

**UNIVERSITY OF MADRAS**  
**M.Sc. DEGREE PROGRAMME IN ZOOLOGY**  
 SYLLABUS WITH EFFECT FROM 2023-2024

**431GEC1**

**GENERIC ELECTIVE COURSES**  
**(SELECT ONE FOR SEMESTER I, II)**

<b>Course Objectives:</b>		
The main objectives of this course is		
	Students should know basic concepts in toxicology	
<b>Course</b>	<b>:</b>	<b>Generic Elective – 1</b>
<b>Course title</b>	<b>:</b>	<b>Toxicology</b>
<b>Credits</b>	<b>:</b>	<b>3</b>
<b>Pre-requisite:</b>		
Students should be aware of importance of toxicology		
<b>Expected Course Outcome:</b>		
Upon completion of this course, Students would have		
I	Able to describe the composition and functional toxicology principles and understand the regulatory perspective and risk assessment of toxic agents.	K2 & K3
II	Acquire knowledge on the composition of various toxicants and understand the side effects and its management.	K3 & K4
III	Able to apply biostatistics tools in human health data.	K5 & K6
IV	Overall understanding of how the body's biochemical and physiological mechanisms operate to manage the exposure to toxins, poisons and drugs.	K3&K4

K1- Remember; K2- Understand; K3- Apply; K4-Analyze; K5-Evaluate; K6- Create

Units	
I	Introduction to Toxicology - History and Scope of toxicology - Principles of toxicology , Dose-effect and dose-response relationship- acute toxicity, chronic toxicity, reversible & irreversible effects, Mechanism of toxicity - Risk assessment- Toxicokinetics - Absorption, Distribution, Metabolism and Excretion of toxicants.
II	Biotransformation of toxicants- biotransformation sites, brief introduction to Phase-I and Phase-II reactions, factors affecting biotransformation of toxicants/xenobiotics; Antidotes- mechanism of antidotal action- assessment of antidotal efficacy
III	Biochemical and molecular basis of toxicology- Receptor theory -. Alterations in cell signalling - Control of gene expression - Hypoxia and Ischemia signalling - Apoptosis - Cell injury and necrosis - DNA damage and cell response.
IV	Methods of Toxicology- Bioassay test Single species test - multi species test acute

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	toxicity test- subacute toxicity test chronic toxicity test - determination of LC50 value - Pathological techniques – autopsy and histology - histopathology Histochemistry - cytochemistry - morphometric methods.
V	Biostatistics and Applied Toxicology - Sample size - Experimental designing - control v/s treatment results - Statistical calculations of acute toxicity- chronic toxicity – mortality - body weight- organ weight and histopathological finding - Bioremediation, Toxic site reclamation, prevention of occupational diseases.
<b>Recommended texts</b>	
Casarett and Doull's toxicology : The basic science of poisons, Ed. Curtis D. Klaassen, 9th ed. New York , McGraw-Hill, 2018. 2. Molecular And Biochemical Toxicology; Robert C. Smart, Ernest Hodgson; Fourth Edition; John Wiley and Sons, Inc; 2008. 3. Rosner B and Rosner R: Fundamentals of Biostatistics by. Cengage Learning Inc. 2010.	

<b>Mapping with Programme Outcomes*</b>										
<b>Cos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>
<b>CO1</b>	S	M	L	M	S	S	M	S	M	M
<b>CO2</b>	S	S	S	S	S	S	S	S	S	S
<b>CO3</b>	M	S	S	S	S	S	S	S	S	L
<b>CO4</b>	M	M	S	L	M	M	M	S	L	M
<b>CO5</b>	M	M	S	L	M	S	M	L	S	M

\*S-Strong; M-Medium; L-Low