

SUBJECT OUTLINE DETAILS

1. Subject: Food and Animal Toxicology

- Code: AN407C

Credits: 3

- **Hours:** 30 theory hours, 20 practice hours, 10 seminar & Discussion hours, and 90 self-study hours.

2. Management Unit:

- **Department:** Food Biotechnology

- **Institute:** Biotechnology of Research and Development Institute, Can Tho University

3. Prerequisites: Non.

4. Subject objectives:

4.1. Knowledge:

4.1.1. This subject helps student master the knowledge about food and animal toxicology related with animal and human health.

4.1.2. Providing the knowledge about poisoning, diagnostic methods and detoxification, prevention.

4.1.3. Providing the knowledge about basic metabolism of toxin in damaging on the body systems, clinical symptoms and usual toxin affected on animal and human health.

4.1.4. Practising on toxic analyzing in examination, detecting toxicity of bacteria and fungi by molecular biotechnology and experimental animal.

4.2. Skill:

4.2.1. Students can practice their behaviors, work in group, search information to make seminar presentation, display presentation and deeply understand the issues.

4.2.2. After studying, students will have skills in examination and distinguishing poisoning conditions in animal, experimental animal and detoxification and using basic medicine in treatment.

4.3. Students understand how to diagnose the toxic effects in clinical animal and depth analyzing in laboratories and experimental animal.

4.4. Attitude:

4.4.1. Helping student positive in researching information.

4.4.2. Students distinguish the toxicity, poisoning conditions, affecting factors on toxic activity, differentiated diagnosis between poisoning and animal infected diseases, analyzing toxic effects on the animal organs: nervous system, liver,

gallbladder, kidney, digestive system, respiratory system, reproductive system, skin, bone and muscle, cardiovascular system.

4.4.3. Applying theories in examination and detection the toxin which makes disease on dogs, pigs by identification bacteria pathogenic genes using molecular biotechnology (PCR) and surveying toxic ability of bacteria, fungi on experimental animal. Detecting the toxin in meat, fresh milk and animal products such as borax, antibiotic residues.

4.4.4. Analyzing and comparing laboratory results and organoleptic observation in meat having borax, antibiotic residues. Surveying poisoning symptoms on experimental animal and comparing, confirming disease in animal. Classifying usual toxin in veterinary medicine.

5. Brief description of subject:

Food and Animal Toxicology subject:

Theory divides into 16 chapters.

Practicing includes 6 lessons on laboratory, clinical and experimental animal.

5. Brief description of subject content:

Food and Animal Toxicology is professional subject of Veterinary Medicine .

- General Toxicology theory: chapter 1.
- Toxic Responses of the systems including central nervous system, liver, kidney, respiratory, eye, blood, reproductive systems: chapter 2-8.
- Pesticides, metals, solvents and vapors, toxins of animal origin, phytotoxicology, environmental toxicology, Toxicants Formed During Food Processing. Food factors and health: chapter 9-16
- Practicing includes 6 lessons on laboratory, clinical and experimental animal.

6. Subject content structure:

6.1. Theory

	Content	Hours	Objectives
Chapter 1.	General Principles of Toxicology	2	4.1.1; 4.1.2; 4.1.3; 4.1.4; 4.2.1; 4.2.2; 4.3
1.1	Origin and Scope of toxicology		
1.2	Toxicologic Evaluation		
1.3	Absorption, Distribution and Excretion of Toxicants		
1.4	Metabolism of Toxic Substances		
1.5	Factors influencing Toxicology		
Chapter 2.	Toxic Responses of the Central Nervous System.	2	4.1.2; 4.1.3; 4.2.1; 4.2.2; 4.3
2.1.	Introduction		
2.2.	Structural Toxicity		
2.3.	Types of nervous toxicants		
Lab.work:	Examination of Nervous Responses influenced by toxins		

