

## MEMORANDUM

**TO:** Undergraduate Curriculum Committee  
**FROM:** Ron Kaufmann, Associate Dean  
**DATE:** November 24, 2015  
**RE:** Materials for Undergraduate Curriculum Committee Meeting 11/24/15  
Salomon Lecture Hall, 12:15-2:15 pm

### Agenda

- 1) Announcements
  - a. Encourage colleagues to review UCC materials well before UCC and Academic Assembly meetings.
  
- 2) New Business
  - a. Expedited Actions
    - i. ENGL 494 – Special Topics (pp. 2-4)
    - ii. LBST 100 – Foundations in Liberal Studies (pp. 5-7)
    - iii. SPAN 305 – Spanish for the Professions and Social Innovation (pp. 8-9)
  - b. Non-Expedited Actions
    - i. EOSC course and program changes (pp. 10-62)
  
- 3) New Business
  - a. ATF Reports
    - i. ATF Report Submission Letter (p. 63)
    - ii. Oral Communication (pp. 64-66)
    - iii. Writing (pp. 67-69)
    - iv. Diversity, Inclusion and Social Justice (pp. 70-74)
    - v. Quantitative Reasoning (pp. 75-77)
    - vi. Integration (pp. 78-80)
    - vii. Critical Thinking and Information Literacy (pp. 81-89)
    - viii. Historical Inquiry (pp. 90-94)
    - ix. Mathematical Reasoning and Problem Solving (pp. 95-98)
    - x. Philosophical Inquiry (pp. 99-102)
    - xi. Scientific and Technological Inquiry (pp. 103-105)
    - xii. Social and Behavioral Inquiry (pp. 106-109)
    - xiii. Theological and Religious Inquiry (p. 110)
  
- 4) Adjournment

Course Proposal (new or changes) Action Sheet

1. Today's Date 11/20/15

2. Course Action

Will the proposed action affect other majors/minors in any College/School?

- Yes (Non-expedited action items require Department Report Form)
- No (Double click on box to add check mark)

What type of curricular Action is being requested?

- Catalog description change (editorial only)
- Change in course #
- Change in course title (editorial only)
- Change in course pre-requisite(s)
- Deletion of course(s)
- Addition of new course
- Revision of existing course
- Revision of existing major/minor/concentration

Effective Term: (list preferred semester/year) Spring 16

3. Basic Information

a. Title of Course (30 characters maximum; appears on transcripts and schedules)

ENGL 494

b. Catalog Title (60 characters maximum; appears only in Catalog)

Special Topics

c. New Course Information

Department Code \_\_\_\_\_

Lecture Contact Hours \_\_\_\_\_

Credit Hours 1-3

Lab Contact Hours \_\_\_\_\_

Course Number \_\_\_\_\_

Other Contact Hours \_\_\_\_\_

d. Catalog Course Description (if new or changed)

e. Grading Mode(s) (check all that apply)

- Standard
- P/F Only
- Audit

**4. Course Format:** method of delivery (check all that apply)

- |   |   |
|---|---|
| <input type="checkbox"/> Lecture            | <input type="checkbox"/> Independent Study            |
| <input type="checkbox"/> Lab                | <input type="checkbox"/> Performance                  |
| <input type="checkbox"/> Lecture/Lab        | <input type="checkbox"/> Field Experience             |
| <input checked="" type="checkbox"/> Seminar | <input checked="" type="checkbox"/> Practicum         |
| <input type="checkbox"/> Recitation         | <input type="checkbox"/> Research/Thesis/Dissertation |
| <input type="checkbox"/> Internship         | <input type="checkbox"/> Community Service Learning   |

**5. Course Designation (check all that apply)**

- |   |   |
|---|---|
| <input type="checkbox"/> Core (include Core proposal form)        | <input type="checkbox"/> Diversity (include D course proposal form) |
| <input type="checkbox"/> Honors                                   |   |
| <input type="checkbox"/> Writing (include W course proposal form) | <input type="checkbox"/> Other _____                                |

**6. Faculty Course Workload**

- Same as course credit
- Same as weekly contact hours
- Percent of weekly contact hours (specify): \_\_\_\_\_
- Based on enrollment (specify): \_\_\_\_\_
- Team taught, full load
- No load
- Other: (specify) \_\_\_\_\_

**7. Course Details (circle Y/N)**

- Will this course be course cross-listed (Y/N)? If Y, with what course? \_\_\_\_\_
- Prerequisites? (Y/N)? If Y, list prerequisite courses \_\_\_\_\_
- Is this course linked with another course (e.g., lecture and lab)? (Y/N)?  
If Y, with what course? \_\_\_\_\_
- Will the linked course be deleted? Y(N)
- Core curriculum requirement met, if any (D, W): \_\_\_\_\_
- Has this course been approved as a D or W course already? (Y/N)
- Is this course a topics or repeatable course for credit? (Y/N)

**8. Department vote (# Yes/ # No/ # Abstentions) 9 / 0 / 4**

**Approvals (Curriculum Committee Use Only)**

- Department Vote; Date \_\_\_\_\_
- Department Chair; Date \_\_\_\_\_
- Core Curriculum Committee; Core Designation \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Dean; Date \_\_\_\_\_

## Department Report Form

### Re: Change to ENGL 494 Special Topics

#### 1. Rationale

We are petitioning to change ENGL 494 to be 1-3 Credit Hours. The purpose of this change is to open up some flexibility, so that the course can be used to cover new high impact initiatives in the English Department. Our creative writing program has just begun a student literary journal, *The Alcala Review*. We plan to offer a 1 unit course under Special Topics, in which the editorial board will enroll. This will allow those working on the journal to get 1 unit of credit, and for the faculty advisor to get a unit of teaching credit. This resembles what Communication Studies does with *The Vista*. We will also offer a 1 unit course under Special Topics to support *The Tudor Plays Project*. Students working on this digital humanities initiative, which is a combination of research, design, and publishing, will be able to get 1 unit of credit, as will the instructor.

The English Department is currently redesigning its major, and we plan on adding a practicum course to cover these and other high impact initiatives. We want to use 494 as a temporary solution until the new major is approved.

#### 2. Impact

- a. Discuss the likely effects on both department curriculum and curricula of other departments. – *There will be no significant effects, as our students already get 1 unit credit for other activities, such as tutoring in the Writing Center.*
- b. Will this change impact the requirements for a major or minor? If Y provide a summary of the changes. – *No impact.*
- c. Will this change have any staffing/budgetary impact? If yes, provide a brief explanation (include commentary on personnel, facilities, library holdings and academic computing) – *No impact.*
- d. Might this change have an impact on any other departments? If Y, what majors and/or minors might be affected by this change? – *No impact.*
- e. Will this change impact student enrollment numbers? If Y, in what courses and in what ways? – *No impact.*

3. **Syllabus** - If appropriate, attach a sample syllabus, which specifies learning objectives, possible assignments, evaluation and supplemental readings.



Dr. Margaret Daley  
Director, Liberal Studies Program  
Mother Rosalie Hill Hall, 149A  
5998 Alcalá Park  
San Diego, CA 92110-2492

November 11, 2015

MEMO:

To: Chair, Undergraduate Curriculum Committee

Re: Expedited Course Action Proposal – Change of course number

The Liberal Studies Advisory Council proposes to renumber the Foundations in Liberal Studies course LBST 200 to LBST 100. This change in course number maintains the course as lower division and does not affect any other majors or minors in any College/School. The rationale for this change is to clearly indicate that the course is introductory and functions as the foundational prerequisite course in the major.

Submitted:

Margaret Daley, Ph.D.  
Liberal Studies Program Director

**Course Proposal (new or changes) Action Sheet**

1. Today's Date \_\_November 11, 2015\_\_\_\_\_

**2. Course Action**

**Will the proposed action affect other majors/minors in any College/School?**

- Yes (Non-expedited action items require Department Report Form)
- No (Double click on box to add check mark)

**What type of curricular Action is being requested?**

- Catalog description change (editorial only)
- Change in course # **Change LBST 200 to LBST 100 – no other changes**
- Change in course title (editorial only)
- Change in course pre-requisite(s)
- Deletion of course(s)
- Addition of new course
- Revision of existing course
- Revision of existing major/minor/concentration

Effective Term: (list preferred semester/year) \_\_\_\_\_Fall 2016\_\_\_\_\_

**3. Basic Information**

a. Title of Course (**30 characters maximum**; appears on transcripts and schedules)

Foundations in Liberal Studies

b. Catalog Title (**60 characters maximum**; appears only in Catalog)

Foundations in Liberal Studies

c. New Course Information **None, renumber existing course.**

Department Code \_\_\_\_\_ Lecture Contact Hours \_\_\_\_\_

Credit Hours \_\_\_\_\_ Lab Contact Hours \_\_\_\_\_

Course Number \_\_\_\_\_ Other Contact Hours \_\_\_\_\_

d. Catalog Course Description (if new or changed)

**Unchanged.**

e. Grading Mode(s) (check all that apply)

- Standard
- P/F Only
- Audit

**4. Course Format:** method of delivery (check all that apply)

- |                                      |   |
|--------------------------------------|---|
| <input type="checkbox"/> Lecture     | <input type="checkbox"/> Independent Study            |
| <input type="checkbox"/> Lab         | <input type="checkbox"/> Performance                  |
| <input type="checkbox"/> Lecture/Lab | <input type="checkbox"/> Field Experience             |
| <input type="checkbox"/> Seminar     | <input type="checkbox"/> Practicum                    |
| <input type="checkbox"/> Recitation  | <input type="checkbox"/> Research/Thesis/Dissertation |
| <input type="checkbox"/> Internship  | <input type="checkbox"/> Community Service Learning   |

**5. Course Designation (check all that apply)**

- |   |   |
|---|---|
| <input type="checkbox"/> Core (include Core proposal form)        | <input type="checkbox"/> Diversity (include D course proposal form) |
| <input type="checkbox"/> Honors                                   |   |
| <input type="checkbox"/> Writing (include W course proposal form) | <input type="checkbox"/> Other _____                                |

**6. Faculty Course Workload**

- Same as course credit - **unchanged**
- Same as weekly contact hours
- Percent of weekly contact hours (specify): \_\_\_\_\_
- Based on enrollment (specify): \_\_\_\_\_
- Team taught, full load
- No load
- Other: (specify) \_\_\_\_\_

**7. Course Details (circle Y/N) - unchanged**

Will this course be course cross-listed (Y/N); If Y, with what course? \_\_\_\_\_

Prerequisites? (Y/N); If Y, list prerequisite courses \_\_\_\_\_

Is this course linked with another course (e.g., lecture and lab)? (Y/N)

If Y, with what course? \_\_\_\_\_

Will the linked course be deleted? Y/N

Core curriculum requirement met, if any (D, W): \_\_\_\_\_

Has this course been approved as a D or W course already? (Y/N)

Is this course a topics or repeatable course for credit? (Y/N)

**8. Department vote (# Yes/ # No/ # Abstentions) 10 / 0 / 0**

Liberal Studies Advisory Council: Nov. 2, 2015

**Approvals (Curriculum Committee Use Only)**

- Department Vote; Date \_\_\_\_\_
- Department Chair; Date \_\_\_\_\_
- Core Curriculum Committee; Core Designation \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Dean; Date \_\_\_\_\_

## Course Proposal (new or changes) Action Sheet

1. **Today's Date**    October 27, 2015

2. **Course Action** – Name change of SPAN 305

**Will the proposed action affect other majors/minors in any College/School?**

- Yes (Non-expedited action items require Department Report Form)  
 No (Double click on box to add check mark)

**What type of curricular Action is being requested?**

- Catalog description change (editorial only)  
 Change in course #  
 Change in course title (editorial only)  
 Change in course pre-requisite(s)  
 Deletion of course(s)  
 Addition of new course  
 Revision of existing course  
 Revision of existing major/minor/concentration

Effective Term: (list preferred semester/year)    Spring 2016

### 3. Basic Information

a. Title of Course (**30 characters maximum**; appears on transcripts and schedules)  
Span for Professions/Social Innov

b. Catalog Title (**60 characters maximum**; appears only in Catalog)  
Spanish for the Professions and Social Innovation

c. New Course Information (No changes here)

Department Code    SPAN

Credit Hours    3

Course Number    305

Lecture Contact Hours    3

Lab Contact Hours    \_\_\_\_\_

Other Contact Hours    \_\_\_\_\_

d. Catalog Course Description (if new or changed)

Project-based course in which students learn basic vocabulary in Spanish from different professions based on their own career paths. Students develop their intercultural competence and communicative proficiency through the study of cultural texts from the Spanish-speaking world with a focus on social innovation. Prerequisite: SPAN 202 or 212, or equivalent.

e. Grading Mode(s) (check all that apply)

- Standard  
 P/F Only  
 Audit



**4. Course Format:** method of delivery (check all that apply)

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Lecture | <input type="checkbox"/> Independent Study            |
| <input type="checkbox"/> Lab                | <input type="checkbox"/> Performance                  |
| <input type="checkbox"/> Lecture/Lab        | <input type="checkbox"/> Field Experience             |
| <input type="checkbox"/> Seminar            | <input type="checkbox"/> Practicum                    |
| <input type="checkbox"/> Recitation         | <input type="checkbox"/> Research/Thesis/Dissertation |
| <input type="checkbox"/> Internship         | <input type="checkbox"/> Community Service Learning   |

**5. Course Designation (check all that apply)**

- |  |   |
|--|---|
| <input type="checkbox"/> Core (include Core proposal form)<br>Honors | <input type="checkbox"/> Diversity (include D course proposal form) |
| <input type="checkbox"/> Writing (include W course proposal form)    | <input type="checkbox"/> Other _____                                |

**6. Faculty Course Workload**

- Same as course credit
- Same as weekly contact hours
- Percent of weekly contact hours (specify): \_\_\_\_\_
- Based on enrollment (specify): \_\_\_\_\_
- Team taught, full load
- No load
- Other: (specify) \_\_\_\_\_

**7. Course Details (circle Y/N)**

Will this course be course cross-listed (Y/N); If Y, with what course? No

Prerequisites? (Y/N); If Y, list prerequisite courses

Yes: SPAN 202 or 212 or placement in upper-division

Is this course linked with another course (e.g., lecture and lab)? (Y/N) No

If Y, with what course? \_\_\_\_\_

Will the linked course be deleted? Y/N N/A

Core curriculum requirement met, if any (D, W): N/A

Has this course been approved as a D or W course already? (Y/N) N/A

Is this course a topics or repeatable course for credit? (Y/N) No

**8. Department vote (# Yes/ # No/ # Abstentions) 13 / 0 / 2**

**Approvals (Curriculum Committee Use Only)**

- Department Vote; Date \_\_\_\_\_
- Department Chair; Date \_\_\_\_\_
- Core Curriculum Committee; Core Designation \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Dean; Date \_\_\_\_\_



Environmental and Ocean  
Sciences

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## MEMORANDUM

**To:** Undergraduate Curriculum Committee (UCC) of the College of Arts and Sciences  
**From:** Michel Boudrias, EOS Department Chair  
**Date:** 11/16/15  
**Re:** Revision to Existing Majors

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The Environmental and Ocean Sciences (EOS) department has revised our existing majors. Documentation for this revision can be found in this packet and includes:

- Department report form (rationale for revision, justification)
- Proposed courses and outline of study (for course catalog)
- UCC documentation (course proposal action sheet, department report form, and sample syllabi) for four new courses:
  - EOSC 123 Organisms and Ecosystems
    - Additional documentation showing Core Curriculum approval for a life science with lab
  - EOSC 222 Environmental Data Analysis
  - EOSC 301W Research Applications in Environmental and Ocean Sciences
    - Additional documentation showing Core Curriculum approval for a writing course
  - EOSC 433 Plankton Ecology

As a courtesy, we are also attaching a complete list of EOSC course numbers and titles previously approved by the UCC, and an additional informational change detailing the change in course number or title of four existing courses.

The EOS department voted 9-0-0 (Y-N-abstentions) on 11/16/15 in support of our revised majors and minors.

## 1. Rationale

The Department went through Academic Program Review (APR) during 2012-13. The external APR reviewers made the following suggestions to the undergraduate programs:

1. A more cohesive integration of the ENVI and MARS programs for better utilization of resources.
2. A single major with a common core and separate tracks in marine systems, earth systems, and environmental policy.

