



Department of  
Sciences

Soil and Water

College of

Agriculture

University of Salahaddin, Erbil

Subject: Water Resources.

Course Book – *For* (2<sup>nd</sup> year students)

Lecturer's name :Prof.Dr. Akram Othman Esmail

B.Sc. 1980 University of Sulaimani

MSc. 1986 University of Salahaddin

PhD. 1992 University of Baghdad

Academic Year: (2022-2023)

### Course Book

1. Course name	Fall semester 2022-2023
2. Lecturer in charge	Prof . Dr. Akram Othman Esmail
3. Department/ College	Soil and Water Sciences, Agricultural Engineering sciences.
4. Contact	e-mail: <a href="mailto:akram.esmail@su.edu.krd">akram.esmail@su.edu.krd</a> Tel: 07504672975

5. Time (in hours) per week	Theory: 2 hours per week Practical: 2 hours per week
6. Office hours	6 hours/week
7. Course code	
8. Teacher's academic profile	The main points in my academic profile can be summarize as follow: 1- Teaching B.Sc. M.Sc and Ph.D students. 2- Doing scientific researches. 3- Member of some scientific committees in the soil and water department and college of Agriculture. 4- Supervising (15) Ph.D. students and 25 MSc. students. 5- Contributing in more than 310 examine committee for MSc and Ph.D students either as a member or chairman. 6-Evaluation of numerous researches for scientific journals in Kurdistan, Iraqi and international journals. 8-Doing statistical analysis for numerous post graduate students. 9-Teaching students in other Universities.
9. Keywords	Water resources, Management of water resources, Water harvesting, Hydrograph, Water quality. 1. Course name: Water resources. 2. Lecturer in charge: Assit.Lect. Aveen Sabir Kareem 3. Department/ College, Soil and water/ College of Agricultural Engineering sciences BSc. 2010, MSc. 2015 Sulaimani Univ. 4. Contact e-mail: aveen.karem@su.edu.krd Tel: (07504515570) 5. Time (in hours) per week      Practical: 2h.      (35) Marks. 6. Office hours      (6)h. per week 7. Course code
10-	Water is very important for life that we cannot imagine life without it. The evolution of life itself took place in the water. In the evolution of all kinds of life, water has played an important role. The amount of water found in the living beings is 65 per cent and 65 to 99 percent in plants. This clearly shows the need and utility of water. Water which is a precious gift of the nature has several uses. Water is very essential

for the development. It is a matter of great concern for all of us. Besides coordinating the demand and supply of the water, there is a need to keep the balance among different sources of water. Hence conservation of water resources is an essential requirement.

#### 11. Course objective:

Goals of the course or Goals of studying water resources:

The main goals of studying water resources can be summarizing as follow: After studying this lesson, the student will be able to

- 1- Know different sources of water.
- 2- Explain the meaning of water budget.
- 3- Explain the uneven distribution of water.
- 4- Know the utility of water.
- 5- Understand the utility and distribution of different sources of irrigation.
- 6- Locate important river valley projects on the map.
- 7- Explain the need of the water management.
- 8- Explain the impact of flood and draught on the life of the people.
- 9- Explain the meaning of watershed development.
- 10- Explain the methods of conservation of water resources.
- 11-drawing hydrograph.
- 12-Water harvesting and management.

#### 12. Student's obligation:

The student must have an important role:

- 1- The students must contribute in the scientific discussions in the class or teaching hall.
- 2- The students must know the importance of quizzes, homework, reports and exams.
- 3- It is necessary to contribute the student in presentation a scientific subject.

#### 13. Forms of teaching:

There are different forms of teaching:

- 1-Datashow and power point.
- 2- White board.
- 3-Lectures.

#### 14. Assessment scheme

Breakdown of overall assessment and examination:

- 1-Monthly exam 9 marks.
- 2-Quizzes 2 marks.

<p>3-Present and contributing in scientific discussions 2 marks. 4-Seminar 2 marks.</p>	
<p>15. Student learning outcome: Explaining and training on determining properties of water samples from different water resources, their uses, management, harvesting, classification and drawing hydrographs.</p>	
<p>16. Course Reading List and References:</p> <ol style="list-style-type: none"> <li>1- Groundwater – the processes and global significance of aquifer degradation". Google.com. 2003-12-29. doi:10.1098/rstb.2003.1380. Retrieved 2009-03-12.</li> <li>2- Hoekstra, A.Y. 2006. The Global Dimension of Water Governance: Nine Reasons for Global Arrangements in Order to Cope with Local Problems. Value of Water Research Report Series No. 20 UNESCO-IHE Institute for Water Education.</li> <li>4- Homer-Dixon, Thomas. "Environment, Scarcity, and Violence." Princeton University Press. (1999).</li> <li>5- McMahon, T.A. and Finlayson, B.L.; Global Runoff: Continental Comparisons of Annual Flows and Peak Discharges. ISBN 3-923381-27-1</li> <li>6- Rasler, Karen A. and W. R. Thompson. "Contested Territory, Strategic Rivalries, and Conflict Escalation." International Studies Quarterly. 50. 1. (2006): 145-168.</li> <li>7- The World's Water 2006-2007 Tables, Pacific Institute". Worldwater.org. Retrieved 2009-03-12.</li> </ol> <p>Magazines:</p> <ol style="list-style-type: none"> <li>1--American J. of Hydrology.</li> <li>2- Journal of Soil Science.</li> </ol>	
17. The Topics:	Lecturer's name
<p>1- Introduction: Which includes definition of natural resources and water resources in Kurdistan and the relation between them. The most important water resource in arid and semi-arid region.</p> <p>1-Water sampling from different water resources for analysis.</p>	<p>Dr. Akram Othman Esmail</p> <p>1<sup>st</sup> week or meeting (2) h.</p> <p>Assit. Lect. Aveen S. Kareem</p> <p>1st week or meeting (2) h</p>

