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**Department of environmental sciences and health**

**College of Sciences**

**Salahaddin University**

**Subject: environmental indices**

**Course Book – (Year 2)**

**Lecturer's name Prof.Dr. Dalshad Azeez Darwesh**

**Academic Year: *2022-2023***

**Course Book**

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| **1. Course name** | **Ecostatistics and Environmental indices**  |
| **2. Lecturer in charge** | **Dr.Dalshad A.Darwesh** |
| **3. Department/ College** | **Environmental sciences and health /Sciences** |
| **4. Contact** | **e-mail: dalshas.darwesh@su.edu.krd****Tel: (optional)** |
| **5. Time (in hours) per week**  | **Theory: 2** **Practical: 2**  |
| **6. Office hours** |  **Every days from 10:30 to 12:30 .Availability for students during the week** |
| **7. Course code** |  |
| **8. Teacher's academic profile**  | **My academic life beginning when BC.s was obtained in biology department college of education during the years 1991-1994, after that the first job was determined as assist biology for me in the same department and college as mentioned above , while the MS.c degree was obtained in the plant nutrition in the college of sciences , biology dept. during years 1998-1999, Where as the Ph.D degree was completed in soil and water department , college agriculture during years 2004-2007 in soil and plant nutrition specialty, in 2010 my job title translocated to environmental sciences from biology department, because my speciality present in the latter department .** |
| **9. Keywords** | **environmental index air pollution and quality ….?** |
| **10. Course overview:** The course will involve statistics and environmental index texts of selective topics together with print media or internet articles which deal with current statistics and environmental indexissues." Instructional strategies attempt to strike a balance between developing the students' ability to cope with statistics texts, extending their general academic reading skills, and increasing their basic knowledge and understanding of statistics. The course will give students a better understanding of a number of statistics topics in environmental, the followings are examples but not restricted to: statistical notation measure of central tendency measure of dispersion and some test, with some extra topics that will be indentified as the course progress. Students will be asked to prepare research papers on selective topics and summarize 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. |
| **11. Course objective:**The course will cover statistics texts and environmental index textsof selective topics together with print media or internet articles which deal with current statistics issues." Instructional strategies attempt to strike a balance between developing the students' ability to cope with statistics texts, extending their general academic reading skills, and increasing their basic knowledge and understanding of statistics. The course will give students a better understanding of a number of statistics topics and environmental quality , the followings are examples but not restricted to: statistical notation measure of central tendency measure of dispersion, air quality index , water quality index ,soil quality index and some test, with some extra topics that will be indentified as the course progress. |
| **12. Student's obligation**students will be asked to prepare research papers on selective topics and summarize 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. |
| **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 materials and any other illustrations, besides worksheet will be designed to let the chance for practicing on several aspects of the course in the classroom |
| **14. Assessment scheme**The students are required to do one closed book exam at the mid of the semester besides other assignments including class room activity and solving statistics problem. The exam has 30 marks, the attendance, classroom activities; count 10 marks. There will be a final exam on 60 marks. So that the final grade will be based upon the following criteria:Mid-semester exam: 13%Classroom participation and assignments 2%Final exam: 50%‌ |
| **15. Student learning outcome:**The main out come of this course is to give the student the information about statistical and **environmental index** use and management , as well as find out the relation among environmental compartments , however explain the role of statistics in study the climate change like global warming that caused by emission of green house gasses particularly the relation ship between the carbon dioxide and temperature raising , as well as the statistics is very importance in explain the population growth rate with all factors that limit the growth rate in certain area for example the rate of mortality and natality in specific area , Thus in general , I think that statistics is very important in both sector private and governorate sectors  |
| **16. Course Reading List and References‌:**Steel R,G . D. and Torrie,J.H. (2010) principle and procedure of ststistics.1th ed McGRAW-HILL Book Company,INC.NewYork. P:475.Ahmad,Q.S Ismail,V.M and Khan,S.A .(2012)Biostatistics .1thed.University Science Press.New Delhi.P:454.And any other **Statistics textbook** published in 21'*t* centuryThe 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 exams. |
| **17. The Topics: first semester**  | **Lecturer's name** |
| **Environmental indices second semester** **Week 1:** Environmental indices . Introduction, properties of indices and their important **Week 2:**Air quality index, definition analysis and explanation the equation used in AQI**Week 3:**Air quality index calculation .**Week 4:**Water quality index , the mathematic equation use, **Week 5:**collection of data , summarized the data , estimation the WQI.Used exercise.**Week 6:**Soil quality index, definition analysis and explanation the equation used in SQI**Week 7:** Collection of data for Soil quality index calculation **Week8:** **Second Examination****Week 9:** Clean index and fertilizer index, collection the data, explanation the equation use in estimation of the CI and FI.**Week 10:****Health risk index for different ecological material** **Week 11:****Bioidicator** **Week 12:****Relative growth of organisms population ?** | Lecturer's nameex: (2 hrs) |
| **18. Practical Topics (If there is any)** |  |
| In this section The lecturer shall write titles of all practical topics he/she is going to give during the term. This also includes a brief description of the objectives of each topic, date and time of the lecture  | Lecturer's nameex: (3-4 hrs) |
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| **Salahaddin University-Erbil** | **Image result for salahaddin university-erbil logo** |  | **Subject: Environmental indices**  |
| **College of Science** |  | **Exam. Duration: 2 hours** |
| **Department of Environmental sciences and Health** |  | **Date:**  |
| **(2nd ) Stage** |  |  |
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**Q1/Answer one of the following in briefly ?** **( 10marks)**1-What is environmental indicator? then explain the DPSIR by illustration ? 2-Successful composting generally depends on some factors that influence the activities of the microorganism directly and indirectly count them ? Then write CQI equation? **Q2/ Calculate the drinking water quality index for the well water using BIS methods. ( 10marks)**

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| **well** | **pH** | **EC** | **TDS** | **T Alka** | **T.Har** | **Ca** | **Mg** | **Na** | **Nitrate** | **Cl** | **SO4** | **Flu** | **Fe** |
| **sample** | **8.0** | **2200** | **1250** | **300** | **450** | **85** | **43** | **189** | **55** | **350** | **250** | **2.2** | **0.4** |
| **limited** | **8.5** | **2000** | **1000** | **200** | **300** | **75** | **30** | **100** | **45** | **250** | **200** | **1** | **0.3** |
| **Wi** | **0.070** | **0.070** | **0.116** | **0.047** | **0.070** | **0.047** | **0.047** | **0.070** | **0.116** | **0.070** | **0.070** | **0.116** | **0.047** |

**Q3/ Calculate the AQI of Erbil city, when the PM 2.5 concentration are 400 µ.m-3 , Since the AQI value is between 301-500 and the break point is ranged between 250.5-500.4 ( 10marks)****Q4/ The following table show the concentration of heavy metals mg/kg in soil during Summer seasons? Calculate the potential ecological risk index RI. ( 10marks)****Q5/ Calculate the Shannon and Simpson index of plant community in the following table ?****( 10marks)**

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|  **Plant Species** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **Total No of plants** |
| **Observed No.** | **6** | **4** | **7** | **2** | **3** | **10** | **1** | **7** | **40** |

**Lecturer :****Prof. Dr. Dalshad A.Darwesh** |
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| **21. Peer review پێداچوونه‌وه‌ی هاوه‌ڵ**   |