



Course	0941464 –Hydrology (3 credit hours)
Office Hours	Sunday 10:00 to 11:00 am, Monday 1:00 to 2:00 pm. <u>Other times will be by appointment ONLY (Office hours could be modified during the semester)</u> I will make every effort to be available during my scheduled office hours. However, University duties may require that I sometimes miss these hours.
Instructor	Dr. Khaldoun Shatanawi (Office: C320) kshatanawi@ju.edu.jo
Textbook	Viessman, W., and Lewis, G., <u>Introduction to Hydrology</u> , 5th edition, Prentice Hall. (ISBN 0-67-399337-x).
References	<ul style="list-style-type: none">• Linsley, R., Kohler, M., Paulhus, J. Hydrology for Engineers. McGraw Hill.• Chow, V., Maidment, D., Mays, L. Applied Hydrology. McGraw Hill.• Todd, D. Ground Water Hydrology, John Wiley & Sons.• Water Authority (WAJ): Studies and reports related to Jordan’s hydrology.
Catalog Data	Provides students with an understanding of hydrological processes, including precipitation, infiltration, and generation of runoff, streamflow, groundwater, and its engineering applications in hydrological analysis and design.
Prerequisites	0901401 – Engineering Statistics, 0941363 – Hydraulics Laboratory
Objectives	The main objective of this course is to develop an understanding of hydrological processes. To build upon the knowledge gained in the fluid mechanics and hydraulics courses. To introduce several new topics, particularly surface water hydrology, and groundwater flow. Prepare students to develop engineering solutions to hydrological problems by emphasizing the inter-linkages of processes in hydrological cycle.
Student Outcomes	This course contributes to the following Civil Engineering Program <ol style="list-style-type: none">1. Apply knowledge of mathematics, science, and engineering.2. Analyze and interpret data.3. Design a system or process to meet desired needs within realistic constraints.4. Use the techniques, skills, and modern engineering tools necessary for engineering practice.5. Identify, formulate, and solve engineering problems.
Course Learning Outcomes	Upon completion of this course, students: <ul style="list-style-type: none">• Will be able to identify main components of hydrological processes. Including; precipitation, evaporation, transpiration, infiltration and runoff.• Will be able to recognize Jordan’s hydrological features.• Will be able to analyze rainfall-runoff relationship.• Will be able to employ the concepts of unit hydrographs.• Will be able to predict peak flood, using rational method, empirical relations, NRCS method, hydrologic routing.• Will be able to outline groundwater movement and general flow equations.• Will be able to recognize main features of wells’ hydraulics.• Will be able to employ some statistical methods in hydrological analysis.

Topics

Hydrologic Principles and Processes (6 weeks)

Hydrology of Jordan, Introduction to hydrology, Hydrologic Cycle, Precipitation, Evaporation and Transpiration, Infiltration, Stream Flow.

Rainfall-Runoff Analysis (4 weeks)

Rainfall-Runoff Relationships, Hydrograph Analysis, Unit Hydrograph Theory, Synthetic Unit Hydrograph Development, Applications of Unit Hydrographs.

Peak Flood Prediction and Hydrologic Design (4 week)

The Rational Method, Empirical Relations, NRCS method, Flood Frequency, Hydrologic Routing.

Groundwater Hydrology (1 week)

Properties of Ground Water, Ground Water Movement, General Flow Equations, Well Hydraulics.

Statistical Methods In Hydrology (1 week)

Probability Distribution, Frequency Analysis, Flow Duration Analysis.

Evaluation

Shot Exam(s)	20 %
Midterm Exam	30 %
Final Exam	50 %

Attendance

Class attendance will be taken and the University policy on absence shall be applied.

Course Policies

All cellular phones must be turned off before class begins. Talking to a fellow student while the lecture is in progress will not be tolerated. You will be asked to leave the class if this behavior is disruptive. For either behavior, points may be deducted from your exam grade(s). The number of points deducted is left to the instructor's discretion. As required by the University, cases of academic dishonesty will be handled through the proper channels.

Assignments

Successful completion of homework assignments will earn you extra bonus grades. The purpose of homework assignments is to give you practice in solving problems. Working these problems will help you consolidate your understanding of the course material and prepare you for the test. You may work with each other to interpret and draft solutions. Do not copy solutions. *Copying homework solutions is a violation.* Homework should be submitted on the day they are due and at the beginning of the class only. No late submissions will be accepted.

To obtain the highest grade on homework, problems should be presented in a neat format, showing the logical steps required to obtain a correct solution. Homework that has a correct answer without neatness and/or sufficient steps will have points deducted. Please use the following guidelines for neat and well-organized work:

1. Use a cover page, with your name, university identification number, and homework number, printed on it.
2. Solve your problems on A4 or engineering form paper only.
3. Print your name on all pages, number all pages, and staple.
4. Present each problem in the following format:
 - Given: List the information given in the problem, using the symbol, value, and units
 - Find: List the items that must be determined for the problem
 - Solution: Begin calculations showing steps in logical progression
5. Show all steps necessary to obtain solution.
6. Write equation in symbolic form first and then substitute numeric values.
7. Move down the page with each progressing step of the solution, leaving sufficient space between each step.
8. Highlight final solution with box, if applicable

Use spreadsheets only when allowed by instructor. When a spreadsheet is used, include in your solution a description of each column and/or row, the equations used, and always show a complete sample hand calculation on a separate sheet. If a sample hand calculations is not included you will receive a zero grade for the problem.