

Petra University		جامعة البترا
Faculty of arts and sciences		كلية الآداب والعلوم
Department of Chemistry		قسم الكيمياء

### Course Syllabus

Year: 2020/2021

Semester: First

Course No.	Course Title	Prerequisite	Co-requisite	Credit Hours Lectures / ECTS
101333	Green Chemistry	101231	-	3/ 5 ECTS: European Credit Transfer System

Instructor Name	e-mail	Office No.	Office ext.	Office Hours
DR. ABDEL MNIM ALTWEIQ	aaltweiq@uop.edu.jo	7115	7115	

<b>Course Description</b>	Green chemistry is the design of chemical products and processes that eliminate the use or generation of hazardous substances. Such sustainable technologies provide benefits, including safer products, reduced use of energy, resources and waste. In this course we will discuss how green chemistry and sustainability ideas can impact society. We will discuss the philosophy of green chemistry and how these ideas have revolutionized how society views products and chemical technology.
---------------------------	--

#### Course Objectives:

- To provide an in-depth introduction to green chemistry principles and concepts.
- To instill in students a sense of enthusiasm for green chemistry, an appreciation of its applications in different fields and to involve them in an intellectually stimulating and satisfying experience of learning and studying.

#### Course Intended Learning Outcomes (ILOs) and their Alignment with Program ILOs:

Upon successful completion of this course, students are expected to achieve the following learning outcomes:

Course ILOs	Program ILOs	Teaching and Learning Method	Assessment Method
<b>Knowledge (K)</b>			
1. Provide foundational information regarding to chemical toxicity and other types of hazards associated with chemical use.  2. Mention methods for prevention, control, measuring and management of the toxic chemical types.  3. understanding how to assess the environmental impact of chemical operations and understand the methods for their minimization and be able to suggest alternative green methods to current processes.	<b>K (1)</b>	Lectures and discussion	First, second and final exams
<b>Intellectual Skills (I)</b>			
1. Write the chemical reactions that represent the harm and toxic effects of various chemical substances.	<b>I (1)</b>	Lectures and discussion	First, second and final exams
<b>Transferable Skills (T)</b>			
1. Problem-solving skills by developing the students' ability to understand the contribution of toxicology science to debate on environmental issues.	<b>T (2)</b>		Final exams

### Course Schedule:

Week	Topics	Topic Details
1, 2	Green chemistry	The concept of the green chemistry, the twelve principles of green chemistry
3, 4	Chemical waste	production, problems and prevention
5	Environmental performance	Measuring and controlling
6, 7	Catalysis and green chemistry	Types of catalyst , green catalysts
8, 9	Organic solvents	Types of organic solvents, toxicity, Environmentally benign solvents
10	Renewable resources	Types of renewable resources
11	Green technologies	Alternatives, green energy

12	Green nanotechnology	Background of green nanotechnology
13	Industrial case studies	
14	The Futures' Green	An integrated approach to a greener chemical industry.

### **Assessment Methods:**

Assessment method	Grade
First exam	25
Second exam	25
Project	10
Final exam	40
Total	100

### **Alignment of Teaching and Learning Methods, Assessment and Course ILOs:**

Teaching method	Contact Hours	Assessed through	ILOs numbers
Lectures and Discussions	3	In-class problems, Exams	K1, T2, I1

### **Learning References:**

<b>1- Textbook (s):</b>
Green Chemistry – An introductory text”, Mike Lancaster , third edition, The Royal Society of Chemistry, 2016
<b>2- References:</b>
<b>Green Chemistry for Environmental Sustainability</b> , 1st Edition, Sanjay K. Sharma, Ackmez, CRC Press, 2019
<b>3- Other Resources:</b>
Course notes, data show facilities and Internet

### **Course Policies**

- Attendance Policy: University regulations apply to attendance.
- Academic Honesty: Academic dishonesty is an unacceptable mode of conduct, and will not be tolerated in any form at University of Petra. All persons involved in academic dishonesty and plagiarism in any form will be disciplined in accordance with University rules and regulations.

Approved by	Name	Date	Signature
Head of Department	Dr. Abdelmnim Altwaiq	24/02/2020	
Faculty Dean	Prof. Rami Abdel-Rahem	26/02/2020	