UNIVERSITY OF SOUTHERN CALIFORNIA  
DEPARTMENT OF CIVIL ENGINEERING  

CE511----Flood Control Hydrology  

Texts:  


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This course discusses hydrologic concepts and methods in depth. The application of hydrologic methods to plan and design water resources projects is demonstrated. What should be the design flow: over a spillway, through a culvert or for an urban drainage system? How to develop rainfall runoff relationship using hydrologic models? The rainfall runoff relationship is necessary to design flood control, water supply, irrigation, hydroelectric, recreational, and environmental projects. What effects will urbanization and human activities have on runoff characteristics of watersheds? How are statistical and probabilistic methods used to determine the frequency of extreme events and their calculated risks? These are few typical questions that a civil engineer trained in hydrology is expected to know. The objective of this course is to provide you with a good background in hydrology to answer these questions.  

<table>
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<th>Date</th>
<th>Subject</th>
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<tbody>
<tr>
<td>8/29</td>
<td>Hydrologic Data---Collection, Processing, and Analysis of Hydrologic Data, Precipitation, Evaporation, Transpiration, and Streamflow Ch. 1 (29-65)</td>
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<tr>
<td>8/29</td>
<td>Infiltration Theory and Practice---Horton Equation, Uniform Loss Method, Runoff Coefficient, and SCS Method. Ch. 1 (65-70)</td>
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</table>
9/12-9/19 **Rainfall-Runoff Relationship and Transformation**---Hydrograph Analysis, Unit hydrograph Concept Using Linear System Approach, Synthetic Unit Hydrograph (Clark, Snyder, & SCS), Application of Unit Hydrograph Using Convolution Equation, Instantaneous Unit Hydrograph, Convolution Integral, Kinematic Wave Approach to Transform Rainfall to Runoff, Nash Model Based on Multiple linear Reservoir, Dooge Model Based on Linear Reservoir and Linear Channel, Rational Method
Ch. 2 (96-151)

9/19 **Critical Review Assignment**

Ch. 4 (241-301)

10/13 **Project Assignment**

10/17 **Midterm Exam**

10/24-10/31 **Hydrologic Models**---Hydrologic Modeling, Introduction to Corps of Engineers’ HEC-HMS, EPA SWMM, HSPF (Stanford Watershed Model), Calibration and Application of Hydrologic Models
Ch. 5 (312-350)
HEC-HMS Manual
Handouts

Ch. 3 (171-226)
Linsley, Ch. (388-398)
Handouts

11/21 **Design Issues in Hydrology**---Rainfall Based Versus Runoff Based Hydrologic Methods, Level of Flood Mitigation, Synthetic Design Storms, Rainfall Intensity-Duration-Frequency (IDF) Curves, Design of Urban Drainage System, Consistency in Hydrologic Computations, Effects of Urbanization and Human Activities on
Hydrologic Characteristics of a Given Watershed, Water Supply Reservoirs, Flood Mitigation Reservoirs, Spillway Design Using Probable Maximum Precipitation (PMP), and Probable Maximum Flood (PMF), Flood Forecasting.
Ch. 9 (565-581)
Linsley, Ch. 16 (442-461)

Chs. 10-12

12/12 Final Exam

Homework assignments:

#1. 1.1, 1.5, 1.16, 1.17, 1.23, 1.25 & 1.28 9/12
#2. 2.2, 2.4, 2.7, 2.13 & 2.28 9/22
#3. 4.2 & 4.4 10/3
#4. 3.3, 3.7, 3.20, 3.22 & 3.33 11/14
#5. 6.8, 6.9 & 6.10 11/28
#6 Critical Review 11/21
#7 Project 12/12

Course Requirements and grading:

Reading assignments & Homework: 15%
Critical review of professional journals: 10%
Project: 15%
Midterm exam: 30%
Final Exam: 30%