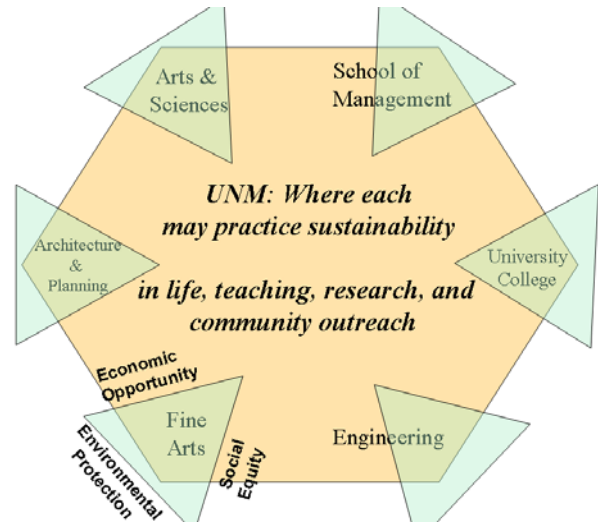


**Sustainability Studies Program (SSP)
Broad Goals for Outcomes Assessment
June 11, 2008**

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Purpose: Define measurable end-of-program student-learning outcomes (SLOs).



1.0 Introduction

Sustainability is a nationally and internationally recognized interdisciplinary field of vital importance. Sustainability promotes environmental health and restoration, social equity, and economic vitality. The goal is to meet the needs of the present (such as health, energy, food, shelter, and transportation) while ensuring the satisfaction of future generations. In light of unprecedented environmental degradation, social instability, and economic uncertainties in today's world, the sustainability minor degree cultivates the complex knowledge and skills needed to secure a healthy future for all.

The Sustainability Studies Program (SSP) is housed within the College of Arts & Sciences and partners with five other colleges and schools to provide learning and research opportunities in the sciences, humanities, engineering, architecture, business, fine arts, and other areas. The Sustainability Studies minor provides students from most disciplines with knowledge, skills, and experiences that complement their major, thereby preparing them to bring sustainable practices to many sectors.

As one of the Provost's Areas of Public Engagement, the SSP spawns experiential learning, research, and service activities to implement practical solutions for the bioregion, the Southwest, and the planet. Sustainability Studies provides a roadmap for the design, selection, and implementation of policies, practices, technologies, and strategies. The SSP effectively bridges between the passionate grassroots community and the professional institutional community of businesses and governmental agencies.

We are one of perhaps 15 programs in the nation to offer an undergraduate minor degree as of fall 2007. The minor degree in Sustainability Studies complements major degrees at UNM to accelerate the adoption of sustainable practices in all sectors.

In 2007 the SSP entered the UNM catalogue to offer courses for the minor degree.

- SUST 134 – Introduction to Sustainability; enrollment capped at 30
- SUST 334 – Sustainability Practicum; enrollment capped at 20
- SUST 434 – Sustainability Synthesis; enrollment capped at 20
- SUST 499 – Sustainability Capstone Independent Study Project

Demand for the courses exceeds enrollment caps. Students also take 9 credits of electives drawn from 21 departments and programs around campus.

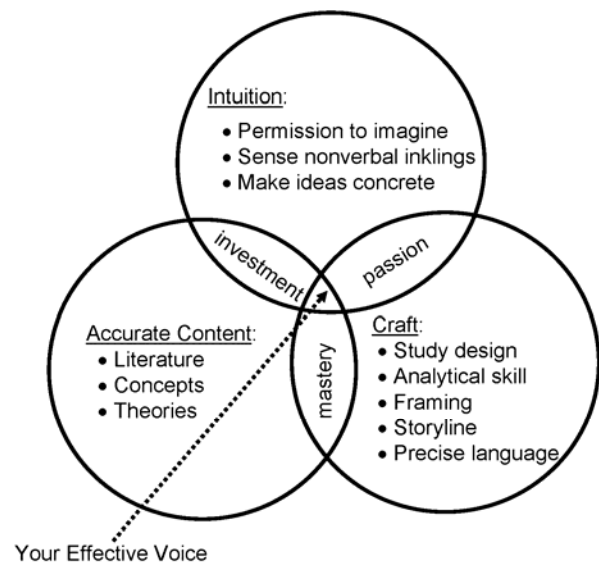
We have submitted Form B to create a seminar course:

