WATERSHED SCIENCE-WR (WR)

Courses

WR 204 Sustainable Watersheds (GT-SC2) Credits: 3 (3-0-0)
Also Offered As: GR 204.
Course Description: Effects of climate, land use, and water use on the sustainability of water quantity and quality.
Prerequisite: None.
Registration Information: Credit allowed for only one of the following: GR 204, GR 304, WR 204 or WR 304.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.
Additional Information: Biological & Physical Sciences 3A, Natural & Physical Sciences w/o lab (GT-SC2).

WR 406 Seasonal Snow Environments Credits: 3 (2-3-0)
Course Description: Evaluation of the physical environment; characteristics of snow; methods of studying snow; snow safety.
Prerequisite: None.
Restriction: Must be a: Junior, Senior, Senior - 5yr Bachelor, Senior - Post Bachelor, Senior - Second Bachelor.
Registration Information: Junior or senior standing. Must register for lecture and laboratory. Required field trips.
Term Offered: Spring (odd years).
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

WR 416 Land Use Hydrology Credits: 3 (3-0-0)
Course Description: Fundamental concepts in hydrology and effects of land use on hydrologic processes.
Prerequisite: (ESS 210 or GEOL 110 and GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210 or SOCR 240) and (CIVE 202 or STAT 201 or STAT 301 or STAT 307 or STAT 315) and (PH 110 or PH 121 or PH 141).
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

WR 417 Watershed Measurements Credits: 3 (1-2-1)
Course Description: Instrument and field techniques in watershed science. Project design and data analysis.
Prerequisite: WR 204 and WR 416, may be taken concurrently.
Restriction: Must not be a: Freshman, Sophomore.
Registration Information: Junior standing. Must register for lecture, lab, and recitation. Required field trips.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.

WR 418 Land Use and Water Quality Credits: 3 (3-0-0)
Course Description: Physical, chemical, biological water quality parameters affecting land use; land management to maintain water quality; water quality standards, legislation.
Prerequisite: (CHEM 103 and CHEM 104 or CHEM 107 and CHEM 108 or CHEM 111 and CHEM 112) and (STAT 158) and (STAT 301 or STAT 315).
Term Offered: Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

WR 419 Water Quality Analyses Credits: 3 (2-2-0)
Course Description: Analyze freshwater samples for water quality constituents. Analyze data along with public water quality datasets.
Prerequisite: (CHEM 107 or CHEM 111) and (STAT 301 or STAT 315) and (WR 417).
Registration Information: Must have concurrent registration in WR 418. Must register for lecture and laboratory.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

WR 440 Watershed Problem Analysis Credits: 3 (2-2-0)
Course Description: Capstone integration of spatial watershed issues, focused on problem solving in watershed science.
Prerequisite: (NR 319 or NR 322) and (WR 416 and WR 418).
Registration Information: Must register for lecture and laboratory.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

WR 474 Snow Hydrology Credits: 3 (3-0-0)
Course Description: Snowfall, accumulation, distribution, physical processes in the snowpack, energy balance, ablation and runoff, measurement methods, runoff forecasting.
Prerequisite: WR 416, may be taken concurrently.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

WR 486 Watershed Field Practicum Credits: 2 (0-6-0)
Course Description: Field visits to watershed management projects and sites of significant field studies.
Prerequisite: None.
Restriction: Must be a: Junior.
Registration Information: Junior standing. Required field trips.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

WR 487 Internship Credits: Var[1-6] (0-0-0)
Course Description: Supervised work experience in professional settings related to Watershed Science.
Prerequisite: None.
Registration Information: Written consent of instructor.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

WR 492 Seminar Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

WR 495 Independent Study-Watershed Resources Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

WR 510 Watershed Management in Developing Countries Credits: 2 (2-0-0)
Course Description: Watershed management problems, approaches, and solutions in developing countries.
Prerequisite: CIVE 322 or WR 416.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

WR 511 Water Resource Development Credits: 3 (3-0-0)
Course Description: Basic principles of water resource management including surface and subsurface flows.
Prerequisite: None.
Registration Information: Graduate standing. Offered as an online course only. Written consent of instructor.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

WR 512 Water Law for Non-Lawyers Credits: 3 (0-0-3)
Course Description: Basics of water law and policy for Colorado, western states, and the U.S.
Prerequisite: None.
Registration Information: Graduate standing. Written consent of instructor.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

