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**Department of: Field Crop**

**College of Agricultural Engineering Science**

**Salahaddin University -Erbil**

**Subject: Remote Sensing and GIS/Practical**

**Course Book : 2nd Year Student**

**Lecturer's name: Hawar Abdulrzaq Sadiq**

**Academic Year: 2022-2023**

**Course Book**

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| **1. Course name** | **First semester/ Autumn semester** | |
| **2. Lecturer in charge** | **Hawar Abdulrzaq Sadiq Razvanchy** | |
| **3. Department/ College** | **Soil and Water science/Agricultural Engineering Science** | |
| **4. Contact** | **e-mail: hawar.sadiq@su.edu.krd**  **Tel: 0750 454 2683**  **07700648281** | |
| **5. Time (in hours) per week** | **Practical: 3** | |
| **6. Office hours** | **6 hours** | |
| **7. Course code** | **-** | |
| **8. Teacher's academic profile** | **He finished his BSc in Salahaddin University-Erbil college of agricultural engineering science soil and water department in 2008 and worked as a demonstrator in the same department in 2009. Also, he obtained an MSc degree in Remote Sensing in 2014. In 2022 he finished his PhD in Soil Survey and Classification. Now he is a lecturer and teaching staff member in the same department.** | |
| **9. Keywords** |  | |
| **10. Course overview:**  In general, there are a few slice of people have enough information about remote sensing. This course is a practical part of remote sensing for this reason we chose software to be gate for introducing with a principals of remote sensing. The software which we study it is ER Mapper version 7.0, actually this version is old somewhat but in same time it’s easy for using and has not a licensing problem. In this course we will study the maximum knowledge about how satellites works, types of satellite images including DEM, pixel values, image processing, and different algorithms application on satellite images using ER Mapper version 7.0 software. As well as, studding the vegetation cover assessment, isolation, classification, calculation, and outputting. On the other hand, studding the classification techniques is one of our course aims for both type supervised and unsupervised. At the end of this course the student should have a good knowledge on satellite images, how satellite works, and how we can exploitation those information in order to make the earth management more easier. | | |
| **11. Course objective:**   1. To learn how to use ER Mapper ver. 7.0 software. 2. To collect knowledge about the product of remote sensing techniques (satellite images) and how use them. 3. To using remote sensing in agricultural purpose. 4. To imagine how remote sensing is useful. | | |
| **12. Student's obligation**  In this course the student at every lecture should ready to quick test (quiz) of previous lectures. Whereas they asked about what we talked and studied in previous lecture. | | |
| **13. Forms of teaching**   * Data show * Presentation * Remote computer controller | | |
| **14. Assessment scheme**  ‌   |  |  | | --- | --- | | First examination | 35 | | Second examination | 35 | | Final assessment | 35+35/2= final mark | | | |
| **15. Student learning outcome:**  Studding Remote sensing course both section theoretical and practical is extremely important especially in agriculture. Because there are tons of applications including forest mapping, agriculture areas assessment, and vegetation cover classification, etc. As well as, remote sensing is in the beginning in Kurdistan relatively, and it makes more things become easily to farthest way that imagine. At the end of this course the students of forest department will have good information about satellite images and spectral signature of vegetation cover and also calculation of vegetation cover by using satellite images and ER Mapper software. Also, make a final vegetation map for any area around the world, in addition more applications and techniques about using remote sensing. | | |
| **16. Course Reading List and References‌:**  ▪ ER Mapper User’s Guide, 2008. ERDAS, Inc.  ▪ http://www.hexagongeospatial.com/products/producer-suite/er-mapper  ▪ http://www.usgs.gov/ | | |
| **17. The Topics:** | | **Dr.Heman Abdulkhaliq** |
| **18. Practical Topics** | | **Lecturer's name** |
| Introduction to ER Mapper   * Definition of ER Mapper software * History of ER Mapper software * ER Mapper software installation * ER Mapper software user interface * ER Mapper software toolbars * ER Mapper software main menus | | Hawar Ab. Sadiq  (3 hrs)  1/10/2022 |
| Viewing images   * Mouse cursor during ER Mapper * Open/close new window * Load image * Moving window * Resizing window * Zooming options * Panning image | | Hawar Ab. Sadiq  (3 hrs)  8/10/2022 |
| Viewing images   * Open several windows * Load several images * Geolinking windows * Preferences | | Hawar Ab. Sadiq  (3 hrs)  15/10/2022 |
| Viewing image data values   * Viewing values and signatures * Viewing locations and distances | | Hawar Ab. Sadiq  (3 hrs)  22/10/2022 |
| The Algorithm window   * Labeling the algorithm * Saving the algorithm * On/Off layers * Delete and Create layers * Change layers orders * Change raster layers | | Hawar Ab. Sadiq  (3 hrs)  29/10/2022 |
| Edit formula   * How to write a formula * Load a formula | | Hawar Ab. Sadiq  (3 hrs)  5/11/2022 |
| Masking images   * How to write a masking formula * Apply a masking formula | | Hawar Ab. Sadiq  (3 hrs)  12/11/2022 |
| Processing the images   * Highlight vegetation (NDVI) * Highlight water (NDWI) * Enhancing image contrast * The Transform buttons * The Transform dialog box | | Hawar Ab. Sadiq  (3 hrs)  19/11/2022 |
| Viewing the image in 3D perspective   * Add a Height layer to the algorithm * Load a digital elevation image into the Height layer * Change the view mode | | Hawar Ab. Sadiq  (3 hrs)  26/11/2022 |
| Classifications   * Supervised * Unsupervised | | Hawar Ab. Sadiq  (3 hrs)  3/12/2022 |
| Statistics   * Calculate statistics for images * Display statistics for images | | Hawar Ab. Sadiq  (3 hrs)  10/12/2022 |
| Landsat TM Wizard   * 321 color composition * 741 color composition * 432 color composition | | Hawar Ab. Sadiq  (3 hrs)  17/12/2022 |
| Sunshading and colordraping   * Viewing sunshaded magnetics data * Colordraping radiometrics over the magnetics data | | Hawar Ab. Sadiq  (3 hrs)  24/12/2022 |
| Image Display and Mosaic Wizard   * Creating a grayscale mosaic image | | Hawar Ab. Sadiq  (3 hrs)  31/12/2022 |
| Setting up the page   * Specify how the page or map can be scaled * Specify the output page size * Specify the output map scale * Position the contents on the page | | Hawar Ab. Sadiq  (3 hrs)  7/1/2023 |
| **19. Examinations:**  ***Q/*** What does the neighbours section mean in cell value profile window?  ***Typical answer/*** Its means the pixel’s value for selected and around pixels as a nine array pattern.  ***Q/*** How to write a formula?  ***Typical answer/***   * Select algorithm in view menu * Click on edit formula icon * Now, write a formula and click on apply changes * After finishing click on close | | |
| **20. Extra notes:**  All examination will be computer based (practical), so the students will answer all questions using ER Mapper software on computer and also write all steps they performed. | | |
| **21. Peer review پێداچوونه‌وه‌ی هاوه‌ڵ** | | |