CIVE/WR 524 MODELING WATERSHED HYDROLOGY

Instructor
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Office hours: Tue 1 - 3 pm, Thu 12 - 1 pm, or by appointment

Canvas
Readings, handouts, assignments, and grades will be posted

Textbook
Most readings will be provided
No textbook is required, but access to a good hydrology textbook is recommended:
- Applied Hydrology by Chow, Maidment, and Mays (1988)
- Physical Hydrology by Dingman (2002)
- Engineering Hydrology: Principles and Practice by Ponce (1989)
- Hydrology by Brutsaert (2005)
- Hydrology: An Introduction to Hydrologic Science by Bras (1990)
- Hydrologic Analysis and Design by McCuen (2005)

Prerequisites
An introductory hydrology class: CIVE 322 or WR 416
An introductory statistics class: CIVE 202, STAT 301, or STAT 315
Familiarity with Excel and differential equations

Grade Determination
50% - Laboratory assignments (10 x 5%)
50% - Semester project
Plus/minus grading will be used

Laboratory Assignments
Given at the start of each laboratory period
Use laboratory period to complete analysis, and then answer the provided questions as homework
Due the following week at the start of lab
Submitted on paper
Late submissions are not accepted

Semester Project
Due the last week of the semester (see class schedule)
Submitted on paper
Late submissions are not accepted

Academic Integrity
Course adheres to the CSU academic integrity policy (in general catalog) and the student conduct code
All course submissions must be entirely your own individual work, but discussion with others is allowed

Subject	Class	Topic	Reading
Introduction	1	Model Classifications	Ch. 1 Xu (2006)
		No Lab	
	2	Model Comparison **(Paper Discussion)**	Reed et al. (2004)
Meteorological Methods	3	Precipitation Methods	Ch. 4, Feldman (2000)
	4	*HEC-HMS Lab*	Sharffenberg (2016)
	5	Potential Evapotranspiration	Ch. 3, Chow et al. (1988)
	6	PET Methods	ASCE (2005)
	7	*HEC-GeoHMS Lab (Not Collected)*	
	8	Snowpack Physics	Ch. 5, Dingman (2002)
	9	Snowpack Modeling	Army Corps of Engineers (1991)
	10	*Snowpack Lab*	
Sub-Basin Elements	11	Partitioning Precipitation	Ch. 6, Dingman (2002)
	12	Event-Based Loss Methods	Ch. 4, Chow et al. (1988)
	13	*Green-Ampt Lab*	USDA (2015)
	14	Continuous Loss Methods	Ch. 5, Feldman (2000)
	15	Flow Accumulation & SCS Transform Method	Ch. 7, Chow et al. (1988)
	16	*Unit Hydrograph Lab*	
	17	Snyder and Clark Transform Methods	Kull et al. (1998)
	18	Kinematic Wave Transform Method	MacArthur and DeVries (1993)
	19	*Kinematic Wave Lab*	Ch. 6, Feldman (2000)
	20	Baseflow Physics	Ch. 10, Brutsaert (2005)
	21	Baseflow Methods	Ch. 7, Feldman (2000)
	22	*Baseflow Lab*	Stewart et al. (2007)
		Spring Break	
Reach Elements		Hydrology Days	
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	23	*Routing Physics (Not Collected)*	Ch. 9, Chow et al. (1988)
	24	Kinematic Routing Methods	Ch. 9, Ponce (1989)
	25	Diffusion Routing Methods	Ponce (1986)
	26	*Routing Lab*	
Parameter Screening	27	Model Implementation	Saltelli et al. (2008)
	28	Sensitivity Analysis	Saltelli et al. (2004)
	29	*Sensitivity Lab*	
Parameter Calibration	30	Calibration **(Paper Discussion)**	Klemes (1997)
	31	Performance Metrics	Ch. 9, Feldman (2000)
	32	*Performance Metric Lab*	
	33	Automatic Calibration	Nelder and Mead (1965)
	34	Manual Calibration	Ch. 6 and 7 Xu (2006)
	35	*Calibration Lab*	
Model Evaluation	36	Model Validation	Oreskes et al. (1994)
	37	Parameter Identifiability	Beven (2001)
	38	*Identifiability Lab (Not Collected)*	
Model Application	39	Forecast Uncertainty	McIntyre et al. (2005)
	40	Model Averaging **(Project Due Wed., May 2)**	Hoeting et al. (1999)
	41	*Forecast Uncertainty Lab (Not Collected)*	
No Final Exam			