<p>2-Quantity and quality of water resources in Kurdistan Region.</p> <p>2-Comparison between TDS , EC and, TSS and pH for water samples taken from springs , rivers and wells.</p>	<p>Dr.Akram Othman Esmail</p> <p>2<sup>nd</sup> and 3<sup>rd</sup> meeting (4) h.</p> <p>Assit. Lect. Aveen S. Kareem</p> <p>2<sup>nd</sup> and 3<sup>rd</sup> week or meeting (2 h</p>
<p>3-The problems of water in south Kurdistan.</p> <p>3-Visting to Efrac Project for Studing practical steps of water purification and Jar test in Efrac project lab.</p>	<p>Dr.Akram Othman Esmail</p> <p>4<sup>th</sup> week (2) h.</p> <p>Assit. Lect. Aveen S. Kareem</p> <p>(2) h.</p>
<p>4-Uses of water resources.</p> <p>4-Vsiting to Dukan or Dohuk Dam.</p>	<p>Dr.Akram Othman Esmail</p> <p>5<sup>th</sup> meeting (2) h.</p> <p>Assit. Lect. Aveen S. Kareem (2) h.</p> <p>.</p>
<p>5-and 6- Classifications of water resources for different purpose especially agricultural purpose.</p> <p>Vesting to Bardarash and Akre for two purposes:</p> <p>a- Practical water harvesting for one of MSc students in our department.</p>	<p>Dr. Akram Othman Esmail</p> <p>6<sup>th</sup> and 7<sup>th</sup> meeting (4) h.</p> <p>Assit. Lect. Aveen S. Kareem</p> <p>(4) h.</p>

<p>b- Vesting to see practically Artesian well.</p>	
<p>7-Water harvesting.</p> <p>6- Determining some chemical properties of water,</p>	<p>Dr. Akram Othman Esmail</p> <p>7<sup>th</sup> meeting (2) h.</p> <p>Assit. Lect. Aveen S. Kareem</p> <p>(2) h.</p>
<p>7- and 9- Types of springs and drawing hydrographs.</p> <p>8- Vesting to sulphate or hot springs in Smaquli Jali village.</p> <p>Sampling the water from hot springs then and analysing it.</p>	<p>Dr.Akram Othman Esmail</p> <p>8<sup>th</sup> and 9<sup>th</sup> (4) h.</p> <p>Assit. Lect. Aveen S. Kareem (4) h.</p>
<p>10-Definition of hydrograph and factors affecting it.</p> <p>10- Radar analysis for some of practical results.</p>	<p>Dr.Akram Othman</p> <p>10<sup>th</sup> meeting (2) h.</p> <p>Assit. Lect. Aveen S. Kareem</p> <p>10<sup>th</sup> meeting (2) h</p>
<p>11-and 12 - Drawing hydrographs and discussing them.</p> <p>.</p> <p>11-Determining ionic strength.</p> <p>12- Practical exam.</p> <p>Practical exam about hydrograph.</p>	<p>Dr Akram Othman Esmail</p> <p>11<sup>th</sup> and 12<sup>th</sup> meeting (4) h.</p> <p>Assit. Lect. Aveen S. Kareem</p> <p>11<sup>th</sup> meeting (2) h</p> <p>Assit. Lect. Aveen S. Kareem</p>

	12 <sup>th</sup> meeting (2) h
<p>13- Dams in Kurdistan region.</p> <p>Advantage and disadvantage of dams</p> <p>13- Analysis of Dam water samples.</p>	<p>Dr. Akram Othman</p> <p>13<sup>th</sup> meeting (2)h.</p> <p>13<sup>th</sup> meeting (3 Assit. Lect. Aveen S. Kareem (2) h.</p>
<p>14 and 15- The problems of water resources in Iraq and Kurdistan region and methods for solving them.</p> <p>14 and 15- Sdrawing the relation between ionic strength and electrical conductivity for different water resources.</p>	<p>Dr. Akram Othman</p> <p>14<sup>th</sup> and 15<sup>th</sup> (4)h.</p> <p>Assit. Lect. Aveen S. Kareem</p> <p>14<sup>th</sup> and 15<sup>th</sup> meeting (4) h</p>
<p>18 Extra notes:</p> <p>Nothing</p>	
<p>1. Peer review: Approved by Prof. Dr. Yahya Ahmad Shekha.</p>	