

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Environmental Health and Safety Management 228 – Stormwater Quality Concepts

1 hour lecture, 1 unit

Catalog Description

Stormwater Quality Concepts applies to construction, industrial and agricultural operations and watershed/land use management impacts on water quality, aquatic life, and water resources. The course covers regulations behind water quality standards, pollutant sources, and runoff theory. Topics support holistic watershed management, including water quality loading patterns from municipal, agricultural, commercial, and other natural and developed land use runoff for regulatory Waste Load Allocations and Total Maximum Daily Loads.

Prerequisite

“C” grade or higher or “Pass” in EHSM 220 or equivalent.

Entrance Skills

- 1) General knowledge of stormwater permits (industrial, construction, municipal), the hydrologic cycle, and common water quality pollutants (e.g., metals, nutrients, sediment).
- 2) Understand the purpose of BMPs, be able to reference factsheets, and apply fundamental safety and inspection practices.

Course Content

- 1) Clean Water Act: Point and Non-Point Sources
- 2) Nationwide Urban Runoff Program
- 3) Holistic Watershed management and water quality
- 4) Land use pollutant sources and management: Urban Runoff; Agriculture; Commercial; Industrial
- 5) Waterbody beneficial uses and Basin Plans
- 6) Total Maximum Daily Loads and Waste Load Allocations
- 7) Metals, nutrients, and pesticides
- 8) Nutrification of waterbodies
- 9) Aquatic and wildlife impacts

Course Objectives

Students will be able to:

- 1) Apply California and Federal regulations and permits to manage stormwater compliance programs in various industries, municipalities, and watershed programs.
- 2) Conceptual development of WLAs and TMDLs.
- 3) Assess pollutant concentrations and loads from land use sources.
- 4) Comparing water quality samples with water quality benchmarks and standards.
- 5) Evaluate BMPs for water quality improvement effectiveness from on-site stormwater inspections.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in a subject matter determined by multiple measurements for

evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Quizzes and exams that measure students' ability to identify, describe and apply California and Federal stormwater permits.
- 2) Exercises that measure students' ability to perform stormwater inspections and develop programs in compliance with California and Federal stormwater regulations and standards.
- 3) Video presentations/projects measuring the student's ability to create or apply stormwater management.

Special Materials Required of Student

None

Minimum Instructional Facilities

Smart Classroom

Method of Instruction

- 1) Lecture and discussion
- 2) Field trips, guest lecturers
- 3) Projects, hands-on exercises

Out-of-Class Assignments

- 1) **Reading:** Nationwide Urban Runoff Program (NURP) historic review of landuses and sources, stormwater quantity versus quality, lectures on metals, nutrients, and other pollutants in runoff, newly recognized pollutant in stormwater and future BMP implementation, changes in pollutant sources, Chollas Creek TMDL for metals.
- 2) **Writing:** Report stormwater runoff pollutants with on-going or current concerns, describe impacts to aquatic life, waterbodies, and drinking water, how to reduce sources of toxic metals.
- 3) **Other:** Observe in field, landuses that could produce water quality impairments, discuss development improvements that could improve water quality of runoff.

Texts and References

- 1) Required (representative example): California State Water Resources Control Board. (n.d.). *NPDES 2022 Construction Stormwater General Permit*. Retrieved September 24, 2025, from https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html
- 2) Supplemental:
 - a. California Department of Transportation. (2024, March). *Construction site best management practices (BMP) manual* (Report No. CTSW-RT-24-425.11.1). Division of Environmental Analysis, Stormwater Program. Brown and Caldwell. <https://dot.ca.gov/programs/environmental-analysis/stormwater-management-program>
 - b. San Diego County Department of Public Works. (2020, September 15). *Best Management Practice Design Manual*. https://www.sandiegocounty.gov/content/sdc/dpw/watersheds/DevelopmentandConstruction/BMP_Design_Manual.html
 - c. California RWQCB San Diego Region. (2016, January). ORDER NO. R9-2015-0001, Waste Discharge Requirements For Discharges From The Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds within the San Diego Region. https://www.waterboards.ca.gov/sandiego/water_issues/programs/stormwater/docs/2015-1118_AmendedOrder_R9-2013-0001_COMPLETE.pdf

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Apply California and Federal stormwater standards, benchmarks, and guidelines related to runoff, waterbodies, and watershed impacts.
- 2) Describe mechanisms and restrictions for BMPs to operate and comply with stormwater compliance programs from runoff to watersheds.
- 3) Identify and analyze pollutant runoff sources for land uses in watersheds.