



مركز الاعتماد
وإضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER



The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

Course Name:

Principles of Hydrogeology

1	Course title	Principles of Hydrogeology
2	Course number	033 5 361
3	Credit hours (theory, practical)	3 cr. Hrs.
	Contact hours (theory, practical)	(2 Theory, 3 Practice)
4	Prerequisites/corequisites	
5	Program title	Applied and Environmental Geology
6	Program code	
7	Awarding institution	The University of Jordan
8	Faculty	Faculty of Science
9	Department	Dept. of Geology
10	Level of course	Third Year Students
11	Year of study and semester (s)	4 Years, 8 Semesters
12	Final Qualification	B.Sc.
13	Other department (s) involved in teaching the course	
14	Language of Instruction	English (Arabic)
15	Date of production/revision	2014-2017

16. Course Coordinator:

Office numbers, office hours, phone numbers, and email addresses should be listed.

301Geo, 12:00-14:00 Mon, Wed. and 10:00-11:00Sun, Tue. Office 22257, mobile: 0799010003, rimawiom@ju.edu.jo

17. Other instructors:

Office numbers, office hours, phone numbers, and email addresses should be listed.

18. Course Description:

As stated in the approved study plan.

The basic physical principles of the water cycle (Precipitation, Evaporation, Infiltration, Runoff, Stream Flow and Measurements, Deep Percolation, and Groundwater Flow and Well Hydraulics. Groundwater Aquifers in Jordan and Environmental Problems in Water Resources in Jordan).

19. Course aims and outcomes:

A- Aims:

To get knowledge about the different elements of the water cycle and the associated application in measurements and forecasting as well as to know the distribution of aquifers in Jordan and the interaction between surface water and groundwater.

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to ...

Upon the successful completion of this course the students will be able to:

1- Understand the global water cycle as well as the situation of the local rainfall depressions occurring in Jordan

2- Understand the Precipitation measurement, distribution and quantification

3- Understand the Evaporation mechanisms, measurement and quantification

4- Understand the infiltration processes and measurements

5- Understand and quantifying the percolation amounts

6- Understand the Surface Runoff, processes, quantification, flood occurrences, measurements

7- Understand the Flood hydrographs and Unit Hydrographs and their application

8- Understand the Earth materials hydraulic characteristics (porosity, permeability ...etc.)

9- Understand the types of aquifers, groundwater movement and flow as well as well hydraulics

20. Topic Outline and Schedule:**Course Outline**

- **The global hydrological cycle**
 - the global system, fluxes, reservoirs, and residence times
 - evaporation, condensation, precipitation
 - regional water balances and resources
 - hydrological effects of climate change
- **Catchment hydrology: Land-atmosphere interactions**
 - precipitation
 - interception
 - evapotranspiration
 - water and energy balance
- **Open channel hydraulics**
 - discharge measurements using control structures
 - velocity distribution in open channels
- **Catchment hydrology: Streams, floods and droughts**
 - hydrographs

- nature and cause of floods
- flood routing
- estimating magnitude and frequency of extreme events
- **Groundwater**
 - Darcy's Law and Hydraulic Potential
 - The Steady-state Groundwater Flow Equation
 - Streamlines and Flow Nets
 - Regional Flow and Geologic Controls on Flow
 - Transient Flow, Aquifer Storage and Compressibility
 - Unconfined Flow
 - Groundwater Interaction with Streams and Lakes
 - Numerical Methods
 - Flow in Fractured Rock
 - Well Hydraulics
 - Thiem and Theis Equations
 - Pump Tests and Slug Tests

1.

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:
Lectures using Power Points Lecture Notes
Practice using weekly exercises on the different titles of given in the lectures
Field Work to Meteorological Stations, Occurring Floods and Stream Flow Measurements

22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:
First Hour Exam after 6 weeks from the semester start: 20%
Second Hour Exam after 12 weeks from the semester start: 20%
Practical Exam: 10%
Final Exam: 50%
Total: 100%

23. Course Policies:

A- Attendance policies:

B- Absences from exams and handing in assignments on time:

C- Health and safety procedures:

D- Honesty policy regarding cheating, plagiarism, misbehavior:

E- Grading policy:

F- Available university services that support achievement in the course:

No special policies for this course since the university policies should be adopted for the different courses

24. Required equipment:

Rainfall Gauge Station

Evaporation Pan

Current Meter for Stream Flow Measurements

Double Ring Infiltrometer

M-Scope for Groundwater Level Measurement

Computers to conducts some calculations on Surface and Groundwater

25. References:

A- Required book (s), assigned reading and audio-visuals:

Raghunath, H.M. (2006): Hydrology; principles, analysis, design. Revised Second Edition, New Age International Publisher Limited New Delhi

Charbs R. Fitts (2002): Groundwater Science. Academic Press Elsevier Science Ltd

26. Additional information:

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Name of Course Coordinator: **Omar Rimawi** Signature: ----- Date 12/09/2017

Head of curriculum committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of curriculum committee/Faculty: ----- Signature: -----

Dean: ----- Signature: -----

Copy to:
Head of Department
Assistant Dean for Quality Assurance
Course File