

I. CATALOG INFORMATION

- A. Discipline: ENVIRONMENTAL SCIENCE
- B. Subject Code and Number: ENSC M05
- C. Course Title: Environmental Sampling and Instrumentation

D. Credit Course units:

Units: 1.5

Lecture Hours per week: 1

Lab Hours per week : 1.5

Variable Units : No

E. Student Learning Hours:

Lecture Hours:

Classroom hours: 17.5 - 17.5

Laboratory/Activity Hours:

Laboratory/Activity Hours 26.25 - 26.25**Total Combined Hours** in a 17.5 week term: 43.75 - 43.75

F. Non-Credit Course hours per week _____

G. May be taken a total of: 1 2 3 4 time(s) for creditH. Is the course co-designated (same as) another course: No Yes
If YES, designate course Subject Code & Number: _____

I. Course Description:

Introduces sampling protocols/techniques for environmental site characterization and field instrumentation to collect and monitor environmental field data. Includes hands-on operations of various instruments/field equipment utilized for soil matrix, water, and air monitoring/sampling. Provides an overview of field sampling plan preparation, health and safety procedures, use of general personal protection equipment, appropriate laboratory analysis, field/lab quality assurance/control, and evaluation of lab data.

J. Entrance Skills

*Prerequisite: No Yes Course(s)

*Corequisite: No Yes Course(s)

Limitation on Enrollment: No Yes

Recommended Preparation: No Yes Course(s)CHEM M12 and ENSC M01

Other: _____ No Yes

K. Other Catalog Information:

Requires field trips.

II. COURSE OBJECTIVES

Upon successful completion of the course, a student will be able to:

		Methods of evaluation will be consistent with, but not limited by, the following types or examples.
1	describe techniques used for air, water, and soil sampling/monitoring.	Laboratory exercises, field demonstrations, assignments, quizzes, and examinations.
2	operate various environmental field instrumentation and explain the basic theoretical concept of each instrument.	Laboratory exercises, field demonstrations, assignments, quizzes, and examinations.
3	apply general methods of laboratory analysis and evaluation for environmental samples for data interpretation.	Laboratory exercises, field demonstrations, assignments, quizzes, and examinations.
4	illustrate how to prepare a basic field-sampling plan.	Laboratory exercises, field demonstrations, assignments, quizzes, and examinations.
5	describe correlations found between data collected and environmental factors.	Laboratory exercises, field demonstrations, assignments, and examinations.

III. COURSE CONTENT

Estimated %	Topic	Learning Outcomes
Lecture (must total 100%)		
13.00%	Geographic tools: - Global positioning system (GPS) and topographic maps - Navigation and mapping - Understanding spatial data	2, 4
	Spectrophotometry and color analysis:	

13.00%	- Using analytical tools for field studies	1, 2, 3, 5
13.00%	Site investigation: - Introduction to site analysis tools, sampling media, environmental assessment and standards - Sampling plan-case	1, 2, 3, 4
13.00%	Field preparation: - Preparing collection equipment - Preparing samples for lab - Reviewing safe handling guidelines	1, 2, 4
13.00%	Field sampling: - Soil and water quality sampling and analysis including soils classification and chemistry - Water quality instrumentation to measure nutrient levels - Dissolved oxygen (DO), pH, and conductivity	2, 3, 4
13.00%	Air quality and meteorological data measured through the use of the campus weather station and air collection instruments	1, 2, 3
15.00%	Analysis of data using spreadsheets, graphing, and/or mapping on software programs	3, 5
7.00%	Presentations/Final exam	1, 2, 3, 4, 5
Lab (must total 100%)		
13.00%	Geographic tools: - Using GPS and topographic maps to locate position - Learning mapping skills including calculating latitude and longitude	2, 3
13.00%	Spectrophotometry and color analysis: - Use instrumentation to determine varying concentrations of nutrients and turbidity or pigment in samples	1, 2, 3, 4, 5
13.00%	Site investigation: - Introduction to site analysis tools, sampling media, environmental assessment and standards - Sampling plan-case	1, 4
13.00%	Field preparation: - Preparing collection equipment - Preparing samples for lab - Reviewing safe handling guidelines	1, 2, 3, 4
13.00%	Field sampling: - Soil and water quality sampling and analysis including soils classification and chemistry - Water quality instrumentation to measure nutrient levels, DO, pH, and conductivity	1, 2, 3
13.00%	Air quality and meteorological data measured through the use of the campus weather station and air collection instruments	1, 2, 3
15.00%	Analysis of data using spreadsheets, graphing, and/or mapping on software programs	1, 3, 5
7.00%	Presentation of scientific method - The data - Experimental procedures - Analysis - Conclusions	1, 3, 4, 5

IV. TYPICAL ASSIGNMENTS

A. Writing assignments

Writing assignments are required. Possible assignments may include, but are not limited to:	
1	reflections on readings from newspaper and journal articles.
2	summary and analysis of guest lecture or other outside-of-class presentation.
3	journal assignments that are reactions to class discussions.
4	essays on assigned topics, such as how to prepare a basic field-sampling plan.

