

Tennessee Technological University
Department of Civil & Environmental Engineering
CEE 5420/4420 – Engineering Hydrology

2017 Catalog Data: CEE 5420/4420 Fundamental processes in the hydrological cycle, including precipitation, infiltration and runoff. Quantitative approaches in engineering hydrology to estimate flows for a variety of design problems. Prerequisite: CEE 3420 or consent of instructor.

Required Textbook: Chin, A. D. (2013). *Water Resources Engineering, Third Edition*. Pearson Prentice Hall™, Upper Saddle River, New Jersey, ISBN: 9780132833219.

Hornberger, G. S. et al., (1998). *Elements of Physical Hydrology*, John Hopkins University Press.

Faculty Coordinator: Alfred J. Kalyanapu Civil & Environmental Engineering,

Participating Faculty: David Huddleston

Prerequisites: CEE 3420 Fluid Mechanics, ME 3720, 2. Hydraulics

Goal: The goal of this course is to introduce you to the fundamental principles of engineering hydrology with application to runoff modeling.

Course learning objectives:

1. To understand the basic components of hydrologic cycle and its application to engineering and hydrological analysis
2. To understand the characteristics of watershed and gain knowledge to delineate watersheds
3. To learn the techniques to perform rainfall-runoff analysis needed for hydrologic analysis and design
4. To learn the concepts of unit hydrograph analysis and determine unit hydrographs for watersheds with and without prior hydrologic data
5. To perform channel and reservoir routing
6. To understand the fundamentals of hydrologic modeling

Major Topics Covered:

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| 1. Hydrologic Cycle | 6. NRCS Curve Number Method & Rational Method |
| 2. Watershed Characteristics | 7. Unit Hydrograph Analysis |
| 3. Hyetograph Analysis and Intensity-Duration-Frequency Curves | 8. Convolution |
| 4. Infiltration | 9. Channel Routing |
| 5. Rainfall-Runoff Processes | 10. Reservoir Routing |
| | 11. Hydrologic Modeling |

Measurable outcomes:

Students will be expected to:

1. Estimate water budgets.
2. Calculate transfer processes in hydrologic cycle.
3. Define and delineate watersheds and characterize hydrologically relevant characteristics
4. Apply rational method for estimating runoff in small catchments.
5. Apply NRCS method for estimating runoff in small catchments.
6. Perform Unit Hydrograph Analysis.
7. Perform Reservoir Routing.
8. Perform Channel Routing.
9. Understand basic concept of hydrologic modeling.