- SUST 402* Topics in Sustainability

Other programmatic activities are designed to create experiential learning opportunities for our students. The Provost selected the SSP as an Area of Public Engagement. In response, the Director's experience on the Governor's Climate Change Advisory Group led him to create the Alliance for a Carbon-neutral Food-shed. The Alliance draws together 12 other entities from across New Mexico (<http://www4.unm.edu/sust/index.php?page=food-shed-alliance>). The Alliance's activities create opportunities for Sustainability students. In other projects, we worked with students, faculty and staff to draft a campus sustainability policy. We are co-leaders of a grassroots committee of citizens, schools, and sustainability organizations to organize a centennial celebration of Aldo Leopold's tenure in New Mexico. Our efforts have attracted local, regional, and national interest.

1.1 Overview of the Assessment Plan

Our sense is that educated students in any discipline will have developed an "effective voice" (Fig. 1). Effective voice stems from expression of intuition, is supported by accurate content, and manifests through skillful expression. Observations in the last 5 years indicate a popular shift away from critical thinking skills in general and purposeful, strategic analysis and argument in particular. Students tacitly confuse ready-access to facts with clear, strategic exposition and effective storytelling.



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Figure 1. Concept of the effective voice as the union of intuition, knowledge and craft.

In response, the SSP curriculum relies on Kolb Experiential Learning Theory. Approximately 60% of our students are "social learners" or "practical learners" who "learn best by tackling a problem as a group, relying on intuition and information from other people rather than on books and lectures." Experimentation, hands-on and practical application of knowledge best suits their appetite for learning.

Thus, we designed our syllabi for SUST 134, 334, and 434 to include experiential learning projects that allow students to work in teams. Projects entail problem-solving on campus and in the community. In spring 2007, student teams produced a very successful Lobo Grower's Market on campus which solidified their course work on a carbon-neutral food-shed and introduced them to 25 local growers. Their efforts yielded a comprehensive handbook entitled, "How to Produce a Grower's Market" and an admirable network of New Mexico community food groups. A second team built a bio-diesel processor with the help of community sponsors. A how-to manual was part of the project. A third team installed a rainwater collection system at the intersection of the Kiva Building and the Department of Education. A fourth team made a sophisticated display about the carbon cycle as a permanent fixture of the program's mobile information kiosk project which conducts educational exhibits at community gatherings and local high schools.

Learning goals are to develop mastery in two distinct areas of the field of sustainability. Students are expected to: (1) verbalize the factual history and justification for action in each area and (2) demonstrate competency in how to take action and to influence others. We expect that they use electronic search tools to seek peer-reviewed literature (both theoretical and factual) to support their areas of mastery. We also expect students to bring judgment to bear on their use of books, scientific periodicals, and popular material including magazines, videos, films, the internet, and newspapers. Their verbal, visual, and written material is often produced by teamwork.

At the end of presentations by instructors, student teams, or guest speakers, we conduct a Plus/Delta Evaluation to assess effectiveness of communication. There is a natural feedback to students embodied in quizzes and exams which immediately suggests what content requires addition, repetition, or presentation in an alternative form. We make mid-course corrections based on group processes by which student values, goals, and expectations are assessed, discussed, and used by the class to modify didactic procedures.

1.1.1 Values:

In 2008, we asked 21 students in SUST 434, "What do you value about your education in Sustainability Studies?" From a diverse list, we discerned categories of values based on: (a) factual and theoretical knowledge that applies (b) personally or in association with others (Table 1).

Table 1. Activities and skills valued by Sustainability Studies students.

