Jordan University of Science and Technology
Faculty of Agriculture
Natural Resources & Environment Department

NR342 Hydrology
First Semester 2023-2024

Course Catalog
3 Credit Hours. The aim of this course is to provide a basic understanding of hydrological cycle, measurement methods to each component (Precipitation, infiltration, runoff, and evapotranspiration), and basic knowledge about groundwater flow and storage. Upon successful completion of the course, students should be able to apply the principles of hydrology to solve hydrology problems including modeling and analysis

Text Book	
Title	Engineering Hydrology
Author(s)	Subramanya, K
Edition	5th Edition
Short Name	Main reference
Other Information	2020

Course References

Short name	Book name	Author(s)	Edition	Other Information
SWCE	Soil and Water Conservation Engineering	Schwab G., Frangmeier D., Elliot W, Fervert R.	4th Edition	
Intro Hydro	Introduction to Hydrology	Warren Viesseman and Gary Lewis	4th Edition	
H	Handouts	NA	1st Edition	

Instructor	
Name	**Prof. Mamoun Gharaibeh**
Office Location	C1L2
Office Hours	

Email	mamoun@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Mon, Wed : 10:00 - 11:30 Room: C5020

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Units of measurements and soil physical properties	From **H**
Weeks 1, 2	Components of hydrologic cycle, Hydrologic equation (Hydrologic budget)	From **SWCE**, From **Intro Hydro**, From **H**
Weeks 2, 3	Precipitation (storm types, forms of precipitation, rain gages, mean precipitation over an area, point rainfall analysis)	From **SWCE**, From **Intro Hydro**
Weeks 3, 4, 5, 6	Analysis of precipitation data (IDF and DDF curves, hydrologic frequency analysis)	From **SWCE**, From **Intro Hydro**, From **H**
Week 7	Infiltration-definition, factors affecting infiltration, and measurements	From **SWCE**, From **Intro Hydro**, From **H**
Weeks 8, 9, 10	Infiltration modeling (Kostiacov, Horton,Philip, Green & Ampt)	From **SWCE**, From **Intro Hydro**, From **H**
Week 10	ET-factors and measurements	From **SWCE**, From **Intro Hydro**, From **H**
Weeks 10, 11	ET estimation (equations)	From **SWCE**, From **Intro Hydro**, From **H**

Week 12	Runoff (factors affecting R-off)	From **SWCE**, From **Intro Hydro**, From **H**
Weeks 12, 13, 14	Runoff estimation (Design runoff rate-runoff cofficient, time of concentration, curve number, design runoff rates [Rational, SCS, and Cook's methods))	From **SWCE**, From **Intro Hydro**, From **H**
Week 14	Hydrographs	From **SWCE**, From **Intro Hydro**, From **H**
Weeks 15, 16	Groundwater (Aquifers: types, hydraulic properties, storage properties)	From **Intro Hydro**, From **H**
Week 16	Aquifers characteristics (porosity, specific yield- retention, specific storage, storativity, transmissivity, compressibility)	From **H**

Mapping of Course Outcomes to Program Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
1. Identify and describe the processes and quantities involved in the hydrologic cycle. Carry out calculations or quantify the components of the water balance of a watershed. [7PLO1, 1PLO4, 2PLO7]	10%	
2. Quantify the variability of precipitation; calculate area average precipitation, magnitude and probability of hydrologic events of specified recurrence interval and frequency. [2PLO1, 5PLO4, 6PLO5, 2PLO6, 2PLO7, 1PLO8, 2PLO9]	20%	
3. Calculate hydrologic losses due to evaporation and infiltration. [2PLO1, 2PLO2, 2PLO3, 5PLO4, 4PLO5, 1PLO6, 2PLO7, 2PLO8]	20%	
1. Calculate runoff volume and rate using different methods [2PLO1, 2PLO2, 1PLO3, 5PLO4, 5PLO5, 1PLO6, 2PLO7, 2PLO8]	20%	
5. Construct and calculate hydrographs based on streamflow and precipitation measurements, watershed attributes and unit hydrograph theory. [1PLO1, 1PLO2, 1PLO3, 2PLO4, 2PLO5, 1PLO6, 1PLO7, 1PLO8]	10%	
6. Provide an introductory description of groundwater, flow, storage and hydraulic properties [1PLO1, 2PLO2, 2PLO3, 1PLO4, 2PLO5, 3PLO6, 2PLO7, 2PLO8, 4PLO9]	20%	

Relationship to Program Student Outcomes (Out of 100%)								
PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
15.05	7.11	6.11	19.05	19.11	8.16	11.11	8.11	6.21

Evaluation	
Assessment Tool	**Weight**
MidExam	50%
Final Exam	50%

Policy	
Exams	Closed book exams. Final exams include all covered materials and in case of absent; approved excuse is required from the department and deanship
Cheating	Prohibited and is subjected to punishment according to university regulations
Attendance	Students are expected to attend all class meeting regularly. A 20% absent rate (excused and unexcused) will prevent student from attending and taking exams and will be assigned an F (failure) grade
Participation	Participation is highly encouraged
Withdrawal	Student can withdraw from the course in accordance with the timeline defined by the university regulations

Date Printed: 2023-09-25