Since that time the department has changed its name to reflect greater cohesion across our disciplines, we have had several retreats to analyze various models for new majors or a streamlined major with pathways, and we have had two hires that have allowed us to propose a major realignment of our majors and minors. The faculty carefully evaluated the options and our own assessment results, and decided to consolidate the academic programs we have been offering. We have chosen to integrate the existing 2 majors, Marine Science with 2 pathways (Biology and Earth Systems) and Environmental Studies and 2 minors (Marine Science and Environmental Studies) into a single major, **Environmental and Ocean Sciences**, with common lower-division prep courses and an upper-division core, distinct upper division pathways and two simplified minors. This means that all students going through the program will have the same preparation, but the program still keeps the distinction at the upper-division level, especially for the very successful Environmental Studies program (now a pathway with a stronger Policy emphasis). We have also reduced the total number of units (a complex task for any interdisciplinary major) and increased the flexibility of the upper division by providing more options and more selections.

We believe that the new Marine Ecology Pathway reflects the strength of the existing faculty, and the required Biology minor provides those students with the proper depth in biology to pursue career opportunities as well as graduate school. The Environmental Science Pathway, modified from the existing Earth Systems Pathway, will be better aligned with other similar programs in the nation, benefits from one of our new hires, and will offer our students the training they need for their academic/professional growth in the environmental fields. The Environmental Studies Pathway strengthens the science background, a response based on the outcomes of assessment for the past 10 years, streamlines the preparation in the first three years of the major (improving the efficient use of our faculty, staff and logistic resources), and provides more policy options at the upper division as a result of a stronger collaboration with POLS/IR and their new faculty member dedicated to teaching environmental policy courses regularly. These additions make it possible to transition from the existing curriculum to the proposed program. Finally the two minors are much simpler to complete, connect directly to our revised preparation and upper division core courses, and allow for either a science-focused or a more policy-focused path.

## 2. Impact

- a. This major realignment of our existing majors into a more streamlined major with pathways improves the efficiency of resource utilization in our department, allows for more opportunities for faculty to teach new courses, and provides more flexibility for students to choose upper division electives. There should be no impact on the curricula of other majors.
- b. There are some changes to the requirements of the major, with a reduction of second semester physics, the addition of EOSC 220 for all our majors (change for the Environmental Science and

Studies), the addition of EOSC 222 as a data analysis course for all majors (change in the science pathways), and the requirement of a Biology minor for the Marine Ecology pathway.

Changes in the minor are more substantial but significantly reduce the complexity. The EOS science minor now has three clear lower division preparatory courses, one gateway course and an open choice elective. The EOS studies and policy minor now has more choices for upper division electives, it's completely open compared to restricted choices.

- c. No expected budgetary impacts at this time.
- d. We expect an increase in the number of Biology minors now that all our Marine Ecology majors must complete this minor. It is not expected to have a significant impact, however, because the previous iteration of the major required all the preparatory courses already. We do not expect any major impact on the other sciences that are part of our preparatory core. There will be a reduction in the number of students taking statistics or research methods courses outside our department, but those students were dispersed across several departments (ECON, MATH, POLS, PSYC).
- e. This revision should not cause any major changes in enrollment. Many of the changes we have done are in response to our self-study, our external review and our analysis of student assessment data which support the changes.

**ENVIRONMENTAL AND OCEAN SCIENCES MAJOR**  
**with 3 pathways**  
**Courses common to the major are highlighted in blue**

**MARINE ECOLOGY PATHWAY**

**Prep for the Major (35 units)**

- (4) EOSC 123 – Organisms and Ecosystems
- (4) EOSC 110 – Introduction to Geosciences OR EOSC 104/104L Natural Disasters
- (4) EOSC 220 – Introduction to Atmospheric and Ocean Sciences
- (3) EOSC 222 – Environmental Data Analysis
- (4) CHEM 151/151L – General Chemistry with Lab
- (4) CHEM 152/152L – General Chemistry with Lab
- (4) MATH 150 – Calculus I
- (4) PHYS 136/136L – General Physics I with Lab
- (4) CHEM 301/301L – Organic Chemistry I with Lab

Additional recommended courses for students going to graduate school include:  
MATH 151, PHYS 137/137L, and CHEM 302/302L

**Upper Division Core (10 units)**

- (3) EOSC 300 – Environmental Issues
- (4) EOSC 301W – Research Applications in Environmental and Ocean Sciences

Capstone (3 units)

- (2) EOSC 496 or 498 or 499 – Research, Internship, or Independent Study
- (1) EOSC 495 – Senior Seminar

**Upper Division Electives (14-16 units)**

**Choose 4 courses: one from the geo/physical group and the other three from the biological group, with at least one ecology course. At least two of the four courses must include labs.**

Biological courses:

- (4) EOSC 431 – Human Impacts on the Coastal Environment\*
- (4) EOSC 432 – Marine Community Ecology\*
- (4) EOSC 433 – Plankton Ecology\*
- (4) EOSC 451 – Biological Oceanography\*
- (4) EOSC 462 – Biology of Fishes
- (3) EOSC 465 – Marine Mammals
- (4) BIOL 350 – Invertebrate Zoology

\* ecology courses

Geo/physical courses:

- (4) EOSC 450 – Geological Oceanography
- (4) EOSC 452 – Marine Geochemistry
- (4) EOSC 473 – Climatology

Or approved study abroad courses

**A Biology minor is required for the Marine Ecology pathway (18 units):**

- (3) BIOL 190 – Introduction to Evolution
- (4) BIOL 221/221L – Introduction to Organismal Diversity with Lab
- (4) BIOL 225/225L – Introduction to Cell Processes with Lab
- (3) BIOL 300 – Genetics
- (4) One upper-division biology course with Lab

**UPPER DIVISION UNITS FOR MARINE ECOLOGY PATHWAY – 24-26 units**  
**TOTAL UNITS FOR MARINE ECOLOGY PATHWAY – 59-61 units from EOSC major + an additional 18 units for Biology Minor**

<b>Recommended Program of Study for Marine Ecology Pathway</b>			
Freshman Year	Sophomore Year	Junior Year	Senior Year
<i>Semester I:</i> EOSC 123 (4) or EOSC 110 / EOSC 104 + L (4) CHEM 151/151L (4) MATH 150 (4) CC or Electives (3-6)	<i>Semester I:</i> EOSC 220 (4) or EOSC 222 (3) CHEM 301/301L (4) BIOL 221/221L (4) CC or Electives (3-6)	<i>Semester I:</i> EOSC 300 (3) EOSC 301W (4) BIOL 300 (3) EOSC 496, 498, or 499 (1) CC or Electives (3-6)	<i>Semester I:</i> Pathway elect. (3-4) Upper-div. Biology Course (4) EOSC 495 (1) CC or Electives (6-9)
<i>Semester II:</i> EOSC 110 / EOSC 104 + L (4) or EOSC 123 (4) CHEM 152/152L (4) BIOL 190 (3) CC or Electives (3-6)	<i>Semester II:</i> EOSC 222 (4) or EOSC 220 (3) PHYS 136/136L (4) BIOL 225/225L (4) CC or Electives (3-6)	<i>Semester II:</i> Pathway elect. (7-8) EOSC 496, 498, or 499 (1) CC or Electives (6-9)	<i>Semester II:</i> Pathway elect. (3-4) CC or Electives (6-9)

## ENVIRONMENTAL SCIENCE PATHWAY

### Prep for the Major (31 units)

- (4) EOSC 123 – Organisms and Ecosystems
- (4) EOSC 110 – Introduction to Geosciences OR EOSC 104/104L Natural Disasters
- (4) EOSC 220 – Introduction to Atmospheric and Ocean Sciences
- (3) EOSC 222 – Environmental Data Analysis
- (4) CHEM 151/151L – General Chemistry with Lab
- (4) CHEM 152/152L – General Chemistry with Lab
- (4) MATH 150 – Calculus I
- (4) PHYS 136/136L – General Physics I with Lab

Additional recommended courses for students going to graduate school include:  
MATH 151, PHYS 137/137L, CHEM 301/301 L, and CHEM 302/302L

### Upper Division Core (14 units)

- (3) EOSC 300 – Environmental Issues
- (4) EOSC 301W – Research Applications in Environmental and Ocean Sciences
- (4) EOSC 314 – Introduction to Maps and Spatial Data Analysis

### Capstone (3 units)

- (2) EOSC 496 or 498 or 499 – Research, Internship, or Independent Study
- (1) EOSC 495 – Senior Seminar

### Upper Division Electives (11-12 units)

**Choose 3 courses: one from the ecology group and the other two from the geo/physical group. At least two of the three courses must include labs.**

#### Geo/physical courses:

- (4) EOSC 415 – Geographic Information Systems
- (4) EOSC 420 – Introduction to Remote Sensing
- (4) EOSC 450 – Geological Oceanography
- (4) EOSC 452 – Marine Geochemistry
- (4) EOSC 473 – Climatology
- (3) EOSC 474 – History of the Earth and Climate, with the option of taking EOSC 474L (1) concurrently
- (4) EOSC 485 – Environmental Geology
- (4) EOSC 487 – Surface Water Hydrology

#### Ecological courses:

- (4) EOSC 431 – Human Impacts on the Coastal Environment\*
  - (4) EOSC 432 – Marine Community Ecology\*
  - (4) EOSC 433 – Plankton Ecology\*
  - (4) EOSC 451 – Biological Oceanography\*
- Or approved study abroad courses

**UPPER DIVISION UNITS FOR ENVIRONMENTAL SCIENCE PATHWAY – 25-26 units**  
**TOTAL UNITS FOR ENVIRONMENTAL SCIENCE PATHWAY – 56-57 units**

<b>Recommended Program of Study for Environmental Science Pathway</b>			
Freshman Year	Sophomore Year	Junior Year	Senior Year
<i>Semester I:</i> EOSC 123 (4) or EOSC 110 / EOSC 104 + L (4) CHEM 151/151L (4) CC or Electives (4-9)	<i>Semester I:</i> EOSC 220 (4) or EOSC 222 (3) PHYS 136/136L (4) CC or Electives (4-9)	<i>Semester I:</i> EOSC 300 (3) EOSC 301W (4) EOSC 496, 498, or 499 (1) CC or Electives (4-9)	<i>Semester I:</i> Pathway elect. (3-4) EOSC 495 (1) CC or Electives (7+)
<i>Semester II:</i> EOSC 110 / EOSC 104 + L (4) or EOSC 123 (4) CHEM 152/152L (4) MATH 150 (4) CC or Electives (3-6)	<i>Semester II:</i> EOSC 222 (4) or EOSC 220 (3) CC or Electives (8+)	<i>Semester II:</i> EOSC 314 (4) Pathway elect. (3-4) EOSC 496, 498, or 499 (1) CC or Electives (6-9)	<i>Semester II:</i> Pathway elect. (3-4) CC or Electives (8+)



## **ENVIRONMENTAL STUDIES PATHWAY**

### **Lower Division Prep for the Major (31 units)**

- (4) EOSC 123 – Organisms and Ecosystems\*\*
- (4) EOSC 110 – Introduction to Geosciences OR EOSC 104/104L Natural Disasters\*\*
- (4) EOSC 220 – Introduction to Atmospheric and Ocean Sciences
- (3) EOSC 222 – Environmental Data Analysis
- (4) CHEM 151/151L – General Chemistry with Lab
- (3) ECON 101 – Principles of Microeconomics\*\*
- (3) ECON 102 – Principles of Macroeconomics
- (3) POLS 120 or 170 – American Politics or International Relations\*\*
- (3) MATH 115 – College Algebra\*\*

### **Upper Division Core (20 units)**

- (3) EOSC 300 – Environmental Issues
- (4) EOSC 301W – Research Applications in Environmental and Ocean Sciences
- (3) EOSC 305 – Environmental Assessment Practices
- (4) EOSC 314 – Introduction to Maps and Spatial Data Analysis
- (3) PHIL 338 or 344 – Environmental Ethics or Environmental Justice\*\*

### Capstone (3 units)

- (2) EOSC 496 or 498 or 499 – Research, Internship, or Independent Study
- (1) EOSC 495 – Senior Seminar

### **Upper Division Electives (10-11 units)**

**Choose 3 courses: one science with lab, one non-science, and one from either list**

#### Science courses:

- (3) EOSC 355 – Environmental Chemistry
- (4) EOSC 415 – Geographic Information Systems
- (4) EOSC 420 – Introduction to Remote Sensing
- (4) EOSC 431 – Human Impacts on the Coastal Environment
- (4) EOSC 432 – Marine Community Ecology
- (4) EOSC 433 – Plankton Ecology
- (4) EOSC 451 – Biological Oceanography
- (4) EOSC 450 – Geological Oceanography
- (4) EOSC 452 – Marine Geochemistry
- (4) EOSC 462 – Biology of Fishes
- (3) EOSC 465 – Marine Mammals
- (4) EOSC 473 – Climatology
- (3) EOSC 474 – History of the Earth and Climate, with the option of taking EOSC 474L (1) concurrently
- (4) EOSC 485 – Environmental Geology
- (4) EOSC 487 – Surface Water Hydrology

Non-science courses:

(3) ECON 308 – Environmental and Natural Resource Economics

(3) HIST 370 – American Environmental History

(3) POLS 329 – Law of the Sea

(3) POLS 349 – Politics and the Environment

(3) SOCI 315 – Health and Society

(3) SOCI 471W – Environmental Inequality and Justice

Other upper-division courses by approval in ECON, ETHN, HIST, PHIL, POLS, SOCI, and THRS

and approved study abroad courses

**UPPER DIVISION UNITS FOR ENVIRONMENTAL STUDIES – 30-31 units**

**TOTAL UNITS FOR ENVIRONMENTAL STUDIES – 61-62 units**

**\*\* courses that also count for the core**

**NUMBER OF UNITS THAT ALSO COUNT FOR CORE – as many as 19 units, D, W**

**Recommended Program of Study for Environmental Studies Pathway**

Freshman Year	Sophomore Year	Junior Year	Senior Year
<i>Semester I:</i> EOSC 123 (4) or EOSC 110 / EOSC 104 + L (4) MATH 115 (3) ECON 101 (3) CC or Electives (3-6)	<i>Semester I:</i> EOSC 220 (4) or EOSC 222 (3) POLS 120 or 170 (3) CC or Electives (6-9)	<i>Semester I:</i> EOSC 300 (3) EOSC 301W (4) EOSC 496, 498, or 499 (1) CC or Electives (4-9)	<i>Semester I:</i> EOSC 305 (4) Pathway elect. (3-4) EOSC 495 (1) CC or Electives (6-9)
<i>Semester II:</i> EOSC 110 / EOSC 104 + L (4) or EOSC 123 (4) CHEM 151/151L (4) ECON 102 (3) CC or Electives (3-6)	<i>Semester II:</i> EOSC 222 (4) or EOSC 220 (3) CC or Electives (8+)	<i>Semester II:</i> EOSC 314 (4) PHIL 338 or 344 (3) EOSC 496, 498, or 499 (1) CC or Electives (6-9)	<i>Semester II:</i> Pathway elect. (6-7) CC or Electives (6-9)

**ENVIRONMENTAL AND OCEAN SCIENCES MINOR (18-19 units)**

- (4) EOSC 123 – Organisms and Ecosystems
- (4) EOSC 110 – Introduction to Geosciences OR EOSC 104/104L Natural Disasters
- (4) EOSC 220 – Introduction to Atmospheric and Ocean Sciences
- (3) EOSC 300 – Environmental Issues

and one upper-division course (3-4 units) from the following list:

Science courses:

- (4) EOSC 314 – Introduction to Maps and Spatial Data Analysis
- (3) EOSC 355 – Environmental Chemistry
- (4) EOSC 415 – Geographic Information Systems
- (4) EOSC 420 – Introduction to Remote Sensing
- (4) EOSC 431 – Human Impacts on the Coastal Environment
- (4) EOSC 432 – Marine Community Ecology
- (4) EOSC 433 – Plankton Ecology
- (4) EOSC 451 – Biological Oceanography
- (4) EOSC 450 – Geological Oceanography
- (4) EOSC 452 – Marine Geochemistry
- (4) EOSC 462 – Biology of Fishes
- (3) EOSC 465 – Marine Mammals
- (4) EOSC 473 – Climatology
- (3) EOSC 474 – History of the Earth and Climate, with the option of taking EOSC 474L (1) concurrently
- (4) EOSC 485 – Environmental Geology
- (4) EOSC 487 – Surface Water Hydrology

## **ENVIRONMENTAL STUDIES AND POLICY MINOR (20-21 units)^**

(4) EOSC 123 – Organisms and Ecosystems

(4) EOSC 110 – Introduction to Geosciences OR EOSC 104/104L Natural Disasters

(3) EOSC 300 – Environmental Issues

and three upper-division courses (9-10 units) from the following lists. At least two must be non-science courses.

