

## Watershed Science (Old)



### Why study watershed science?

The watershed science track trains students in the principles of hydrology, climate as it relates to water, water law, appropriate areas of public policy, and links to ecology and soils. Water is a key resource in the western US and in much of the developed World. Watersheds are the natural geographic unit for water management and science, and encompass issues like water quality, water supply, flood management, biodiversity, and climate change. The multiple factors involved with watersheds provide experience for several different career tracks. Students are likely to pursue careers in water and watershed management, environmental consulting, government agencies, and environmental non-profits. The track is also very good preparation for graduate school in ecology, hydrology, environmental policy, or especially interdisciplinary environmental management programs. Law school is also a very good option for those students who take the appropriate social sciences and law classes and electives.

### Preparatory Subject Matter Requirements

| Preparatory Subject Matter                 |                                     | Quarter(s)<br>Offered | Units | Completed | Notes                              |
|--|-------------------------------------|-----------------------|-------|-----------|------------------------------------|
| <b>Written and Oral Expression</b>         |                                     |                       |       |           |                                    |
| UWP 101, or any from the 102 or 104 series | Upper Division Writing              | I, II, III, IV        | 4     | _____     | <u>May test out of requirement</u> |
| CMN 1, 3V, 3Y, or DRA 10                   | Communication                       | I, II, III, IV        | 4     | _____     | _____                              |
| <b>Biological Sciences</b>                 |                                     |                       |       |           |                                    |
| BIS 2A                                     | Essentials of Life on Earth         | I, II, III, IV        | 5     | _____     | _____                              |
| BIS 2B                                     | Principles of Ecology and Evolution | I, II, III, IV        | 5     | _____     | _____                              |
| BIS 2C                                     | Biodiversity and the Tree of Life   | I, II, III, IV        | 5     | _____     | _____                              |
| <b>Geology</b>                             |                                     |                       |       |           |                                    |
| <i>Choose one of the following</i>         |                                     |                       |       |           |                                    |
| GEL 1                                      | The Earth                           | I, II, III            | 4     | _____     | _____                              |
| GEL 50 (recommended)                       | Physical Geology                    | I, II, III            | 3     | _____     | _____                              |
| <b>Chemistry</b>                           |                                     |                       |       |           |                                    |
| CHE 2A or 2AH                              | General Chemistry                   | I, II, IV             | 5     | _____     | _____                              |
| CHE 2B or 2BH                              | General Chemistry                   | II, III, IV           | 5     | _____     | _____                              |
| CHE 2C or 2CH (recommended, not required)  | General Chemistry                   | I, III, IV            | 5     | _____     | _____                              |
| <b>Physics</b>                             |                                     |                       |       |           |                                    |
| <i>Complete either 1AB or 7ABC</i>         |                                     |                       |       |           |                                    |
| PHY 1A                                     | General Physics                     | I, II, IV             | 3     | _____     | _____                              |
| PHY 1B                                     | General Physics                     | II, III               | 3     | _____     | _____                              |
| PHY 7A                                     | General Physics                     | I, II, III, IV        | 4     | _____     | _____                              |
| PHY 7B                                     | General Physics                     | I, II, III, IV        | 4     | _____     | _____                              |
| PHY 7C                                     | General Physics                     | I, II, III, IV        | 4     | _____     | _____                              |
| <b>Economics</b>                           |                                     |                       |       |           |                                    |
| ECN 1A, 1AV, or 1AY                        | Principles of Microeconomics        | I, II, III, IV        | 4     | _____     | _____                              |
| <b>Mathematics</b>                         |                                     |                       |       |           |                                    |
| MAT 16A, 17A, or 21A                       | Calculus                            | I, II, III, IV        | 3-4   | _____     | <u>MAT 17AB recommended</u>        |
| MAT 16B, 17B, or 21B                       | Calculus                            | I, II, III, IV        | 3-4   | _____     | _____                              |
| <b>Environmental Science and Policy</b>    |                                     |                       |       |           |                                    |
| ESP 1                                      | Environmental Analysis              | I, IV                 | 4     | _____     | _____                              |

I = fall quarter, II = winter quarter, III = spring quarter, IV = summer session

\*Course is offered in odd years only (2023, 2025, etc.)

