

CE 424 Hydrology

Department of Civil Engineering King Saud University

Course Description: Course Number and Name CE 422 hydrology (Required for a BSCE degree)	Meteorological data; basic hydrological processes: precipitation, evaporation, transpiration, infiltration and runoff; stream flow; hydrograph theory and application; groundwater principles: aquifers, wells and intrusion in coastal areas; water resources planning: basic principles, water supply and demand, application in arid and semi-arid regions. Introduction to computer applications. Group project. 2 (2,1,0)
Prerequisite	CE 322 (Hydraulics) Prerequisite by Topics: 1. Understanding of basic principles of hydraulics as applied to analyzing surface and ground water problems. 2. Understanding of hydraulic structures used in discharge measurements. 3. Understanding of flow in open channel
Course learning Objectives	Students completing this course successfully will be able to a. Realize the need of hydrology as an engineering science essential for the planning, design and operation of water resource systems b. Understand the basic elements of the hydrological cycle. c. Use of analytical and empirical methods for modelling the hydrological processes (precipitation, evaporation, transpiration, infiltration and runoff). d. Understand the basic principles of groundwater aquifers and wells. e. Understand and apply the basic principles of water resources planning, to manage water supply and demand in arid and semi-arid regions. f. Use computer software to solve hydrologic problems. g. Improve the communication skills and teamwork.
Topics Covered	a. Introduction to hydrologic cycle and hydrologic budget (3 hours) b. Analysis of meteorological data (5 hours) c. Measurements and analysis of precipitation data (4 hours) d. Infiltration measurement and methods of estimation (4 hours) e. Evaporation and transpiration: Process, measurement and estimation (4 hours) f. Streamflow: stage & discharge measurement and interpretation of data (4 hours) g. Stream-flow hydrographs: Separation, unit hydrograph (UH), synthetic UH (4 hours) h. Groundwater principles: Aquifer and well hydraulics (6 hours) i. Water Resources Planning principles and applications (9 hours)
Class/ tutorial Schedule	Class is held two times per week in 50-minute lecture sessions. There is also a 50-minute weekly tutorial associated with this course.
Computer Applications	Commercial and educational hydrological software are encouraged to be used during the course such as HEC-HMS.
Contribution of Course to Meeting the Professional Component	1. Students learn the analysis process to be involved in dealing with various hydrological components encountered in professional water resources engineering. 2. Students improve their writing, communication and presentation skills. 3. Students recognize the role of the professional societies and organizations in developing some computer software which facilitate the analysis of complex hydrological systems.
Relationship of Course to Program Outcomes	1. Students apply algebra, elementary calculus, and principles of physics. 2. Students are able to identify and formulate an engineering problem and to develop a solution. 3. Students recognize the importance of analysis in solving hydrological problems. 4. Students are encouraged to submit accurate analysis in an efficient and professional way. 5. Students are encouraged to recognize the different hydrological analysis methods and their range of applications. 6. Students recognize the ethical and professional responsibility in achieving accurate hydrological results to be utilized by hydraulic engineers for safe and economical design of hydraulic structures. 7. Students recognize the need for technical updating on a continuing basis, since the course emphasizes on the changing nature of methods and software.

	8. Students recognize the importance of reading and understanding technical contents in English in order to achieve life-long learning and be able to carryout their responsibilities. 9. Students recognize the important role of computers in facilitating analysis of hydrological systems. 10. Students are encouraged to improve their writing, communication and presentation skills.
Textbook(s) and/or Other Required Material	1- Hydrology for Engineers, Ray Linsley, JR., M. Kohler, J. Paulhus, McGraw-Hill International Book Company, (SI Metric edition). 2- Engineering Hydrology by E.M Wilson, Latest Edition
Prepared by	Dr. Raied Alharbi and Pro. Abdulmohsen A. Al Shaikh
Date of Preparation	September 1, 2019
Date of Midterms	1- First Midterm: 16-10-2019 2- Second Midterm: 27-11-2019
Grading	20% - 20% - 40% - 20%(1 st Midterm - 2 nd Midterm – Final - TA)
Sickness Absence Policy	Absence > 25% including T.A Lectures Missing a lecture (Bring medical excuses in 2 weeks after day of absence) Do not Bring in the last week (I will not take it)