^Note: Environmental and Ocean Sciences Majors (Marine Ecology and Environmental Science pathways only) can minor in Environmental Studies and Policy, and should take EOSC 305 in place of EOSC 300 within the minor.

### Science courses:

(4) EOSC 314 – Introduction to Maps and Spatial Data Analysis

(3) EOSC 355 – Environmental Chemistry

(4) EOSC 415 – Geographic Information Systems

(4) EOSC 420 – Introduction to Remote Sensing

(4) EOSC 431 – Human Impacts on the Coastal Environment

(4) EOSC 432 – Marine Community Ecology

(4) EOSC 433 – Plankton Ecology

(4) EOSC 451 – Biological Oceanography

(4) EOSC 450 – Geological Oceanography

(4) EOSC 452 – Marine Geochemistry

(4) EOSC 462 – Biology of Fishes

(3) EOSC 465 – Marine Mammals

(4) EOSC 473 – Climatology

(3) EOSC 474 – History of the Earth and Climate, with the option of taking EOSC 474L (1) concurrently

(4) EOSC 485 – Environmental Geology

(4) EOSC 487 – Surface Water Hydrology

### Non-science courses:

(3) ECON 308 – Environmental and Natural Resource Economics

(3) EOSC 305 – Environmental Assessment Practices

(3) HIST 370 – American Environmental History

(3) PHIL 338 – Environmental Ethics

(3) PHIL 344 – Environmental Justice

(3) POLS 329 – Law of the Sea

(3) POLS 349 – Politics and the Environment

(3) SOCI 315 – Health and Society

(3) SOCI 471W – Environmental Inequality and Justice

Other upper-division courses by approval in ECON, ETHN, HIST, PHIL, POLS, SOCI, and THRS and approved study abroad courses

## Course Proposal (new or changes) Action Sheet

1. Today's Date \_\_November 4, 2015\_\_

### 2. Course Action

Will the proposed action affect other majors/minors in any College/School?

- Yes  
 No

What type of curricular Action is being requested?

- Bulletin description change (editorial only)  
 Change in course #  
 Change in course title (editorial only)  
 Change in course pre-requisite(s)  
 Deletion of course(s)  
 Addition of new course  
 Revision of existing course  
 Revision of existing major/minor/concentration

Effective Term: (list preferred semester/year) \_\_Fall 2016\_\_

### 3. Basic Information

a. Title of Course (30 characters maximum; appears on transcripts and schedules)  
Organisms and Ecosystems

b. Bulletin Title (60 characters maximum; appears only in Bulletin)  
Organisms and Ecosystems

c. New Course Information

Department Code \_EOSC\_  
Credit Hours \_4\_  
Course Number \_123\_

Lecture Contact Hours \_3\_  
Lab Contact Hours \_3\_  
Other Contact Hours \_\_NA\_\_

d. Bulletin Course Description (if new or changed)

An introduction to organisms and environmental biology from an ecological perspective. Students will learn about fundamental principles of ecology, in addition to major groups of organisms and how the two are related. This is a required course for all Environmental and Ocean Sciences majors. This course satisfies the core curriculum requirement for a life science with laboratory. Three hours of lecture and one laboratory per week.

e. Grading Mode(s) (check all that apply)

- Standard  
 P/F  
 Audit

**4. Course Format:** method of delivery (check all that apply)

- |   |   |
|---|---|
| <input type="checkbox"/> Lecture                | <input type="checkbox"/> Independent Study            |
| <input type="checkbox"/> Lab                    | <input type="checkbox"/> Performance                  |
| <input checked="" type="checkbox"/> Lecture/Lab | <input type="checkbox"/> Field Experience             |
| <input type="checkbox"/> Seminar                | <input type="checkbox"/> Practicum                    |
| <input type="checkbox"/> Recitation             | <input type="checkbox"/> Research/Thesis/Dissertation |
| <input type="checkbox"/> Internship             | <input type="checkbox"/> Community Service Learning   |

**5. Course Designation (check all that apply)**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Core (include Core proposal form) | <input type="checkbox"/> Diversity (include D course proposal form) |
| <input type="checkbox"/> Honors                                       | <input type="checkbox"/> Other _____                                |
| <input type="checkbox"/> Writing (include W course proposal form)     |   |

Was approved by the Core Curriculum Committee at their October meeting for a life science with laboratory course.

**6. Faculty Course Workload**

- Same as course credit
- Same as weekly contact hours
- Percent of weekly contact hours (specify): \_\_\_\_\_
- Based on enrollment (specify): \_\_\_\_\_
- Team taught, full load
- No load
- Other: (specify) \_Faculty course workload equal to 3 units for the lecture and 2 units for the lab section

**7. Course Details (circle Y/N)**

Will this course be course cross-listed (Y/N); If Y, with what course? \_N\_\_\_\_\_

Prerequisites? (Y/N) if Y, list prerequisite courses \_N:\_\_\_\_\_

Is this course linked with another course (e.g., lecture and lab)? (Y/N) If Y, with what course? \_N\_\_\_\_\_ ; Will the linked course be deleted? Y/N

Core curriculum requirement met, if any (D, W): \_N\_\_\_\_\_ ; Has this course been approved as a D or W course already? (Y/N)

Is this course a topics or repeatable course for credit? N

**8. Department vote (# Yes, # No, # Abstentions) \_8 Yes, 0 No, 0 Abstentions\_(11/13/2015)\_**

**Approvals (Curriculum Committee Use Only)**

- Department Vote; Date \_\_\_\_\_
- Department Chair; Date \_\_\_\_\_
- Core Curriculum Committee; Core Designation \_\_\_\_\_ Date \_\_\_\_\_
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Dean; Date \_\_\_\_\_

## Department Report Form

**\*adjust the space needed for each section on this word document as necessary**

### 1. Rationale

The Department of Environmental and Ocean Sciences is currently revising our major(s) to provide for more integration among our courses and to streamline the lower-level prep courses. The new proposed course, EOSC 123 – Organisms and Ecosystems, will serve as a new lower-level prep course for all Environmental and Ocean Sciences majors. This new course will include an introduction to basic ecological principles in addition to organisms in major taxonomic groups. Lastly, students will connect adaptations of organisms to various habitats and ecosystems that they live in. The concepts in this course will provide an essential foundation for upper-level courses in the major.

### 2. Impact

- a. Discuss the likely effects on both department curriculum and curricula of other departments.

Since this course will only be a required course for Environmental and Ocean Sciences majors, it is unlikely to affect other departments.

- b. Will this change impact the requirements for a major or minor? If Y provide a summary of the changes.

Yes. It will be a required lower-level course for all majors in Environmental and Ocean Sciences.

- c. Will this change have any staffing/budgetary impact? If yes, provide a brief explanation (include commentary on personnel, facilities, library holdings and academic computing)

No, since it replaces a course (ENVI 121) that previously served a similar role, it should not have major effects on staffing or budgetary needs.

- d. Might this change have an impact on any other departments? If Y, what majors and/or minors might be affected by this change?

No.

- e. Will this change impact student enrollment numbers? If Y, in what courses and in what ways?

### 3. Syllabus - Attach a sample syllabus, which specifies learning objectives, possible assignments, evaluation and supplemental readings.

Sample syllabus attached on following pages.

## **EOSC 123: Organisms and Ecosystems**

Fall 2016

M W F: xx - xx

SCST xxx

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Instructor: Dr. xxxx

Office: SCST xxx

Email: xxxx

Phone: 619-260-xxxx

Office Hours: xxxxxx

and by appointment

---

Lab: xx - xx in SCST xxx

Lab Instructor: xxx

Lab exercises to be **downloaded and printed**, prior to lab, from the course website on Blackboard: <http://ole.sandiego.edu>

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### Texts for the course:

The primary (and required) textbook for this course will be:

*Environmental Biology* by Mike Calver, Alan Lymbery, Jen McComb, and Mike Bamford

Other supplementary texts will be assigned and posted on the course website on

Blackboard: <http://ole.sandiego.edu>

Course Description: An introduction to organisms and environmental biology from an ecological perspective. Students will learn about fundamental principles of ecology, in addition to major groups of organisms and how the two are related. This is a required course for all Environmental and Ocean Sciences majors. This course satisfies the core curriculum requirement for a life science with laboratory. Three hours of lecture and one laboratory per week.



Learning Outcomes:

By the end of the course, students will be able to:

1. Explain the basic principles of ecology
2. Identify and describe organisms in major taxonomic groups, and understand how their adaptations relate to their natural history and ecology
3. Describe major terrestrial and aquatic habitats in terms of their physical and biological components
4. Employ the scientific method, including formulation of hypotheses, and the use of varied approaches (experimental and observational) for testing hypotheses related to the concepts in the course

Expectations: This class will introduce you to the basic principles of ecology and organismal biology. In addition to learning concepts, definitions, and names of organisms, students are expected to be able to apply these concepts to different ecosystems and learn how these concepts are interrelated.

Students are expected to regularly attend class, be on time and ready to learn, and complete the reading assignments prior to each class (See participation rubric for full details).

Grading: Your final course grade will be out of 750 points, and will be the sum of your lecture grade (500 points) and your lab grade (250 points). The lecture grade will be determined by 3 midterm exams, a final exam, participation, and assignments and in-class activities. Your lab grade will be determined by lab exams, lab reports and assignments, and pre-lab worksheets. The breakdown of points for the lecture part of your grade is shown below.

**Note that you must pass both the lecture and lab to pass this course.**

Lecture Grade:

Midterm Exams (3 @ 100 points each) (LO #1, #2, and #3)	300 points
Final Exam (LO #1, #2, and #3)	150 points
Assignments and In-class Activities (LO #1, #2, and #3)	25 points
Participation	25 points
<b>Lecture Total</b>	<b>500 points</b>

Lab Grade (see lab syllabus for more details):

Pre-Lab Worksheets	25 points
Lab Reports and Assignments (LO #1, #2 and #4)	120 points
Lab Quizzes (LO #2 and #4): 4 worth 20 points each	80 points
Lab Presentation (LO #2 and #4): 4 worth 20 points each	25 points
<b>Lab Total</b>	<b>250 points</b>

**Course total: 750 points**

Tentative Course Schedule:

Below are tentative dates for the midterm exams and final exam. A tentative schedule of topics covered is also shown (note that the schedule is tentative and subject to change).

Midterm Exam 1	Week 5 (Biology and Ecology Fundamentals)
Midterm Exam 2	Week 9 (Organisms)
Midterm Exam 3	Week 13 (Ecosystems and Organism Adaptations)
Final Exam	Week 15 (Comprehensive)

	<b>Topics Covered</b>	<b>Reading from Textbook</b>
<b>Week 1</b>	Intro to Environmental Biology and the Scientific Method	Selections from Ch. 1 and Ch. 2
<b>Week 2</b>	Building Blocks of Biology, Population Ecology	Selections from Ch. 3 and Ch. 16
<b>Week 3</b>	Community Ecology and Basics of Evolution/Natural Selection	Ch. 17 and selections from Ch. 6
<b>Week 4</b>	Energy flow in the environment; Viruses and Bacteria	Ch. 4 and Ch. 9
<b>Week 5</b>	Phytoplankton and Other Protists, Land Plants	Ch. 10, Ch. 11 and Ch. 12
<b>Week 6</b>	Intro to Phylogeny and Invertebrates	Ch. 8 and Ch. 14
<b>Week 7</b>	Invertebrates (continued)	Ch. 14
<b>Week 8</b>	Invertebrates (continued) and Introduction to Chordates	Ch. 14 and Ch. 15
<b>Week 9</b>	Chordates (continued)	Ch. 15
<b>Week 10</b>	Chordates (continued); Organism wrap-up and activity	Ch. 15
<b>Week 11</b>	Terrestrial Ecosystems	Selections from Ch. 22 and Ch. 23
<b>Week 12</b>	Freshwater Ecosystems	Selections from Ch. 20 and Ch. 21
<b>Week 13</b>	Marine Ecosystems	Selections from Ch. 18 and Ch. 19
<b>Week 14</b>	Cross-Ecosystem Interactions	

Exams: The midterm exams will be given in class and will cover all material up until that point. Rescheduling the midterm is only possible with advance notice and special circumstances (which does not include travel plans). If there is an emergency situation, please contact me right away so we can make arrangements. The final exam will cover material from the entire course and will be given on xxx in our normal classroom. Under no circumstances will the final be given at another time unless you have obtained prior permission for special circumstances only. Exams are taken individually and are closed book.

Academic Integrity: It is expected that each student in this class conduct him or herself within the guidelines of the USD Honor Code (<http://www.sandiego.edu/documents/conduct/HonorCode.pdf>). All academic work should be done with the high level of honesty and integrity that this university demands. Guidelines for working with other students on specific assignments are described above, but if there is ever any confusion, please ask me.

Electronics: Electronic devices (e.g., cell phones, iPods, etc.) should be turned off and put away when class begins with the exceptions of laptops/tablets being used specifically for class activities.

Office Hours: Please do not hesitate to come to office hours if you are having any difficulty with the course material. If your schedule does not allow you to come to the set office hours, please email me to set up alternate times to meet.

Students with Disabilities: Any students who will require special attention should contact me as soon as possible to make the appropriate arrangements

## EOSC 123: Organisms and Ecosystems Laboratory Section

The objective of the laboratory section of EOSC 123 is to gain hands-on experience to solidify the ecological and organismal concepts from lecture. Lab activities will include experiments, field trips and data collections, and organismal labs in which students will observe and become familiar with features of organisms from different taxonomic groups and habitats. Students are expected to not only actively engage and participate in lab, but also think critically about the concepts and how they are integrated.

### Tentative Lab Schedule

	<b>Topics Covered in Lecture</b>	<b>Lab Activity</b>
<b>Week 1</b>	Intro to Environmental Biology and the Scientific Method	Lab Safety and Scientific Method Activity
<b>Week 2</b>	Building Blocks of Biology, Population Ecology	Feeding Frenzy: Community Ecology Lab
<b>Week 3</b>	Community Ecology and Basics of Evolution/Natural Selection	Ecology and Evolution Simulation Lab
<b>Week 4</b>	Energy flow in the environment; Viruses and Bacteria	Bacteria and Protists in a Local Aquatic Ecosystem
<b>Week 5</b>	Phytoplankton and Other Protists, Land Plants	Seaweed and Local Plants: Nature Walk on Campus
<b>Week 6</b>	Intro to Phylogeny and Invertebrates	Invertebrates I
<b>Week 7</b>	Invertebrates (continued)	Invertebrates II
<b>Week 8</b>	Invertebrates (continued) and Introduction to Chordates	Vertebrates I
<b>Week 9</b>	Chordates (continued)	Vertebrates II
<b>Week 10</b>	Organism wrap-up and activity	Visit to Museum of Natural History
<b>Week 11</b>	Terrestrial Ecosystems	Field Trip to Mission Gorge/Mission Trails
<b>Week 12</b>	Freshwater Ecosystems	Field Trip to Lake Miramar
<b>Week 13</b>	Marine Ecosystems	Field Trip to Rocky Intertidal
<b>Week 14</b>	Cross-Ecosystem Interactions	Presentations on Organism Adaptations

Lab Assignments and Reports: In lab section throughout the course, students will be regularly required to do short in-class assignments to go along with their lab activity/experiment for the day. For a few of the labs (two total throughout the course), students will be instead required to complete a longer 4-5 page written lab report due a week after the in-class activity. This lab report will be focused on the scientific method, asking students to explain the hypotheses, methods, and results of the experiment from lab. Lab assignments and reports will be worth a total of 120 points towards the course grade.

Lab Quizzes: To regularly assess student's understanding of concepts in lab, particularly on the organismal topics, students will be given a total of four short quizzes (worth 20 points each) throughout the course. These quizzes will be given during lab and take roughly 20 minutes. They will be spread out throughout the semester, assessing the following topics: 1) bacteria, protists, and plants, 2) invertebrates, 3) vertebrates, and 4) local ecosystems.

Lab Presentation: Each student will give a short 5-10 minute oral presentation on the last day of lab in the semester. Each student will choose an organism and an ecosystem that the organism inhabits. The student will then discuss how that organism is specifically adapted to environmental conditions and stresses of that ecosystem, drawing on the phylogenetic and ecological concepts learned throughout the course. The presentation will be worth 25 points towards the lab grade.