B. Appropriate outside assignments

Appropriate outside assignments are required. Possible assignments may include, but are not limited to:	
1	assigned writings based on textbook readings, journal articles, the Internet, and/or guest lectures.
2	field observations.
3	operate various environmental field instrumentation and explain the basic theoretical concept of each instrument.

C. Critical thinking assignments

Critical thinking assignments are required. Possible assignments may include, but are not limited to:	
1	in-class case studies utilizing learned sampling/field techniques.
2	analysis of water extraction data from various instrumental analyses to determine extent of contamination.

V. METHODS OF INSTRUCTION

Methods of instruction may include, but are not limited to:

- Distance Education – When any portion of class contact hours is replaced by distance education delivery mode (Complete DE Addendum, Section XV)
- Lecture/Discussion
- Laboratory/Activity
- Other (Specify) Case Studies
- Optional Field Trips

Required Field Trips

VI. METHODS OF EVALUATION

Methods of evaluation may include, but are not limited to:

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> Essay Exam | <input checked="" type="checkbox"/> Classroom Discussion | <input checked="" type="checkbox"/> Skill Demonstration |
| <input checked="" type="checkbox"/> Problem Solving Exam | <input checked="" type="checkbox"/> Reports/Papers/Journals | <input checked="" type="checkbox"/> Participation |
| <input checked="" type="checkbox"/> Objective Exams | <input checked="" type="checkbox"/> Projects | <input checked="" type="checkbox"/> Other (specify) |

Presentation of environmental data collection and analysis.

VII. REPRESENTATIVE TEXTS AND OTHER COURSE MATERIALS

Zhang, Chunlong. Fundamentals of Environmental Sampling and Analysis. Wiley, 2007.

Csuros, Maria. Environmental Sampling and Analysis: Lab Manual. CRC, 1997.

The Hazardous Materials Training and Research Institute. Site Characterization: Sampling and Analysis: Preserving the Legacy. Wiley, 1997.

Bodger, Keith. Fundamentals of Environmental Sampling. Government Institutes, 2003.

VIII. STUDENT MATERIALS FEES

No Yes

IX. PARALLEL COURSES

College	Course Number	Course Title	Units
Rio Hondo College	ET 260	Environmental Sampling and Analysis	4

X. MINIMUM QUALIFICATIONS

Courses Requiring a Masters Degree:
 Master's degree in ecology or environmental studies OR the equivalent OR see interdisciplinary studies.

XI. ARTICULATION INFORMATION

A. Title V Course Classification:

1. This course is designed to be taken either:

- Pass/No Pass only (no letter grade possible); or
 Letter grade (P/NP possible at student option)

2. Degree status:

Either Associate Degree Applicable; or Non-associate Degree Applicable

B. Moorpark College General Education:

1. Do you recommend this course for inclusion on the Associate Degree General Education list?

Yes: No: If YES, what section(s)?

—

- A1 - Natural Sciences - Biological Science
- A2 - Natural Sciences - Physical Science
- B1 - Social and Behavioral Sciences - American History/Institutions
- B2 - Social and Behavioral Sciences - Other Social Behavioral Science
- C1 - Humanities - Fine or Performing Arts
- C2 - Humanities - Other Humanities
- D1 - Language and Rationality - English Composition
- D2 - Language and Rationality - Communication and Analytical Thinking
- E1 - Health/Physical Education
- E2 - PE or Dance
- F - Ethnic/Gender Studies

C. California State University(CSU) Articulation:

1. Do you recommend this course for transfer credit to CSU? Yes: No:

2. If YES do you recommend this course for inclusion on the CSU General Education list?

Yes: No: If YES, which area(s)?

