



**Jordan University of Science and Technology**  
**Faculty of Applied Medical Sciences**  
**Allied Medical Sciences Department**

LM440 Molecular Toxicology - JNQF Level: 6

Second Semester 2023-2024

**Course Catalog**

3 Credit Hours. Exposures to foreign compounds (toxic compounds, drugs, and carcinogens) can disrupt normal cellular processes leading to toxicity. This course will focus on the molecular mechanisms by which chemical exposures lead to end-organ injury and diseases. Students will learn the difficulties in modeling responses to low-dose chronic exposures, how these exposures are influenced by metabolism and disposition, and how reactive intermediates alter the function of biomolecules. Mechanisms are responsible for cellular damage, aberrant repair, and end-organ injury will be discussed. Students will also learn about the process of drug development.

**Teaching Method:** Blended

**Text Book**

<b>Title</b>	A TEXTBOOK OF MODERN TOXICOLOGY
<b>Author(s)</b>	Ernest Hodgson
<b>Edition</b>	4th Edition
<b>Short Name</b>	Ref #1
<b>Other Information</b>	

**Course References**

<b>Short name</b>	<b>Book name</b>	<b>Author(s)</b>	<b>Edition</b>	<b>Other Information</b>
Ref #2	Toxicology: The Basic Science of Poisons and relevant literature	Cassarett & Doull's	4th Edition	

**Instructor**

<b>Name</b>	Dr. ROWIDA AL-MOMANI
<b>Office Location</b>	-
<b>Office Hours</b>	
<b>Email</b>	rfalmomani7@just.edu.jo

<b>Class Schedule &amp; Room</b>
Section 2: Lecture Time: Wed : 13:00 - 14:30 Room: M3301

<b>Tentative List of Topics Covered</b>		
<b>Weeks</b>	<b>Topic</b>	<b>References</b>
Week 1	Introduction Toxic responses and General Principles	From <b>Ref #1</b>
Week 2	Common Testing Parameters: IC50, LOEL, NOEL, and Threshold	From <b>Ref #1</b> , From <b>Ref #2</b>
Week 3	Basic Concepts of Toxicology: Toxicokinetics and Toxicodynamics	From <b>Ref #2</b>
Week 4	Toxicokinetics: Absorption and Routes of Exposure	From <b>Ref #1</b>
Week 5	Toxicokinetics: Distribution and Transport	From <b>Ref #1</b>
Week 6	Toxicokinetics: Excretion	From <b>Ref #1</b>
Week 7	Toxicokinetics: Metabolism	From <b>Ref #1</b> , From <b>Ref #2</b>
Week 8	Biotransformation: Phase I and Phase II	From <b>Ref #1</b>
Week 9	Biotransformation: Phase I: CYP 450, Phase II: Transferases	From <b>Ref #2</b>
Weeks 10, 11	Mechanisms of Toxicity: Cell Death Mechanisms and DNA Damage	From <b>Ref #1</b>
Weeks 12, 13	Cell and DNA repair Mechanisms Chronic Inflammation and Cancer Mechanisms	From <b>Ref #2</b>
Week 14	Pharmacogenetics	
Weeks 15, 16	Risk Assessment: The process of drug discovery and development	From <b>Ref #1</b> , From <b>Ref #2</b>

<b>Mapping of Course Outcomes to Program Outcomes and NQF Outcomes</b>	<b>Course Outcome Weight (Out of 100%)</b>	<b>Assessment method</b>
Understanding the basic concepts of Toxicology: Toxic substances, Toxicokinetics, and Toxicodynamics [1SLO1, 1SLO6] [1L6K1, 1L6K2]	20%	
Understanding the chemical properties of toxic xenobiotics and the mechanisms of toxicity through their absorption, distribution, metabolism, and excretion. [1SLO1, 1SLO6, 1MSLO1] [1L6K2]	20%	
Grasping the basic concepts of drug metabolism and drug biotransformation [1SLO6, 1MSLO1] [1L6K1, 1L6K2]	20%	
Analyze the mechanisms of cellular damage, aberrant repair, and end-organ injury [1SLO1, 1MSLO1] [1L6K1]	10%	

Understanding the Risk Assessment : The process of drug discovery and development [1SLO1, 1MSLO3] [1L6K2]	10%	
Analytical Skills: Students will analyze different molecular mechanisms of chemical exposures, identifying key events leading to toxicity and disease. [1MSLO6] [1L6S1]	10%	
Molecular Expertise: Students gain specialized knowledge in molecular mechanisms of chemical toxicity, understanding pathways leading to disease. They learn to synthesize insights from various fields, enhancing their ability to understand complex interactions between chemicals and health. [1SLO1, 1SLO6, 1MSLO1, 1MSLO5] [1L6K1, 1L6K2, 1L6S2]	10%	

Relationship to Program Student Outcomes (Out of 100%)											
SLO1	SLO2	SLO3	SLO4	SLO5	SLO6	MSLO1	MSLO2	MSLO3	MSLO4	MSLO5	MSLO6
29.17					29.17	24.17		5		2.5	10

Relationship to NQF Outcomes (Out of 100%)			
L6K1	L6K2	L6S1	L6S2
33.33	53.33	10	3.33

Evaluation	
Assessment Tool	Weight
First Exam	30%
Second Exam	30%
Final Exam	40%

Policy	
Attendance Policy	Attendance is mandatory for all classes. Absences exceeding 20% will result in suspension from the course. Absences are recorded electronically, and students exceeding the limit will be notified via email. Regular attendance is essential for academic success, as lecture participation significantly influences grades. Students are accountable for all material covered in lectures.

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