



Course	093761 –Surface Water Hydrology (Graduate Course- 3 credit hours)
Office Hours	Sun Tues 14:30-15:30 or by direct arrangements with instructor
Instructor	Prof. Dr. Radwan Al-Weshah (Office: C310) e-mail: r.weshah@ju.edu.jo ; Class Group on Facebook
Textbook	<ul style="list-style-type: none">• Chow, V., Maidment, D., Mays, L. Applied Hydrology. McGraw Hill, 1988 (2nd edition of 2013 is available online).• Class lecture notes and handouts.
References	<ul style="list-style-type: none">• Viessman, W., and Lewis, G., <u>Introduction to Hydrology</u>, 5th edition, Prentice Hall 2003. (ISBN 0-67-399337-x)• Bedient P., Wayne C. Huber and Baxter E. Vieux, <i>Hydrology and Floodplain Analysis</i>, 4th Edition, Pearson, 2007.• Subramanya K., <i>Engineering Hydrology</i>, Third Edition. McGraw Hill, 2009.• Water Authority (WAJ): Studies and reports related to Jordan’s hydrology.
Catalog Data	Hydrologic process in nature, rainfall-runoff analysis, measurement of surface water flow, unit hydrograph analysis, hydrologic statistics and frequency analysis, hydrologic routing, computer models in surface hydrology and their applications in hydrological analysis and design.
Objectives	The main objectives of this course are to: <ul style="list-style-type: none">• Develop an understanding of surface hydrological processes;• Understand the principles underlying surface water hydrology and hydrologic measurements and modeling;• Apply these principles to solve engineering problems using hydrologic analysis and design; and• Develop case studies and applications through performing relevant class projects.
Course Learning Outcomes	Upon completion of this course, students will be able to: <ol style="list-style-type: none">1. Identify main components of hydrological processes including; precipitation, evaporation, transpiration, infiltration and runoff and their measurements;2. Understand Jordan’s hydrological features and its surface water;3. Analyze rainfall-runoff relationships;4. Understand and apply the concepts of unit and flood hydrographs;5. Employ some statistical methods in hydrological analysis and design;6. Analyze design storm to estimate peak floods, using rational method, empirical relations, NRCS method, hydrologic routing in hydrological analysis and design; and7. Utilize computer modeling and applications and be able to communicate the results effectively through written and verbal skills.
Topics	Hydrologic Principles and Processes (2 weeks) <i>Hydrology of Jordan, introduction to hydrology, hydrologic cycle, precipitation,</i>

evaporation and transpiration, infiltration, stream flow and their measurements.

Rainfall-Runoff Analysis (4 weeks)

Rainfall-runoff relationships, hydrograph analysis, unit hydrograph theory, synthetic unit hydrograph development, applications of unit hydrographs.

Flood Routing (1 week)

Hydrologic routing using level pool and Muskingum methods.

Statistical Methods in Hydrology (2 weeks)

Probability distribution, frequency analysis, flow duration analysis.

Design Storm, Peak Flood Prediction, and Flood Risk Management (3 weeks)

Design storm analysis, the rational method, empirical relations, NRCS method, flood frequency, hydrologic design, and flood risk management.

Applications, Case Studies and Project Presentations (3 weeks)

Computer applications using hydrological software (HEC-HMS, WMS, etc.) and class project presentations

Evaluation	Course Project, Short Exams etc.	30%
	Midterm Exam	30 %
	<u>Final Exam</u>	<u>40 %</u>
	Total	100 %

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 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 grade is a bonus and the homework should be submitted on the day they are due and at the beginning of the class only. 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 using the symbol, value, and units
 - Find: List the items that must be determined for the problem
5. Solution: Begin calculations showing steps in logical progression,
6. Show all steps necessary to obtain solution.
7. Write equation in symbolic form first and then substitute numeric values.
8. Move down the page with each progressing step of the solution, leaving sufficient space between each step.
9. Highlight final solution with box, if applicable

Course Project

The purposes of the course project are:

1. To enable you to explore in depth some aspect of surface water hydrology of interest that is relevant to the course objectives.
2. To provide experience in the formulation, execution, and presentation of applied research.

The steps in carrying out the project are:

1. Prepare a 1-page proposal on by the second week of class specifying the objective of your project and outlining how you plan to go about executing it for instructor approval.
2. Give a brief presentation of the progress you have made with your project in class.
3. Present a final oral presentation in class near the end of the semester. The presentation date will be scheduled later in the semester.
4. Presentations will be judged based on technical contents, presentation quality and skills, as well as ability to answer relevant questions.