

**MS in Environmental Management
PROGRAM ASSESSMENT Plan 6/16**

I. Mission Statement

The Environmental Management Program will educate graduate students to provide management solutions to environmental problems using innovative, interdisciplinary approaches in an environmentally just manner.

II. General Goals of the Program:

- To provide an interdisciplinary approach to the study of the relationship and interaction of human beings with the natural world
- To utilize principles and processes of the natural sciences, social sciences and the humanities to provide both theoretical and applied knowledge for students interested in managing environmental issues
- To prepare students to meet the demands of industry, government, and the consulting sector regarding the protection of the environment and the fulfillment of environmental regulations
- To deliver a program that provides the required knowledge to develop value-based and culturally appropriate approaches to the protection of the environment.

III. Learning Outcomes (as of 6/16 – to be reviewed again and perhaps revised in the fall)

Students graduating from the MSEM program will be able to:

1. Demonstrate an interdisciplinary approach in analysis of environmental issues and management strategies.
2. Utilize both theory and applied knowledge to evaluate and recommend management strategies for environmental issues.
3. Choose and apply appropriate tools, techniques, and technologies to analyze environmental issues.
4. Skillfully communicate environmental management issues through written reports and oral and visual presentations.

Old Outcomes used for exit survey

Students graduating from the MSEM program will be able to:

- *Demonstrate an understanding of an interdisciplinary approach to the study of the relationships and interactions of human beings with the natural world*

- *Utilize principles and processes of the natural sciences, social sciences and the humanities to provide both theoretical and applied understanding of managing environmental issues*
- *Demonstrate understanding of environmental management tools, techniques, and technologies designed to meet the demands of industry, government, and the consulting sector regarding the protection of the environment and the fulfillment of environmental regulations*
- *Communicate skillfully through written reports and oral presentations of environmental management issues*
- *Critically analyze impacts, both actual and potential, of human activity on the environment and their prevention and mitigation*

IV. Assessment Methods

A. Direct Measures

1. Demonstrate an interdisciplinary approach in analysis of environmental issues and management strategies.

Assessment Tools:

- Direct: *Course-embedded assessment*. Final exam essay questions in ENVM 601, 602, and 603; Evaluation of a subset of written Master's projects.

2. Utilize both theory and applied knowledge to evaluate and recommend management strategies for environmental issues.

Assessment Tools:

- Direct: *Course-embedded assessment*. Final exam essay questions in ENVM 601, and 602; Evaluation of a subset of written Master's projects.

3. Choose and apply appropriate tools, techniques, and technologies to analyze environmental issues.

Assessment Tools:

- Direct: *Course-embedded assessment*. Final exam essay questions in ENVM 601 and 602.

4. Skillfully communicate environmental management issues through written reports and oral and visual presentations.

Assessment Tools:

- Direct: *Course-embedded assessment*. Evaluation of a subset of written Master's projects and Master's project presentations, both the oral component and the accompanying slides.

B. Indirect measure: Self reported attainment of LOs (based on 2013 LOs) in the MSEM Exit Survey. 125 survey results currently available rating how well the LOs were achieved.

The question wording:

To what extent do you think you attained the following MSEM Learning Outcomes?

- *Fully*
- *Quite a bit*
- *Somewhat*
- *Not at all*

Current Results

Answer Options	Fully	Quite a bit	Somewhat	Not at all	Response Count
Demonstrate an understanding of an interdisciplinary approach to the study of the relationships and interactions of human beings with the natural world.	71	47	7	0	125
Utilize principles and processes of the natural sciences, social sciences and the humanities to provide both theoretical and applied understanding of managing environmental issues.	60	58	8	0	125
Demonstrate understanding of environmental management tools, techniques, and technologies designed to meet the demands of industry, government, and the consulting sector regarding the protection of the environment and the fulfillment of environmental regulations.	45	54	26	0	125
Communicate skillfully through written reports and oral presentations of environmental management issues.	65	51	10	0	125
Critically analyze impacts, both actual and potential, of human activity on the environment and their prevention and mitigation.	64	52	8	1	124

Alumni survey. Alumni from the program who have been out for three years will be asked the same questions regarding learning outcomes.