## Course Outline of Record (COR) Proposal Form

During 2010-11, the Academic Assembly, the SBA Faculty, and the Senate endorsed a new list of undergraduate learning goals and outcomes. The Core Curriculum Committee phased in the new set of goals and outcomes during the academic year (2011-12) and developed this new core curriculum proposal. This is now the required COR proposal format.

When applying for a course to meet a core curriculum requirement, please fill out the following and attach to course syllabus:

1. Course title, number and *Bulletin* description: Identify the core outcome(s) your course will satisfy from the general list in the link below. Your course must satisfy at least one but not more than three of the twelve undergraduate outcomes.

EOSC 123: Organisms and Ecosystems

Course Description: An introduction to organisms and environmental biology from an ecological perspective. Students will learn about fundamental principles of ecology, in addition to major groups of organisms and how the two are related. This is a required course for all Environmental Studies, Environmental Science, and Marine Ecology majors. This course satisfies the core curriculum requirement for a life science and a laboratory. Three hours of lecture and one laboratory per week.

This course will satisfy the following two core outcomes: Outcome 4 Critical Thinking and Outcome 11 Environmental Awareness.

2. Identify your course outcomes (these should be identical to those that appear on your syllabus).

Learning Outcomes for EOSC 123:

1. Explain the basic principles of ecology
  2. Identify and describe organisms in major taxonomic groups, and understand how their adaptations relate to their natural history and ecology
  3. Describe major terrestrial and aquatic habitats in terms of their physical and biological components
  4. Employ the scientific method, including formulation of hypotheses, and the use of varied approaches (experimental and observational) for testing hypotheses related to the concepts in the course
3. Explain briefly how at least one of your course outcomes fulfills or satisfies the undergraduate outcome(s) you identified in #1.

The proposed course will challenge students to not only learn characteristics of major organismal groups and habitats, but will have to apply this knowledge to demonstrate how organism adaptations are connected to where and how they live (Course learning outcome 2). In addition, students will learn how to employ the scientific method to be able to formulate and test scientific hypotheses that relate to how organisms and ecosystems are connected (Course learning outcome 4). Both of these course learning outcomes will require students to acquire and demonstrate critical thinking (core learning outcome #4) in how they integrate and apply information from different parts of the course.



In addition, this course will directly satisfy core learning outcome #11 on environmental awareness by introducing students to the basic principles of ecology (course learning outcome 1), which relate to how organisms (including humans) interact with their environment. Also, by exploring major terrestrial and aquatic habitats (course learning outcome 3), students will be challenged to think about them not only as physical environments, but also the biological components including the effects of humans.

4. List specific instructional assignments (e.g., exams, lab reports, and/or papers) that will provide evidence that the outcome(s) has/have been achieved.

Students will be required to complete lab reports in which they will demonstrate their understanding and ability to apply the scientific method to biological concepts. In addition, students content knowledge on principles in ecology and organismal biology will be assessed through midterm exams and laboratory quizzes. Lastly, through a final presentation, students will show their ability to integrate concepts from across the course and apply them to a chosen organism and ecosystem.

5. If you have constructed assignment rubrics or grading criteria for courses outcomes, please include these. Your rubrics or assessment measures will help to explain how the outcome(s) was/were achieved.

The above proposal was approved by a vote of the department/program on: October 22, 2015  
Date  
Nickel Brachman  
Signature of Chair

The procedure for a COR course approval is as follows:

- 1) After department/program approves course, chair/director submits COR proposal form & syllabus to the Chair of the Core Curriculum Committee.
- 2) Core Committee makes recommendation to Dean's office. Suggestions for revision (if any) will go to the department chair.
- 3) Dean sends to the Undergraduate Curriculum Committee or School of Business Administration Undergraduate Studies Committee for standard course approval process
- 4) The Undergraduate Curriculum Committee makes recommendation to Academic Assembly or School of Business Administration faculty.

## Course Proposal (new or changes) Action Sheet

1. Today's Date \_\_November 10, 2015\_\_

### 2. Course Action

Will the proposed action affect other majors/minors in any College/School?

- Yes  
 No

What type of curricular Action is being requested?

- Bulletin description change (editorial only)  
 Change in course #  
 Change in course title (editorial only)  
 Change in course pre-requisite(s)  
 Deletion of course(s)  
 Addition of new course  
 Revision of existing course  
 Revision of existing major/minor/concentration

Effective Term: (list preferred semester/year) \_\_Fall 2016\_\_

### 3. Basic Information

a. Title of Course (30 characters maximum; appears on transcripts and schedules)

ENVIRONMENTAL DATA ANALYSIS

b. Bulletin Title (60 characters maximum; appears only in Bulletin)

ENVIRONMENTAL DATA ANALYSIS

c. New Course Information

Department Code \_EOSC\_

Lecture Contact Hours \_3\_\_

Credit Hours \_3\_\_

Lab Contact Hours \_\_0\_\_

Course Number \_222\_

Other Contact Hours \_\_NA\_\_

d. Bulletin Course Description (if new or changed)

This course will provide an introduction to the fundamentals of experimental design and quantitative analysis of data in environmental sciences. Students will learn to form and test hypotheses through the lens of Environmental and Ocean Sciences. The later class meetings will provide a conceptual overview of some of the specialized statistics (e.g., nMDS, Time Series Analysis, PCA) to prepare students for the use of these tests in 300 and 400 level EOSC courses. Students will learn the basics of using R to analyze data, leveraging the GUI-based R-Commander. This is a required course for all Environmental and Ocean Sciences majors. Three hours of lecture per week.

e. Grading Mode(s) (check all that apply)

- Standard



- P/F
- Audit

**4. Course Format:** method of delivery (check all that apply)

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Lecture | <input type="checkbox"/> Independent Study            |
| <input type="checkbox"/> Lab                | <input type="checkbox"/> Performance                  |
| <input type="checkbox"/> Lecture/Lab        | <input type="checkbox"/> Field Experience             |
| <input type="checkbox"/> Seminar            | <input type="checkbox"/> Practicum                    |
| <input type="checkbox"/> Recitation         | <input type="checkbox"/> Research/Thesis/Dissertation |
| <input type="checkbox"/> Internship         | <input type="checkbox"/> Community Service Learning   |

**5. Course Designation (check all that apply)**

- |   |   |
|---|---|
| <input type="checkbox"/> Core (include Core proposal form)        | <input type="checkbox"/> Diversity (include D course proposal form) |
| <input type="checkbox"/> Honors                                   | <input type="checkbox"/> Other _____                                |
| <input type="checkbox"/> Writing (include W course proposal form) |   |

**6. Faculty Course Workload**

- Same as course credit
- Same as weekly contact hours
- Percent of weekly contact hours (specify): \_\_\_\_\_
- Based on enrollment (specify): \_\_\_\_\_
- Team taught, full load
- No load
- Other: (specify) \_Faculty course workload equal to 3 units for the lecture and 2 units for the lab section

**7. Course Details (circle Y/N)**

Will this course be course cross-listed (Y/N); If Y, with what course? \_N\_\_\_\_\_

Prerequisites? (Y/N) if Y, list prerequisite courses \_Y: EOSC 110 or 104, EOSC 123\_\_\_\_\_

Is this course linked with another course (e.g., lecture and lab)? (Y/N) If Y, with what course? \_N\_\_\_\_\_; Will the linked course be deleted? Y/N

Core curriculum requirement met, if any (D, W): \_N\_\_\_\_\_; Has this course been approved as a D or W course already? (Y/N)

Is this course a topics or repeatable course for credit? N

**8. Department vote (# Yes, # No, # Abstentions) 9 Yes, 0 No, 0 Abstentions 11/16/15\_\_**

**Approvals (Curriculum Committee Use Only)**

- Department Vote; Date \_\_\_\_\_
- Department Chair; Date \_\_\_\_\_
- Core Curriculum Committee; Core Designation \_\_\_\_\_ Date \_\_\_\_\_
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Dean; Date \_\_\_\_\_

## Department Report Form

**\*adjust the space needed for each section on this word document as necessary**

### 1. Rationale

Employers and graduate schools in Environmental and Ocean Sciences are increasingly seeking students who are skilled in the quantitative analysis of environmental data. Upper division courses in EOSC require students to design and conduct experiments where data are collected and analyzed. In recent Assessment Reports the EOSC department note that our students frequently achieve excellence in the design and implementation of experiments but are less able to effectively analyze their results and make sense of trends in environmental data. In order to improve our students' abilities to quantitative analyze environmental data, allowing them to better meet both our program goals and expectations of potential employers/graduate schools, we propose this new 200 level course (EOSC222) where students are taught fundamental skills in the analysis of environmental data that they can later implement and master at the upper division.

### 2. Impact

- a. Discuss the likely effects on both department curriculum and curricula of other departments.

This course will fill a gap in our currently offered courses for the major and streamline our department expectations of data analysis skills required in our upper division courses. Currently some of our students (Environmental Studies major only) take a statistics course in math, psychology, political science or economics; each of these courses has a different emphasis. However, students entering our upper division courses would benefit from environmental specific data analysis experience before being able to apply these skills. This course will thus allow our upper division courses to focus on curriculum required for those courses rather than teaching data analysis skills at the start of our upper division courses.

- b. Will this change impact the requirements for a major or minor? If Y provide a summary of the changes.

Yes. This course will form part of our core requirements for preparation of our revised Environmental and Ocean Sciences major.  
[revised major is being submitted concurrently]

- c. Will this change have any staffing/budgetary impact? If yes, provide a brief explanation (include commentary on personnel, facilities, library holdings and academic computing)

Yes. This new course will be taught every semester, so will require staffing. In mitigation of those resource needs, however, we note that this course will allow

us to not have to teach this material in multiple upper division courses, and that we have more than one faculty member who can teach this course.

- d. Might this change have an impact on any other departments? If Y, what majors and/or minors might be affected by this change?

There should be fewer EOSC students enrolled in MATH 120, PSYC 260, POLS 330 and ECON 216.

- e. Will this change impact student enrollment numbers? If Y, in what courses and in what ways?

See above.

- 3. Syllabus** - Attach a sample syllabus, which specifies learning objectives, possible assignments, evaluation and supplemental readings.

Sample syllabus attached on following pages.

**MWF 1010-1100**

## Course Description

EOSC222 will review some basic principles of statistical analysis, introduce some fundamentals of experimental design, and cover important concepts of hypothesis testing, all through the lens of Environmental and Ocean Science. The later class meetings for this course will provide a conceptual overview of some of the specialized statistics (e.g., nMDS, Time Series analyses, PCA) to prepare students for the use of these tests in 300 and 400 level EOSC courses. Students will learn the basics of using R to analyze data, leveraging the GUI-based R-Commander.

## Expected Student Learning Outcomes

Analyzing data, presenting results clearly and concisely, and supporting your conclusions with well-reasoned arguments and references are elements that form the core of good scientific literature. Your oral communication skills will be improved through leading class discussions. At the end of this course, a student is expected to be able to:

- \*use a number of basic statistical tests employed in Environmental and Ocean Sciences, and explain the rationale underlying them.
- \*design, critique, and employ proper experimental design.
- \*run common statistical tests using R.
- \*understand and employ a range of diversity indices.
- \*evaluate data and apply knowledge in novel situations.
- \*formulate a valid hypothesis and design experiments to test it.

## Exams

There will be a brief short-answer and essay style midterm and final exam. This course stresses an understanding of the conceptual underpinnings of statistical tests, rather than the math, but you will be required perform analyses during the exam using R.

## Writing assignments

All students will be expected to critique the methodologies and statistics of a paper in the primary literature. Details of the assignment will be provided in class.

# EOSC 222: quantitative analysis of environmental data

## Take-home assignments

There will be four major take-home assignments throughout the class, each worth 50 points. These will be opportunities for you to practice using R and what you have learned in class to answer questions that are similar to those that will appear on exams. Details of the assignment will be provided in class.

## NoteBook

to encourage you to keep careful notes and make a reference you can use in the future, your notes from class will need to be turned in as an assignment at the end of the semester. Class notes will need to have a table of contents and an index, and will be graded on completeness.

### Points:

The breakdown of points will be as follows:

Critique -	25 points
Midterm -	100 points
Final -	200 points
Take-home Assignments	200 points
Participation -	25 points
Notebook -	25 points
total -	575 Points

## Texts

The Required text for this course is Whitlock, M. C., and D. Schluter. 2014. *The Analysis of Biological Data*. Roberts & Co. Publishers, Greenwood Village, CO. 864pp.

Required reading (in the form of PDFs) will also be distributed during the semester.

## Some other helpful books:

# EOSC 222: quantitative analysis of environmental data

- Manly, Bryan. 2008. *Statistics for Environmental Science and Management*, Second Edition. Written by a respected statistician, this volume also includes lots of info about sampling and experimental design.
- Zar, Jerrold H. *Biostatistical Analysis* Prentice-Hall, Inc. 1999. This is THE book that you should have if you plan on staying in the sciences - not an easy read, but a good “recipe book” to look up formulas, critical Z values, etc.
- Sokal, R. R. and F. J. Rohlf. 1995. *Biometry: the principles and practice of statistics in biological research*. 3rd edition. W. H. Freeman and Co.: New York. 887 pp. ISBN: 0-7167-2411-1
- Rodda, H. and Little, M. 2016. *Understanding Mathematical and Statistical Techniques in Hydrology: An Examples-based Approach*.
- Quinn, G. and Keough, M. 2001. *Experimental Design and Data Analysis for Biologists*. Cambridge University Press.
- Huff, D. 1952. *How to Lie with Statistics*. This is a classic book on ways in which commonly-presented statistics (particularly in the media) can be misleading. It is an easy and entertaining read, and amazingly relevant even half a century after it was written.
- Gonick, Larry & Woolcott Smith. *The Cartoon Guide to Statistics* Collins Reference. 1993. I know, but don't be put off by the name - if every grad student (heck, every scientist) actually had a clear grasp on all of the concepts in this book, there would be a lot fewer bad papers in print!

## Tentative Schedule

Week 1	Introduction; installing and getting started in R
Week 2	Types of statistics, sampling, data exploration
Week 3	Distributions, Graphing/presentation of difficult data (e.g., Depth profiles, Ternary plots).
Week 4	Probability
Week 5	Regression/Correlation as a measure of covariation between environmental and biological parameters
Week 6	Chi-Square - analyzing frequency data and looking for associations between categorical variables
Week 7	Some issues in environmental and ocean sciences - transformations, pseudoreplication and p values
Week 8	t-tests
Week 9	ANOVA - one-way and two-way
Week 10	ANOVA - nested, multiway
Week 11	Non-Parametric alternatives (many commonly applied when used where sampling is extremely difficult, such as deep-sea)
Week 12	Experimental Design in Environmental and Ocean Sciences
Week 13	Multivariate techniques - a primer

## Course Proposal (new or changes) Action Sheet

1. Today's Date 3/26/15

### 2. Course Action

Will the proposed action affect other majors/minors in any College/School?

- Yes (Non-Expedited Action Items require Department Report Form)  
 No

What type of curricular Action is being requested?