		Knowledge:	
		Factual	Theoretical
For self		Practical sustainability methods, research project design, career options	Research; Proposal writing
With others		Communication skills; Organizing groups; Outreach projects; Service learning; Awareness of global health, poverty, hunger	Innovations; Systems-view; Networks; Global/local debate; Innovations e.g., local currency models, cap & trade systems, etc.

1.1.2 Goals:

- Effective voice (Figure 1):
 Awareness and expression of one’s intuition
 Accurate content; concepts, literature, theories
 Craft; analysis, framing, and precise language
- Mastery in two areas of sustainability:
 Major area, e.g., alternative fuels
 Minor area, e.g., environmental racism

1.1.3 Student Learning Outcomes (SLOs):

- a) Be able to *verbalize* the background context of sustainability situations and options.
- b) Identify relevant *strengths, weaknesses, opportunities and threats*.
- c) Be sensitive to the *uncertainties of current knowledge*.
- d) *Master and use scholarly literature* in sustainability research and outreach.
- e) *Be equipped to influence others* effectively.
- f) Stretch-goal: Participate in an *international experience* to learn first-hand about quality of life for the 2 billion people who have zero wealth.

2.0 Measurable Student-learning Outcomes (SLOs):

For each SLO (section 1.1.3) we list measurable outcomes and identify SUST core courses that include assignments and activities to fulfill the SLOs (Table 2).

2.1 Measurable outcomes

a) *Verbalization*

1. For each of the basic needs (i.e., health, food, shelter, transportation), cite and summarize 3 peer-reviewed, professional publications that examine the unsustainable practices that have compromised planetary wellness and social equity. SUST 134, SUST 434
2. Cite three sources and summarize reasons why two sustainable options (e.g., wind energy, local food) provide viable means of reducing the negative impacts of conventional practices. The two options constitute the major and minor areas of mastery (see Competencies, section 1.1.2, above). SUST 134, SUST 434
3. Present a capstone project at a public venue using appropriate media, e.g., oral presentation, poster, electronic medium, art. SUST 334 , SUST 499

b) *Strengths, weaknesses, opportunities, and threats*

1. For a given sustainable practice (e.g., organic agriculture), list four relevant strengths, weaknesses, opportunities and threats (SWOT) and justify each. SUST 134 , SUST 434
2. Use the drama triangle (i.e., perpetrator, victim, and rescuer) to sculpt the conflicts created by profit-making enterprises that neglect environmental wellbeing and social equity. SUST 134, SUST 434
3. Use the SWOT analysis and drama triangle in a project to implement sustainable practices on campus or in the local community. SUST 334
4. Design, implement, and submit a final report about a project that critiques or develops sustainable innovations that can be applied in the student's major discipline. SUST 499, SUST 402*

c) *Uncertainties of current knowledge*

1. Use ecological foot-printing software to assess your personal footprint. SUST 134
2. Use foot-printing software to examine the relative impacts of 10% changes or per-unit changes in life-style choices related to food, transportation, and consumption. SUST 134
3. Use numerical values from a time series (e.g., inflation-adjusted oil prices) to conduct a risk analysis of various substitutes or alternative commodities. SUST 434
4. Demonstrate how to use the concept of risk to facilitate adoption of sustainable practices. SUST 434, SUST 402*

d) *Mastery of scholarly literature*

1. Follow instructions in a request for proposals and write a 10 page research proposal that includes logical and scholarly justification for the proposed activity. SUST 134
2. Contribute 15 citations to an annotated bibliography of sustainability literature. SUST 134, SUST 434