V. Time Frame

Spring 2016: We will evaluate Learning Outcome 4 based on both Master's Project presentations and paper.

Spring 2017: We will evaluate Learning Outcomes 1 and 2 based on Master's Project papers

2017/2018: We will evaluate Learning Outcome 3 based on final exams from ENVM 601.

The alumni survey will be conducted in fall 2016.

V. Who Will Do the Assessment?

A subcommittee within the Environmental Science Department will take primary responsibility for assessment of the Environment Management graduate program. This

will include the Graduate Program Director and at least two other faculty members. The full Department will review the subcommittee's assessment; pending Departmental review of this fourth Learning Outcome, we may expand the subcommittee to include additional faculty (although the Department only has seven full-time faculty members).

VI. How data will be used to improve program or revise curricula

Pending the results from review described above, the subcommittee will make recommendations to the Department regarding strengths and weaknesses in the MSEM curriculum. On an annual basis, the Department will reassess the effectiveness of the program, and of individual classes, in preparing students to meet the MSEM Learning Outcomes.

One of the challenges with assessing learning outcomes is that more of the courses in the program are electives. There are only four required courses and students may obtain waivers for three of these courses. This limits the number of courses that can be used for assessment of learning outcomes. The final Master's project is completed by all students and provides the best opportunity for assessment.

Curriculum Mapping Worksheet

Key I = Introduced with minimal coverage
 M = Moderate Coverage
 C = Comprehensive Coverage

Goals/Outcomes	Economics and Policy	Energy & Climate	Environmental Health	Physical Sciences	Ecology	Masters Project
	607, 613, 614, 661	651, 671, 672	644, 647, 648	601, 630, 631, 633, 654, 655, 656	602, 620, 621, 622, 626, 627, 628	698
Demonstrate an interdisciplinary approach in analysis of environmental issues and management strategies.	M	I	M	M	C	
Utilize both theory and applied knowledge to evaluate and recommend management strategies for environmental issues.	I		M		C	
Choose and apply appropriate tools, techniques, and technologies to analyze environmental issues.	C	M	I		I	C
Skillfully communicate environmental management issues through written reports and oral and visual presentations.	M	C	M		M	C

MSEM PROGRAM Learning Outcome Rubrics

Outcome	Poor Achievement of Outcome	Average Achievement of Outcome [Benchmark Standard]	Good Achievement of Outcome
1. Demonstrate an interdisciplinary approach in analysis of environmental issues and management strategies.	Students can not identify the range and magnitude of environmental impacts from more than two disciplines	Students can identify basic issues for environmental impacts from three disciplines, but can not compare and contrast details of impacts from these disciplines	Students can identify basic issues and details for environmental impacts from at least three disciplines and can compare and contrast the magnitude and scale of impacts from different disciplines
2. Utilize both theory and applied knowledge to evaluate and recommend management strategies for environmental issues.	Students can not identify an acceptable approach for evaluating a proposed environmental impact or for evaluating a potential management alternative.	Students can identify an acceptable approach for evaluating a proposed environmental impact and for evaluating a potential management alternative.	Students can compare and contrast the relative effectiveness of different approaches for evaluating a proposed environmental impact and for evaluating a potential management alternative.
3. a. Choose and apply appropriate tools, techniques, and technologies to analyze environmental issues.	Students can not provide a basic overview of regulatory, policy, and planning concerns, or they can not provide more than two specific examples of these issues for environmental management.	Students can provide a basic overview of regulatory, policy, and planning concerns and can provide at least three specific examples of these issues for environmental management.	Students can provide a detailed overview of regulatory, policy, and planning concerns and can provide at least five specific examples of these issues for environmental management.
3. b. Choose and apply appropriate tools, techniques, and technologies to analyze environmental issues.	Students can not describe basic technical and policy approaches for mitigating environmental problems, or they can not provide more than two examples of effective environmental mitigation.	Students can describe the basic technical and policy approaches for mitigating environmental problems and can provide at least three examples of effective environmental mitigation.	Students can describe the basic technical and policy approaches for mitigating environmental problems and can compare and contrast the use of mitigation for different environmental impacts. They can provide at least five examples of effective environmental mitigation.
4. a. Skillfully communicate environmental management issues through written reports and oral and visual presentations. – Written reports.	Student papers do not cover key issues for the particular environmental problem. Little insight is provided for management opportunities. Paper is poorly organized and difficult to understand.	Student papers cover basic information on the topic but lack synthesis or insight into management recommendations. Organization and writing style is acceptable but not particularly effective.	Student papers synthesize data from a range of sources to provide insight into environmental problem and management opportunities. Paper is well organized and interesting to read.
4. b. Skillfully communicate environmental management issues through written reports and oral and visual presentations. – Oral reports.	Students cannot convey a clear message of environmental problems or management approaches. Use of media is poor.	Students present basic information but with little integration. Use of media is very basic.	Students clearly present complex environmental information in an informative and interesting manner. Use of graphics and other visual tools is effective.