- Catalog description change (editorial only)  
 Change in course #  
 Change in course title (editorial only)  
 Change in course pre-requisite(s)  
 Deletion of course(s)  
 Addition of new course  
 Revision of existing course  
 Revision of existing major/minor/concentration

Effective Term: (list preferred semester/year) Fall 2016

### 3. Basic Information

a. Title of Course (30 characters maximum; appears on transcripts and schedules)

**Res App in Envi & Ocean Sci**

b. Catalog Title (60 characters maximum; appears only in Bulletin)

**Research Applications in Environmental and Ocean Sciences**

c. New Course Information

Department Code EOSC  
Credit Hours 4  
Course Number 301 W

Lecture Contact Hours 3 hours  
Lab Contact Hours 5 hours  
Other Contact Hours \_\_\_\_\_

d. Catalog Course Description (if new or changed)

Students will be introduced to the research process and common laboratory and field sampling methods in environmental and ocean sciences, as well as the underlying principles and applications of these methods. Students will participate in hypothesis-based, interdisciplinary, hands-on research examining the spatial and temporal variability of biological, chemical, geological and physical factors within local environments. Written and oral scientific communication will be emphasized. Eight hours of combined laboratory, field and lecture per week.

e. Grading Mode(s) (check all that apply)

- Standard  
 P/F  
 Audit

**4. Course Format:** method of delivery (check all that apply)

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> Lecture | <input type="checkbox"/> Independent Study                       |
| <input checked="" type="checkbox"/> Lab     | <input type="checkbox"/> Performance                             |
| <input type="checkbox"/> Lecture/Lab        | <input checked="" type="checkbox"/> Field Experience             |
| <input type="checkbox"/> Seminar            | <input type="checkbox"/> Practicum                               |
| <input type="checkbox"/> Recitation         | <input checked="" type="checkbox"/> Research/Thesis/Dissertation |
| <input type="checkbox"/> Internship         | <input type="checkbox"/> Community Service Learning              |

**5. Course Designation (check all that apply)**

- |  |   |
|--|---|
| <input type="checkbox"/> Core (include Core proposal form)                   | <input type="checkbox"/> Diversity (include D course proposal form) |
| Honors   |   |
| <input checked="" type="checkbox"/> Writing (include W course proposal form) | <input type="checkbox"/> Other _____                                |

**6. Faculty Course Workload**

- Same as course credit
- Same as weekly contact hours
- Percent of weekly contact hours (specify): \_\_\_\_\_
- Based on enrollment (specify): \_\_\_\_\_
- Team taught, full load
- No load
- Other: (specify) \_\_\_\_\_ 6 units \_\_\_\_\_

**7. Course Details (circle Y/N)**

Will this course be course cross-listed (Y/N); If Y, with what course? \_\_\_\_\_  
Prerequisites? (Y/N) if Y, list prerequisite courses EOSC 121 OR BIOL 221/221L; AND EOSC 110 OR EOSC 104/104L; AND CHEM 151/151L; AND EOSC 220; AND STATISTICS (EOSC 222 OR PSYC 260 OR MATH 120 OR POLS 330 OR ECON 216)  
Is this course linked with another course (e.g., lecture and lab)? (Y/N) If Y, with what course? \_\_\_\_\_; Will the linked course be deleted? Y/N  
Core curriculum requirement met, if any (D, W): W; Has this course been approved as a D or W course already? (Y/N)  
Is this course a topics or repeatable course for credit? (Y/N)

**8. Department vote (# Yes, # No, # Abstentions) 8, 0, 0**

<b>Approvals (Curriculum Committee Use Only)</b>	
<input type="checkbox"/>	Department Vote; Date _____
<input type="checkbox"/>	Department Chair; Date _____
<input type="checkbox"/>	Core Curriculum Committee; Core Designation _____ Date _____ (if needed)
<input type="checkbox"/>	Other Curriculum Committee; Name _____ Date _____
<input type="checkbox"/>	Other Curriculum Committee; Name _____ Date _____ (if needed)
<input type="checkbox"/>	Other Curriculum Committee; Name _____ Date _____ (if needed)
<input type="checkbox"/>	Dean; Date _____



## Department Report Form

**\*adjust the space needed for each section on this word document as necessary**

### 1. Rationale

**Provide a brief rationale for the change/deletion/addition/revision of this course**

Hands-on research experience, interpretation of scientific data, and scientific communication skills are important components of both the Environmental Studies and Marine Sciences majors in our department. Following our recent Academic Program Review, and during subsequent departmental meetings, we have decided to change our departmental name (now the Environmental and Ocean Sciences department) to restructure our major so that our students take common courses in the preparation for the major, before undertaking more specialized instruction in upper-division pathways. Based on our Assessment reports, we would like to better-prepare students for their upper-division courses by having a “gateway” course that introduces key research techniques, teaches scientific interpretation, and science communication skills. Therefore, we have designed a new course, EOSC 301W, so that students begin to develop these skills earlier (the writing course was previously in a 400-level course), and can better apply what they learn to the upper division courses they will take following EOSC 301W. By having all students complete EOSC301W, we ensure that students learn basic research techniques and have the same preparation going into their 400-level upper division courses. This will allow us to enhance our instruction at the upper-division (less time will be devoted to teaching lab and field techniques in lab, which means we can delve more deeply into research questions). Furthermore, EOSC301W will better prepare students for their capstone experience, which includes participation in a research project.

### 2. Impact

**a. Discuss the likely effects on both department curriculum and curricula of other departments.**

EOSC 301W is one of a series of changes we plan to make to our revised curriculum. It will help streamline our course offerings, provide more cohesion in the instruction all of our students receive, and will serve as a “gateway” to the upper division courses. It will not impact other departments.

**b. Will this change impact the requirements for a major or minor? If Y provide a summary of the changes.**

EOSC 301W will fulfill the ‘Upper Division Science with Lab’ requirement for the Environmental Studies major, or serve as an upper division elective for the Marine Science major. Upon the restructuring of the major to include a common lower division preparation, EOSC 301W will serve as one of two gateway courses students are required to complete before beginning upper division courses within their pathway (Environmental Studies, Environmental Sciences, or Marine Ecology).

**c. Will this change have any staffing/budgetary impact? If yes, provide a brief explanation (include commentary on personnel, facilities, library holdings and academic computing)**

We expect that budgetary impact will be minimal since we have the boats and most lab and field equipment. We may require some re-prioritization of the current budget. There may be some impact of on personnel time (like work study and GA's) in terms of helping to prep logistics for field work.

**d. Might this change have an impact on any other departments? If Y, what majors and/or minors might be affected by this change?**

We do not anticipate impacts to other departments.

**e. Will this change impact student enrollment numbers? If Y, in what courses and in what ways?**

It is not possible to predict at this point since we are creating a new course and a new set of pathways. We hope that this course will reduce the enrollment in some of our other upper division courses that are typically over-enrolled (e.g., ENVI 331W regularly has at least 20 students which is too many for a writing course).

**3. Syllabus**

Please see attached.

## **EOSC 301W – Research Applications in Environmental and Ocean Sciences**

### **INSTRUCTORS:**

**Nathalie Reyns**, ST277, email: [nreyns@sandiego.edu](mailto:nreyns@sandiego.edu)

**Eric M. Cathcart**, ST250; email: [cathcart@sandiego.edu](mailto:cathcart@sandiego.edu)

### **OFFICE HOURS:**

### **TEXTBOOKS:**

We will be developing a reader with select readings for students to purchase before the start of the semester.

### **MEETING TIMES:**

**Lecture/laboratory/fieldwork: Tuesday/Thursday 8:00 am – 12:05 pm, ST174**

### **WHO SHOULD TAKE THIS COURSE?**

EOSC 301W will fulfill the ‘Upper Division Science with Lab’ requirement for the Environmental Studies major, or serve as an upper division elective for the Marine Science major. Upon the restructuring of the major to include a common lower division preparation, EOSC 301W will serve as one of two gateway courses students are required to complete before beginning upper division courses within their pathway (Environmental Studies, Environmental Sciences, or Marine Ecology).

### **COURSE DESCRIPTION:**

In this class, students will be introduced to the research process and some key laboratory and field sampling methods. Students will participate in an interdisciplinary, hands-on research project examining the spatial and temporal variability of biological, chemical, geological and physical factors within Mission Bay and the surrounding watershed. Research will be hypothesis-based, and students will learn to use some common field and lab techniques in environmental and ocean sciences, as well as the underlying principles and applications of these methods. Given that written and oral communication skills are essential to the scientific process, this class is designated as a ‘W’ course. Students will strengthen their writing skills through intensive writing and editing exercises that include preparing a research proposal and data management plan, analyzing data, presenting results clearly and concisely, and supporting conclusions with well-reasoned arguments and evidence from the scientific literature. Oral communication skills will be improved through leading class discussions and an end-of-semester poster and oral presentation. Data collected in this course will be archived to contribute to a long-term Mission Bay data set, which supports additional faculty and student research projects.

**LEARNING OUTCOMES:** This course is designed to introduce students to the research process by applying the scientific method, teach laboratory and field sampling techniques commonly used in environmental and ocean sciences, and develop scientific writing skills.

**BY THE END OF THIS COURSE, STUDENTS WILL:**

- Formulate a valid hypothesis and design a study to test it.
- Write a data management plan, research proposal and research report using the scientific writing process.
- Demonstrate correct use of scientific equipment and analytical techniques common to the fields of environmental and ocean sciences.
- Describe and perform data acquisition with common equipment and sampling strategies and discuss appropriate locations, controls, sensitivities, and limitations.
- Practice data recording techniques.
- Evaluate data and construct a cogent argument in the language of environmental and marine science through written and oral presentations.
- Read, evaluate and incorporate primary literature to support conclusions.
- Work as a team to complete a research project.

**COURSE REQUIREMENTS AND POLICIES:**

- Regular attendance and being **attentive** are critical to your understanding of the subject matter, and will improve your performance on the exams. As a core class in your major, there is a tremendous amount of information and new terminology. **Emphasis will be on integration of terms and concepts, focusing on critical thinking**; it never works well to memorize ‘mechanically’, understand the material.
- We understand that unfortunate events happen, however, make sure that you let me know in advance as much as possible. To make up an exam or a quiz, you must have valid documentation of an illness or emergency, or by prior arrangement. Without a valid excuse or prior arrangement, you will not be allowed to make up an exam or quiz.
- Lecture power point slides, animations, links to websites, assignments, and additional reading will be available **on Blackboard**.
- Exams will cover course material presented in lecture and the reader, video assignments, and any additional information posted on Blackboard (you will be notified in class).
- **RESPECT** your instructor and peers:
  - PLEASE TURN SOUND OFF ON PHONES AND PUT AWAY (off desks and laps) DURING LECTURE AND EXAMS.
  - Computers and electronic devices can only be used for class-related purposes.
  - Please do not make a habit of excusing yourself in the middle of lecture, or arriving late.
- Please **communicate** any concerns or special needs.
- **Academic Integrity:** You are responsible to have read and fully understand the meaning and expectations of academic integrity. Any suspected violations of academic integrity will be referred

to the Dean of Arts and Sciences and may result in a failing grade for the course. Please review the Academic Integrity Policy, which can be found in the University's Policy and Procedure Manual, this is available as a PDF file: [http://www.sandiego.edu/conduct/the\\_code/university\\_policies/](http://www.sandiego.edu/conduct/the_code/university_policies/) or <http://www.sandiego.edu/associatedstudents/branches/vice-president/academics/additional/academic.php>

- **Late work:** A specific due date will be given for all assignments. You are required to turn in all assignments on the specified date. **Late work will not be accepted.**

### **PAPERLESS OBJECTIVE**

We will make every attempt to minimize the amount of paper we generate for this class. If you need to turn in an assignment which cannot be submitted electronically, we would appreciate the use of recycled paper. Other than exams, we will attempt to make all assignments easy to submit electronically via Blackboard. Please note that it is your responsibility to make sure we have received your assignments.

### **GRADING**

Exams and final grades will be determined using the following scale:

100-90%:	A to A-
89-80%:	B+ to B-
79 – 70%:	C+ to C-
69 – 60%:	D+ to D-
<60%:	F

### **WRITING ASSIGNMENTS: 50%**

Proposals (10%)

Workplans: Sampling, Analysis, and Data Management Plans (10%)

Research Report (20%)

Posters (10%)

### **EXAMS: 40%**

Midterm 1 (20%)

Midterm 2 / Lab Practical (20%)

### **FINAL ORAL PRESENTATION: 5%**

### **CLASS PARTICIPATION: 5%**

<b>Spring 2016 – EOSC 301W</b>		
	<b>Tuesday</b>	<b>Thursday</b>
<p>Week 1: <b>Introduction</b></p> <p><b>Writing Assignment 1:</b> Research Objectives and Hypotheses due (draft one; part of research proposal)</p>	<p><b>Lecture:</b> Introduction to the course, facilities and study locations; Developing a research question, hypotheses, and the scientific method.</p> <p><b>Lab:</b> Scavenger hunt around the science building locating labs and equipment areas.</p>	<p><b>Lecture:</b> Introduction to research proposals. History of Mission Bay, background on hydrologic systems, and synopsis of research in area.</p> <p><b>Lab:</b> Exploring Mission Bay – Inlets and outlets, history, biological, geologic, and environmental issues.</p>
<p>Week 2: <b>Data Acquisition Protocols and Discussions of Faculty Research; Proposal Topic Selection</b></p> <p><b>Writing Assignment 2:</b> Writing lab and field notes exercise due; peer review and faculty feedback on proposal hypotheses</p>	<p><b>Lecture:</b> Data acquisition: Field notebooks and field observation and quantification. Sample descriptions (logs) and classification systems. Field sampling laws, permits, public VS. private land, cultural understanding, hazards and health.</p> <p><b>Lab:</b> Navigation and plotting, GPS, compass techniques. Rock and sediment characteristics/quality. Topo/Geologic/Bathymetric maps.</p>	<p><b>Lecture:</b> Researching and discussion of proposal topics and writing a Statement of Qualification.</p> <p><b>Lab:</b> Discussions of ongoing faculty research. (Each faculty member submits one or two slides summarizing their research); water quality and air quality.</p>
<p>Week 3: <b>Data Display, Organization, Selection of Research Topic and Workplans</b></p> <p><b>Writing Assignment 3:</b> Workplan due (including revised Research Objectives and Hypotheses section [draft two]); Faculty feedback on workplan</p>	<p><b>Lecture/Lab:</b> Generating base maps, fundamentals of mapping, figures, recording data; field records, logs, photographs, measuring distances, stereoscopic images, historical images.</p>	<p><b>Lecture/Lab:</b> How to write and format workplans, references and literature reviews.</p>
<p>Week 4: <b>Fundamentals of field sampling techniques (Bio and Physical)</b></p> <p><b>Writing Assignment 4:</b> Final draft of research proposal due</p>	<p><b>Lecture:</b> Sampling and Analysis Plans, Data Management Plans, and sampling methodology.</p> <p><b>Lab:</b> Biological sampling methods.</p>	<p><b>Lecture:</b> Sampling methodology.</p> <p><b>Lab:</b> Physical oceanography sampling methods.</p>

<p>Week 5: <b>Fundamentals of field sampling techniques (Chem and Geologic)</b></p> <p><b>Writing Assignment 5:</b> Pros and Cons of Sampling Methods</p>	<p><b>Lecture:</b> Sampling methodology</p> <p><b>Lab:</b> Chemical oceanography and ecotoxicology sampling methods.</p>	<p><b>Lecture/Lab:</b> Sampling methodology</p> <p><b>Lab:</b> Terrestrial and marine geologic sampling methods.</p>
<p>Week 6: <b>Selecting research projects and data collection planning</b></p> <p><b>Writing Assignment 6:</b> Introduction and Methods write-up (draft 1; Research Report)</p>	<p><b>Lecture/Lab:</b> Planning for field sampling; pulling together equipment and supplies.</p>	<p><b>Lab:</b> Field data collections.</p>
<p>Week 7: <b>Data Collection and lab analysis procedures</b></p> <p><b>Peer review of Introduction and Methods; faculty also provide comments on draft of Research Proposal</b></p>	<p><b>Lecture/Lab:</b> Sample processing procedures (LPS, sieving, nutrients, point counting, identification of organisms).</p>	<p><b>Lab:</b> Field data collections.</p>
<p>Week 8: <b>Data Collection and lab analysis procedures</b></p> <p><b>Writing Assignment 7:</b> Introduction and Methods write-up (draft 2; Research Report)</p>	<p><b>Lecture/Lab:</b> Sample processing procedures; data processing tools (Excel, Stats Programs).</p>	<p><b>Lecture/Lab:</b> Processing and analyzing samples.</p>
<p>Week 9: <b>Sample Processing and Analysis</b></p>	<p><b>Lecture/Lab:</b> Sample analysis.</p>	<p><b>Lecture/Lab:</b> sample analysis.</p>
<p>Week 10: <b>Data Reporting and Interpretation</b></p> <p><b>Writing Assignment 8:</b> Introduction, Methods and Results (draft 3; Research Report)</p>	<p><b>Lecture/Lab:</b> Data management.</p>	<p><b>Lecture/Lab:</b> Interpretation of results.</p>

<p>Week 11:  <b>Data Reporting and Interpretation</b></p> <p><b>Writing Assignment 9:</b> Introduction, Methods, Results, and Discussion (draft 4; Research Report)</p>	<p><b>Lecture:</b> Reporting for industry vs. reporting for academia; report writing.</p>	<p><b>Lab:</b> Report writing.</p>
<p>Week 12: <b>Poster Creation</b></p> <p><b>Writing Assignment 10:</b> Draft of poster; faculty and peer feedback on Research Reports</p>	<p><b>Lab:</b> Creating posters.</p>	<p><b>Lab:</b> Creating posters.</p>
<p>Week 13:  <b>Research Reports due</b></p>	<p><b>Lab:</b> Poster Presentations.</p>	<p><b>Lab:</b> Poster Presentations.</p>
<p>Week 14  <b>Presentations</b></p>	<p><b>Lab:</b> Oral Presentations.</p>	<p><b>Lab:</b> Oral Presentations.</p>



## “W” Designation

The “W” designation identifies a course conceived in part or in whole with the outcomes of developing students’ ability to

1. Demonstrate significantly more advanced and sophisticated written literacy through frequent writing tasks with instructor feedback;
2. Write with clarity and cogency as inquiring and analytical readers of texts in the field of their major or other discipline;
3. Articulate observations, express ideas, and formulate arguments within the relevant discipline.
4. Demonstrate a process-oriented approach to writing, through drafting, feedback (**instructor feedback required; peer feedback optional**), revision and editing, and final drafts.

