

Course Name	Code\No.	Number of Credits			
		Theo.	Lab.	Train.	Credit
Watershed Hydrology	HWR 222	2	2	-	3
Pre-Requests	HWR 221				

Course Objectives:

The purpose of this course is to introduce the science of watershed hydrology: How to handle maps of watersheds (wadis), delineate watersheds, extract properties of watersheds. Use of some survey devices to measure watershed properties. Morphological analysis to study the rainfall and runoff. Use of some computer programs to perform rainfall-runoff computations.

Course Contents:

1. Map: what is map? Types of maps, topographic maps, reading maps, obtaining features from maps.
2. Watershed: what is watershed? How to delineate watershed, stream network, drawing the profile of the main stream in the watershed.
3. Watershed properties: calculation of watershed perimeter, watershed area using survey devices, calculation of morphometric parameters.
4. Stream network ordering: Use of various method of stream network ordering, making the orders, delineating of sub-watersheds, calculation of stream lengths and contributing areas.
5. Rainfall: Calculation of average rainfall form the rain gages in the watershed by various methods.
6. Water balance: Basic calculation of a water balance in a watershed.
7. Runoff: Hydrograph, unit hydrograph theory, calculation of runoff hydrograph by various methods (Rational method, Snyder method, SCS Unit hydrograph, etc.).
8. Mathematical models: Use of some computer programs to calculate runoff for a watershed (e.g. program SMADA, HEC-HMS).

Course outcomes:

- It is expected that the student will get the following knowledge and experience :
- Delineation of watersheds and Calculate its properties.
- How to read maps and understanding features from the topographic maps.
- Using some devices to measure some watershed properties.
- How to calculate average rainfall on a watershed.
- Calculation of rainfall by varies methods.
- Calculation of flood discharge at the watershed by synthetic methods and using some soft wares (SMADA,HEC-HMS).
- The ability to analyze runoff and rainfall and factors affecting them.

Evaluation Method:

The evaluation is performed by periodic tests, homework and requirements given to the student by the staff member.

References:

- **Philip B. Bedient and Wayne C. Huber (2012)**, Hydrology and Floodplain Analysis (5th Edition).
- **C.W. Fetter Jr. (2000)** Applied Hydrogeology (4th Edition)
- **Larry W. Mays (2011)** Ground and Surface Water Hydrology
- **Andy D. Ward and Stanley W. Trimble (2003)** Environmental Hydrology, Second Edition
- **Chow, V.T., Maidment, D.R. and May, L.W. (1988)** Applied hydrology, McGraw Hill Book Company.