



Course Name:

Advanced Hydrology

Course Number: 20-644	Credit: 3
Program: Graduate	Course Type: Technical optional
Prerequisite: Engineering Hydrology, Environmental Engineering, Advanced Mathematics, Computer Programming	Corequisite: -

Course Description (Objectives):

This course provides a comprehensive overview of the concepts behind river basin hydrology and land-surface modeling. It covers key topics such as river basin terminology and classification, principles of channel network formation, river basin hydro-geomorphologic characteristics, conceptual frameworks for hydrologic modeling, and the physical basis of water cycle processes in land-surface models. The course also explores stochastic transport of water and solute in hydrological systems, including time-variant travel time distributions.

Course Content (outline):

- Chapter 1: River Basin Terminology and Classification
- Chapter 2: Principles of Channel Network Formation
- Chapter 3: River Basin Hydro-Geomorphologic Characteristics
- Chapter 4: Conceptual Frameworks for Hydrologic Modeling
- Chapter 5: Introduction to Land-Surface Models
- Chapter 6: Physical Basis of Water Cycle Processes in Land-Surface Models
- Chapter 7: Energy Balance and Evapotranspiration at Earth's Surface
- Chapter 8: Stochastic Transport of Water and Solute in Hydrological Systems

References:

- "Runoff Prediction in Ungauged Basins" by Blöschl et al., Cambridge University Press, 2013.
- "Land Surface Hydrology, Meteorology, and Climate: Observations and Modeling", Lakshmi V., J. Albertson, and J. Schaake, American Geophysical Union, 2013.
- "Fractal river basins: chance and self-organization", I. Rodríguez-Iturbe & A. Rinaldo, Cambridge University Press, 2001.
- "Water-Resources Engineering" by David A. Chin, Pearson; 3rd edition, 2012.
- "Rainfall-runoff modelling: the primer" by K. J. Beven, John Wiley & Sons, 2012.