



UNIVERSITI TEKNOLOGI MARA

BIO616: PRINCIPLES OF NEUROBIOLOGY

Course Name (English)	PRINCIPLES OF NEUROBIOLOGY APPROVED
Course Code	BIO616
MQF Credit	3
Course Description	This course is designed to provide students with an overview of the wide ranging field of neurobiology, with exposure to the fundamental principles. It will examine the fundamental concepts of neurobiology from general and functional neuroanatomy, cellular morphology, cellular neurophysiology and biochemistry, through systems and cognitive neurobiology. The course will also focus on the chemistry, physiology, and pharmacology of specific neurotransmitters and receptors. Emphasis will be on the vertebrate, particularly mammalian nervous system. Students participation in class discussion and in-class assignments, as well as time spent on the homework assignments will be critical components of the learning process.
Transferable Skills	1. Designing and evaluating experiments to test specific neurobiological hypotheses. 2. Critical reading of scientific journal articles.
Teaching Methodologies	Lectures, Discussion, Directed Self-learning
CLO	CLO1 Explain the fundamental principles and functions of the nervous system. CLO2 Design experiments to address basic questions regarding electrical and chemical neurotransmission to test specific neurobiological hypotheses. CLO3 Describe some of the current techniques used to advance the field of neurobiology based on the critical reading of papers in the scientific literature.
Pre-Requisite Courses	No course recommendations
Topics	
1. 1.0 Introduction 1.1) 1.1 What is Neurobiology? 1.2) 1.1.1 Neuroscience: Past, Present, and Future 1.3) 1.2 The Levels of Neural Organization 1.4) 1.3 The Concept of Functional Units 1.5) 1.4 Understanding Brain Function	
2. 2.0 Cell biology, Anatomy, and Development of the Nervous System 2.1) 2.1 Neurons and Glia (e-learning) (www.learner.org/courses/biology/textbook/neuro/index.html) (Video: The Brain) 2.2) 2.2 The Structure of the Nervous System 2.3) 2.2.1 Gross Organization of the Mammalian Nervous System (e-learning) (Video: The Mysteries of Human Brain)	
3. 3.0 Neural Signalling 3.1) 3.1 Electrical Signals of Nerve Cells 3.2) 3.2 Voltage-Dependent Membrane Permeability 3.3) 3.3 Ion Channels and Transporters 3.4) 3.4 Synaptic transmission 3.5) 3.5 Neurotransmitters, Receptors, and Their Effects (e-learning) (Video: Function of Neurotransmitters) 3.6) 3.6 Molecular Signalling within Neurons 3.7) 3.7 Synaptic Plasticity	
4. 4.0 Sensation and Sensory Processing 4.1) 4.1 The Somatic Sensory System: Touch and Proprioception 4.2) 4.2 Pain 4.3) 4.3 The Special Senses	

5. 5.0 Complex Brain Functions (e-learning) (Video: The Human Spark)

5.1) 5.1 Association Cortex and Cognition

5.2) 5.2 Speech and language

5.3) 5.3 Sleep and Wakefulness

5.4) 5.4 Emotions

5.5) 5.5 Memory

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Writing a movie review on current scenario and future trends in neuroscience.	10%	CLO3
	Case Study	Neurological Disorders Case Studies.	20%	CLO1
	Test	Test questions cover from Chapter 1 to 3.	20%	CLO2

Reading List	Recommended Text	<ul style="list-style-type: none"> Mark F. Bear, Barry W. Connors, Michael A. Paradiso 2015, <i>Neuroscience</i>, Lww [ISBN: 0781778174]
	Reference Book Resources	<ul style="list-style-type: none"> Neil R. Carlson 2014, <i>Foundations of Behavioral Neuroscience</i>, Pearson College Division [ISBN: 0205947999] Duane E. Haines 2012, <i>Neuroanatomy</i>, Lippincott Williams & Wilkins [ISBN: 1605476536] Duane E. Haines 2013, <i>Fundamental Neuroscience for Basic and Clinical Applications, with STUDENT CONSULT Online Access</i>, Elsevier Health Sciences [ISBN: 1437702945] Constance Hammond 2005, <i>Cellular and Molecular Neurophysiology</i>, Fourth Ed., Academic Press USA [ISBN: 0123970326] Eric Kandel 2013, <i>Principles of Neural Science, Fifth Edition</i>, McGraw Hill Professional [ISBN: 0071390111] Robert A. McArthur 2013, <i>Translational Neuroimaging</i>, Academic Press [ISBN: 0123869455] John G. Nicholls 2012, <i>From Neuron to Brain</i>, Sinauer Associates Incorporated [ISBN: 0878936092] Dale Purves 2012, <i>Neuroscience</i>, Sinauer Associates Incorporated [ISBN: 0878936955] Stephen D. Silberstein, Michael J. Marmura, Hsiangkuo Yuan 2015, <i>Essential Neuropharmacology</i>, Cambridge University Press [ISBN: 1107485541] Larry R. Squire 2013, <i>Fundamental Neuroscience</i>, Academic Press [ISBN: 9780123858702] Floris G. Wouterlood 2012, <i>Cellular Imaging Techniques for Neuroscience and Beyond</i>, First Ed., Academic Press USA [ISBN: 0123858720]
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	