<p>Chapter 3.</p> <p>3.1 Introduction</p> <p>3.2 Morphologic and functional consideration</p> <p>3.3 Clasification of chemical-induced liver injury</p> <p>3.4 Cellular sites of liver injury</p> <p>3.5 Mechanism of liver injury</p> <p>3.6 Factor involved in liver injury</p> <p>Lab.work:</p>	<p>Toxic Responses of the Liver</p> <p>Examination of Liver influenced by toxins</p>	<p>2</p>	<p>4.1.2; 4.1.3; 4.2.1; 4.1.4; 4.2.2; 4.3</p>
<p>Chapter 4.</p> <p>4.1 Introduction</p> <p>4.2 Renal Physiology and Pathophysiology</p> <p>Lab.work:</p>	<p>Toxic Responses of the Kidney</p> <p>Examination of Kidney Function influenced by toxins</p>	<p>2</p>	<p>4.1.2; 4.1.3; 4.2.1; 4.1.4; 4.2.2; 4.3</p>
<p>Chapter 5.</p> <p>5.1</p> <p>5.2</p> <p>5.3 Introduction</p> <p>5.4 Structure of the respiratory tract</p> <p>5.5 Gases and Vapors Particulate Material</p> <p>Lab.work:</p>	<p>Toxic Responses of the Respiratory System</p> <p>Examination of Respiratory System Function influenced by toxins</p>	<p>2</p>	<p>4.1.2; 4.1.3; 4.2.1; 4.1.4; 4.2.2; 4.3</p>
<p>Chapter 6.</p> <p>6.1</p> <p>6.2</p> <p>6.3 Introduction</p> <p>6.4 Cornea,conjunctiva and neighboring tissues</p> <p>6.5 The iris</p> <p>6.7 The aqueous outflow system</p> <p>6.8 The ciliary body</p> <p>Lab.work:</p> <p>The lens</p> <p>The Retina and Choroid</p> <p>The ganlion cell layer and optic nerve</p>	<p>Toxic Responses of the Eye</p> <p>Examination of Eye Response influenced by toxins.</p>	<p>2</p>	<p>4.1.2; 4.1.3; 4.2.1; 4.1.4; 4.2.2; 4.3</p>

Chapter 7.		2	
7.1			4.1.2; 4.1.3;
7.2	Toxic Responses of the Blood		4.2.1; 4.1.4;
7.3	Introduction		4.2.2; 4.3
Lab.work:	Hematopoiesis		
	Histotoxic Hypoxia		
	Analysis of Blood sample.		
Chapter 8.	Toxic Responses of the Reproductive system	2	
8.1	Introduction		4.1.2; 4.1.3;
8.2	General reproductive biology		4.2.1; 4.1.4;
8.3	General pharmacologic principles		4.2.2; 4.3
8.4	General toxicologic principles		
Lab.work:	Examination of Reproductive Function influenced by toxins		
Homework:	Toxic Responses of Animal Body.		
Chapter 9.	Pesticides	2	
9.1	Introduction		4.1.2; 4.1.3;
9.2	Economics and public health		4.2.1; 4.1.4;
9.3	Insecticides		4.2.2; 4.3
9.4	Herbicides		
9.5	Fungicides		
9.6	Rodenticides		
Lab.work:	Identifying pesticides.		
Chapter 10.	Metals	2	
10.1	Introduction		4.1.2; 4.1.3;
10.2	Factors influencing toxicity		4.2.1; 4.1.4;
10.3	Metal chelation		4.2.2; 4.3
10.4	Toxic effects		
10.5	Acquired tolerance		
10.6	Lead		
10.7	Mercury		
10.8	Aluminium		
10.9.	Antimony		
10.10	Arsenic		
10.11	Copper		
10.11	Iron		
10.13	Zinc		
Lab.work	Identifying toxic metals.		
Chapter 11.	Solvents and Vapors	1	
11.1	Introduction		4.1.2; 4.1.3;
11.2	Paraffins		4.2.1; 4.1.4;
11.3	Halogenated Hydrocarbons		4.2.2; 4.3