Institutional Learning Outcomes vs. Program Learning Outcomes Grid

Institutional Learning Outcomes X Program Learning Outcomes	PLO #1: Demonstrate an interdisciplinary approach in analysis of environmental issues and management strategies.	PLO #2: Utilize both theory and applied knowledge to evaluate and recommend management strategies for environmental issues.	PLO #3: Choose and apply appropriate tools, techniques, and technologies to analyze environmental issues.	PLO #4: Skillfully communicate environmental management issues through written reports and oral and visual presentations.
Institutional Learning Outcomes				
1. Students reflect on and analyze their attitudes, beliefs, values, and assumptions about diverse communities and cultures and contribute to the common good.				
2. Students explain and apply disciplinary concepts, practices, and ethics of their chosen academic discipline in diverse communities.				
3. Students construct, interpret, analyze, and evaluate information and ideas derived from a multitude of sources.	X		X	
4. Students communicate effectively in written and oral forms to interact within their personal and professional communities.				X
5. Students use technology to access and communicate information in their personal and professional lives.				
6. Students use multiple methods of inquiry and research processes to answer questions and solve problems.	X	X	X	
7. Students describe, analyze, and evaluate global interconnectedness in social, economic, environmental and political systems that shape diverse groups within the San Francisco Bay Area and the world.	X			

Assessment of PLO #4 Based on Evaluation of Project Presentations

The rubric for assessment of PLO #4 based on the final Master's Project presentations is given below:

Criterion	Exceptional	Proficient	Approaching Proficient	Below Proficient
Content	Speaker provides an accurate and complete explanation of topic, drawing upon relevant literature/information. Listeners able to develop an understanding of the material. (5 pt.)	Speaker provides an adequate explanation of topic and presents significant level of relevant information.(4 pt.)	Explanation of topic too broad or somewhat inaccurate. Does not follow assignment carefully. Sections missing. Listeners gain little from the presentation (3)	Does not meet assignment requirements, is not current, and/or objective. (2 pt.)
Organization	Speaker presents information in logical, interesting sequence which audience can follow. Has a clear opening statement that catches audience's interest, and clearly stated conclusion that follows from the content presented. (5 pt.)	Speaker presents information in logical sequence which audience can follow. Introduction and/or conclusion not as robust as desired. (4 pt.)	Audience has difficulty following presentation because it jumps around. Conclusion does not necessarily flow from material presented. (3 pt.)	Audience cannot understand presentation because there is no consistent flow of information. (2 pt.)
Speaking Skills	Poised, articulate; proper volume; steady rate; good posture and eye contact; enthusiasm; confidence. All terms pronounced properly. (2 pt.)	Clear articulation but not as polished. Either inconsistent volume or rate. (1.5 pt.)	Some mumbling; little eye contact; uneven rate; little or no expression. (1 pt.)	Inaudible or too loud; no eye contact; rate too slow/fast; disinterested/ monotone. (0 pt.)
Timing	On time, with substantially all material covered and little extraneous material. (2 pt.)	Too long or short by more than 2 minutes. (1.5 pt.)	More or less by 3 minute. (1 pt.)	More or less by 4 minutes or more. (0 pt.)
Response to Questions	Fully yet concisely responds to questions, showing depth of knowledge.(2 pt.)	Responds to questions with pertinent information. (1.5 pt.)	Difficulty responding to questions, answer incomplete, shows limited understanding. (1 pt.)	Unable to answer questions. (0 pt.)
Slides	Speaker's slides are well designed and compelling and greatly enhance presentation. (4 pt.)	Speaker's slides enhance presentation. (3.5 pt.)	Speaker occasionally uses unnecessary or unclear slides. (3pt.)	Speaker uses superfluous slides that do not enhance presentation. (2 pt.)

