UNIVERSITI TEKNOLOGI MARA

BMS664: ADVANCED IMMUNOLOGY

Course Name (English)	ADVANCED IMMUNOLOGY APPROVED
Course Code	BMS664
MQF Credit	3
Course Description	This course covers topics in immunology for students who already have a basic knowledge of immunology. It provides students with a more in depth and advanced understanding of immunology particularly in areas which include genetics of antibody diversity; genetics and structure of the T cell receptor and MHC molecules; mechanisms of immune response regulation, the immune system in health and disease and techniques applicable in both diagnostic and research laboratories.
Transferable Skills	Performing ELISPOT and Western blot.
Teaching Methodologies	Lectures, Lab Work
CLO	CLO1 Explain the genetic mechanisms that result in the diversity in immunoglobulin structure and T cell receptor responsible for antigen recognition and the signalling transduction involved in lymphocytes activation. CLO2 Discuss the general organization and inheritance of MHC, its role in antigen processing and presenting and allograft graft rejection. CLO3 Relate the function of the immune system to its applications in protection, transplantation and immunological diseases. (PO1-C5, A4, P1) CLO4 Predict the effects of failure in the mechanism of tolerance and regulation of the immune.system. CLO5 Justify the selection of suitable immunological techniques to address immunological questions. CLO6 Conduct immunoassays experiments and communicate the findings in scientific writing.
Pre-Requisite Courses	No course recommendations

Topics
1. 1.0 The Immune System Revisited 1.1) Adaptive immune response vs Innate Immune response 1.2) Antibody mediated immune response 1.3) Cell mediated immune response
2. 2.0 Organization and expression of Immunoglobulin and T cell receptor 2.1) Genetic mechanisms models of antibody diversity 2.2) Multigene Organization of Ig Genes 2.3) Variable-Region Gene Arrangements 2.4) Mechanism of Variable-Region DNA Arrangements 2.5) Generation of Antibody Diversity 2.6) Class Switching 2.7) Expression of Ig Genes 2.8) Synthesis, Assembly and Secretion of Immunoglobulins 2.9) Regulation of Ig-Gene Transcription 2.10) Antibody genes and Antibody engineering 2.11) Organization and rearrangement of T cell receptor genes 2.12) TCR receptor complex 2.13) Tcell accessory membrane molecules 2.14) Alloreactivity of T cells

3. 3.0 Signalling through Immune System Receptors 3.1) General principle of signal transduction and propagation 3.2) Antigen receptor signalling and lymphocyte activation 3.3) Other receptors and signalling pathway
4. 4.0 Major Histocmpatibility Complex and its Function 4.1) General organization and inheritance 4.2) MHC molecules and genes 4.3) Genomic Map of MHC genes 4.4) Cellular expression of MHC molecules 4.5) Regulation of MHC expression 4.6) MHC roles in Antigen Processing and Presenting 4.7) MHC and disease susceptibility
5. 5.0 The Immune System in Health and Disease 5.1) Hypersensitivity Reactions 5.2) Autoimmunity and transplantation 5.3) Immunodeficiency diseases 5.4) Immune Response to Infectious Diseases
6. 6.0 Tolerance and Regulation of Immune System 6.1) Establishment and maintenance of tolerance 6.2) Regulation of the Immune system
7. 7.0 Laboratory Techniques Commonly use in Immunology 7.1) Polyclonal and Monoclonal Antibodies production 7.2) Bead-based Technology 7.3) Enzyme linked Immunospot Assay (ELISPOT) 7.4) Western Blot 7.5) Immunocytochemistry 7.6) Flow Cytometry

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	This assessment will be on area of the Immune system in health and disease	5%	CLO3
Test	Test 1 includes the following topics on organization and expression of Immunoglobulin and T cell receptor genes and 3.0 Signalling through Immune System Receptors	10%	CLO1
Test	Test 2 includes the following topics Major Histocmpatibility Complex and its Function and The Immune System in Health and Disease	10%	CLO2 , CLO3
Test	Test 3 includes the following topics tolerance and regulation of immune system and laboratory techniques commonly use in immunology	10%	CLO4 , CLO5
Written Report	These written reports are scientific reports on laboratory experiments (six experiments) carried out during the semester	15%	CLO6

Reading List

Recommended Text

- **Judith A. Owen,Jenni Punt,Janis Kuby,Sharon A. Stranford 2013, *Kuby Immunology*, 7th Ed., W. H. Freeman [ISBN: 9781464137846]**
- **Gordon MacPherson,Jon Austyn 2012, *Exploring Immunology*, John Wiley & Sons [ISBN: 9783527324125]**

Reference Book Resources

- **David K. Male,Jonathan Brostoff,Ivan M. Roitt 2012, *Immunology,With STUDENT CONSULT Online Access,8*, 8th Ed., Elsevier Health Sciences [ISBN: 9780323080583]**
- **Kenneth Murphy 2012, *Janeway's Immunobiology*, 8th Ed., Garland Science [ISBN: 978081534243]**

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

Other References: This Course does not have any other resources