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**Department of Environmental Sciences**

**College of Sciences**

**University of Salahaddin**

**Subject: Waste Management Theory**

**Course Book – (3rd Year)**

**Lecturer's name Dr. MOHAMMED AZEEZ OTHMAN**

**Academic Year: 2022/2023**

**Course Book**

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| **1. Course name** | **Waste management**  |
| **2. Lecturer in charge** | **MOHAMMED AZEEZ OTHMAN** |
| **3. Department/ College** | **Environmental Sciences - Sciences** |
| **4. Contact** | **e-mail: mohammed.othman@su.edu.krd** **Tel: (optional) 009647504611803** |
| **5. Time (in hours) per week**  | **For example Theory: 2 Supervision** |
| **6. Office hours** | **Every day before and after the lecture except off day** |
| **7. Course code** |  |
| **8. Teacher's academic profile**  | * **I graduate from Salahaddin University/ College of**

**Science/ Biology department in 2003 (Ranked 8 the in****College).** * **In 2004 I worked as assistant biology for 2**

**Years and assisted in practical ecology lab.,****microbiology lab., practical soil lab., practical sewage****Microbiology lab. and practical plant physiology lab.*** **In 2008 I completed my M.Sc. degree and in same**

**year I started as Assistant Lecturer Teaching Practical Limnology and pollution, and theory waste management in the same college.*** **For 3 years (2009-2011) I worked as a Member of the**

**Examination Committee for College of Science.*** **I participated in Teaching Methods Course in 2009in the same university.**
* **In 2018 I completed my PhD. degree and in same year**

I started Teaching theory population and Ecology |
| **9. Keywords** | **Phytoremediation, electrocoagulation treatment, Electrochemical treatment, pesticides,**  |
| **10. Course overview:****The course will cover principle information about waste management, and understanding of waste management requires knowledge not only of the small amount but also for large amount of waste. A suitable technique is necessary for each type of the waste, since life depends upon the continuance of a proper exchange of essential substances and energies between the organism and its surroundings. And the study of the way of collecting of waste till through to the landfill. Type of hazardous wasteand the processes that undergo to decrease the risk of their toxicity.** |
| **11. Course objective:** **This course book provides comprehensive coverage for a first course in hazardous waste management for environmental engineers and managers. It is written primarily for generators of hazardous waste with a primary emphasis on source reduction, waste minimization, reuse, and recycling before waste disposal. The book provides guidance on how to determine the proper category of hazardous waste generators, with separate and distinct sets of requirements for the three different categories of generators, and gives basic supplemental guidance for transporters, storage, and disposal facilities. It covers proper completion of hazardous waste manifests and reports.** |
| **12. Student's obligation****When I ask the student for preparing in class, and in the exam, preparing and writing a report and discusses in class, this stimulate the students to become more active and able to learn more things about environment science.** |
| **13. 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, classification of Environmental health and any other illustrations, besides worksheet will be designed to let the chance for practicing on several aspects of the course in the classroom, 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 classroom discussions and the lecture will give enough background to translate, solve, analyze, and evaluate problems sets, and different issues discussed throughout the course.****To get the best of the course, it is suggested that you attend classes as much as possible, read the required lectures, teacher’s notes regularly as all of them are foundations for the course. Lecture’s notes are for supporting and not for submitting the reading material including the handouts. try as much as possible to participate in classroom discussions, preparing the assignments given n the course.** |
| **14. Assessment scheme****Your final grade will be derived as follows:** **Quizzes: About 10 quizzes will be given throughout the semester. They will be given at the beginning of the class period and last 10 minutes.10% of your grade.****Exams: There will be two closed book exams given throughout the semester. Each test will be scheduled for 90 minutes.30% of your grade.****Final Exam: The Final Exam is Comprehensive in all course outlines.60% of your grade‌****Mean of two examinations: 40%** **Final examination: 60%****Final Exam: The Final Exam is Comprehensive in all course outlines.60% of your grade‌****Mean of two examinations: 40%** **Final examination: 60%** |
| **15. Student learning outcome** **Waste management and recycling of it, is one of the most important lecture in Environmental Sciences Department because the student in this course learn many things about waste management and type of waste that around us, how pollution control , guideline of safe and healthy Environment and increase the number of people who not full-time water can understand and apply its general concepts to a broad range of related disciplines all these things can students apply in our daily life for services the community** |
| **16. Course Reading List and References‌:****1. Kan A. General characteristics of waste management: a review. Energy Educ Sci****Technol Part A 2009;23:55–69.****2. Dijkema GPJ, Reuter MA, Verhoef EV. A new paradigm for waste management.****Waste Manage 2000;20:633–8.****3. Demirbas A. Energy concept and energy education. Energy Educ Sci Technol****Part B 2009;1:85–101.****4. Kurnaz MA, Calik M. A thematic review of ‘energy’ teaching studies: focuses,****needs, methods, general knowledge claims and implications. Energy Educ Sci****Technol Part B 2009;1:1–26****5. Ather, G.D. ( 2005). Essential Meteorology. 3rd Edition. Doubleday and Co., Garden City, NY.****6. Prof. R N Singh, Professor, School of Energy and Environmental Studies, Devi Ahilya Vishwavidyalaya, Indore** **7. Prof. J S Saini, Professor Emeritus, Department of Mechanical and Industrial Engineering, IIT Roorkee** **8. Dr. R.L. Sawhney, Former Professor, TERI Unievrsity, Delhi; School of Energy and Environmental Studies, Devi Ahilya Vishwavidyalaya, Indore****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 plant communities' texts.** |
| **17. The Topics:** | **Lecturer's name** |
| **Week 1:****Introduction to waste management****Week 2:****Classification of solid waste****Week 3 & 4:****Physical properties of waste****Mechanical properties of waste****Chemical properties of waste****Week 5:****Point of collection****Frequency of waste collection****Street cleansing****Transfer stations****Collection vehicles****Week 6 &7:****Resource recovery options from organic waste Material recovery facilities****Full stream processing facilities****Planning for recycling****Week 8****The water cycle/moisture Clouds and fog****Week 9****Stability Precipitation****Week 10:****The mechanism of anaerobic digestion** **Kinetics of anaerobic digestion6****Environmental factors affecting anaerobic digestion Other factors influencing anaerobic digestion****Week 11:****Composting process****Environmental factors affecting composting****Other factors influencing the composting process****Week 12:****Incineration****Processes of thermal treatmen****Week 13 and 14:****Thermal gasification8.7 Energy content of MSWWeek 15 and 16:****Weather stations** | **Dr, Mohammed Azeez Othman** |
| **18. Practical Topics (If there is any)** |  |
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| **19. Examinations:****Examples of Examinations****First Examination****Q1:- Explain pyrolysis process?** **Q2:- what is Encapsulation?**  **LAYERS OF THE ATMOSPHERE** **Q3:- define the following terms? -SCATTERED AND REFLECTED LIGHT** **Q4:- What is Precipitation Processes****Q5:- How Measuring Air Pressure?**  |