

Second Stage/ Hydrogeology G306

Course Description Form

In this course, the student will be able to understand in detail the distribution, movement and presence of groundwater in the subsurface layers of the earth, the most important laws that control its movement, methods of detection and extraction, and the most important factors affecting it in detail.

1. Educational Institution	College of Science/ University of Basrah
2. Department	Geology
3. Course name/Code 1. Programs included in it	Hydrogeology G306
4. Programs included in	Bachelor's, Master's, Doctorate
5. Attendance Form Available	Weekly
6. Semester/ Year	2020-2019
7. Total of study hours	30 hours + 60 practical hours
8. The course description was	prepared in 1/8/2020
9. Aims of the Course	
The student's ability to recognize the importance of water resources, their presence, distribution, environmental and economic importance, as well as their distribution in the environment. As well as methods of sustainability and	

measurement of primary productivity in drainage basins and the factors affecting them

10.Course outcomes and methods of teaching, learning and assessment

11.a- Knowledge and Understanding goals

12.A1- Identify the types of water in nature.

13.A2- Identifying the sources, presence and locations of groundwater extraction in the ground.

14.A3- Identify the characteristics of the petrophysical layers and the direction of groundwater and its movement within the earth.

15.A4- Knowing the laws that control the movement of groundwater, its derivations, and the principles governing its movement.

16.A5- Study of the hydraulics of groundwater.

17.A 6- Knowing the methods of drilling shallow and deep underground wells.

18.A 7- The reasons for the fluctuation of groundwater levels and the factors affecting it.

19.A8- Surface and subsurface detection methods for groundwater.

20.A9- Salt intrusion into groundwater aquifers

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b- Subjective- Specific Skills

- b.1. Recognize the sources of surface and ground water in the environment.
- b.2. Acquiring the skills of calculating the water balance and analyzing its results
- b.3. Identify and understanding of sustainability methods and how to achieve them.

Learning Methods

- 1. Explanation and Discussion of the Lectures
- 2. It is boosting the student to conduct research and reports.
- 3. Urging the student to make PowerPoint presentations.

Evaluating Methods

- 1- Daily test and reports
- 2- Monthly exams
- 2- Final exams

C- Emotional and evolutional goals

- 1. The ability to recognize the importance of water resource in earth system.
- 2. Linking knowledge to environmental reality.

Learning Methods

- 1. Explanation and Discussion of the Lectures
- 2. Boosting the student to conduct research and reports.
- 3. The student PowerPoint presentations.

d- General qualification skills transferred (other skills related to employability and personality development)

- 1. Developing the mental abilities of the student
- 2. Developing the skills
- 3. Dealing with field and laboratory
- 4. Monitoring and evaluating water resources in the environment and the impact of climate change.

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, demonstrating whether he has made the most of the available learning opportunities. It must be linked to the description of the program.

1. Sequencing of course content

Week	Hours	Unit name	Course Outcomes	Learning method	Evaluation method
1 st week, 2 ^{ed} , 3 ^{ed} weeks	2 h. lect. 2h. lab.	<p>Theoretical:</p> <p>Introduction to the definition of groundwater resources, ways of their presence and sources, and the origin of this water in the layers of the earth</p> <p>Practical:</p> <p>a practical study of the characteristics of petrophysical underground reservoirs</p>	Knowledge and understanding of lectures	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests
4 th week, 5 th and 6 th weeks	2 h. lect. 2h. lab.	<p>Theoretical:</p> <p>An explanation of the laws that control the movement of groundwater and its basic derivations</p> <p>The practical side:</p>	Knowledge and understanding of lectures	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests

		<p>Calculation of the natural recharge of groundwater reservoirs and its relationship to climate</p> <p>first semester exam</p>			
<p>7th week, and 8th weeks</p>	<p>2 h. lect. 2h. lab.</p>	<p>Theoretical:</p> <p>Knowing the laws that control the movement of groundwater, its derivations, and the principles controlling its movement</p> <p>The practical side:</p> <p>Calculation of the hydraulic characteristics of the aquifer (Theiss method)</p>	<p>Knowledge and understanding of lectures</p>	<p>Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory</p>	<p>Daily and monthly tests</p>
<p>9th week, and 10th weeks</p>	<p>2 h. lect. 2h. lab.</p>	<p>Methods of drilling shallow and deep underground wells</p> <p>The practical side:</p> <p>Calculation of the hydraulic characteristics of an aquifer (Jacob method)</p>	<p>Knowledge and understanding of lectures</p>	<p>Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory</p>	<p>Daily and monthly tests</p>
<p>11th week, and 12th weeks</p>	<p>2 h. lect. 2h. lab.</p>	<p>the theoretical side:</p> <p>Surface and subsurface detection methods for groundwater</p> <p>The practical side:</p>	<p>Knowledge and understanding of lectures</p>	<p>Understand the evolving state of knowledge learn to carry out practical work, in the</p>	<p>Daily and monthly tests</p>

		Calculation of the hydraulic properties of the aquifer (Thim method)		field and in the laboratory	
13th week	2h. lab.	exam	11. Infrastructure	evolving state of knowledge learn to carry out practical	monthly tests
1- Textbooks required for the course				field and in the laboratory	
14th week, and 15th weeks	2 h. lect. 2h. lab.	Theoretical: Hydrograph , flood control methods Practical : Practical semester exam	Hydrology (Principles and Design). H. m. Raghunath, second add. New Delhi, Bangalore. 2006. * Groundwater hydrology (David Todd) Third edition /2005	Understand the evolving state of knowledge learn to carry out practical work in the field and in the laboratory	Daily and monthly tests
Recommended readings			Engineering Hydrology by Ir. W. Spaans. 1996. IHE/Savenije/de Laat/Spaans		
Electronic website					

12. Course Development Plan

Course development based on recent versions of books and references..
The adoption of modern interactive teaching methods.
Activating alignment programs with international universities to learn about modern curricula and to exchange the experiences.