3. Prepare a professional report of an independent (or group) research (or community outreach) project; include at least 10 peer-reviewed citations. SUST 134, SUST, 434, SUST 499
4. Participate in seminar courses or community reading groups that review writings of sustainability practitioners, visionaries, and scholars. SUST 402*

e) Equipped to influence others effectively

1. Use Power Point to deliver a 10 minute oral presentation in support of a proposed research or outreach project. SUST 134, SUST 334, SUST 434
2. Engage in 15 clock hours of outreach activity off campus. SUST 134, SUST 334
3. Keep a log of personal sustainability practices adopted while a student in the Sustainability Studies Program. SUST 134, SUST 334, SUST 499
4. Use Open Space Technology to organize a class project or community forum. SUST 134, SUST 334, SUST 434

f) Stretch-goal: International Experience

1. Participate in the Sustainable Global Leadership Alliance (SGLA) program and live in a developing country for 26 days. SUST 499
2. Participate in a micro-lending program to support impoverished entrepreneurs in developing nations. SUST 434

Table 2. Cross-tabulation of measurable SLOs (section 2.1) and courses that satisfy each. SUST 134, 334, and 434 are core courses for the minor degree. SUST 402/502 is a proposed seminar course.

Goal	Courses:				
	134	334	434	499	402/502
<i>a. Verbalization</i>					
1.	X		X		
2.	X		X		
3.		X			
<i>b. SWOT</i>					
1.	X		X		
2.	X		X		
3.		X			
4.				X	X
<i>c. Uncertainty</i>					
1.	X				
2.	X				
3.			X		
4.			X		X
<i>d. Mastery</i>					
1.	X				
2.	X		X		
3.	X		X	X	
4.					X
<i>e. Influence</i>					
1.	X	X	X		
2.	X	X			
3.	X	X		X	
4.	X	X	X		
<i>f. International</i>					
1.				X	
2.			X		

Template¹
Sustainability Studies Program
Plan for Assessment of Student Learning Outcomes
The University of New Mexico

A. College, Department and Date

1. College: Arts & Sciences
2. Department: Sustainability Studies Program
3. Date: May 2008

B. Academic Program of Study²

Minor, Sustainability Studies

C. Contact Person(s) for the Assessment Plan

Bruce T. Milne, Professor of Biology & Director, Sustainability Studies Program.
bmilne@sevilleta.unm.edu

D. Broad Program Goals & Measurable Student Learning Outcomes

[*Attach Cover Sheet for Student Learning Outcomes and associated materials.*]

OR

[*List below:*]

1. Broad Program Learning Goals for this Degree/Certificate Program
 - A. Develop the “Effective voice” of an agent of sustainable theory and practice, which includes: (i) Awareness and expression of one’s intuition; (ii) Accurate content, concepts, literature, & theories; and (iii) Craft including analysis, framing, and precise language.
 - B. Develop mastery in two areas of sustainability:
 - (i) Major area, e.g., alternative fuels,
 - (ii) Minor area, e.g., environmental racism
2. List of Student Learning Outcomes (SLOs) for this Degree/Certificate Program
 - a) Be able to *verbalize* the background context of sustainability situations and options.
 - b) Identify relevant *strengths, weaknesses, opportunities and threats*.
 - c) Be sensitive to the *uncertainties of current knowledge*.

¹ Source: Kansas State University Office of Assessment.

² Academic Program of Study is defined as an approved course of study leading to a certificate or degree reflected on a UNM transcript. A graduate-level program of study typically includes a capstone experience (e.g. thesis, dissertation, professional paper or project, comprehensive exam, etc.).

- d) *Master and use scholarly literature* in sustainability research and outreach.
- e) Be *equipped to influence others* effectively.
- f) Stretch-goal: Participate in an *international experience* to learn first-hand about quality of life for the 2 billion people who have zero wealth.

E. Assessment of Student Learning Three-Year Plan

All programs are expected to measure some outcomes annually and to measure all priority program outcomes at least once over two consecutive three-year review cycles. Describe below the plan for the next three years of assessment of program-level student learning outcomes.

1. Student Learning Outcomes

[Insert at least 2-5 priority learning outcomes that will be assessed by the unit over the next three years. Each unit will select which of its learning outcomes to assess.]

a) Cite three sources and summarize reasons why two sustainable options (e.g., wind energy, local food) provide viable means of reducing the negative impacts of conventional practices. The two options constitute the major and minor areas of mastery (see Competencies, section 1.1.2, above).

b) Design, implement, and submit a final report about a project that critiques or develops sustainable innovations that can be applied in the student’s major discipline.

c) Engage in 15 clock hours of outreach activity off campus.

