



Postgraduate Course Book

Department: Biology

College: Education

University: Salahaddin University

Subject: Environmental pollution

Course Book Level: Ph.D.; **Second semester**

Lecturer's name: Asst. prof. Dr. Zhian Rashid Salih

Academic Year: 2023/2024

Course Book

1. Course name	Environmental pollution
2. Lecturer in charge	Zhian Rashid Salih
3. Department/ College	Biology Dept./ College of Education
4. Contact	e-mail: zhian.salih@su.edu.krd
5. Time (in hours) per week	(3 theory)
6. Office hours	
7. Course code	
8. Teacher's academic profile	<p>I pursued the biology department, college of education, Salahaddin university in 1989 as assistance biology and awarded an M.Sc. in plant physiology in 1997 and a Ph.D. in 2019. Then, I started to work in the same department, as an assistant lecturer. And then upgrading to lecturer in 2005 and assistant professor in 2009. The teaching experience is both theoretical and practical including plant physiology, plant anatomy, plant nutrition, scientific debate, and botany.</p> <p>The researches published are:</p> <ol style="list-style-type: none"> 1- The effect of salt stress on leaf water relations, growth, and yield in wheat varieties. Journal of Babylon University, 10 (3), 2005. 2- Morphological responses of wheat and lentil crops to ultraviolet radiation, 12(3), 2005. 3- Effect of different auxins and type of cuttings on rooting ability of orange (<i>Citrus sinensis</i> L.local Cv.) cutting. Zanco Journal for Pure and Applied Sciences, 19(2), 2007. 4- - Effect of Foliar Application of Zinc on Growth, Yield and some Chemical Constituents of Faba Bean (<i>Vicia faba</i> L. sham local CV.). JOURNAL OF DUHOK UNIVERSITY, 10(2), 2007. 5- Rooting ability responses of (<i>Olive europaea</i> L. Digal) to different kinds of auxins and type of cuttings. JOURNAL OF DUHOK UNIVERSITY, 12(1), 2009. 6- Interaction effect of iron and plant growth regulators on growth and chemical components of broad bean plant. Zanco Journal for Pure and Applied Sciences, 1(2), 2010. 7- Effect of Foliar Application of Boron on Growth, Yield, and Photosynthetic Pigments of Wheat plant (<i>Triticum aestivum</i> L. Rizgarie). 4th international scientific conference of Salahaddin university, 2011. 8- EFFECT OF FOLIAR APPLICATION OF MAGNESIUM ON GROWTH, YIELD, AND PHOTOSYNTHETIC PIGMENTS OF BARLEY PLANT. First International Scientific Conference of Zakho University, 2013. 9- Response of barley (<i>Hordeum vulgare</i> L.) plants to foliar fertilizer with different concentration of Hoagland solution. Journal of uloom

	<p>science-Mosul university, 2014.</p> <p>10- Some Physiological Parameters of the Growth of Wheat Plant Soaking with Zamzam and Well Water. First International Scientific Conference of Kirkuk University, 2015.</p> <p>11- Effect of foliar and soil application of sulfur on growth, yield, and photosynthetic pigments of the wheat plant. The journal of Raparin university, 2015.</p> <p>12- Heavy Metals Accumulation in Leaves of Five Plant Species as a Bioindicator of Steel Factory Pollution and their Effects on Pigment Content. Polish Journal of Environmental studies. Journal With impact factor 1.867, 2019.</p> <p>13- Heavy Metal Accumulation in Dust and Workers' Scalp Hair as a Bioindicator for Air Pollution from a Steel Factory. Polish Journal of Environmental studies. Journal With impact factor 1.867, 2020.</p> <p>14- Effects of the Brand of Electrical Generator on the Concentration of Heavy Metals in Soil and Plants. Zanco Journal for Pure and Applied Sciences, 35(3), 2023.</p> <p>15- Plants as bioindicators of heavy metal pollution. Zanco Journal for Pure and Applied Sciences, 35(2), 2023.</p>
<p>9. Keywords</p>	<p>Environmental pollution, Ecophysiology, Acid rain, Particulate matter.</p>
<p>10 and 11. Course overview and Course objective:</p> <p>Air pollution comes from undesirable air matter that can harm human, animal, and plant health. Factories, electric generators, and trains are the main sources of air contaminants. Some of these pollutants may interact with other elements in the atmosphere, affecting the air quality. Approximately one-third of greenhouse gas emissions are caused by traffic. The biggest contributor to climate change is greenhouse gases in the atmosphere. Agriculture emits contaminants major look like methane (CH₄) and dioxide nitrous (NO₂) and is deemed as greenhouse gases too. Industrial processes also produce and emit numerous additional chemical wastes, including methane, ammonia, carbon dioxide, nitrogen dioxide, and tiny dust particles. Air composition contaminants may occur in various ways like through anthropogenic activities. The weather parameter plays an important role in the formation or elimination of air contaminants, such as, wind can transport contaminants from one area to another, and rain transports contaminants from the earth's atmosphere to the water and soil. Arsenic, cadmium, lead, chromium, nickel, and mercury are examples of trace heavy metals that are significant environmental contaminants, especially in regions with high anthropogenic pressure. Copper, manganese, iron, and zinc are other significant trace micronutrients in addition to these metals. The widespread bioavailability</p>	