WR 513 Water Sustainability in the Western US Credits: 3 (3-0-0)
Course Description: Explores the historical, social, agricultural, and environmental issues related to water resources and the sustainability of its use in the Western United States.
Prerequisite: None.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. Credit not allowed for both WR 513 and WR 580A3.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

WR 514 GIS and Data Analysis in Water Resources Credits: 3 (1-4-0)
Course Description: Exposure to multiple data analysis and GIS tools used to study water resources. Assess online data sources, download and pre-process digital data, and analyze water information.
Prerequisite: None.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. Must register for lecture and laboratory. Offered as an online course only. Credit not allowed for both WR 514 and WR 581A1.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

WR 516 Cumulative Effects and Watershed Analysis Credits: 3 (2-0-1)
Course Description: Definition, causal processes, and modeling of cumulative watershed effects; comparison and evaluation of current watershed analysis procedures.
Prerequisite: WR 416 and WR 417.
Registration Information: Must register for lecture and recitation.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

WR 520 Evapotranspiration Credits: 2 (2-0-0)
Course Description: Theory, estimation, measurement, simulation, and application of evapotranspiration processes in hydrology.
Prerequisite: PH 122.
Term Offered: Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

WR 523C Environmental Data Science Applications: Water Resources Credits: 2 (2-0-0)
Also Offered As: ESS 523C.
Course Description: Focus on analyzing and understanding water resources. Examine key innovations in deep learning for hydrological prediction and model parameterization, with a focus on cutting-edge techniques and hands-on analyses.
Prerequisite: ESS 523A, may be taken concurrently or SOCR 523A, may be taken concurrently.
Registration Information: This is a partial semester course. Credit not allowed for both ESS 523C and WR 523C.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

WR 524 Modeling Watershed Hydrology Credits: 3 (2-2-0)
Also Offered As: CIVE 524.
Course Description: Development and application of watershed models: structure, calibration, evaluation, sensitivity analysis, simulation.
Prerequisite: (CIVE 203 or STAT 301 or STAT 315) and (CIVE 322 or WR 416).
Registration Information: Must register for lecture and laboratory. Credit not allowed for both CIVE 524 and WR 524.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

WR 574 Advanced Snow Hydrology Credits: 4 (3-0-1)
Course Description: Snow processes in hydrologic cycle; physical and conceptual methods of modeling; techniques for measuring different states and change rates.
Prerequisite: CIVE 322 or ENVE 322 or WR 416.
Registration Information: Must register for lecture and recitation.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

WR 575 Snow Hydrology Field Methods Credit: 1 (0-2-0)
Course Description: Field course offering hands-on experience in snow hydrology.
Prerequisite: None.
Registration Information: Enrollment in a graduate program. Required field trips.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

WR 616 Hillslope Hydrology and Runoff Processes Credits: 3 (1-0-2)
Course Description: Hillslope hydrology and runoff processes in different environments; implications for management and modeling.
Prerequisite: CIVE 322 or WR 416.
Restriction: Must be a: Graduate, Professional.
Registration Information: Must register for lecture and recitation.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.

WR 671 Advanced Topics in Watershed Science Credits: Var[1-6] (0-0-0)
Course Description: Explores advanced topics in watershed hydrology, biogeochemistry, and ecology.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: May be repeated for a maximum of 9 credits.
Grade Mode: Traditional.
Special Course Fee: No.

WR 674 Data Issues in Hydrology Credits: 3 (3-0-0)
Course Description: Types of data, data sources, data quality, missing data, spatial data, data usage, sensitivity in models, error, presentation of data and results.
Prerequisite: WR 574.
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.

WR 692 Seminar Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

WR 695 Independent Study Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

WR 696 Group Study Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

WR 698 Research Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

WR 699 Thesis Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

WR 712 Watershed Systems Credits: 3 (2-2-0)
Course Description: Dynamic simulation of watershed behavior; application and evaluation of current hydrologic models.
Prerequisite: (CIVE 322 or WR 416) and (STAT 340).
Restriction: Must be a: Graduate, Professional.
Registration Information: Must register for lecture and laboratory.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

WR 714 Water Quality for Wildland Managers Credits: 3 (3-0-0)
Course Description: Sampling, statistics of sampling, concepts of ionic equilibrium, water quality modeling, instream flow requirements.
Prerequisite: WR 418.
Restriction: Must be a: Graduate, Professional.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

WR 798 Research Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

WR 799 Dissertation Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.