Relationship to UNM Student Learning Goals (insert the program SLOs and check all that apply):

University of New Mexico Student Learning Goals				
Program SLOs	Knowledge	Skills	Responsibility	Program SLO is conceptually different from university goals.
<i>a. Be able to verbalize the background context of sustainability situations and options.</i>	x	x		
<i>b. Identify relevant strengths, weaknesses, opportunities and threats.</i>	x	x	x	
<i>c. Be sensitive to the uncertainties of current knowledge.</i>	x		x	
<i>d. Master and use scholarly literature in sustainability research and outreach.</i>	x	x		

<i>e. Be equipped to influence others effectively.</i>		x	x	
<i>f. Participate in an international experience to learn first-hand about quality of life for the 2 billion people who have zero wealth.</i>	x		x	

2. How will learning outcomes be assessed?

A. What:

i. *For each SLO, briefly describe the means of assessment, i.e., what samples of evidence of learning will be gathered or measures used to assess students' accomplishment of the learning outcomes in the three-year plan?*

a) In SUST 134, students compile three annotated bibliographic entries and report them in writing and orally in class.

b) Students in SUST 499 deliver a final report, in written form or in other appropriate media such as video documentary, under the tutelage of a mentor (Appendix A).

c) In SUST 134 and 334, students obtain voucher signatures from mentors and leaders to whom they contribute service hours, e.g., coordinator of the Lobo Growers Market.

ii. *Indicate whether each measure is **direct** or **indirect**. If you are unsure, then write "Unsure of measurement type." There is an expectation that at least **half of the assessment methods/measures will be direct** measures of student learning. [See attached examples of direct and indirect measures.]*

a) Direct

b) Direct

c) Direct

iii. *Briefly describe the **criteria for success** related to each direct or indirect means of assessment. What is the program's performance target (e.g., is an "acceptable or better" performance by 60% of students on a given measure acceptable to the program faculty)? If scoring rubrics are used to define qualitative criteria and measure performance, attach them to the plan as they are available.*

- a) Students generally complete 80 – 100% of the weekly three assignments.
- b) Student projects are evaluated by external committee (Appendix A).
- c) Students are expected to complete 10 of 15 hours to “pass” the requirement and rewarded in direct proportion to the actual number of hours logged.

B. Who: State explicitly whether the program’s assessment will include evidence from all students in the program or a sample. Address the validity of any proposed sample of students.

- a) All students enrolled in the respective course(s).
- b) All students enrolled in the respective course(s).
- c) All students enrolled in the respective course(s).

3. When will learning outcomes be assessed? When and in what forum will the results of the assessment be discussed?

[Briefly describe the timeframe over which your unit will conduct the assessment of learning outcomes selected for the three-year plan. For example, provide a layout of the semesters or years (e.g., 2008-2009, 2009-2010, and 2010-2011), list which outcomes will be assessed, and which semester/year the results will be discussed and used to improve student learning (e.g., discussed with program faculty, interdepartmental faculty, advisory boards, students, etc.)]

- a) Once per year.
- b) As each student completes SUST 499.
- c) Each semester the course is offered.

4. What is the unit’s process to analyze/interpret assessment data and use results to improve student learning?

Briefly describe:

1. *who will participate in the assessment process (the gathering of evidence, the analysis/interpretation, recommendations).*

- a) Course instructor reports data to Director using spreadsheet that tracks annual offerings.
- b) Director
- c) Course instructor reports data to Director using spreadsheet that tracks annual offerings.

2. *the process for consideration of the implications of assessment for change:*

a. to assessment mechanisms themselves,
Annual review by Director and instructors.

b. to curriculum design,
Annual review by Director and instructors.