Proposed “W” course title and number: **Research Applications in Environmental and Ocean Sciences, EOSC 301 W**

Check one:

This is a new course.

This is an existing course enhanced by instruction in writing and additional writing assignments.

How does writing pertain to your discipline?

**Writing in the natural sciences is an essential skill that pertains to communication during multiple components of the scientific process: one must (1) be proficient (clearly articulate hypotheses and justify their research ideas) at writing research proposals to acquire funds to support the research; (2) be able to organize the research by writing work/sampling/data management plans; (3) carefully document the research processes by compiling careful notes in the laboratory and field; and (4) disseminate research findings in both written and oral formats. This course is designed to give students a hands-on, interdisciplinary research experience and incorporates key components of the scientific writing process. Students will also learn about how writing for government agencies, environmental consulting firms, and academia differ (under ‘Reporting’ on syllabus), and will learn how to communicate their findings in a written report, poster, and oral presentation. As scientists, we routinely need to write for multiple audiences (non-science vs science) and disseminate results in written and oral formats.**

Which faculty in your program may be interested in teaching the course as a “W” ?

Nathalie Reyns

Eric Cathcart

other EOSC faculty plan to rotate into this course after it becomes well-established

Address how this course includes frequent writing tasks with instructor feedback on the content of the paper and the quality of the writing and uses a process-oriented approach to writing instruction rather than simply assigning more writing.

**The course, and subsequently the writing assignments, have been developed to reflect the research process. First, students are asked to write a Research Proposal which is a fundamental component of obtaining funding to do research within our field, or a process that students must undertake when**

conducting their own research. This research proposal process also entails developing a Workplan (sampling, analysis and data management plans) which basically constitutes the 'methods' of the research. Secondly, students are asked to write a Research Report which compiles their research findings (after they've completed the research) and places results within the broader context of the field. Writing assignments have been broken down into smaller, more manageable components, so that students essentially have writing assignments to complete each week, and faculty have the ability to provide feedback. For example, in Week 1 (see syllabus), students write a research objective and hypotheses. Faculty will read, evaluate, and provide feedback about the assignment to individual students the following week. This serves as the first draft of one section that will become part of the larger Research Proposal. In Week 3, students write a Workplan, which includes a revised draft of their Research Objectives and Hypotheses, but also includes their research methodology. Faculty will provide students with feedback, both electronically using 'track changes' and comments in Word, but also through individual student meetings. The following week (Week 4), students turn in a final Research Proposal that includes revised drafts of the Research Objectives and Hypotheses as well as the Workplan.

These first writing assignments (1-4) address developing research questions and hypotheses, and writing workplans to organize and learn accurate record-keeping during the research process. Peer and faculty feedback are provided to students, and these assignments contribute to the Research Proposal that students will submit. The assignments will teach students to critically evaluate the scientific literature so they can support and justify their research objectives and hypotheses. We will be incorporating how to properly find and cite scientific literature during this process. Feedback will be given on content and writing styles, and students will read and evaluate research proposals written by others.

The second group of assignments (6-9) are related to the Research Report, which is written in sections (Introduction, Methods, Results, and Discussion). This reflects the process of doing science (coming up with the research idea = Introduction; doing the science = Methods; reporting the findings = Results; and disseminating the results in the context of the broader literature = Discussion). Students will receive feedback after writing each section on both content and proper scientific writing, and produce a revised draft due with the next assignment. For example, in Week 6, the initial Introduction and Methods write up is due, which should follow the research objectives and workplan described in the Research Proposal. In Week 7, we will have a roundtable discussion within small student groups so that students receive feedback on their writing from peers. Students will receive supplemental comments from faculty. In Week 8, students submit a second draft of the Introduction and Methods, where we expect to see development and improvement in writing quality. In each subsequent week, students further develop their Research Report, by incorporating suggested changes by faculty and peers, as well as add an additional section of writing to the report (Week 10, add Results; Week 11, add Discussion). Faculty will review drafts each week, and in Week 12 there will be an additional opportunity for peer review in class. Thus, the final report (due in Week 13) will be the product of four drafts, and should reflect proficient scientific writing, understanding of the research process and ability to put one's findings into the context of the scientific literature. By using this approach, we also expect to see students develop their writing skills from week to week.

Based on a sample syllabus for this course, identify the expected learning outcome or outcomes that qualify this course as a "W," listing specific instructional activities that are used to achieve each learning outcome (the outcome(s) you list here should also appear on your course syllabus and be aligned with the 4 outcomes listed above):

This course is designed to: (1) introduce students to the research process by applying the scientific method, (2) teach laboratory and field sampling techniques commonly used in environmental and ocean sciences, and (3) develop scientific writing skills. The overall approach of the class is aligned with Outcome 1 listed above. More specifically, the learning outcomes from the syllabus that directly pertain to writing are as follows:

- Formulate a valid hypothesis and design a study to test it.
- Understand the proposal process by writing a research proposal and data management plan. These two objectives will be evaluated in the Research Proposal, which will have a draft, peer, and faculty review before the final proposal is turned in. This is aligned with Outcomes 1-4 listed above.

- Practice data recording techniques.

This objective will be met by having students write descriptions of a lab exercise and a field location, which other students will read and evaluate, to see if they can re-create the lab exercise or find the field location based on the details of the notes. This is an essential skill for replicating scientific work, and requires detailed writing. This exercise is aligned with Outcomes 2-4 listed above.

- Evaluate data and construct a cogent argument in the language of environmental and marine science through written and oral presentations.
- Read, evaluate and incorporate primary literature to support conclusions.

The Research Report, and Research Poster will incorporate these two objectives, as students will need to interpret their research findings and place them in the context of the literature. Students will write the report iteratively (in sections) and receive feedback. At each new report submission, we expect to see improvements in writing clarity, grammar, and scientific interpretation. The poster will be a summary of research findings (based on the report) and will allow students to gain experience in science communication that combines written (the poster) and oral (presentation of the poster) communication. These objectives are aligned with Outcomes 1-4 listed above.

How will the assessment of this learning outcome or outcomes occur? Please be specific about the direct assessments you will make.

**We will develop rubrics to assess assignments. These rubrics will be based on the document *Developing and Applying Rubrics* available on the College's Faculty Resources webpage. In addition, we will use the following to assess written assignments:**

- Application of the Scientific Method:** The student's research proposal and report clearly defines the key hypothesis (es) that are being analyzed and is able to clearly describe the components of the scientific method.
- Organization:** The student's research proposal and report are well organized, with a good flow of ideas and paragraphs, and also with clear descriptions of each major data component paralleled in the discussion with an analysis of each major component.

- c. **Grammar and mechanics:** The student’s sentences are grammatically correct and well structured, words are spelled and used correctly, and paragraphs are structured well.
- d. **Clarity:** Each section of the research report and the overall product is written clearly, the ideas follow a well-defined path and the discussion explains the data and connects to the hypothesis easily.
- e. **Sources and citations:** The student uses proper citation style (reflective of the type of scientific paper being written), consistently uses citations in proper context (more frequently in Introduction and Discussion), and distinguishes primary literature, technical reports, website information and original data.

What faculty development activities would be helpful for other potential teachers of the course (including part-time/temporary instructors)? Which of these activities will take place in your department?

This was approved by a vote of the 8/0/0 department/program on  
 date 3/26/15

Michel A. Boudrias  
 signature of chair/director

Accepted by the College/School faculty on \_\_\_\_\_

The procedure for “W” course approval is as follows:

- 1) After department/program approves course, chair/director submits “W” proposal form & syllabus to the chair of the Core Curriculum Committee.
- 2) Core Curriculum Committee makes recommendation to Dean’s office. Suggestions for revision (if any) will go to department chair.
- 3) Dean sends to Undergraduate Curriculum Committee or School of Business Administration Undergraduate Studies Committee for standard course approval process
- 4) Undergraduate Curriculum Committee makes recommendation to Academic Assembly or School of Business Administration faculty.

(revised: 10/24/11)

## Course Proposal (new or changes) Action Sheet

1. Today's Date \_\_November 4, 2015\_\_

### 2. Course Action

Will the proposed action affect other majors/minors in any College/School?

- Yes  
 No

What type of curricular Action is being requested?

- Bulletin description change (editorial only)  
 Change in course #  
 Change in course title (editorial only)  
 Change in course pre-requisite(s)  
 Deletion of course(s)  
 Addition of new course  
 Revision of existing course  
 Revision of existing major/minor/concentration

Effective Term: (list preferred semester/year) \_\_Fall 2016\_\_

### 3. Basic Information

a. Title of Course (30 characters maximum; appears on transcripts and schedules)

Plankton Ecology

b. Bulletin Title (60 characters maximum; appears only in Bulletin)

Plankton Ecology

c. New Course Information

Department Code \_EOSC\_

Lecture Contact Hours \_3\_\_

Credit Hours \_4\_\_

Lab Contact Hours \_4\_\_

Course Number \_433\_

Other Contact Hours \_\_NA\_\_

d. Bulletin Course Description (if new or changed)

This course is a study of the fundamental processes in plankton ecology from the perspective of how individual plankton interact with each other and their environment. Throughout the course, students will gain intuition about life in the plankton by incorporating an understanding of both the biology of the organisms and their physical environment. In addition to lecture, the course includes lab activities, reading and discussing peer-reviewed scientific articles, and completing group and individual assignments.

e. Grading Mode(s) (check all that apply)

- Standard  
 P/F  
 Audit

**4. Course Format:** method of delivery (check all that apply)

- |   |   |
|---|---|
| <input type="checkbox"/> Lecture                | <input type="checkbox"/> Independent Study            |
| <input type="checkbox"/> Lab                    | <input type="checkbox"/> Performance                  |
| <input checked="" type="checkbox"/> Lecture/Lab | <input type="checkbox"/> Field Experience             |
| <input type="checkbox"/> Seminar                | <input type="checkbox"/> Practicum                    |
| <input type="checkbox"/> Recitation             | <input type="checkbox"/> Research/Thesis/Dissertation |
| <input type="checkbox"/> Internship             | <input type="checkbox"/> Community Service Learning   |

**5. Course Designation (check all that apply)**

- |   |   |
|---|---|
| <input type="checkbox"/> Core (include Core proposal form)        | <input type="checkbox"/> Diversity (include D course proposal form) |
| <input type="checkbox"/> Honors                                   | <input type="checkbox"/> Other _____                                |
| <input type="checkbox"/> Writing (include W course proposal form) |   |

**6. Faculty Course Workload**

- Same as course credit
- Same as weekly contact hours
- Percent of weekly contact hours (specify): \_\_\_\_\_
- Based on enrollment (specify): \_\_\_\_\_
- Team taught, full load
- No load
- Other: (specify) \_Faculty course workload equal to 3 units for the lecture and 3 units for the lab section

**7. Course Details (circle Y/N)**

Will this course be course cross-listed (Y/N); If Y, with what course? \_N\_\_\_\_\_

Prerequisites? (Y/N) if Y, list prerequisite courses \_Y:\_EOSC 220 and EOSC 301W or consent of instructor. \_\_\_\_\_

Is this course linked with another course (e.g., lecture and lab)? N

If Y, with what course? \_\_\_\_\_; Will the linked course be deleted? Y/N

Core curriculum requirement met, if any (D, W): none\_\_;

Has this course been approved as a D or W course already? (Y/N)

Is this course a topics or repeatable course for credit? N

**8. Department vote (# Yes, # No, # Abstentions) \_\_9 yes, 0 no, 0 abstentions\_(11/13/2015)\_**

**Approvals (Curriculum Committee Use Only)**

- Department Vote; Date \_\_\_\_\_
- Department Chair; Date \_\_\_\_\_
- Core Curriculum Committee; Core Designation \_\_\_\_\_ Date \_\_\_\_\_
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Other Curriculum Committee; Name \_\_\_\_\_ Date \_\_\_\_\_ (if needed)
- Dean; Date \_\_\_\_\_

## Department Report Form

**\*adjust the space needed for each section on this word document as necessary**

### 1. Rationale

EOSC 433 – Plankton Ecology is a newly developed course by Jennifer Prairie in her area of expertise. This course was taught as a special topics course (MARS 494) in Spring 2015 and overall received positive feedback from students and faculty in the department. The addition of this course to the Environmental and Ocean Sciences Department provides an additional upper-division ecology elective for Marine Science majors and Environmental Studies majors.

### 2. Impact

- a. Discuss the likely effects on both department curriculum and curricula of other departments.

Since this course provides an additional elective in our department for both the Marine Science and Environmental Studies majors, it will allow more flexibility and choice at the upper-division for students in our department. The addition of this course will not affect any other departments.

- b. Will this change impact the requirements for a major or minor? If Y provide a summary of the changes.

No. It will not effect the requirements; it will only provide another elective choice at the upper-division.

- c. Will this change have any staffing/budgetary impact? If yes, provide a brief explanation (include commentary on personnel, facilities, library holdings and academic computing)

No, the course has supplies/equipment needs that are in line with other upper-level lab courses in our department.

- d. Might this change have an impact on any other departments? If Y, what majors and/or minors might be affected by this change?

No.

- e. Will this change impact student enrollment numbers? If Y, in what courses and in what ways?

No

3. **Syllabus** - Attach a sample syllabus, which specifies learning objectives, possible assignments, evaluation and supplemental readings.

## **Plankton Ecology**

EOSC 433 - Fall 2016

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Instructor: Dr. Jennifer Prairie  
Office: SCST 269  
Email: [jcprairie@sandiego.edu](mailto:jcprairie@sandiego.edu)  
Phone: 619-260-**8820**

Office Hours: xx  
xxxxxxx  
xxxxxxxxx  
and by appointment

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Required Text: *A Mechanistic Approach to Plankton Ecology*, by Thomas Kiørboe

Supplemental reading including scientific articles for class discussions will be posted on the Blackboard site for this course: [ole.sandiego.edu](http://ole.sandiego.edu)

Course Description: Plankton play a critical role in marine ecosystems both as the base of pelagic food webs and through mediating the marine carbon cycle. Plankton ecosystem dynamics are often studied on water column, regional, or even ocean basin scales; however, ecological processes begin with interactions at the scale of individual organisms. In this course, we will study fundamental processes in plankton ecology from the perspective of how individual plankton interact with each other and their environment. Throughout the course, students will gain intuition about life in the plankton by incorporating an understanding of both the biology of the organisms and their physical environment. Some specific topics we will cover include bacteria and plankton motility and swimming behavior, uptake of nutrients through diffusion and advection, planktonic predator-prey interactions, and chemical and hydromechanical sensing in the plankton. Towards a holistic understanding of plankton ecology, students will also be challenged to examine how these small-scale processes affect larger scale patterns in plankton distributions, population dynamics, and trophic dynamics. The course includes an integrated lecture and lab in which students will not only be covering content but also be conducting laboratory experiments, reading and discussing peer-reviewed scientific articles, and completing group and individual assignments.



Learning Outcomes:

By the end of the course, students will be able to:

1. Explain and interpret about how plankton interact with their physical environment.
2. Apply mathematical equations used to describe interactions between plankton and their physical environment.
3. Analyze and critically discuss scientific literature regarding planktonic bio-physical interactions.
4. Apply concepts relevant to plankton ecology to different biological or environmental systems.
5. Interpret and assess experimental data and relate it to concepts in plankton ecology.

My Expectations for You: This course will challenge you to understand how plankton interact with their environment and other organisms at the scale of individual organisms. These interactions are inherently interdisciplinary, and true insight into the life of plankton requires integrating concepts from biology, physics, chemistry, and mathematics. Thus, to excel in this course, you are expected to think critically about how these concepts are coupled in the context of plankton ecosystem dynamics, and not just memorize facts and terms.

This course will be highly interactive, and so you are expected to regularly attend class, be on time and ready to learn, and complete the reading assignments prior to each class. Active participation from each student is essential to engaging in the material and thoroughly understanding and applying the concepts (See participation rubric for full details).

Grading: Your final course grade will be out of 700 points, and will be determined by one midterm exam, a final exam, homework and in-class assignments, pre-class quizzes, class discussions on scientific articles, a final presentation, lab assignments, and participation.

