Paramedical program	
Specialization	**Pharmacy**
Course number	020805261
Course title	**Toxicology**
Credit hours	**2**
Theoretical hours	**2**
Practical hours	**0**

Brief Course Description:

This course deals with poisoning and types of materials which may lead to toxicity either drugs, chemicals, synthetic products, natural poisons, and their suitable antidotes
Furthermore, it is concerned with chemical and physical properties of poisons, pharmacokinetics of toxic agents, physiologic and behavioral effects of these poisons in humans, and the effective prevention and management of those effects.

Course Objectives:

Upon the completion of the course, the student will be able to:

1. To increase students' knowledge with different kinds of toxicants
2. Understand the dangers of poisoning and its symptoms shown in human beings, animals and plants
3. Identify the process used to interpret biotoxicological data (clinical presentations and the differential lab and physical examinations)
4. To provide students with the ability to differentiate between antidotes used against toxicants and their mode of action
5. Know the general methods that are used for poisoning treatment.

Detailed Course Description:

Unit number	Unit Name	Unit content
1.	**Basics of toxicology**	▪ **Introduction to Toxicology and General Definitions** * Toxicology, Toxicant (poison), Toxicity, Antidote ▪ **Types of toxicity** * Acute, Sub acute, Sub chronic, chronic ▪ **Spectrum of Undesired Effects** * Allergic reactions, Immediate Toxicity, Delayed toxicity, Reversible vs. irreversible toxic effects, Local vs. systemic toxicity, Gene mutations, Carcinogenic, Teratogenic ▪ **Toxicity degree** * Very toxic substances, toxic substances, moderately toxic substances, slightly toxic substances, practically non-toxic substances • **toxicokinetics in general**
2.	**Diagnostic process in clinical toxicology**	▪ **Patient status** * Awake, altered mental status, coma ▪ **Signs and symptoms (in general)** * Vital signs (Respiratory rate, Heart rate and blood pressure, Body temperature) * General features (Odors, Skin color, Diaphoresis vs. dryness, Hair, Eyes miosis vs mydriasis, Ears tinnitus and hearing loss, Urine color) ▪ **Diagnostic Tests (in general)** * Blood biochemistry (ABGs, Ca, K, Na changes) * Electrocardiogram ECG * Radiology

3.	**General management of poisoning**	▪ **Initial stabilization**: ABCD ▪ **Decontamination and enhanced drug removal** * Ipecac syrup- Induced emesis * Gastric lavage * Activated charcoal * Cathartics * Chelation therapy * Whole-Bowel Irrigation WBI * Forced diuresis and urinary PH manipulation (Alkaline diuresis, Acid diuresis) * Dialysis ▪ **Antidote** * Mechanical or physical antidotes * Chemical antidotes * Physiological or pharmacological antidote * Antivenom
4.	**Toxins**	▪ **Toxins from microorganisms and plant origin, their main signs and symptoms of toxicity, management/ antidote** * Bacteria (Salmonella, Staphylococcus, Clostridium Botulinum, Vibrio ahameolyticus) * Fungus (claviceps purpurea (Ergot Alkaloids), Aspergilus flavuns (aflatoxin), Mushrooms * Differentiated plants (Atropa Belladona, Curare, Cathae dulis, Cannabis Sativa, Datura, Erythroxylum coca, Nux Vomica, Hemluck ▪ **Toxins from animals origin, their main signs and symptoms of toxicity, management/ antidote** * Scorpion, Snake, Spider, Bee, Fish ▪ **Heavy metals, their main signs and symptoms of toxicity, management/ antidote** * Arsenic, Mercury, Lead, Cadimum * Other metals such as Iron, Copper, Fluorine, Cobalt, Cyanide, silver

		▪ **Pesticides**, **their main signs and symptoms of toxicity, management/ antidote** * Insecticides 1. Organic chlorinated hydrocarbon 2. Organic phosphor elated (Organophosphotes, carbamate) 3. Plant origin insecticides (pyrethrum, nicotine) * Herbicides (Acetamide, Dipyridyl, Phosphonate) * Rodenticides (Thallium, Red squill, coumarin) * Fungicide(6-chlorobenzene, Dithiocarbamate) ▪ **Air transferred pollutants, their main signs and symptoms of toxicity, management/ antidote** * Carbon monoxide, Nitrogen oxide, Sulfur dioxide, Ozone * Solid dust materials (asbestos) ▪ **Radiation, types , illness symptoms and treatment** * Atomic radiations , Ionizing and non- ionizing radiation ▪ **Drugs, their main signs and symptoms of toxicity, management/ antidote** * Acetaminophen, Digoxin, Opioids, Hallucinogens, Ketamine, Lithium, Methylxanthines, Anticoagulants, Benzodiazepines, Barbiturates, Tricyclic antidepressant, Mono aminooxidase inhibitors, Alcohol, Beta blockers, Aspirin.

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	**40%**	--/--/----
	Final Exam	**50%**	--/--/----
Homework and Projects		**5%**	--/--/----
Discussions and lecture Presentations		**5%**	--/--/----

Teaching language:

- English

Teaching Methodology:

- Lectures, Discussions, quizzes and exams, Home works and home assignments.

References:

1. Essentials of Toxicology. 3rd edition , casarett and Doull, Curtis Klaassen and John Watkins III
2. Goldfrank's Toxicologic Emergencies, 10e. Robert S. Hoffman, Mary Ann Howland, Neal A. Lewin, Lewis S. Nelson, Lewis R. Goldfrank
3. Richard C. Dart, Medical Toxicology, 2012, Lippincott Williams & Wilkins.