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## Core Subject Matter Requirements

NOTE: Students graduating with this major are required to attain at least a C average (2.0 GPA) in all courses taken at the university in Depth Subject Matter *and* pass all coursework. See requirements of the College of Agriculture & Environmental Science in the UC Davis General Catalog.

| Depth Subject Matter  | Prerequisites                              | Qtr(s)  | Units          | Completed |       |
|---|--|---|----------------|-----------|-------|
| <b>Global Environment</b>   |  |   |                |           |       |
| ESM 120   | Global Environmental Interactions          | One college-level chemistry and biology course  | II             | 4         | _____ |
| <b>Ecology</b>  |  |   |                |           |       |
| <i>(Choose one of the following)</i>                              |  |   |                |           |       |
| ESP 100   | General Ecology                            | BIS 2A-C; MAT 16A-B or 17A-B or 21A-B; STA 13 recommended   | I, II, IV      | 4         | _____ |
| EVE 101   | Introduction to Ecology                    | BIS 2A-C; MAT 16A-B or 17A-B or 21A-B; or equivalent  | I, II, III, IV | 4         | _____ |
| <b>Policy</b>   |  |   |                |           |       |
| ESP 162   | Environmental Policy                       | ECN 1A  | II             | 4         | _____ |
| <b>Statistics</b>   |  |   |                |           |       |
| <i>(Choose one of the following – Statistics 100 recommended)</i> |  |   |                |           |       |
| STA 13  | Elementary Statistics                      | Two years of high school algebra or equivalent in college   | I, II, III, IV | 4         | _____ |
| STA 100   | Applied Statistics for Biological Sciences | MAT 16B or 17B or 21B   | I, II, III, IV | 4         | _____ |
| <b>Environmental Monitoring</b>                                   |  |   |                |           |       |
| <i>(Choose one of the following)</i>                              |  |   |                |           |       |
| ATM 124   | Meteorological Instruments & Observations  | ATM 60  | I              | 3         | _____ |
| ESM 108   | Environmental Monitoring                   | Entry level course in the environmental sciences  | III            | 3         | _____ |
| ESP 151L  | Limnology Lab                              | ESP 151 (can be concurrent)   | III            | 3         | _____ |
| ESP 179   | Environmental Impact Assessment            | ESP 1 or the equivalent   | II, IV         | 4         | _____ |
| <b>Environmental Data Science</b>                                 |  |   |                |           |       |
| <i>(Choose one of the following)</i>                              |  |   |                |           |       |
| ABT/LDA 150   | Introduction to GIS                        | None  | I, II, III     | 4         | _____ |
| ESP 106   | Environmental Data Science                 | STA 13 or 32 or 100 recommended   | II             | 4         | _____ |
| <b>Internship</b>   |  |   |                |           |       |
| ESM/ESP 92/192 Internship   |  | Upper division standing, permission of instructor<br>Variable unit – must take at least 3 units of internship<br>May complete internship in a different area with prior approval<br>(e.g.: PLS, SSC, ATM) | I, II, III, IV | 3         | _____ |
| <b>Capstone</b>   |  |   |                |           |       |
| ESM 195   | Integrating Env Science & Management       | Senior standing in ESM  | III            | 2         | _____ |
| <b>Honors Thesis (Optional)</b>                                   |  |   |                |           |       |
| ESM 194H  | Senior Honors Thesis                       | Senior standing, Overall GPA of 3.50 or higher;<br>Consent of the master adviser  |                | 2-6       | _____ |