11.4	Alcohols		
11.5	Glycols		
Lab.work	Identifying Solvents and vapors		
Chapter 12	Toxins of animal origin	2	
12.1	Toxicology problems of animal origin		4.1.2; 4.1.3;
12.2	Characteristics of venoms		4.2.1; 4.1.4;
12.3	Marine toxins		4.2.2; 4.3
12.4	Arthropod toxins and venoms		
12.5	Amphibian and reptile toxins		
12.6.	Mammals with high hepatic vitamin A		
Lab.work	Identifying toxic animals.		
Chapter 13.	Phytotoxicology	2	4.1.2; 4.2.1;
13.1	Introduction		4.1.4; 4.2.2;
13.2	Importance of poisonous plants to human and animal		4.3
13.3	Poisonous plants		
Lab.work	Identifying toxic plants		
Homework	Effects of Toxins on animal and food.		
Chapter 14.	Environmental Toxicology	2	
14.1	Introduction		4.1.2; 4.2.1;
14.2	Food additives and contaminants		4.1.4; 4.2.2;
14.3	Air pollutants		4.3
14.4	Water and Soil Pollutants		
Lab.work	Identifying environmental pollutants		
Homework	Effects of environment pollution on animal living		
Chapter15	Toxicants Formed During Food Processing	2	
15.1	Polycyclic Aromatic Hydrocarbons (PAHs)		4.1.2; 4.1.3;
15.2	Maillard Reaction Products		4.2.1; 4.1.3;
15.3	Polycyclic Aromatic Amines (PAA)		4.1.4; 4.2.2;
15.4	N-Nitrosamines		4.3
15.5	Acrylamide		
15.6	Food Irradiation		
Chapter16	Food Factors and Health	1	
16.1	Probiotics, Prebiotics, and Synbiotics		4.1.1; 4.1.2;
16.2	Antioxidants		4.2.1; 4.1.4;
16.3	Functional Components Found in Food for		4.2.2; 4.3
16.4	Disease Prevention		

6.2. Practice

Content

Hours

Objectives

Unit 1.	Detection of the borax residues in fresh meat and animal products	2	4.1.1, 4.1.4
Unit 3	Detection of the antibiotic residues in fresh meat, poultry and milk	2	4.1.1, 4.1.4
Unit 4	Isolation of <i>Aspergillus flavus</i> , <i>A. fumigatus</i> from feed. Aflatoxin examination in laboratory animal –baby duck.	4	4.1.1, 4.1.2, 4.1.3, 4.1.4
Unit 5	Xác định chất độc từ thực vật làm thức ăn gia súc hay rau cải có chứa Nitrate	2	4.1.2, 4.1.3, 4.1.4
	Sample collection : diarrhea feces sampling + Isolation of <i>Enterotoxigenic Escherichia coli</i> (ETEC) .+ Determination of toxic genes (ST: STa, STb) from ETEC caused piglet diarrhea by PCR analysis – Electrophoresis + Determination of these toxins in animal laboratory	8	4.1.1, 4.1.2, 4.1.3, 4.1.4
Unit 6	- Results analysis.		
	A field trip for sampling and classification of toxins in food and animals.	2	4.1.1, 4.1.3, 4.1.4

7. Teaching method:

- Theory: 70%, in that, teaching about situations gets 30% of theory time.
- Practicing: 30%, in that, practicing lessons in laboratory get 70% and in experimental animal and laboratory working, homework.

8. Duties of student:

Students have to do the following duties:

- Attending at least 80% of theory time.
- Attending enough 100% of practicing time in laboratory and real practice in small groups and reporting the results.
- Doing enough homework in small groups, researching information, preparing situational presentation and topics, presenting power point, discussion and evaluating the results.
- Attending the final examination.
- Actively organizing in study time by themselves.