*c. to pedagogy
...in the interest of improving student learning.
Question is too vague to answer.*

3. *How, when, and to whom will recommendations be communicated?*
Orally, in writing, and quantified in spreadsheets from instructors to Director at completion of semester.

APPENDIX A:

UNM Sustainability Studies Program

SUST 499: Mentor Orientation & Guidelines

Updated August 25, 2007

CONTENTS

1. Summary
2. Introduction to Sustainability Studies Program
3. Requirements for the minor degree
4. Procedures for SUST 499
5. Role of Mentors
6. Role of Review Committee
7. Assignment of Grades

1.0 SUMMARY

The Sustainability Studies Program (SSP) spawns experiential learning, research, and service activities to implement practical solutions for a sustainable future for the bioregion, the Southwest, and the planet. The SSP surrounds the student with colleagues, mentors, and peers who understand and practice sustainability.

The Sustainability Independent Capstone Project is the culminating project of the minor in Sustainability Studies. The typical experience includes three phases:

- 1) Planning and background research (typically 1 semester of 499 for 1 credit)
- 2) Implementation (typically 1 semester of 499 for 2 credits)
- 3) Evaluation by review committee and reporting of final grade.

The Mentor guides the student through topic selection, project design, and background research, culminating in a proposal for the second semester's work. The Mentor monitors progress and helps keep the student on track for completing the project.

Reporting, Review, and Grading:

- 1) The Mentor ensures that the final report or other form of expression is submitted to the Chair of the Review Committee three (3) weeks before the end of the semester.

<u>Semester</u>	<u>Submission deadline</u>
Spring	Fourth Friday of April
Fall	Fourth Friday of November

- 2) The Chair of the Review Committee reports recommended grades and conveys critiques to the Director of the Sustainability Studies Program by the beginning of finals week.
- 3) The Director of the SSP conveys Review Committee results to the Mentors who assign a final grade by the end of finals week.

2.0 INTRODUCTION

Sustainability promotes environmental health and restoration, social equity, and economic vitality. The goal is to meet the needs of the present (such as health, food, shelter, and transportation) while ensuring the satisfaction of future generations. The Sustainability Studies minor degree complements the major, thereby preparing students to apply sustainability solutions in business, education, government, and the non-profit sector.

Mission:

The Sustainability Studies Program (SSP) spawns experiential learning, research, and service activities to implement practical solutions for a sustainable future for the bioregion, the Southwest, and the planet. Sustainability Studies integrates knowledge and methodologies from the Sciences, Humanities, and Arts to provide a roadmap for students that can be applied to the design, selection, and implementation of policies, practices, technologies, and strategies. Sustainability Studies provides a dynamic feedback loop of information and praxis.

Goals:

- Surround the student with colleagues, mentors, and peers who understand and practice sustainability.
- Provide access to thriving examples of sustainable communities on and off campus.
- Integrate theory and practice through service learning, research, and outreach projects.

3.0 REQUIREMENTS FOR THE MINOR DEGREE

21 credit hours total consisting of:

- 9 hours taken from three groups of electives.

9 hours of required core courses (SUST 134, 334, 434)

3 hours of **Independent Capstone Project (SUST 499)**

Students apply lessons from the sustainability minor in the context of the major discipline or other arena. Students are advised in the selection of a faculty mentor who oversees the project. An ad hoc committee evaluates the final product and recommends a grade accordingly.

SUST 499. Sustainability Independent Capstone Project as Research or Creative Expression. (1-3)

Apply lessons from the sustainability minor in the context of the major discipline or other arena, supported by a mentor and a review committee. Students select thesis research (section 1) or multimedia expression (section 2) option. Prerequisites: SUST 434.

4.0 PROCEDURES FOR SUST 499

The capstone is the culminating project of the minor in Sustainability Studies. Each student works on a project of his/her interest that integrates knowledge from core courses and electives. Students demonstrate their understanding of sustainability core concepts by showcasing an integration of the three pillars of sustainability (environmental protection, social equity, economic vitality).