Points breakdown for each are shown below:

Course Grade:

Midterm Exam (LO #1, #2, #4)	100 points
Final Exam (LO #1, #2, #4)	150 points
Homework/In-Class Assignments (LO #1 and #2)	100 points
Pre-Class Quizzes (LO #1)	25 points
In-Class Article Discussions (LO #3)	50 points
Final Presentation (LO #3 and #4)	50 points
Lab Assignments (LO #1, #2, #5)	200 points
<u>Participation</u>	<u>25 points</u>
<b>Total</b>	<b>700 points</b>

Tentative Course Schedule:

Below dates are provided for the midterm exam, final presentations, and final exam. A tentative schedule of topics covered is also shown (note that the schedule is tentative).

Midterm Exam 1	xx
Final Presentations	xx
Final Exam	xx

	<b>Topic Covered</b>
<b>Week 1</b>	Introduction to Plankton, Life at Low Reynolds Numbers
<b>Week 2</b>	Random Walks and Diffusion
<b>Week 3</b>	Diffusion and Advection of Nutrients
<b>Week 4</b>	Boundary Layers and Phytoplankton Growth
<b>Week 5</b>	Introduction to Particle Encounter Processes
<b>Week 6</b>	Predator-Prey Encounters and Aggregation
<b>Week 7</b>	Hydromechanical Signals in the Plankton
<b>Week 8</b>	Sensing continued and Midterm Exam
<b>Week 9</b>	To Eat and To Not Be Eaten
<b>Week 10</b>	Zooplankton Feeding and Bioenergetics
<b>Week 11</b>	Scaling Up: Overview
<b>Week 12</b>	Species Diversity and Planktonic Food Webs
<b>Week 13</b>	Plankton Patchiness
<b>Week 14</b>	Review and Final Presentations

Reading Assignments and Pre-Class Quizzes: You are expected to have completed the reading assignment prior to each class. Reading assignments can be found on the detailed course schedule on the Blackboard course for this site. Most readings will be out of our course textbook (by Thomas Kiørboe). However, some supplemental readings will be posted on Blackboard (when noted on the schedule).

There will be 5 reading quizzes throughout the course, worth 5 points each. These quizzes must be taken on Blackboard before class on the day noted on the schedule. These quizzes are to assess your understanding of the reading material and to allow you to ask any questions you may have. The quizzes should be taken individually, but can be taken open-book (using the reading material during the quizzes).

Homework and In-Class Assignments: Homework and in-class assignments will be assigned throughout the course, with a total of 100 points towards your course grade. Full instructions will be given with each assignment. Unless otherwise noted, you are encouraged to work with others, but the final assignment you turn in must be completed on your own.

Lab Assignments: Throughout the course, you will participate in 7 different laboratory modules during class (which will include laboratory experiments, computer simulations, and some field work). For each lab module, you will complete an assignment that will be turned in at a later assigned date. See the class schedule for the due dates of each of the lab assignments.

In-Class Article Discussions: There will be five class discussions on scientific articles throughout the course. For each article discussion, the student-leaders will prepare a discussion guide (at least one class period prior). You are expected to have printed both the discussion guide and the scientific article (which will be posted at least one week before), and carefully read both prior to the in-class discussion. In class, all students are expected to actively participate in discussion. Up to 10 points can be earned for participating in each discussion (for a total of 50 possible points for the course) – see the article discussion participation rubric for full details.

Final Presentation: Each student will individually complete a final presentation worth 50 points. The presentations (for undergraduate students) will take place on the last day of class. You must have your presentation slides (in pdf form) emailed to Dr. Prairie by the day before at 5:00 pm. The presentation should be no longer than 12 minutes, with a few minutes for questions following the presentation.

For this presentation, you will find a peer-reviewed scientific article that applies a topic we have covered in class to some other biological or environmental system of interest to you. In the presentation, you will explain the main points of the scientific article, along with how the study is related to concepts from the course. Full instructions for the final presentation will be available after the midterm exam.

Exams: The midterm exam will be given in class and will cover all material up until that point. Rescheduling the midterm is only possible with advance notice and *very* special circumstances, but if you do have a conflict or an emergency situation, please contact me right away so we can make arrangements. The final exam will cover material from the entire course and will be given on xxx from xxx in our normal classroom. Exams are taken individually and are closed book.

Academic Integrity: It is expected that each student in this class conduct him or herself within the guidelines of the USD Honor Code (<http://www.sandiego.edu/documents/conduct/HonorCode.pdf>). All academic work should be done with the high level of honesty and integrity that this university demands. Guidelines for working with other students on specific assignments are described above, but if there is ever any confusion, please ask me.

Electronics: Electronic devices (e.g., cell phones, iPods, etc.) should be turned off and put away when class begins with the exceptions of laptops/tablets when being used specifically for class activities.

Office Hours: Please do not hesitate to come to office hours if you are having any difficulty with the course material. If your schedule does not allow you to come to the set office hours, please email me to set up alternate times to meet.

Students with Disabilities: Any students who will require special attention should contact me as soon as possible to make the appropriate arrangements.

**Environmental and Ocean Sciences**  
**Existing MARS/ENVI course numbers and proposed new EOSC course numbers**

<b>Existing Course #</b>	<b>Proposed Course #</b>	<b>Course Title</b>
		Black = unchanged Green = same course content, new course name Orange = course renumbered Red = deleted course
MARS 101	EOSC 101	Physical Aspects of the Ocean ( <i>existing name</i> ) <b>Exploring Oceanography</b>
ENVI 104	EOSC 104	Natural Disasters
ENVI 104L	EOSC 104L	Natural Disasters Lab
ENVI 109	EOSC 109	Introduction to Physical Geography
ENVI 110	EOSC 110	Introduction to Earth Systems
ENVI 112	EOSC 112	Ecology and Environmental Biology
ENVI 121	EOSC 121	Life in the Ocean
ENVI 170	EOSC 170	The Science of Climate Change
MARS 220	EOSC 220	Introduction to Physical Oceanography
ENVI 294/ MARS 294	EOSC 294	Special Topics in Environmental Studies ( <i>existing name</i> ) Special Topics in Marine Science ( <i>existing name</i> ) <b>Special Topics in Environmental and Ocean Sciences</b>
ENVI 300	EOSC 300	Environmental Issues
ENVI 305	EOSC 305	Environmental Assessment Practices
ENVI 312	EOSC 312	Introduction to GIS
ENVI 313	EOSC 313	Geospatial Information Systems for Organizations
ENVI 314	EOSC 314	Introduction to Maps and Spatial Data Analysis
ENVI 315	EOSC 315	Geographic Information Systems
ENVI 420	<b>EOSC 320</b>	Introduction to Remote Sensing
MARS 300	<b>EOSC 340</b>	Marine Environment
ENVI 355	EOSC 355	Environmental Chemistry
ENVI 361	EOSC 361	Ecological Communities of San Diego County
ENVI 364	EOSC 364	Conservation Biology
ENVI 331W	<b>EOSC 431W</b>	Coastal Environmental Science
MARS 464	<b>EOSC 432</b>	Marine Community Ecology
MARS 450	EOSC 450	Geological Oceanography
MARS 451W	EOSC 451W	Biological Oceanography
MARS 452	EOSC 452	Marine Geochemistry
MARS 462	EOSC 462	Biology of Fishes
MARS 465	EOSC 465	Marine Mammals
<b>MARS 468</b>	<b>To be deleted</b>	<b>Marine Ecology</b>
MARS 473	EOSC 473	Climatology
MARS 474	EOSC 474	History of the Earth and Climate
MARS 474L	EOSC 474L	History of the Earth and Climate Laboratory
MARS 478	EOSC 478	Boundary Layer Flow
ENVI 485	EOSC 485	Environmental Geology
ENVI 487	EOSC 487	Surface Water Hydrology

MARS 493	EOSC 493	Methods in Marine Science ( <i>existing name</i> ) <b>Methods in Environmental and Ocean Sciences</b>
ENVI 494/ MARS 494	EOSC 494	Special Topics in Environmental Studies ( <i>existing name</i> ) Special Topics in Marine Science ( <i>existing name</i> ) <b>Special Topics in Environmental and Ocean Sciences</b>
ENVI 495/ MARS 495	EOSC 495	Senior Seminar
ENVI 496/ MARS 496	EOSC 496	Research
ENVI 497/ MARS 497	EOSC 497	Undergraduate Laboratory Assistant
ENVI 498/ MARS 498	EOSC 498	Internship
ENVI 499/ MARS 499	EOSC 499	Independent Study

**Environmental and Ocean Sciences  
Informational Changes for November 2015 UCC Meeting**

<b><u>Existing Course #</u></b>	<b><u>Proposed Course #</u></b>	<p style="text-align: center;"><b><u>Course Title</u></b>                      Black = unchanged                      Green = same course content, new course name                      Orange = course renumbered</p>
EOSC 110	EOSC 110	Introduction to Earth Systems ( <i>existing name</i> ) <b>Introduction to Geosciences</b>
EOSC 315	<b>EOSC 415</b>	Geographic Information Systems
EOSC 320	<b>EOSC 420</b>	Introduction to Remote Sensing
EOSC 431W	EOSC 431	Coastal Environmental Science ( <i>existing name</i> ) <b>Human Impacts on the Coastal Environment</b>

To: Undergraduate Curriculum Committee

From: Kristin Moran, Special Assistant to the Dean, Core Director

Re: ATF Report submission

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Attached to this letter you will find an Area Task Force (ATF) Report for review. The curriculum committee is asked to take a vote to accept or reject the report. The curriculum committee may not amend the content of the report. If the committee rejects the report, revision suggestions should be communicated to the chair of the ATF. The ATF will resubmit a revised report for approval.

In its deliberations, the committee is asked to focus the discussion on the scope, applicability and utility of the student learning outcomes as presented in the report.

Please note that every report will be slightly different in form. After student learning outcomes and assessment criteria are accepted, a single document will be produced to aggregate and summarize the information in the individual reports.

ATF Report  
Oral Communication Competency

**Description of Goals of Core Area**

Traditionally, USD has not required students to demonstrate their oral communication proficiency in the core curriculum. Investigating outcomes across disciplines, it is clear that many majors understand its central role by requiring oral presentation skills as a program learning outcome, including Architecture, Biochemistry, Biology, Chemistry, Communication Studies, Computer Science, Environmental Studies, French, Interdisciplinary Humanities, Liberal Studies, Marine Sciences, Mathematics, Physics, Sociology, Spanish, and Theology & Religious Studies. There are many opportunities for seamless integration since so many majors already integrate an oral competency. Moreover, every discussion of essential outcomes for our USD undergraduates has included this competency. Its contribution to a liberal arts education is noted by national level educational organizations such as the Association of American State Colleges and Universities (AASCU) and the Association of American Colleges and Universities. Additionally, in a 2010 national survey of employers, the areas they identified as requiring increased focus first include written and oral communication, then critical thinking and analytic reasoning, the application of knowledge in real-world settings, ethical decision making, and teamwork (Hart Research Associates, 2010).

Our understanding of the oral communication competency is based upon several key documents from the National Communication Association, and are embedded in the outcomes below (Morreale, S., Rubin, R.B., & Jones, E., 1998; Simonds, C.J., Buckrop, J., Redmond, M., & Quianthy, D.H., 2012). Our conceptual definition is a modified version of the AAC&U Value Rubric for Oral Communication (2010); our additions provide further clarification of terminology. **We define oral communication as a prepared, purposeful, presentation for an audience designed to increase knowledge, to foster understanding, and/or to promote change in the listeners' attitudes, values, beliefs, or behaviors.**

**List of Student Learning Outcomes**

Students will be able to:

- a) deliver a central message that is compelling and appropriate to the audience  
(*Central Message*)
  - a. precisely stated
  - b. imaginative language
  - c. appropriately repeated
  - d. memorable
  - e. strongly supported



- b) construct presentations with clear and consistent organizational patterns  
(*Organization*)
  - a. specific introduction and conclusion
  - b. sequenced material within the body of the speech
  - c. transitions
  - d. application of a variety of supporting materials: explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities
  - e. established credibility and authority on the topic through appropriate reference to information or analysis that significantly supports the presentation
  
- c) demonstrate techniques of verbal and nonverbal delivery that evoke confidence from the speaker, make the presentation compelling, and fully engage the audience  
(*Delivery*)
  - a. volume
  - b. expressiveness
  - c. pauses
  - d. posture
  - e. gestures
  - f. sustained eye contact

### **Assessment Criteria**

These learning outcomes are to be applied to the oral presentation of an individual speaker who has constructed a presentation of sufficient length to be judged on its own merit. If presentations will be evaluated through a group assignment each speaker should be evaluated separately. Examples of appropriate assignments include, but are not limited to, informative presentations (capstone projects, senior seminar research, class projects, current events) and persuasive speeches (policy proposals, problem solving, marketing pitches).

This competency does not lend itself to being embedded in any one part of the core curriculum because its features are unique. Therefore, this competency could easily be flagged inside various core and/or major courses. These kinds of learning outcomes could be appropriately paired with other competencies, such as written communication, and in capstone courses where students are expected to present culminating work.

Often such courses are capped at a restricted enrollment, which would advantage students practicing oral communication skills in the classroom prior to being assessed on their presentations. Given that class time will need to be dedicated to the assessment of student presentations, departments are encouraged to target courses with lower course enrollments for this upper division flag.

There are two key features to consider when flagging these outcomes in a course. The first critical feature is their developmental nature. We expect that students will achieve varying

skill levels depending on the amount of in-class speaking opportunities, degree of practice, and their maturity as individuals. Students should receive preparatory training in how to create, organize and deliver their content prior to their presentation during class, as well as encouraged to practice outside of class. It is advisable to give students an opportunity to speak in front of their audience before being assessed. Students should be encouraged to record their presentations, as this offers them the ability to reflect on their strengths and areas for improvement. Our committee strongly encourages early exposure to this competency in the semester with, at minimum, two instructor-assessed presentations.

The second critical feature is that presentations should be of sufficient length so that the outcomes can be achieved by the students and assessable by the instructor; therefore they are not suitable for oral examination answers or impromptu assignments.

### **Summary**

The oral communication competency is understood as a prepared, purposeful, presentation for an audience designed to increase knowledge, to foster understanding, and/or to promote change in the listeners' attitudes, values, beliefs, or behaviors. Learning outcomes attend to the central message, content, and delivery of student presentations. Students should be introduced to oral communication skills early in their upper division flagged class and be encouraged to develop learning outcomes throughout the course of the semester.

### **References:**

- AAC&U Oral Communication Value Rubric (2010). Retrieved from:  
<http://www.aacu.org/value/rubrics/OralCommunication.cfm>
- Morreale, S., R.B., & Jones, E. (1998). Speaking and listening competencies for college. Washington DC: National Communication Association.
- Simonds, C.J., Buckrop, J., Redmond, M., & Quianthy, D.H. (2012). Revised resolution on the role of communication. Report to NCA Legislative Assembly. Washington DC: National Communication Association.

Writing Competency ATF Report  
10/14/15

**Description of Goals of Core Area**

Written communication is one of the competencies of the Core Curriculum. The new Core continues the existing overall structure for writing, but makes refinements to both courses. New learning outcomes will guide both a 3-unit First-Year Writing course (FYW) and a flagged Advanced Writing course (AW). FYW must be taken in the first year, and should prepare students for writing in subsequent Core and major courses. FYW should stretch beyond a single discipline, so that students will study multiple discourses and gain practice in multiple kinds of writing. AW builds on FYW, providing further instruction in the same four basic outcome areas. Most AW students will work more specifically within an academic discipline, equipping them to succeed in their majors. Training and oversight for both FYW and AW will be provided by the new Writing Program.

