldstein, S.T. Kilpatrick 2013, *Lewin's essential genes. 3rd ed.*, Jones and Barlettt,, Burlington**