Adapted from: <http://www.d.umn.edu/~lshannon/oral%20presentation%20rubric.htm>

Assessment Results

Presentations were assessed by 7 reviewers. There were a total of 31 presentations. 28 presentations received at least one assessment. 49 total reviews were completed. Reviewers were open to which presentations they reviewed. The results corresponding to the rubric are given below with student names replaced by numbers. The average is 18.02 out of 20 suggesting that students largely obtained the expected learning outcome based on their presentations.

Students #	Content	Organization	Speaking Skills	Timing	Response to Questions	Slides	Total
1	4	5	1.5	2	2	3	17.5
2	4	4	1.5	2	1.5	4	17
2	5	5	2	2	1	5	20
3	4	4.5	2	2	1.5	4	18
3	4.5	5	2	2	1.5	4	19
4	5	5	1.5	2	3	4	19.5
5	2	3	1	1	1.5	4	12.5
6	5	4	1.5	1	2	3.5	17
6	5	3.5	1.5	2	1.5	4.5	18
7	4	4	1	2	2	3	16
8	4	4	2	2	2	4	18
8	5	5	2	2	2	4	20
8	5	5	2	2	2	4	20
9	5	5	2	2	2	4	20
10	5	5	2	1.5	2	3.5	19
10	5	5	2	2	2	2	18
10	4	4	2	2	1	3	16
11	5	5	2	2	1.5	4	19.5
11	4	5	2	2	2	3.5	18.5
12	5	4	2	2	2	4	19
12	5	5	2	2	2	3	19
12	4	5	1.5	1.5	2	3	17
13	5	4	1.5	2	1	3	16.5
13	4	4	1.5	1.5	1.5	3	15.5
13	3	5	2	2	2	4	18
14	4.5	5	1.5	2	2	4	19
15	4	5	2	2	2	4	19
16	5	5	2	2	2	3.5	19.5
17	3	3	2	2	1.5	4	15.5
17	4	5	2	2	2	4	19
18	5	5	1.5	2	2	4	19.5
18	5	4	2	2	2	4	19
19	3.5	3.5	1.5	2	1	3.5	15
19	3	4	1	1	1	3	13
20	5	5	2	2	1	4	19
21	4	5	1.5	2	2	4	18.5

21	3	3	1.5	1.5	1.5	4	14.5
21	5	5	2	2	2	3.5	19.5
22	4	3	2	2	2	4	17
23	5	5	1.5	2	2	4	19.5
24	5	4.5	2	2	2	4	19.5
25	4	4	1	2	2	3.5	16.5
26	5	5	2	2	2	4	20
26	5	5	2	2	2	4	20
26	4	5	2	2	2	4	19
27	5	4.5	2	2	2	4	19.5
28	5	4	2	1	2	4	18
28	5	5	1.5	2	2	3	18.5
28	5	4	2	0	2	4	17