

## Course Specification Template

### 1. General information about Instructor:

Name	Dr. Saed Khayat			Class Time & Office Hours				
Phone	Internal		Day	SUN	MON	TUE	WED	THU
	External							
Mobile	0599868605		Class Time	11-2	9-10		910	8-11
Instructor's E-mail	Saed.khayat@gmail.com		Class Room	Lab.	H-17		H-17	Lab.
			Office Hours		10-11		10-11	11-12

### 2. General information about the Course

No	Requirements						
1	Course Title	<b>Wastewater Treatment</b>					
2	Course code & Number						
3	Credit hours	Theo. (CH): 2			Practical (CH):1		
4	Faculty	<b>Agricultural Sciences and Technology</b>					
5	Department / Division that offers the course:	<b>Environment and Sustainable Agriculture</b>					
6	Course type	Compulsory			Elective		
		Uni. <input type="checkbox"/>	Fac. <input type="checkbox"/>	Dep. <input checked="" type="checkbox"/>	Uni. <input type="checkbox"/>	Fac. <input type="checkbox"/>	Dep. <input type="checkbox"/>
7	Level and Semester	3/1					
8	Prerequisite(s) – If any	<b>Chemistry 101/ Analytical Chemistry</b>					
9	Co-requisite(s) – if any						
10	Program/programs for it/them the course is offered						
11	Instruction Medium:	English <input checked="" type="checkbox"/>			Arabic <input type="checkbox"/>		

### 3. Course description:

This course provides fundamental information on wastewater treatment with a focus on understanding the Principles governing design of biological, physical and chemical treatment processes. It also aims at advancing the students' knowledge in wastewater treatment systems and enhancing the principles of treatment plants design aspects. In addition, the course covers sludge characteristics and treatment methods.

### 4. General Course Objectives

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| 1) Understanding fundamentals on biological, chemical and physical treatment processes for wastewater treatment<br>2) Understanding engineering approaches used for designing biological, chemical and physical treatment processes for wastewater treatment |
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**5. Intended Learning Outcomes/ILO's (please specify the learning outcomes of the course as outlined below):**

At the end of this course students should be able to : <b>Getting knowledge about the process of physical, chemical and biological treatment technologies.</b> <b>Knowing the engineering skills for designing the treatment process at different levels of treatment</b>
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**6. Topics covered and Calendar:**

**A. Theoretical parts (Please state the titles of the subjects you intend to cover each week)**

(Course schedule)		
WEEK	Topics to be discussed	COMMENTS
1-3	<b>Introduction to wastewater treatment</b> <i>Importance of wastewater treatment, wastewater flow rates, wastewater collection systems, characterization of wastewater, levels of wastewater treatment</i>	
2-6	<b>Preliminary and Primary treatment of wastewater</b> <i>Screening, grit removal, flow equalization, primary sedimentation</i>	
7	<b>EXAM 1</b>	
8-10	<b>Secondary Treatment of Wastewater</b> <i>Fundamentals of biological wastewater treatment, suspended and attached growth processes, kinetics of biological treatment processes, development of process models for biological treatment aeration, secondary clarification</i>	
10-11	<b>Tertiary Wastewater Treatment</b> <i>Nutrients removal, disinfection</i>	
12	<b>EXAM 2</b>	
13-14	<b>Sludge Treatment and Management</b> <i>Sludge handling and treatment, anaerobic digestion of sludge, biosolids management</i>	
15	<b>Special Topic: Simulation of Wastewater Treatment Process</b> <i>Introduction to a process simulator used for wastewater process design</i>	
16	<b>FINAL EXAM</b>	

**B. Practical part (Please state the titles of the experiments you intend to cover each week)**

The objective of lab is to evaluate treatment performance of local wastewater treatment plants in the University. Student will visit wastewater treatment plants to collect wastewater samples from different process units. Student will be divided into groups, and will work together in the lab to characterize the wastewater samples to evaluate the treatment efficiency. The detailed information will be provided during the tutorial.

### 7. Student assessment methods based on ILO,s

No	Assessment method	Week	Mark	Percentage to overall mark
1.	First Exam	7th	15	15
2.	Second Exam	12th	15	15
3.	Lab. Exam and reports	14th	30	30
4.	Coursework	14th	10	10
5.	Final Exam	16th	30	30

### 8. References and other resources

<p>This course will be mainly based on the course notes and lectures. For references, the following textbooks are recommended:</p> <ul style="list-style-type: none"> <li>• Metcalf, E. (2003). Wastewater Engineering: Treatment, Disposal, Reuse, Metcalf &amp; Eddy. Inc., McGraw-Hill, New York.</li> <li>• Riffat, R. (2012). Fundamentals of wastewater treatment and engineering. CRC Press.</li> </ul>
<b>A. Other references</b>
<b>B. Electronic resources, Websites related to the course</b>

**Name & signature of Head of department/ program leader**

Name: ..... signature: .....Date: .....

**Name & signature of Quality rep. in your faculty**

Name: ..... signature: .....Date: .....

**Course Tutor’s name and signature**

Name: Dr. Saed Khayat signature: .....Date: .....