



UNIVERSITI TEKNOLOGI MARA

BMS654: MOLECULAR BIOLOGY OF DISEASES

Course Name (English)	MOLECULAR BIOLOGY OF DISEASES APPROVED
Course Code	BMS654
MQF Credit	3
Course Description	This course is designed to acquaint the students to the necessary theoretical knowledge needed to understand the genetic and molecular basis of human diseases. By acquiring knowledge of diseases e.g. cancer at the molecular level, we can identify molecular targets and design specific drugs with enhanced efficiency and little side effects. The next generation of therapeutics made possible by this approach will also be discussed. The molecular pathology of infectious diseases will be discussed in another course.
Transferable Skills	Students are able to understand the genetic and molecular basis of human diseases for e.g cancer. Also able to identify molecular targets and the use of design specific drugs.
Teaching Methodologies	Lectures, Practical Classes, Presentation
CLO	CLO1 Discuss the genetics and molecular mechanisms underlying common heritable diseases including molecular techniques as diagnostic tools. CLO2 Explain current technologies for improvement of diagnosis and treatment of diseases. CLO3 Perform scientific experiments on molecular diagnostics of diseases. CLO4 Demonstrate social communication skills in group tasks on selected emerging technology for the treatment of diseases
Pre-Requisite Courses	No course recommendations
Topics	
1. Genetic diseases 1.1) Monogenic diseases 1.2) Polygenic diseases 1.3) Diseases resulting from mitochondrial disorders 1.4) Complex disease with multifactorial inheritance	
2. Genetic predisposition 2.1) Genetic predisposition to disease 2.2) Familial clustering of diseases 2.3) Mapping of human disease 2.4) SNPs and disease association	
3. The genetics basis of cancer 3.1) Cancer as a genetic disease 3.2) Cancer and the cell cycle 3.3) Programmed cell death 3.4) Oncogenes and tumor suppressor genes 3.5) Chromosomal rearrangement 3.6) Genetic pathways to cancer 3.7) Signal transduction in cancer 3.8) G Protein-Coupled Receptors in Cancer 3.9) Gap junctions and cancer	

4. Topics on selected genetic diseases

- 4.1) Cystic fibrosis
- 4.2) Huntington's disease
- 4.3) Pendred syndrome
- 4.4) Hematopoietic eg. thalassemia, sickle cell anaemia
- 4.5) Marfan syndrome
- 4.6) Tay-Sachs
- 4.7) Fragile X syndrome
- 4.8) Von Hippel-Lindau syndrome (VHL)
- 4.9) Asthma
- 4.10) Gaucher's disease
- 4.11) Diabetes Mellitus Type 1

5. Genetic testing

- 5.1) Considerations for testing
- 5.2) Types of genetic testing
- 5.3) Karyotyping

6. Gene Therapy

- 6.1) Overview of Gene Therapy.
- 6.2) Gene delivery
- 6.3) Synthetic gene delivery strategies
- 6.4) Examples of potential therapy: Cancer gene therapy
- 6.5) Public policy, regulatory issues and ethical issues. Synthetic gene delivery strategies
- 6.6) Examples of potential therapy: Cancer gene therapy
- 6.7) Public policy, regulatory issues and ethical issues.

7. Emerging technologies

- 7.1) Stem Cells
- 7.2) Tissue engineering
- 7.3) Other technologies

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Presentation	n/a	20%	CLO4
	Test	n/a	20%	CLO1
	Written Report	Lab report	10%	CLO3

Reading List	Recommended Text	Reference Book Resources
	<ul style="list-style-type: none"> • Robert L. Nussbaum, Roderick R. McInnes, Huntington F. Willard 2016, <i>Thompson & Thompson Genetics in Medicine</i>, 2nd Ed., 1,2,3, Elsevier Health Sciences [ISBN: 9781437706963] • Lynn B. Jorde, John C. Carey, Michael J. Bamshad 2015, <i>Medical Genetics</i>, Elsevier Health Sciences [ISBN: 0323188354] 	<ul style="list-style-type: none"> • Daniel Johnson 2012, <i>Cell Death Signaling in Cancer Biology and Treatment</i>, Springer Science & Business Media [ISBN: 9781461458470] • Tom Strachan, Judith Goodship, Patrick Chinnery 2014, <i>Genetics and Genomics in Medicine</i>, 1 Ed., Garland Science [ISBN: 978-081534480] • Peter D. Turnpenny, Sian Ellard 2012, <i>Emery's Elements of Medical Genetics</i>, 14th Ed., Churchill Livingstone [ISBN: 9780702040436] • Amanda Harvey 2013, <i>Cancer Cell Signalling</i>, John Wiley & Sons [ISBN: 9781119967576]

Article/Paper List	This Course does not have any article/paper resources
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Other References	This Course does not have any other resources
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