UNIVERSITI TEKNOLOGI MARA

AGC703: TOXICOLOGY

Course Name (English)	TOXICOLOGY APPROVED
Course Code	AGC703
MQF Credit	2
Course Description	Provide instruction, develop interest and promote further understanding of the organism, biochemical and molecular responses of insects to synthetic and biological insecticides and plant compounds. Guide students to achieve an integrative perspective of the process of chemical poisoning of insects in relationship to, and on the bases of their previously acquired knowledge in insect physiology. Explain the molecular basis of insecticide selectivity, efficacy and safety, and the mechanisms and molecular genetics of insecticide resistance. Introduce students to the applications of molecular biology to insect toxicology. Explain the molecular basis of insecticide selectivity, efficacy and safety, and the mechanisms and molecular genetics of insecticide resistance. Introduce students to the applications of molecular biology to insect toxicology. Discuss transgenic technology available for pest control. Introduce students to the applications of molecular biology to insect toxicology. Discuss transgenic technology available for pest control.
Transferable Skills	knowledge and technical of insect toxicology in plantation
Teaching Methodologies	Lectures, Discussion, Presentation, Journal/Article Critique
CLO	CLO1 Describe and explain toxicological studies in insects, penetration through insect cuticle, toxic effects at the target site CLO2 Analyse and interpret toxicity of a compound, dose and dose response (concentrations, idem), assumptions, threshold doses and morality data (LO3, PO3) CLO3 Prepare and observe insecticide solutions and discussion insecticide resistance CLO4 Integrates with group members in the group discussion, writing, presentations, as well as in the lecture room
Pre-Requisite Courses	No course recommendations

Topics
1. Toxicology Definition 1.1) Toxicological studies in insects, penetration through insect cuticle, toxic effects at the target site. 1.2) Inventing Pesticides: generic invention process, registration process. 1.3) Reduced risk pesticides.
2. Toxicity and Probit Analysis 2.1) How to measure the toxicity of a compound. Dose and dose response (concentrations, idem), assumptions, threshold doses, morality data. 2.2) Quantal response probit analysis 2.3) Abbots corrected morality 2.4) Probit transformation
3. Insect Targets 3.1) DDT: toxicity, uses, mode of action, molecular effect. Methoxychlor, Indoxacarb, Molecular site of action, functional significance of sites, resistance, other neurotoxins. 3.2) Pyrethrins. 3.3) Pyrethroids

4. Chloride channel 4.1) GABA receptor: Ligand, synthetic convulsants, vertebrate GABA receptor, structure, Insect GABA receptor, agonist binding site, physiological characterization, molecular biology, resistance. 4.2) Organochlorinated insecticides 4.3) Avermectins
5. Baculoviruses 5.1) Biology and mode of action, uses and proposed applications, failed attempts at commercializing recombinant viruses.
6. Insect Growth Regulators 6.1) Molting hormone and mimetics 6.2) Juvenile hormone (JH) and JH analogs. Inhibitors of chitin synthesis
7. Insecticide Resistance 7.1) Genetic 7.2) Evaluate resistance development risk, ecological, operational factors. 7.3) Metabolism of insecticides

Assessment Breakdown	%
Continuous Assessment	70.00%
Final Assessment	30.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	written Assignment	10%	CLO4
Assignment	Written Assignment	20%	CLO2
Presentation	Video presentation	10%	CLO3
Test	Online Test	15%	CLO1
Test	Online Test	15%	CLO2

Reading List	This Course does not have any book resources
Article/Paper List	**Reference Article/Paper Resources** • **Ed. C. Tomlin 2000, The Pesticide Manual. British Crop Protection Council. 12th edition**
Other References	• **Book P. D. Josephy; B. Mannervik and P. O. de Montellano 1997, *Molecular Toxicology*, Oxford University Press** • **Directory Ed. R. Bryant, M. Bite and W. L. Hopkins. Ag. Chem 1999, *Global insecticide directory.*, Inform. Services. Agranova. 2nd ed.**