

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Environmental Health and Safety Management 229 – Stormwater Quality Calculations

1 hour lecture, 1 unit

Catalog Description

Stormwater Quality Calculations applies to construction, industrial, municipal, tribal, and agricultural operations, as well as overall watershed and land use management with an emphasis on water quality BMP design/selection and water quality pollutant loading calculations. The course involves calculations, models and regulations behind water quality standards, pollutant sources and details runoff theory and understanding of the various aspects of pollutant build-up and wash-off theory. Special topics include water quality loading patterns from natural and developed land use runoff, as well as the impact to living organisms and aquatic environments.

Prerequisite

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

Recommended Preparation

Statistics C1000 – Introduction to Statistics

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) Land use pollutant runoff concentrations and loading sources: Construction; Urban Runoff; Agriculture; Industrial; Commercial
- 2) Nationwide Urban Runoff Program values
- 3) Metals (metal speciation), nutrients and pesticides
- 4) Nutrification of waterbodies
- 5) Reservoirs and estuary management
- 6) Stormwater, groundwater and drinking water
- 7) Aquatic and wildlife impacts
- 8) Water Quality stormwater models: theories and background
- 9) Applicable principles of operations for Best Management Practices
- 10) Total Maximum Daily Loads/Wasteload Allocations Calculations

Course Objectives

Students will be able to:

- 1) Apply California and Federal regulations and permits from calculations and sample results for watershed programs.
- 2) Research and design stormwater best management practices (BMPs) and SWPPP documentation.
- 3) Calculate and estimate pollutant concentrations and loads from land use sources.
- 4) Comparing water quality samples results and water quality benchmarks and standards.
- 5) Evaluate BMPs for water quality on-site stormwater inspections.

- 6) Determine effectiveness of operational or post-construction BMPs.

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, scenario exercises

Out-of-Class Assignments

- 1) **Reading:** Calculations using (NURP) historic landuse data, updating calculations using recent sampling studies, pollutant loadings in mass and conversions from concentrations, introduce other watershed and water quality modeling programs, review BMPs and sampling programs under MS4, IGP and CGP programs, methods to estimate flowrates (Los Penasquitos TMDL), approaches to assess pollutants sources for Chollas Creek TMDL for metals.
- 2) **Writing:** Run mass loading and concentration conversion calculations, calculate or model runoff values and compare to standards or benchmarks.
- 3) **Other:** Discuss in class, observations publicly (or occupational) viewable with estimations where modeling and calculations could improve, or not, waters resources.

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. US EPA. (1983, September). *Final Report of the Nationwide Urban Runoff Program*.
 - c. US EPA. (1986, May). *Quality Criteria for Water (Gold Book)*.

Student Learning Outcomes

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

- 1) Use California and Federal stormwater standards and guidelines to calculate and choose the correct BMPs and design stormwater management plans.

- 2) Properly research and estimate site-specific watershed management programs for improvements in water quality impacts.
- 3) Create water quality sampling programs, which effectively evaluate the effectiveness of BMPs.
- 4) Create and design BMPs to specifically address and meet water quality standards and criteria.