<p>of these heavy metals can result in bioaccumulation in the food chain, which is particularly risky to human health. The presence of trace heavy metals in the atmosphere, soil, and water can pose major issues for all organisms. The drinking water quality, ecological environment, and food chain are all impacted by the contaminations described. In addition, the toxicity brought on by tainted water, soil, and produce poses a major hazard to human health</p>	
<p>12. Student's obligation The role of students and their obligations throughout the academic year include:</p> <p>A. Quizzes and daily activities. B. Seminar. C. Review article D. 1st examination E. Final examination</p>	
<p>13. Forms of teaching In this course different ways are used; this way is characterized by simplicity and distinctness. The most important one is using PowerPoint presentations which give benefits tools for observation statements, diagrams, and pictures.</p>	
<p>14. Assessment scheme</p>	
<p>15. Student learning outcome:</p> <p>1. Understanding the source of pollution and its effects. 2. Understanding climate changes and ozone depletion. 3. Understanding the management of pollution by Bioremediation and phytoremediation 4. Understanding the physiological mechanism of plant and animal adaptation to the changes in the environment.</p>	
<p>16. Course Reading List and References:</p> <p>1. Patnaik, P. (2018). Handbook of environmental analysis. Third edition. Taylor & Francis Group, LLC 2. Spellman, F.R.(2017). The science of environmental pollution. CRC Press. 3. Marchand, C. (2017). Phytoremediation of soil contaminated with petroleum hydrocarbons and trace elements. Linnaeus University Press, 351 95 Växjö. 4. Larcher, W. (2003). Physiological plant ecology. Fourth edition. Springer-Verlag Telos. Louw, G.N. (1993). Physiological animal ecology. Addison-Wesley.</p>	
<p>17. Topics Program</p>	
<p>Week 1: Source of environmental pollution and its effects.</p>	
<p>Week 2: Air pollution control (Air quality and monitoring).</p>	
<p>Week 3: The effect of environmental pollution on humans, plants, and materials.</p>	

Week 4: Effects of particular matters on human health.	
Week 5: Heavy metals and their effect on humans and plants.	
Week 6: Acid rains (source, types) and its effect.	
Week 7: Climate changes and global warming.	
Week 8: Ozone and Ozone depletion.	
Week 9: Environmental pollution by an oil refinery and gas station.	
Week 10: Environmental remediation (types and technology).	
Week 11: Phytoremediation and its mechanism. (advantages and limitations)	
Week 12: Food chains (elaborate with diagram and relationship).	
Week 13: Differences between renewable and non-renewable energy resources.	
Week 14: Solid waste management and its effect on environment and climatic and human health	
Week 15: Examination	
18. Grading procedure Review article = 15, Seminar presentation= 10, Quiz= 5, Midterm examination = 20. Total= 50. Final examination = 50. 50+50= 100.	
19. Examinations:	
20. Extra notes:	
21. Peer review *	

* Must have permission of the Scientific and Higher Education Committee