CIVE 522 ENGINEERING HYDROLOGY

INSTRUCTOR

Jorge A. Ramírez, Ph.D.
Professor, Civil and Environmental Engineering Department
A222 Engineering Bldg. (970) 491-7621

Office Hours: MWF 1:00 - 2:00 PM – A222 Engineering Bldg.

TEXTBOOKS AND REFERENCES

The following books and references have been placed on reserve at the Morgan Library.

8. Class handouts.

COURSE OBJECTIVES


COURSE EVALUATION

Homework
3 Exams

SCHEDULE

Lecture MWF 10:00 - 10:50 AM – Room B4 Engineering Building

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 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

TOPIC

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

TOPIC

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