- A1 A2 A3 B1 B2 B3 B4
- C1 C2 D1 D2 D3 D4 D5
- D6 D7 D8 D9 D10 E

D. University of California (UC) Articulation:

1. Do you recommend this course for transfer to the UC? Yes: No:

2. If YES do you recommend this course for the Intersegmental General Education Transfer Curriculum (IGETC)? Yes: No:

IGETC Area 1: English Communication

- English Composition
- Critical Thinking-English Composition
- Oral Communication

IGETC Area 2: Mathematical Concepts and Quantitative Reasoning

- Mathematical Concepts

IGETC Area 3: Arts and Humanities

- Arts
- Humanities

IGETC Area 4: Social and Behavioral Sciences

- Anthropology and Archaeology

- Economics
- Ethnic Studies
- Gender Studies
- Geography
- History
- Interdisciplinary, Social & Behavioral Sciences
- Political Science, Government & Legal Institutions
- Psychology
- Sociology & Criminology

IGETC Area 5: Physical and Biological Sciences (mark all that apply)

- Physical Science Lab or Physical Science Lab only (non-sequence)
- Physical Science Lecture only (non-sequence)
- Biological Science
- Physical Science Courses
- Physical Science Lab or Biological Science Lab Only (non-sequence)
- Biological Science Courses
- Biological Science Lab course
- First Science course in a Special sequence
- Second Science course in a Special Sequence
- Laboratory Activity
- Physical Sciences

IGETC Area 6: Language other than English

- Languages other than English (UC Requirement Only)
- U.S. History, Constitution, and American Ideals (CSU Requirement ONLY)
- U.S. History, Constitution, and American Ideals (CSU Requirement ONLY)

XII. REVIEW OF LIBRARY RESOURCES

- A. What planned assignment(s) will require library resources and use?

The following assignments require library resources:

Research using the Library's print and online resources as well as other Internet resources concerning analysis of water contamination and sampling techniques.

- B. Are the currently held library resources sufficient to support the course assignment?

YES: NO:

If NO, please list additional library resources needed to support this course.

XIII. PREREQUISITE AND/OR COREQUISITE JUSTIFICATION

ENSC M05: Not Applicable

XIV. WORKPLACE PREPARATION

Required for career technical courses only. A career technical course/program is one with the primary goal to prepare students for employment immediately upon course/program completion, and/or upgrading employment skills.

Detail how the course meets the Secretary of Labors Commission on the Achievement of Necessary Skills (SCANS) areas. (For a description of the competencies and skills with a listing of what students should be able to do, go to:

<http://www.ncrel.org/sdrs/areas/issues/methods/assment/as7scans.htm>)

The course will address the SCANS competency areas:

1. Resources: the students will study and operate environmental sampling and analysis tools.
2. Interpersonal: the students will work in research teams in order to solve environmental problems.
3. Information: the students will gather, assimilate, and communicate essential information in order to demonstrate knowledge of environmental processes.
4. Systems: the students will demonstrate an understanding of physical and biological systems and the impact of development and pollutants on those systems.
5. Technology: the students will use software and instruments to analyze environmental data and create a presentation of their findings.

The course also addresses the SCANS skills and personal qualities:

1. Basic Skills: the students will prepare, plan, and execute a research project in the field and summarize their findings in an oral presentation.
2. Thinking Skills: the students will critically evaluate the correlation between trends in data and environmental factors.
3. Personal Qualities: the students will demonstrate competencies through oral and written presentations that will be shared with the class in an effort to establish an informed and involved citizenry.

XV. DISTANCE LEARNING COURSE OUTLINE ADDENDUM

ENSC M05: Not Applicable

XVI. GENERAL EDUCATION COURSE OUTLINE ADDENDUM

ENSC M05: Not Applicable

XVII. STUDENT MATERIALS FEE ADDENDUM

ENSC M05: Not Applicable

XVIII. REPEATABILITY JUSTIFICATION TITLE 5, SECTION 55041

ENSC M05: Not Applicable

XIX. CURRICULUM APPROVAL

Course Information:

Discipline: ENVIRONMENTAL SCIENCE

Discipline Code and Number: ENSC M05

Course Revision Category: Outline Update

Course Proposed By:

Originating Faculty Brian Swartz 03/06/2016

Faculty Peer: Michael Walegur 03/07/2016

Curriculum Rep: Robert Keil 03/08/2016

Department Chair: Robert Keil 03/06/2016

Division Dean: Howard Davis 03/07/2016

Approved By:

Curriculum Chair: Jerry Mansfield 04/11/2016

Executive Vice President: Lori Bennett 04/11/2016

Articulation Officer: Letrisha Mai 03/16/2016

Librarian: Mary LaBarge 03/16/2016

Implementation Term and Year: Fall 2016

Approval Dates:

Approved by Moorpark College Curriculum Committee: 04/05/2016

Approved by Board of Trustees (if applicable): _____

Approved by State (if applicable): 04/12/2016