



## UNIVERSITI TEKNOLOGI MARA

### BMS532: GENE EXPRESSION AND REGULATION

<b>Course Name (English)</b>	GENE EXPRESSION AND REGULATION <b>APPROVED</b>
<b>Course Code</b>	BMS532
<b>MQF Credit</b>	3
<b>Course Description</b>	This subject introduce students to the gene expression mechanisms in eukaryotic cells. Students will learn how gene expression is carried out and regulated by a plethora of pathways in cells. At the end of the subject, students are taught how altered gene expression control fundamental biological processes such as development and aging, and how aberrant gene expression can lead to human diseases.
<b>Transferable Skills</b>	At the end of the course, the student will have the knowledge on the eukaryotic gene expression and regulation systems and able to perform molecular biology technique such as DNA extraction, PCR, agarose gel preparation, agarose gel electrophoresis, the use of UV transilluminator, Gel Documentation camera unit, calculations on molarity, concentration and basic aseptic technique in laboratory. Students will be able to work in group in coordinated manner and develop teamwork.
<b>Teaching Methodologies</b>	Lectures, Case Study, Practical Classes
<b>CLO</b>	CLO1 Describe the principles and mechanisms underlying the eukaryotic gene expression and regulation CLO2 Explain how the knowledge and understanding of gene regulation and expression in applications CLO3 Perform scientific experiments in gene expression and regulation
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	
<b>1. Epigenetics and chromatin structures</b> 1.1) Introduction to chromatin structure 1.2) Regulation of gene expression via modification on DNA, Histone and Nucleosome 1.3) X-inactivation and genomic imprinting	
<b>2. Transcription in eukaryotes</b> 2.1) Transcription process 2.2) Regulation of transcription in eukaryotes	
<b>3. Post-transcriptional events</b> 3.1) RNA processing: splicing 3.2) RNA processing: 5' capping and polyadenylation 3.3) Alternative splicing of RNA	
<b>4. Translation process</b> 4.1) Formation of initiation translation complex 4.2) Translation of mRNA 4.3) Protein folding	
<b>5. Post translational modifications (PTMs)</b> 5.1) Introduction to post translational modifications 5.2) Examples of PTMs: phosphorylation, methylation, glycosylation, ubiquitination, and other additions. 5.3) Gene expression regulation via Proteolysis	
<b>6. Gene expression and cell function</b> 6.1) Relating gene expression and cellular function, development 6.2) Overview of diseases due to aberrant gene expression	

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment/case study. Student will be given article/journal followed by questions.	20%	CLO2
	Test	n/a	20%	CLO1
	Written Report	Lab report	10%	CLO3

Reading List	Recommended Text	<ul style="list-style-type: none"> <li>William S Klug, Michael R Cummings, Charlotte A Spencer, Michael A Palladino, Darrell Killian 2018, <i>Concepts of Genetics</i>, 12 Ed., Pearson [ISBN: 978-013460471]</li> <li>Michael Goldberg, Leland Hartwell, Leroy Hood, Janice Fischer 2017, <i>Genetics: From Genes to Genomes</i>, 6th Ed., McGraw-Hill Education [ISBN: 978-125970090]</li> </ul>
	Reference Book Resources	<ul style="list-style-type: none"> <li>T. A. Brown, Terence A. Brown 2017, <i>Genomes</i>, 5 Ed., Garland Science [ISBN: 0815345089]</li> </ul>

Article/Paper List	Recommended Article/Paper Resources	<ul style="list-style-type: none"> <li>Moreno V, Sanz-Pamplona R. 2015, Altered pathways and colorectal cancer prognosis, <i>BMC Medicine</i>, 2015 Apr 8, 76 <a href="http://doi: 10.1186/s12916-015-0307-6">http://doi: 10.1186/s12916-015-0307-6</a>.</li> </ul>
--------------------	-------------------------------------	---

Other References	<ul style="list-style-type: none"> <li>Book Nessa carey 2013, <i>The Epigenetics Revolution: How Modern Biology Is Rewriting Our Understanding of Genetics, Disease, and Inheritance</i>, Columbia University Press, ISBN-13: 978-0231161176</li> <li>website National cancer Institute 2015, <i>Genetics of Colorectal Cancer</i> <a href="http://www.cancer.gov/cancertopics/">http://www.cancer.gov/cancertopics/</a></li> <li>Book Cath Ennis (Author), Oliver Pugh (Illustrator) 978-1848318625 2016, <i>Introducing Epigenetics: A Graphic Guide</i>, Icon books, Canada</li> </ul>
------------------	---