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 **Course Book**

**University of Salahaddin**

 **College of Science**

**Department of Environmental Sciences and Health**

**Wastes management-practic**

 **Assistant lecturer: Sara Abdulkhaleq Yaseen**

**MSc in Phycolimnology**

**2022-2023**

**Second semester**

**Class: 3**

**Course objective**

The course will cover the basic view about the wastes management including the basic terms of wastes in addition to increase the knowledge of student about the technologies that are used in treatment of wastes or in disposal of waste.

Forms of Teaching

Different forms of teaching will be used to reach the objectives of the course: power point presentations for the head titles and definitions and summary of conclusions, besides worksheet will be designed to let the chance for student, furthermore students will be asked to prepare research papers on selective topics and summarise articles contents published in English into either Kurdish or Arabic language, those articles need to be from printed media or internet articles. There will be lectures discussions and the lecture will give enough background to translate, solve, analyze, and evaluate problems sets, and different issues discussed throughout the course.

Grading

The students are required to do one closed book exam at the mid of the semester besides other assignments including translations and one research paper. The exam has 20 marks, the attendance, classroom activities; translations and research paper included. There will be a final exam on 30 marks. So that the final grade for second course will be based upon the following criteria:

Mean of two examinations: 20%

Activites and quiz: 15%

Course material

Required book:

Waste treatment, Reducing Global Waste Anne Maczulak, Third addition

The core materials of the course consists of the above book, articles from media and internet, and lecture’s notes, make sure you read all the materials and prepare well before going for the examinations. Students are encouraged to search for any other materials that may help improve their English language ability in reading, writing, listening and speaking Waste management texts.

Course programme:

*Week 1:*  Basal definition of wastes

*Week 2:* purpose of water management

*Week 3:*  Waste types

*Week 4: The importance of wastes and its effect*

*Week 5: Hazardous of wastes*

*Week 6: Incineration*

*Week 7: Incineration/ pollution*

*Week 8:* Plasmaof wastes

Week 9: Verification of wastes

*Week 10:* Solidification and stablization of wastes .

*Week 11: Sanitary Landfilling of wastes*

*Week 12: Radiation*

*Week13: Recycling*

*Week14: Phytoremedation*

*Week 15: Law and regulation of wastes*

\***Waste** is the unwanted substances or toxins that are expelled from them. Waste is directly linked to human development, both technologically and socially. The compositions of different wastes have varied over time and location, with industrial development and innovation being directly linked to waste materials.

**Waste classification according to their sources:**

\*Solid wastes: domestic, commercial and industrial wastes

 Examples: *plastics, bottles, cans, papers, …*

\*Liquid Wastes: wastes in liquid form

 Examples: *domestic washings, chemicals, oils, waste water from ponds,…*

**Classification of Wastes according to
their Effects on Human Health and the Environment**

1- Hazardous wastes

Substances unsafe to use commercially, industrially, agriculturally, or economically that are shipped, transported to or brought from the country of origin for dumping or disposal in.

2- Non-hazardous

Substances safe to use commercially, industrially, agriculturally, or economically that are shipped, transported to or brought from the country of origin for dumping or disposal in.

**Types of waste according to properties:**

* Bio-degradable: can be degraded (paper, wood, fruits and others).
* Non-biodegradable: cannot be degraded (plastics, bottles, old machines, cans, containers and others).
* **Waste treatment** techniques are used to change the physical chemical or bacteriological characters of the waste, to reduce it is volume and/or toxicity and to make the waste safe to disposal. Waste treatment may be required for radioactive and hazardous substances, in other words make it safer to dispose in compliance with environmental regulation
* **Waste management**: All activities, administrative and operational (including transportation activities), involved in the handling, treatment, conditioning, storage and disposal of waste.