NRM 85 Course Outline as of Fall 2015

CATALOG INFORMATION

Dept and Nbr: NRM 85 Title: WATERSHED HYDRO
Full Title: Watershed Hydrology
Last Reviewed: 2/14/2011

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	4.00	Lab Scheduled	3.00	8	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 210.00

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

Catalog Description:
This course serves as an introduction to forest and wildland hydrology and the management of water resources on a watershed scale, including urbanization and urban ecology impacts. The material covered will include the fundamental concepts of the hydrologic cycle: precipitation, interception, evaporation, evapotranspiration and runoff, infiltration, and groundwater. The fundamentals of protection, management, and monitoring of water in California will be emphasized.

Prerequisites/Corequisites:

Recommended Preparation:
Eligibility for ENGL 100 or ESL 100 and Course Eligibility for MATH 150A

Limits on Enrollment:

Schedule of Classes Information:
Description: This course serves as an introduction to forest and wildland hydrology, and the management of water resources on a watershed scale, including urbanization and urban ecology impacts. The material covered will include the fundamental concepts of the hydrologic cycle:

precipitation, interception, evaporation, evapotranspiration and runoff, infiltration, and groundwater. The fundamentals of protection, management, and monitoring of water in California will be emphasized. (Grade or P/NP)
Prerequisites/Corequisites:
Recommended: Eligibility for ENGL 100 or ESL 100 and Course Eligibility for MATH 150A
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**			Effective:	Inactive:
CSU GE:	**Transfer Area**			Effective:	Inactive:
IGETC:	**Transfer Area**			Effective:	Inactive:
CSU Transfer:	Transferable	Effective:	Fall 1999	Inactive:	Fall 2019
UC Transfer:		Effective:		Inactive:	

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon completion of this course, students will be able to:
1. Define the hydrologic cycle and explain the various processes of the cycle.
2. Construct a stream hydrograph and analyze its various components.
3. Inventory and appraise various watershed characteristics such as area, drainage density, relief ratio, circularity ratio, stream order, etc.
4. Calculate the average precipitation of a drainage basin using various approaches including Theissen polygon method, Isohyetal method, and arithmetic average method.
5. Recognize and demonstrate runoff and infiltration principles and processes.
6. Describe the effects of various resource management practices on water yield.
7. Recognize and discuss important water issues in California.

Topics and Scope:

I. Introduction to Water Resources in California
   A. History of water development.
   B. Regional basis of supply and demand for water.
   C. Conflicts among the different user groups.
   D. State, federal and local water projects in California.
II. The Hydrologic Cycle, Water and Energy Budgets
   A. Physical processes, storage and transport of water.
   B. Water: physical properties, molecular structure and phases.
   C. Energy exchange and effect on hydrologic functioning.
   D. Analysis of urbanization and urban ecology to watershed health.

III. Atmospheric Precipitation
A. Types of precipitation: rain, snow, fog.
B. Measurement: annual amounts, intensity and seasonal variation.
C. Geographic and topographic variation of precipitation.
D. Basin precipitation: measurement and analysis, Theissen polygon method, Isohyetal method, and arithmetic average method.
IV. Canopy Interception and Redistribution of Water
A. Vegetation canopy characteristics and water storage capacity.
B. Canopy throughfall and stemflow.
C. Litter interception and potential infiltration.
D. Evapotranspiration of water.
V. Infiltration and Runoff
A. characteristics, vegetation disturbance and effect on infiltration rates.
B. Surface and subsurface flow of water.
C. Measurement of water yield, and stream hydrograph construction and analysis.
VI. Measurement of Watershed Characteristics
A. Basin area, aspect and topographic relief.
B. Stream order, drainage density, and total length of perennial and intermittent streams.
C. Streamflow, discharge rates, erosion and sedimentation.
VII. Resource Management Activities and Effect on Water Quality and Quantity
A. Timber harvesting and log road construction.
B. Gravel mining and related impacts
C. Wildland fire and cumulative management effects.

Assignment:

1. Reading assignments from the text (approximately 15-20 pages per week).
2. Four field lab reports during the semester, such as measurement of water flow, and stream cross section construction, and sediment and channel analysis.
3. Skill demonstration of use of field equipment.
4. Construction of a river hydrograph.
5. Design of drainage structures from information gathered in the field.
6. Mid-term and final.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, river hydrograph, lab reports	Problem solving 30 - 50%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Class performances, river hydrograph, field work, performance exams, design of drainage structure	Skill Demonstrations 40 - 60%

Exams: All forms of formal testing, other than skill performance exams.

Midterm and Final: Multiple choice, true/false, matching items, completion	Exams 10 - 25%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
Watersheds: Processes, Assessment and Management, by Paul A. DeBarry. Wiley, John & Sons, publisher. 2004. (Classic)