CIVE 522 ENGINEERING HYDROLOGY

INSTRUCTOR
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TEXTBOOKS AND REFERENCES
The following books and references have been placed on reserve at the Morgan Library.
8. Class handouts.
9. [http://www.engr.colostate.edu/~ramirez/ce_old/classes/ce522_ramirez/CE522-new.htm](http://www.engr.colostate.edu/~ramirez/ce_old/classes/ce522_ramirez/CE522-new.htm)

COURSE OBJECTIVES

COURSE EVALUATION
Three exams (75% of final grade) and 5/6 homework assignments (25% of final grade)

ACADEMIC INTEGRITY AND HONOR PLEDGE
This course will adhere to the Academic Integrity Policy of the Colorado State University General Catalog and the Student Conduct Code. Accordingly, we will use an honor pledge for all homework assignments and all exams as indicated below.

The honor pledge will be:

“I pledge that I have not given, received, or used any unauthorized assistance.”

“I pledge that I will not give, receive, or use any unauthorized assistance.”

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COURSE OUTLINE

TOPICS

Linear System Theory and Rainfall-Runoff Analysis
  Unit hydrograph theory
  instantaneous unit hydrograph (IUH)
  IUH analysis methods: Harmonic analysis
    Fourier transforms
    Laplace transforms
  Linear channel
  Linear reservoir
  Nash model

River and Reservoir Flood Routing
  Flood Routing
  Reservoir flood routing methods:
    Mass curve method
    Storage indication method
    Puls method
    Goodrich method
    Coefficient method
    Woodward method
    Others
  Linear Muskingum method:
    Analytical Solution
    Hydraulic analogy
    Parameter estimation procedures.
  Multiple reach Muskingum method
  Nonlinear Muskingum method:
    Muskingum-Cunge method
  Distributed flow routing - Wave motion
    Kinematic wave and Overland Flow
      Analytical solution - Overland flow problem
      Linear and non-linear numerical solutions
      Overland Flow with spatially variable infiltration
    Routing of diffusive and dynamic waves

Hydrologic Design
  Design scale
  Design Level
  Risk Analysis
  Hydroeconomic Analysis
  First Order Analysis of uncertainty
  Composite Risk Analysis
  Risk Analysis of safety factors and safety margins
  Hydrologic design under natural and parameter uncertainty
    Bayes risk
    Opportunity Losses
    Value of Sample Information
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COURSE OUTLINE

TOPICS

Precipitation data analysis.
  Data analysis
  Modeling
  Mean Areal Precipitation: Thiessen polygons - Isohyets - IWD Methods
  Kriging
  Kriging with covariances
  Kriging with semivariograms
  Kriging with generalized covariances
  Co-Kriging
  Orographic Influences and their analysis

Design Storms
  Design precipitation depth
  Point precipitation
  Areal precipitation
  Intensity-Duration-Frequency (IDF) Curves
  Design Hyetographs
    Storm event-based analysis
    IDF-based analysis
  Estimated Limiting Storms
  Frequency analysis