With guidance from the SSP staff, the student selects a mentor with whom to conduct the project. An ad hoc review committee formed by the Director of the Sustainability Studies Program reviews the completed project, attends any relevant presentations or performances or visits installations, and recommends a grade to the Director (Figure 1).

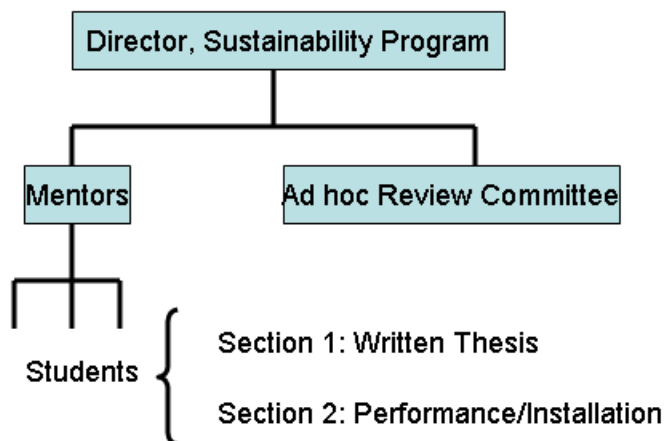


Figure 1. Organization of the capstone project process. Director constitutes an ad hoc review committee and solicits mentors to guide individual student projects.

Ideally there are three phases:

- 1) Planning and background research (typically 1 semester of 499 for 1 credit)
- 2) Implementation (typically 1 semester of 499 for 2 credits)
- 3) Evaluation by review committee

Students may take the course according to two schedules; plan A is preferred because it allows more time to mature ideas into a compelling project and to accommodate logistical issues:

- A) 1 credit for one semester (planning and background research), 2 credits for the second semester (implementation and evaluation)
- B) 3 credits in one semester (includes planning, background research, implementation, and evaluation)

Depending on the student's interest he/she can choose to take one of two sections of 499:

Section 1: Research

Sustainability research conducted in association with a faculty mentor and reviewed by an ad hoc committee. The topic of the written thesis can be integrated with a major degree.

Section 2: Expression

Creative exploration of sustainability conducted in association with a faculty mentor and reviewed by an ad hoc committee. Students present and share their explorations in a multimedia thesis format such as construction, the arts, media, or installations.

5.0 ROLE OF MENTORS

Students select mentors to guide them through the process of designing, implementing, and reporting the outcomes of an independent study project. As a capstone experience, the project should apply knowledge and skills from the sustainability curriculum to a topic in the student's major discipline. Alternatively, after consideration and discussion with the mentor, a student may elect to use SUST 499 to investigate a unique problem or a topic unrelated to their major, e.g., where the student plans to enter another discipline in graduate school.

In the first semester, the Mentor guides the student through topic selection, project design, and background research, culminating in a proposal for the second semester's work. Care should be taken to establish feasibility and cost effectiveness. Thought should be given to ultimate dispensation of the final product at meetings, in journals, or other media.

In the second semester, the Mentor monitors progress and helps keep the student on track for completing the project. The Mentor ensures that the final report or other form of

expression is **submitted to the Chair of the Review Committee three (3) weeks before the end of the semester.**

<u>Semester</u>	<u>Submission deadline</u>
Spring	Fourth Friday of April
Fall	Fourth Friday of November

6.0 ROLE OF REVIEW COMMITTEE

The Review Committee is constituted with tenure track faculty from participating departments, generally those that offer elective courses available to Sustainability Studies students. The Chair of the Review Committee receives final projects or is notified of student exhibitions. The Chair recruits two or three committee members to review each project. Reviewers write brief critiques and reach consensus regarding a recommended grade for the project. **The Chair reports recommended grades and conveys critiques to the Director of the Sustainability Studies Program by the beginning of finals week.**

7.0 ASSIGNMENT OF GRADES

The Director of the SSP conveys Review Committee results to the Mentors who report grades accordingly. Where differences of opinion arise, Mentors should consult with the Director to arrive at **a final grade by the end of finals week.**