UNIVERSITI TEKNOLOGI MARA

PHM654: TOXICOLOGY

Course Name (English)	TOXICOLOGY APPROVED
Course Code	PHM654
MQF Credit	2
Course Description	This course provides the basic concept of toxicology especially the principles, the effects of toxicant on target organs and the management that are the foundation of the discipline. In addition, toxicity by pesticides, teratogens, mutagens and carcinogens are included.
Transferable Skills	Upon completion of this course, students would be able to interpret the basic outcomes of toxicology
Teaching Methodologies	Lectures, Reading Into Writing Task, Presentation
CLO	CLO1 identify and describe how xenobiotics can be absorbed through various routes. CLO2 describe the metabolism of xenobiotics either to form less toxic compounds or to be activated. CLO3 explain the mechanism of toxicity CLO4 describe neurotoxicity, hepatotoxicity, nephrotoxicity, pulmonary toxicity. CLO5 describe the herbicides, insecticides and reproductive toxicity CLO6 describe the toxicity of heavy metals and the effects of food contaminants and additives. CLO7 describe genetic toxicity, carcinogenesis and the general management of poisoning. CLO8 discuss the clinical features and treatment of specific poisons.
Pre-Requisite Courses	No course recommendations

Topics
1. Introduction to Toxicology 1.1) Classes of toxicology 1.2) Classification of toxicants 1.3) Sources of toxicants 1.4) Stages in the induction of toxicity 1.5) Types of toxic responses 1.6) Factors influencing toxicity
2. Toxicokinetics 2.1) Process of toxicokinetics 2.2) Toxicokinetic parameters 2.3) Uptake routes & barriers 2.4) Methods of toxicant uptake 2.5) P450 system
3. Dose Response & Risk Assessment 3.1) Dose response curve 3.2) Measurement of dose response relationship 3.3) Risk assessment process
4. Toxicodynamics 4.1) Introduction to toxicodynamics

5. Mechanism of Toxic injury I 5.1) Mechanisms of toxicity 5.2) Chemical agents that cause toxicity 5.3) Chemicals interactions 5.4) Toxic response detection
6. Mechanism of Toxic injury II 6.1) Mechanisms & response of cellular toxicity 6.2) Apoptosis & necrosis 6.3) Pharmacological, physiological & biochemical effects
7. Metal Toxicity /antioxidants 7.1) Arsenic 7.2) Mercury 7.3) Cadmium 7.4) Lead 7.5) Aluminium
8. Pesticide Toxicity 8.1) Classes of pesticides 8.2) Economic vs. Public health
9. Hepatotoxicity & Pulmonary Toxicity 9.1) Metabolic activation 9.2) Major cell types of liver 9.3) Types of liver injury 9.4) Drug-toxins liver injury 9.5) Mechanisms of liver toxicity 9.6) Introduction to anatomy & physiology of lungs 9.7) Lung reaction towards inhaled toxicants 9.8) Types of lung toxicity 9.9) Factors influencing the degree of hazard 9.10) Blood-borne agents that cause lung toxicity
10. Nephrotoxicity & Reproductive toxicology 10.1) Introduction to kidney 10.2) Nephrotoxicity causative agents 10.3) Factors that influence teratogenicity 10.4) Principle mechanism of teratogenesis 10.5) Animal teratology studies 10.6) Major teratogens
11. Carcinogens /Genetic toxicity 11.1) Introduction to DNA 11.2) Mutagenesis 11.3) Mechanism of genetic alteration & DNA damage 11.4) Stages of carcinogenesis 11.5) Mechanism of genotoxic carcinogens
12. Toxicity Evaluation Tests, Poisoning & Clinical Management 12.1) Risk assessment process 12.2) Types of toxicity assessment 12.3) Advantages of animal models 12.4) Assessment of non-carcinogens 12.5) Safety/uncertainty factors 12.6) ABC's of poisoning management 12.7) Signs & symptoms of inhaled, injected & absorbed poisons 12.8) Airway management

Assessment Breakdown	%
Continuous Assessment	30.00%
Final Assessment	70.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	Short essay on the importance of toxicology	5%	CLO1
Presentation	Key learning issues in genetic toxicity & carcinogenesis	5%	CLO7
Test	Test 1	10%	CLO1 , CLO2 , CLO3 , CLO6
Test	Test 2	10%	CLO4 , CLO5 , CLO7 , CLO8

Reading List

Reference Book Resources

- **Curtis D. Klaassen 2008, *Casarett & Doull's Toxicology. The Basic Science of Poisons*, 7th Ed., McGraw Hill USA**
- **Hodgson, E. 2010, *A textbook of Modern Toxicology*, 4th Ed., John Wiley & sons**
- **Timbrell J. A 2000, *Principles of Biochemical Toxicology*, 3rd Ed., Taylor & Francis**

Article/Paper List: This Course does not have any article/paper resources

Other References: This Course does not have any other resources