9. Assessment of student learning outcomes:

9.1. Assessment

No.	Point components	Rules and Requirement	Weights	Objectives
1	Studious score	Attending hours/sum	10%	4.1.1, 4.1.2, 4.1.3, 4.1.4
2	Seminar	- Presentaion, discussion, comments	15%	4.1.1, 4.1.2, 4.1.3, 4.1.4

3	Practical score	- Attending enough 100% of practicing time in laboratory and real practice in small groups and reporting the results	15%	4.1.1, 4.1.2, 4.1.3, 4.1.4
4	Final score	- Take Examination - Attending at least 80% of theory time. - Attending enough 100% of practicing time in laboratory	60%	4.1.1, 4.1.2, 4.1.3, 4.1.4

9.2. Grading

- Grading components and final test scores will be marked on a scale of 10 (0 to 10), rounded to one decimal place.
- Subject score is the sum of all the components of the evaluation multiplied by the corresponding weight. The subject score is marked on a scale of 10 and rounded to one decimal place, then is converted to A-B-C-D score and score on a scale of 4 under the academic provisions of the University.

10. Materials:

Thông tin về tài liệu	Code number
Principles of food toxicology / Tõnu Pussa.- Boca Raton: CRC Press, 2008.- 321 p. ; ill., 25 cm, 0849380901.- 615.954/ P987	MON.029970
Casarett and Doull's Toxicology. The Basic Science of poisons. 2 nd edition.. Macmillan publishing Co. Ins. 778 page	<u>NN.007834</u>
Clinical and diagnostic veterinary toxicology / Edited by Gary A. Van Gelder ... [et al.].- 2nd.- Dubuque, Iowa: Dubuque, Iowa : Kendall/Hunt Publishing company, 1973.- 380 p., 28 cm.- 636.08959/ C641	<u>NN.008010</u>
Veterinary toxicology : Basic and clinical principles / Ramesh C. Gupta edited by.- Boston: Butterwoth-Heinemann, 2007.- 1201 p., 27 cm, 9780123704672.- 636.08959/ V586	<u>NN.012637</u>
D'Mello J P F, Scottish. Food Safety: Contaminants and Toxins. 2003. Agricultural College, Edinburgh, UK.	
Takayuki Shibamoto, Leonard Bjeldanes. Introduction to Food Toxicology. 2009. 2 nd Edition. Academic Press is an Imprint of Elsevier	
Lý Thị Liên Khai, Hồ Thị Việt Thu. 2012. Độc chất học thú y. NXB Đại học Cần Thơ. toxicology	

11. Self-study Guide:

Wee k	Content	Theory (hours)	Practice (hours)	Students' duties
1	Chapter 1. General Principles of Toxicology	3	0	Read the references ahead: 1 , 6 , 7
2	Chapter 2. Toxic Responses of the Central Nervous System	3	5	6 , 7 , 10
3	Chapter 3. Toxic Responses of the Liver	3	5	1 , 6 , 9 , 10
4	Chapter 4. Toxic Responses of the kidney	3	5	1 , 6 , 9 , 10
5	Chapter 5. Toxic Responses of the Respiratory System	3	5	1 , 6 , 9 , 10
6	Chapter 6. Toxic Responses of the Eye	3	5	1 , 6 , 9 , 10
7	Chapter 7. Toxic Responses of the Blood	3	5	1 , 6 , 9 , 10
8	Chapter 8. Toxic Responses of the Reproductive system	3	5	1 , 6 , 9 , 10
9	Chapter 8. Pesticides	3	5	2 , 3 , 9
10	Chapter 10. Metal	3	5	2 , 3 , 9
11	Chapter 11. Solvents and vapors. Chapter 12. Toxins of animal origin	3	5	2 , 3 , 9 1 , 2 , 8
12	Chapter 12. Toxins of animal origin (cont.) Chapter 13. Phytotoxicology	3	5	1 , 2 , 8 1 , 2 , 6 , 10
13	Chapter 13. Phytotoxicology (cont.) Chapter 14. Environmental toxicology	3	5	1 , 2 , 6 , 10 2 , 3 , 5
14	Chapter 14. Environmental toxicology (cont.). Chapter 15. Toxicants Formed During Food Processing	3	5	2 , 3 , 5 5 , 6 , 7 , 10
15	Chapter 15. Toxicants Formed During Food Processing (cont.) Chapter 16. Food Factors and Health	3	5	5 , 6 , 7 , 10

Can Tho, September 10, 2014

**ON BEHALF OF RECTOR
DEAN/ DIRECTOR**

HEAD OF DEPARTMENT