

**Department of Soil and Water Science**

**College of Agriculture**

**University of Salahaddin- Hawler**

**Subject: Hydrology**

**Course Book - (Year 2 )**

**Lecturer's name: Dr. Shwan Omar Ismael**

**Academic Year: 2022/2023**

**Course Book**

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| **1. Course name** | **Hydrology** |
| **2. Lecturer in charge** | **Dr. Shwan Omar Ismael**  |
| **3. Department/ College** | **Soil & water/ Agriculture** |
| **4. Contact** | **e-mail: shwan.seeyan@ su.edu.krd** |
| **5. Time (in hours) per week**  | **Theory: 2 hr.**  |
| **6. Office hours** | **12 hours** |
| **7. Course code** |  |
| **8. Teacher's academic profile**  | **Dr. Shwan Omar Ismael****- PhD in Hydrogeology (2012-2015); TU-Bergakademie Freiberg- Hydrogeology Institute/Germany** **- MSc. In Hydrochemistry and Hydrogeology (2005-2008); Salahaddin University- Science College-Geology Department.****- BSc. In Geology (1994-1998); Salahaddin University-Science College-Geology Department.**  |
| **9. Keywords** | **Water Cycle, Water available, Water losses, Surface water, Discharge, Groundwater, and Recharge.**  |
| **10. Course overview:** Hydrology as a Science is a branch of earth science; it is the science that treats the waters of the earth, their occurrence, circulation, and distribution, their chemical and physical properties, and their reaction with the environment, including the relation to living things.A profession is a “calling requiring specialized knowledge, which has as its prime purpose the rendering of a public service” . The hydrologists can use water– water withdrawal and in stream uses, Water Control – flood and drought mitigation, and Pollution Control – point and nonpoint sources.  |
| **11. Course objective:** The course will cover selective topics of Hydrology which deals with study of water in different sources and related subjects, like water in the rivers, oceans, streams, swamps, lakes as a surface water, and springs, and water wells as a groundwater. The course include the study of water beneath and surface forms, and the factors causes the losses and available parameters for increasing and decreasing the source of water, the origin of the spring water and the source of major water in the rivers and streams. This course also include the methods for determine the water usage as discharge from the surface water, and the methods for determining the recharge from groundwater. The aim of this course is to help the student to understand how these sources of water and methods will work naturally and artificially, and taking information about water and its sources in our world.  |
| **12. Student's obligation**Students are strongly encouraged to attend all the Lectures and exercises, Quizzes, exams and class participation. Preparing the reports for the subject will take from the class like exercises and applying the methods of determining the discharge of the surface water and recharge of the groundwater. Preparing reports for the scientific field trips. Working as a group (group work).The final exam will be comprehensive and will cover the lecture material but will do so in more depth than the quizzes. |
| **13. Forms of teaching** **Lectures:** Different forms of teaching will be used to reach the objectives of the course: power point presentation for the head titles and definitions and summary of conclusions, classification of materials and any other illustration.There will be classroom discussions and the lecture will give enough background to translate, solve, analyse and evaluate problems sets, and different issues discussed throughout the course.To get the best of the course, it is suggested that the student attend classes as much as possible, read the required lectures, teachers notes regularly as all of them are foundations for the course. Lectures notes are for supporting and not for submitting the reading material including the hand-outs. Try as much as possible to participate in classroom discussions, preparing the assignments given in the course. |
| **14. Assessment scheme****Course assessment will be**There will be quizzes and exams during the semester, given during regular lecture periods. The course grade will be based on the exams, quizzes, and Report as shown below:* Theory Exam 20%
* Theory Quiz 5%
* Theory Attendance 5%
* Report 10%
* The total will be 40%

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| **15. Student learning outcome:**Students should learn the following:1. Basic knowledge of world water, its source and origion.2. Knowledge of Characteristics, description and identification of water cycle and its parameters .3. Classification of the source of water demands and water uses.4. Characterization, description and identification of the Surface water.5. Characterization, description and identification of the Groundwater.7. The student should be able to understand rocks and the effect of parent material to the Characteristics of the water.8. The student should be able to determine the discharge of the surface water and recharge of groundwater.9. The student should be able to determine the water losses elements and water availability of the increasing and decreasing the water. 10. Analysis and interpretation of source of water, methods for using water . |
| **16. Course Reading List and References‌:**1.Introduction to Hydrology2.Hydrology: Principles, Analysis, and Design. 3.Introduction to Physical Hydrology.4. Engineering Hydrology.  And any other physical or general textbook published recently. |
| **17. The Topics:** This includes lectures on different topics covered in the theory as follows: | **Lecturer's name** |
| **Week - 1** Introduction and scope of Hydrology, and water cycle**Week - 2**  Hydrologic System and Budget, Precipitation**Week - 3**  Radar and Satellite determination of precipitation **Week - 4**  Water losses, Evaporation and Evapotranspiration Estimation**Week - 5**  Hydrograph Separation Techniques**Week - 6** Examination **Week – 7**Stream flow measurement and River stage **Week - 8** Groundwater; advantages and disadvantages **Week - 9** Aquifers and Aquifer types **Week - 10** Groundwater Flow, flow direction and movements. **Week - 11**  Relationship between groundwater and surface water**Week - 12**  Groundwater Recharge and Discharge **Week - 13**  Examination | **Dr. Shwan Omar Ismael**  |
| **18. Practical Topics ( not include)** |  |
| **19. Examinations:** The theoretical exams are focused on material studied in lectures, plus the required reports and quizzes, the formats will be include short answer, definition, multiple choice, and differences. The quiz will be similar to the exams in terms of the type and difficulty of questions, but shorter. ***1. Compositional:*** Includes the comparison between the different materials, the definitions, explanation, discussion, and the selecting materials. ***2.Questions that need to be calculated:*** |
| **20. Extra notes:** |
| **21. Peer review ‌**  |