Liverpool John Moores University

Title:	MEDICINAL AND BIOMOLECULAR CHEMISTRY
Status:	Definitive
Code:	**5002MCPHAR** (113319)
Version Start Date:	01-08-2012
Owning School/Faculty:	Pharmacy & Biomolecular Sciences
Teaching School/Faculty:	Pharmacy & Biomolecular Sciences

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Academic Level:	FHEQ5	**Credit Value:**	36.00	**Total Delivered Hours:**	83.00
Total Learning Hours:	360	**Private Study:**	277		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	55.000
Practical	21.000
Tutorial	4.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	70.0	3.00
Report	AS2	The extended practical report is to be submitted as directed in the module handbook	30.0	

Aims

To present and illustrate the principles involved in drug action at a molecular level and the way in which molecular properties can affect such actions. To discuss the principles of drug discovery and design and the effects that metabolism may have on drug action. To present and illustrate the molecular basis of nutrition. To introduce and develop the concept of pharmaceutical product quality by considering the issues of product specification, analytical testing and data evaluation.

Learning Outcomes

After completing the module the student should be able to:

1	demonstrate an understanding of the chemistry involved in drug-receptor interactions.
10	Calculate correlation coefficients and regression equations and understand what information they convey.
11	Understand the principles of pharmaceutical product quality and the role of the product specification
12	demonstrate a basic knowledge of key analytical techniques employed in pharmaceutical QC
13	make a rational choice of analytical method appropriate to particular analytical problems.
14	evaluate data of a qualitative and quantitative nature, as generated by a variety of instrumental methods of analysis.
15	demonstrate an ability to gather, evaluate and communicate information relevant to this module.
16	apply information in this module to the solution of practice based problems.
2	recognise the influence of molecular properties on pre-receptor events involving drugs
3	demonstrate a knowledge of the chemical principles of signal transduction resulting from drug-receptor interactions.
4	recognise the significance of stereochemistry in relation to drug action.
5	discuss the processes involved in drug discovery.
6	demonstrate an understanding of the principles involved in rational drug design.
7	define the mechanisms by which drugs are metabolised and excreted and the factors that influence the rate at which these processes occur and be able to predict the likely fate of simple drug molecules
8	demonstrate an understanding of the biochemical basis of nutrition
9	assess the effects of disease states and drug therapy on nutrition.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Examination	1	2	3	4	5	6	7	8	9	10
Extended project report	11	12	13	14	15	16				

Outline Syllabus

Chemical aspects of drug-receptor interactions.

Signal transduction and second messengers.

Stereochemistry and drug action.

Drug discovery and design, cheminformatics.

Nutrients; types, biological value, energy requirements and value, basal metabolic rate, macronutrients, dietary composition and requirements.

Lipid, protein and carbohydrate requirements.

Micronutrients; vitamins, classification, biochemistry, pathology, toxicology, prophylaxis, therapeutics. Trace elements, classification, biochemistry, physiological function, pathology, therapeutics.

Correlation coefficient, regression equations and tests of significance.

Principles of pharmaceutical quality, pharmacopoeias, specifications & licenses.

Theory and applications of qualitative and quantitative pharmaceutical analysis.

Classical and instrumental pharmaceutical analysis: Titrimetry, spectroscopy, chromatography and physicochemical techniques.

The compendial testing of drug substances & drug products.

Routes of phase I metabolism. Toxification and treatment of toxification. Cytochrome P450. Formation of conjugates. Liver enzyme induction and inhibition. Structure and metabolic fate of drugs.

Learning Activities

Lectures on specific topics, a series of practicals demonstrating key pharmaceutical analysis techniques, a CAL package based on a data-evaluation scenario. As well as traditional presentation formats, the module will utilise problem-solving practical exercises, operating, in some instances, by group work. Tutorials will be of a problem solving nature, in relation to the extended practical project.

References

Course Material	Book
Author	Cronin, MTD; Livingstone DJ
Publishing Year	2004

Title	Predicting Chemical Toxicity and Fate
Subtitle	
Edition	1st
Publisher	CRC Press
ISBN	0415271800

Course Material	Website
Author	www.pharmacopoeia.co.uk
Publishing Year	2003
Title	British Pharmacopoeia 2011
Subtitle	
Edition	
Publisher	TSO
ISBN	

Course Material	Website
Author	www.tsoshop.co.uk/bookstore.asp?DI=626846&CLICKID=002289
Publishing Year	2001
Title	European Pharmacopoeia 2011
Subtitle	
Edition	
Publisher	EDQM
ISBN	

Course Material	Book
Author	Watson, D.G.
Publishing Year	2005
Title	Pharmaceutical Analysis: A Textbook for Pharmacy Students and Pharmaceutical Chemists
Subtitle	
Edition	2nd
Publisher	Churchill Livingstone
ISBN	0443074453

Course Material	Book
Author	Cairns, D
Publishing Year	2008
Title	Essentials of Pharmaceutical Chemistry
Subtitle	
Edition	3rd
Publisher	Pharmaceutical Press
ISBN	0853697450

Course Material	Book
Author	King, F D
Publishing Year	2002

Title	Medicinal Chemistry: Principles and Practice
Subtitle	
Edition	2nd (revised)
Publisher	Royal Society of Chemistry
ISBN	0854046313

Course Material	Book
Author	Burger, A
Publishing Year	1995
Title	Burger's Medicinal Chemistry and Drug Discovery: Vols 1-3
Subtitle	
Edition	
Publisher	Wiley-Blackwell
ISBN	0471372188

Course Material	Book
Author	Montgomery et al
Publishing Year	1996
Title	Biochemistry - A Case Oriented Approach
Subtitle	
Edition	6th
Publisher	C V Mosby
ISBN	0815164831

Course Material	Book
Author	Katzung, B.G.
Publishing Year	2009
Title	Basic and Clinical Pharmacology
Subtitle	
Edition	11th
Publisher	McGraw-Hill Medical
ISBN	0071604057

Notes

This module will introduce the students to the molecular basis of drug action and nutrition. Particular emphasis will be placed upon the influence of molecular properties on biochemical function. The students will also be introduced to the scientific principles involved in drug discovery and design, as well as drug metabolism and the use of correlation and regression analysis. This module will also provide an overview of the quality control of pharmaceuticals. Emphasis will be placed on theoretical principles of product quality and the rational use of analytical techniques with which it can be assessed. Practice will be given in the assessment of analytical data and it's relationship to product quality specifications.