

1.	Name of Course/Module	Introductory Course in Pharmacology
2.	Course Code	HPC2019
3.	Status of Subject	Core for B. Sc Bioinformatics
4.	MQF Level/Stage	Bachelor Degree – MQF Level 6
5.	Version (state the date of the last Senate approval)	June 2012
6.	Requirement for Registration	HAP1019 Anatomy and Physiology of the Major Organ Systems HBC1029 Biochemistry 2
7.	Name(s) of academic/teaching staff	Margaret A Seldon Tan Chai Hong Ong Chia Sui
8.	Semester and Year offered	Trimester 1 (Delta level)
9.	Objective of the course/module in the programme :	
	To introduce the principles of pharmacology with focus on the metabolism, distribution and the mechanism of drug action	
10.	Learning Outcomes :	
	At the completion of the subject, students should be able to:	
	1. Describe how drugs are absorbed, distributed, metabolized and eliminated (cognitive, level 2)	
	2. Understand the principles of drug action at the cellular level (cognitive, level 4)	
	3. Understand the effects of drugs on body systems (Cognitive, level 4)	
	4. Understand the method of computer aided drug design (Cognitive, Level 3)	
11.	Synopsis:	
	The course will introduce students to the principles of drug action. Students will be exposed to the action of drugs at various drug targets (Receptors, Enzymes, and Ion Channels), the routes of administration of drugs, the absorption and distribution, the metabolism and elimination and the factors that influence individual response to drug. The laboratory sessions will cover various aspects of computer aided drug design.	
	Kursus ini akan memperkenalkan prinsip-prinsip asas tindakan ubat. Pelajar akan mempelajari tindakan ubat pada pelbagai sasaran (seperti reseptor, enzim, saluran ion), administrasi ubat, penyerapan dan pembahagian ubat, metabolisma dan pemusnahan dan faktor yang mempengaruhi tindak balas individu terhadap ubat. Sesi makmal akan merangkumi pelbagai aspek dalam reka bentuk ubat dengan menggunakan komputer.	

12.	Mapping of Subject to Programme Outcomes :		
	Programme Outcomes		% of Contribution
	PO1: Apply soft skills in work and career related activities		50
	PO2: Demonstrate knowledge and understanding of fundamental concepts, principles and best practices		50
13.	Assessment Methods and Types :		
	Method and Type	Description/Details	Percentage
	Quizzes (3 times)		30%
	Assignment	Report & Presentation	10%
	Final Exam		50%
	Lab report		10%
14.	Details of Subject		
	Topics	Mode of Delivery	
		Lecture	Tutorial
	1. Introduction – Overview, Nomenclature and Classification of Drugs	1	
	2. General Principles of Drug Action: <ul style="list-style-type: none"> • The binding of drug molecules to cells • Desensitization and tachyphylaxis 	1	
	3. How Drugs Act: Molecular Aspects <ul style="list-style-type: none"> • Targets for drug action • Receptors • Ion channels • Enzymes • Nucleic acids 	4	
	4. Cellular Mechanisms: Excitation, Contraction and Secretion <ul style="list-style-type: none"> • Regulation of Intracellular calcium levels • Excitation • Muscle contraction • Release of chemical mediators • Epithelial ion transport 	2	
	5. Cellular Mechanism: Cell Proliferation, and Apoptosis <ul style="list-style-type: none"> • Cell proliferation • Angiogenesis • Apoptosis and cell removal • Pathophysiological implications • Therapeutic implications 	2	1
	6. Absorption and Distribution of Drugs <ul style="list-style-type: none"> • Translocation of drug molecules • Drug disposition • Drug absorption • Special drug delivery systems <p>Concept of Volume of Distribution, Clearance and $T_{1/2}$</p>	3	

	7. Drug Metabolism, Elimination, Pharmacokinetics & Pharmacodynamics <ul style="list-style-type: none"> • Drug metabolism • Renal excretion of drugs and drug metabolites • Biliary excretion and enterohepatic circulation 	3	1
	8. Factors that influence the Patient Response to a Drug Adverse Drug Reactions	1	
	9. Chemical Mediators and the <ul style="list-style-type: none"> • Autonomic Nervous System • Cholinergic Transmission • Noradrenergic Transmission 	4	
	10. Chemical Mediators: <ul style="list-style-type: none"> • Other Peripheral Mediators • Peptides and Proteins as Mediators • Nitric Oxide • Local Hormones, Inflammation, and Immune Reactions • Anti Inflammatory and Immunosuppressant Drugs 	3	1
	11. Action of Drugs on specific Organ Systems <ul style="list-style-type: none"> • Cardiovascular, Renal 	2	
	12. Methods and Measurement in Pharmacology <ul style="list-style-type: none"> • Bioassay • Animal models of disease • Clinical trials • Balancing benefits and risks 	2	
	Total	28	3
15.	Laboratory <ul style="list-style-type: none"> • Introduction • Experimental Techniques and Data Analysis • Computer aided drug design – virtual high throughput screening • Computer aided drug design – sequence analysis • Computer aided drug design – homology modelling • Computer aided drug design – similarity searches • Computer aided drug design – drug lead optimization • Computer aided drug design – physicochemical modelling • Computer aided drug design – drug bioavailability and bioreactivity 		
16.	Total Student Learning Time (SLT)	Face to Face (Hours)	Total Guided and Independent Learning
	Lecture	28	28
	Tutorials	3	3
	Laboratory/Practical	18	9
	Presentation		
	Assignment	-	10
	Mid Term Test		
	Final Exam	2	20
	Quiz	3	3
	Sub Total	54	73
	Total SLT	$127/40 = 3.17 \Rightarrow 3$	

17.	Credit Value	3
18.	Reading Materials :	
	Textbook	Reference Materials
	<ol style="list-style-type: none"> 1. <i>Pharmacology. 6th ed.</i> Rang HP, Dale MM, Ritter JM & Moore PK. Churchill Livingstone, 2007. 2. <i>Pharmacology Condensed. 2nd Ed.</i> Dale MM & Haylett DG. Churchill Livingstone, 2009 	<ol style="list-style-type: none"> 1. <i>Fundamentals of Pharmacology. 5th ed.</i> Alan Galbraith, Bullock S & Manias E. Prentice Hall, 2006. 2. <i>Integrated Pharmacology. 3rd ed.</i> Page, Curtis, Walker & Hoffman. Mosby, 2006.
19.	Appendix (to be compiled when submitting the complete syllabus for the programme) :	
	<ol style="list-style-type: none"> 1. Mission and Vision of the University and Faculty 2. Mapping of Programme Objectives to Vision and Mission of Faculty and University 3. Mapping of Programme Outcome to Programme Objectives 4. Programme Objective and Outcomes (Measurement and Descriptions) 	