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## Watershed Science

| Required Courses   | Prerequisites  | Qtr(s)  | Units  | Completed |                |
|--|--|---|--------|-----------|----------------|
| <b>Select one course</b>   |  |   |        |           |                |
| HYD 10   | Water, Power, Society                                  | None  | III    | 3         | _____          |
| ESM 121  | Water Science & Management                             | PHY 10 or GEL 1   | III    | 3         | _____          |
| <b>Complete</b>  |  |   |        |           |                |
| SSC 100  | Principles of Soil Science                             | College-level course in each of CHE, PHY, BIS, and GEL recommended                | I      | 5         | _____          |
| <b>Select two hydrology courses</b>                                |  |   |        |           |                |
| ESM 100 or<br>HYD 141  | Principles of Hydrologic Science<br>Physical Hydrology | CHE 2B; MAT 16B; PHY 7A or 9A<br>PHY 9B, MAT 21B                                  | I<br>I | 4<br>4    | _____<br>_____ |
| ESM 108  | Environmental Monitoring                               | Entry level course in the environmental sciences                                  | III    | 3         | _____          |
| HYD 142  | Systems Hydrology                                      | HYD 141 or ECI 142  | II     | 4         | _____          |
| HYD 143**  | Echohydrology  | HYD 10 or 141 or ESP 1 or ESM 100 or ESM 108 or ESM 120 or GEL 1 or 50 or SSC 100 | II     | 4         | _____          |
| HYD 145  | Water Science and Design                               | HYD 141 or ESM 100; MAT 16B or 17B or 21B or consent of instructor                | II     | 4         | _____          |
| Note: Cannot complete this section with ESM 100 <i>and</i> HYD 141 |  |   |        |           |                |
| <b>Select one geology course</b>                                   |  |   |        |           |                |
| ESP 151L   | Limnology Lab  | ESP 151 (can be concurrent)   | III    | 3         | _____          |
| GEL 35   | Rivers   | None  | III    | 3         | _____          |
| GEL 136  | Ecogeomorphology of Rivers & Streams                   | Enrollment by application only, not offered every year                            | III    | 5         | _____          |
| GEL 140**  | Intro to Process Geomorphology                         | GEL 1 or 50; MAT 16B or 17B or 21B  | I      | 4         | _____          |
| <b>Select one GIS course</b>                                       |  |   |        |           |                |
| ABT 181N*  | Concepts & Methods in GIS                              | LDA 150 or consent of instructor  | II     | 4         | _____          |
| ABT/HYD 182**  | Environmental Analysis with GIS                        | ABT 150 or equiv GIS experience, biology and/or ecology courses rec.              | II     | 4         | _____          |
| <b>Select one soil science course</b>                              |  |   |        |           |                |
| SSC 105  | Field Studies of Soils in CA Ecosystems                | SSC 100 and 120 or equivalent recommended   | IV     | 5         | _____          |
| SSC 118  | Soils in Land Use & the Environment                    | SSC 100 or equivalent recommended   | III    | 4         | _____          |
| SSC 120  | Soil Genesis, Morphology, & Classification             | SSC 100; GEL 50 recommended   | III    | 5         | _____          |
| <b>Select two environmental studies courses</b>                    |  |   |        |           |                |
| LDA 60   | Landform and Grading Studio                            | LDA 70  | III    | 4         | _____          |
| ESP 166  | Ocean & Coastal Policy                                 | ESP 1   | I      | 3         | _____          |
| ESP 168A   | Methods of Env Policy Analysis                         | STA 13; ESP 1; ECN 1A; ECN 100 recommended  | I      | 5         | _____          |
| ESP 169**  | Water Policy & Politics                                | POL 1 or ECN 1A recommended   | III    | 3         | _____          |
| ESP 172  | Public Lands Management                                | ECN 1A and POL 1 recommended  | I      | 4         | _____          |
| ESP 174  | Environmental Justice Policy and Practice              | ESP 1 or the equivalent recommended   | III    | 4         | _____          |
| ESP 179  | Environmental Impact Assessment                        | ESP 1 or the equivalent   | II, IV | 4         | _____          |
| HYD 150  | Water Law  | Consent of instructor or upper division standing                                  | II     | 3         | _____          |
| SOC 160  | Sociology of the Environment                           | SOC 1, 2, or 3 recommended  | I      | 4         | _____          |
| <b>Complete</b>  |  |   |        |           |                |
| ATM 133  | Biometeorology   | One biological course; MAT 16B; or consent of instructor                          | II     | 4         | _____          |
| <b>Select one aquatic habitats course</b>                          |  |   |        |           |                |
| ENT 116  | Biology of Aquatic Insects                             | BIS 2B or equivalent  | III    | 3         | _____          |
| ESP 151  | Limnology  | BIS 2A and 2B; BIS 2C and ESP 100 or EVE 101 recommended                          | III    | 4         | _____          |
| EVE 115*   | Marine Ecology   | ESP 100, EVE 101, or BIS 2B, or consent of instructor                             | II     | 4         | _____          |
| WFC 120  | Biology & Conservation of Fishes                       | BIS 2A-C; upper division ecology course recommended                               | I      | 3         | _____          |
| WFC 134  | Herpetology  | BIS 2A-C; upper division ecology course recommended                               | II     | 3         | _____          |

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