**First-Year Writing Student Learning Outcomes**

***Contexts and Purposes***

Students will:

- write in ways appropriate to the audiences and occasions of each assignment
- write effectively in or about multiple discourses by distinguishing among and responding to rhetorical contexts

***Content***

Students will:

- apply relevant and compelling content, based on strong understandings of assigned subjects, in order to write effectively across multiple types of discourse

***Sources and Evidence***

Students will:

- use credible sources to develop ideas and arguments that are effective within assigned disciplines and discourses
- cite sources accurately according to conventions of the topic and discipline

***Mechanics***

Students will:

- write clearly and fluently, with few errors in syntax and grammar

## **First-Year Writing Assessment Criteria**

- Many FYW courses will be linked with LLCs, but not all.
- Courses can be taught by faculty from any department, upon completion of training by the Writing Program (see last bullet below).
- Multiple discourses: the syllabus can be based on the instructor's home discipline (e.g., literature), but should strive to cross into other disciplines and discourses. This does not mean the course must survey all major kinds of discourse. And it does not mean the instructor must teach content outside of his or her expertise. Rather, the goal is to help students recognize that many different kinds of writing and discourse are found across academia and in public media, the workplace, and elsewhere. Familiarity with some of these will allow students to practice writing in several discourses, and to practice moving from one discourse to another.
- Process writing: courses should be writing intensive and writing instructive, focusing on teaching writing as a process. This includes pre-writing, multiple drafts, revision, and editing.
- Training: all FYW instructors must take part in training workshops. The new Writing Program will oversee training and oversight of FYW instructors, and student placement.

## **Advanced Writing Student Learning Outcomes**

### ***Contexts and Purposes***

Students will:

- write with the mastery of a student advanced in an area of study by distinguishing and responding to audiences, occasions, and discursive contexts

### ***Content***

Students will:

- apply relevant and compelling content, based on mastery of assigned subjects, in order to write effectively within the area of study

### ***Sources and Evidence***

Students will:

- use credible sources to develop ideas and arguments that are effective within the area of study
- cite sources accurately according to the conventions of the area of study

### ***Mechanics***

Students will:

- write clearly and fluently in formats relevant to the area of study, with few errors in syntax and grammar

## **Advanced Writing Assessment Criteria**

- AW courses can be required in the major, at the discretion of each department. They can also be fulfilled outside of the major, which creates an opportunity to develop new courses that include several departments, e.g., Writing in the Social Sciences or Writing in the Sciences.
- AW courses should be allowed in languages other than English in the specific case of majors in the Languages, Cultures, and Literatures department.
- Process writing: courses should be writing intensive and writing instructive, focusing on teaching writing as a process. This includes pre-writing, multiple drafts, revision, and editing.
- Training: all AW instructors must take part in training workshops. The new Writing Program will oversee training and oversight of AW instructors.

## **Summary**

Faculty accustomed to teaching writing, in both ENGL 121 and the W courses, should be aware that Core revision has made some important adjustments to course goals, reflected in these outcomes and criteria. First-Year Writing is meant to be less of an English class than our current Composition and Literature course. It now includes the aim of helping students differentiate among multiple discourses, and giving them the opportunity to practice writing in several discourses (see note on multiple discourses in the assessment criteria). The option to attach FYW to an LLC is one way that such interdisciplinarity can be fostered; the new Writing Program will provide resources and training for this transition. Advanced Writing will benefit from reinvigorated training and oversight by the new Writing Program. Before teaching AW courses, instructors will be required to complete training workshops, which will help ensure that these courses are not just writing intensive, but also writing instructive. The new Writing Program should provide the opportunity for innovation in AW courses, and the development of new courses and new approaches.

Faculty who have not previously taught ENGL 121 are invited to apply to teach FYW. It will likely be staffed mostly by the English Department, but any other interested department or faculty can apply. Applicants should pay careful attention to learning outcomes, and will receive training from the Writing Program.

Respectfully submitted by;  
Tom Dalton, Kathleen Kramer, Mike Mayer, Abe Stoll, David Sullivan

ATF Report Template  
DIVERSITY, INCLUSION, AND SOCIAL JUSTICE (DISJ)

**Description of Goals of Core Area**

Critical examination of inclusion and social justice fosters an informed appreciation of different experiences and perspectives, recognition of privilege and power, and engagement across a range of intellectual and cultural traditions. Courses in the Diversity, Inclusion, and Social Justice foundation area emphasize students gaining substantial **knowledge** of self and diverse others, and honing **skills** to articulate complexities of how people are categorized and valued differently, and how that leads to wide disparities in life experiences and outcomes.

- *Diversity* refers to difference, understood as an historically and socially constructed set of value assumptions about what / who matters that figures essentially in power dynamics from the local to the global. Some differences have been made to matter more than others.
- *Inclusion* is the institutional process(es) of incorporating diversity.
- *Social Justice* entails identifying and contesting the process(es) in which power and privilege utilize diversity for inequitable outcomes along intersecting lines—race, class, gender, sexual orientation, religion, ability, and more—that inhibit democratic empowerment, civil and human rights, and Catholic social teachings.

**GOAL: Knowledge:** Understanding how assumed differences among people become named, valued, and institutionalized requires an interdisciplinary framework that examines group and identity formation, cultural dynamics and expression, historical legacies, political and economic conditions, and the basis of knowledge itself. Knowledge SLO emphasizes the conceptual, reflective, and relational understanding required to engage diversity, inclusion, and social justice both critically and compassionately, and in an informed and grounded manner (i.e. the context).

**GOAL: Skills:** Interdisciplinary intellectual tools and methods are required to conceptualize and articulate the complexities of diversity, inclusion and social justice. The skills SLO highlights indispensable tools and methods that position students as competent contributors to just and equitable social improvements.

**List of Student Learning Outcomes**

KNOWLEDGE: **Critical self-reflection** – Critically reflect on and describe how you and others have experienced privilege and oppression.

KNOWLEDGE: **Explain diversity, inclusion, and social justice** – Analyze how social constructions are produced historically and reproduced in contemporary

contexts and various forms of cultural representation – literature, film, among others. Describe struggles of marginalized peoples and their allies against forces such as racism, sexism, classism, or heterosexism to attain equitable outcomes.

**SKILLS: Analyze the complexities of diversity, inclusion, and social justice** – Critically examine the intersections of categories such as race, ethnicity, class, gender and sexuality in local and/or global contexts of unequal power relationships and social justice.

### **Assessment Criteria**

*List the criteria that will be used to determine whether the student learning outcomes are being met. Course criteria are distinct from assessment criteria and should not be included in this section.*

#### **KNOWLEDGE: Critical Self-Reflection**

##### Criteria

- Accuracy of information about privilege/oppression
- Depth and impact of self-reflection
- Relevance of personal experience
- Clarity and effectiveness of ability to communicate about self and self in relation to others

#### **KNOWLEDGE: Explain diversity, inclusion, and social justice**

##### Criteria

- Accuracy of information about groups and identities, factual accuracy not stereotypes
- Breadth of multiple viewpoints
- Distinguish between master and counter narratives
- Clarity of explanation about group(s)/values

#### **SKILLS: Conceptualize and articulate the complexities of diversity, inclusion, and social justice**

##### Criteria

- Accuracy and depth of synthesis of intersecting axes into a more complex picture of self, another individual, or a group
- Accuracy and thoroughness of explanation of past, current, and future national/global group patterns

- Effective employment of multiple or mixed-methods (such as qualitative, quantitative, case studies, spatial analysis, oral history, literary or cultural studies etc.)

## **Summary**

*Describe final thoughts that can be used to guide faculty who will submit courses for inclusion in this area of the core.*

- Course proposals from across the departments and schools are especially encouraged.
- Courses previously approved under the “D” core requirement are not guaranteed approval in the DISJ area.
- “D” versus “DISJ”: The current “D” courses must have at least 30% of their content address some aspect of diversity and have not required assessment. DISJ courses will have all DISJ learning outcomes as the frame or lens for all course content and must have a plan for assessment.
- Proposals must include a description of activities designed to help students achieve the learning outcomes.
- The two DISJ flags are developmental (level one and level two), and course proposals should clarify which level they target. Referring to the attached rubric, level one courses should aim for “Developing – 2” and “Accomplished – 3”, and level two courses should aim for “Advanced – 4” and “Mastery – 5”.
- Students must take at least one DISJ course with a domestic focus, so proposed courses must identify if they have a domestic focus, and clearly present what that domestic focus is.
- The Diversity Curriculum Committee recommendations (2/22/12) include applied learning through community service learning. These pedagogies would greatly increase the impact of all DISJ learning outcomes, and we encourage course proposals to include these strategies.
- International perspectives are welcomed. Given the location of the university we also encourage emphasis on California, southern California, or San Diego.



Rubric	Mastery - 5	Advanced - 4	Accomplished - 3	Developing - 2	Benchmark - 1
Critical Self Reflection	-Fully accurate and highly insightful treatment of privilege and oppression; - Significantly transformative self reflection that deeply impacts self and others; -Pivotal personal experiences; -Clear and insightful communication about self and self in relation to others	-Fully accurate treatment of privilege and oppression with some critical reflection on stereotypes; -Clear and significant depth or impact in self reflection; -High relevance of personal experiences; -Very good ability to communicate about self and self in relation to others	-Privilege and oppression presented in fully accurate, non-stereotypical terms; - Good depth and impact in self reflection; -Clear relevance of personal experiences; -Good ability to communicate about self and self in relation to others	-Privilege and oppression presented mostly accurately, with minimal stereotypical terms; - Some depth or impact in self reflection; - Some relevance of personal experiences; -Some ability to communicate about self and self in relation to others	-Privilege and oppression presented in largely stereotypical terms, significant inaccuracies; -Little to no depth or impact in self reflection; -Low relevance of personal experiences; -Limited ability to communicate about self and self in relation to others
Explain DISJ	-Fully accurate and thorough information about groups and identity categories, heavy presence of extensive analysis of formation and role of stereotypes; -Deep comprehension of multiple viewpoints; Clear, accurate, precise, insightful, and deep distinction between master and counter narratives; - Clear and insightful explanation about groups and values	-Very good accuracy of information about groups and identity categories, good critical awareness of existing stereotypes; - Very good ability to comprehend multiple viewpoints; -Clear, fully accurate, and precise distinction between master and counter narratives; - Very clear and effective explanation about groups and values	-Good accuracy of information about groups and identity categories, good critical awareness of stereotypes; -Good ability to comprehend multiple viewpoints; - Well able to distinguish between master and counter narratives; -Mostly clear explanation about groups and values	-Some accuracy of information about groups and identity categories, little presence of stereotypes; -Some clear ability to comprehend multiple viewpoints; -Some ability to distinguish between master and counter narratives; - Somewhat clear explanation about groups and values	-Limited accuracy of information about groups and identity categories, heavy presence of stereotypes; -Little ability to comprehend multiple viewpoints; - Difficulty distinguishing between master and counter narratives; - Unclear explanation about groups and values

<p>Conceptualize and Articulate Complexities of DISJ</p>	<p>-Extensive and original synthesis of intersecting categories; -Fully accurate and thorough explanation of past, current, and future US/global group patterns; - Significant facility and originality with utilizing multiple or mixed-methods in examining DISJ; -Insightful and innovative vision for a just world</p>	<p>-Limited or missing synthesis of intersecting categories; - Inaccurate or missing explanation of past, current, and future US/global group patterns; -Inability to distinguish between and utilize multiple or mixed-methods in examining DISJ; -Can articulate a vision for a just world with notable depth and impact</p>	<p>-Good synthesis of intersecting categories; -Mostly accurate explanation of past, current, and future US/global group patterns, with some notable depth; - Good ability to distinguish between and utilize multiple or mixed-methods in examining DISJ; - Fully able to articulate a substantial vision for a just world</p>	<p>-Some synthesis of intersecting categories; - Somewhat accurate explanation of past, current, and future US/global group patterns; -Some ability to distinguish between and utilize multiple or mixed-methods in examining DISJ; -Can somewhat articulate a substantial vision for a just world</p>	<p>-Limited or missing synthesis of intersecting categories; - Inaccurate or missing explanation of past, current, and future US/global group patterns; -Inability to distinguish between and utilize multiple or mixed-methods in examining DISJ; - Little to no ability to articulate a vision for a just world</p>

ATF Report  
QUANTITATIVE REASONING

**Description of Goals of Core Area**

Quantitative Reasoning (QR) is the ability to use relevant quantitative information in the evaluation, construction, and communication of arguments in public, professional, and personal life, and to consider the power and limitations of such quantitative evidence.

The ability to think quantitatively is important in today's data-driven world. Selecting appropriate quantitative data and using it effectively to support an argument has applications in every-day life, for example:

- evaluating the proper use of data and statistics when determining the pros and cons of vaccination;
- calculating the cost effectiveness of increased fuel efficiency of a hybrid versus combustible engine automobile;
- evaluating the risk involved to property and persons in determining frequency and likelihood of natural disasters, such as earthquakes and hurricanes; or
- comparing home loan scenarios under changing interest rates and different loan terms.

As the above examples demonstrate, QR is interdisciplinary in nature. For that reason, **we recommend QR a flag designation** so that it can be qualified by a broader array of courses.

**List of Student Learning Outcomes (SLO's)**

**Identification:** Recognize and select quantitative information that is relevant to the argument (e.g., extract necessary data from larger datasets that may also contain non-relevant information).

**Calculation and Organization:** Perform any necessary calculations (e.g., converting units, standardizing rates, applying formulas, solving equations), and put data into comparable forms (e.g. graphs, diagrams, tables, words).

**Interpretation:** Interpret and explain data in mathematical forms, such as analyzing trends in graphs and making reasonable predictions about what the data suggest about future events.

**Evaluate Assumptions and Recognize Limitations:** Make and evaluate important assumptions in estimating, modeling, and analysis of quantitative data as well as recognizing their limitations.

**Justification:** Communicate carefully qualified conclusions and express quantitative evidence to support arguments.

### **Assessment Criteria**

A course that satisfies the QR requirement for the Core Curriculum will meet each of these learning outcomes. Assessment instruments (assignments, exams, reports) should be designed to show that students are meeting these learning outcomes.

The attached rubric will aid in your assessment of their competency. For example, how will you know if a student is mastering the Identification outcome? They will recognize and select quantitative data *correctly* or *accurately*. A successful student will master the other learning outcomes by providing successful, comprehensive, and insightful calculations. Their Interpretations are *accurate, appropriate, or reasonable*. They identify and explicate Assumptions *clearly* and *compellingly*. They recognize Limitations *accurately* and articulate them with *clarity*. They justify with *depth* and *thoughtfulness*. Students not yet at this Mastery level can be identified by the descriptions in the developing and introduction columns of the attached rubric.

The example assignment provided was designed to target all SLO's but multiple assessments may be used to target different SLO's as long as by the end of a QR course a student has achieved competency of all SLO's. Mastery of each QR learning outcome is desired, however, a student who shows progressive development of QR skills toward mastery is also acceptable.

### **Summary**

QR courses develop students' ability to communicate, draw insights and facilitate decision making with quantitative information; in other words, think quantitatively. A common misconception is that QR is embedded in mathematics classes. However, QR takes mathematics tools in carrying out complex reasoning in decision making. A critical component of QR is the ability to identify quantitative relationships in a range of contexts. As such, the mathematic tools should be taught in a disciplinary or interdisciplinary context to demonstrate their relevance and application. Ultimately, QR stays in the intersection of critical thinking, math skills in a real-world context of learning.

For more guidance while working with this competency, see the American Association of Colleges and Universities (AACU) special publication "Quantitative Reasoning: The Next "Across the Curriculum" Movement" found here:  
<https://www.aacu.org/peerreview/2014/summer/elrod>

## QUANTITATIVE REASONING RUBRIC

*Modified from the Quantitative Literacy Value Rubric of the American Association of Colleges and Universities*

Skill level achieved:	Mastery 4	3	Developing 2	Introductory 1
<b>Recognize and Select</b> <i>quantitative information that is relevant to an argument</i>	Correctly or accurately select data that is needed to best support the argument. Student is able to identify data that is not relevant or data that is redundant.	Most of the relevant data is selected but the argument could be strengthened by inclusion of further data, or some data selected is not necessary for the strongest argument.	Selection of appropriate data is attempted but mostly incorrect or inaccurate.	Selection of data is not relevant or specific (i.e., student uses all data provided rather than selecting the most relevant data) and thus student has not recognized which data are required in support of a strong argument.
<b>Calculate and Organize</b> <i>perform calculations and put data into comparable forms</i>	Calculations attempted are correct and sufficiently comprehensive to solve the problem. Results are skillfully organized into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.	Calculations attempted are mostly correct and adequately comprehensive to solve the problem. Results are organized into an appropriate and desired mathematical portrayal.	Calculations attempted are either unsuccessful or represent only a portion of the calculations required to comprehensively solve the problem. Resulting mathematical portrayal is only partially appropriate or inaccurate calculations.	Calculations are attempted but are both unsuccessful and are not comprehensive. Resulting mathematical portrayal is inappropriate or inaccurate.
<b>Interpret and Explain</b> <i>Ability to explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words)</i>	Provides accurate, appropriate and reasonable explanations of information presented in mathematical forms. Makes appropriate inferences based on that information. <i>For example, accurately explains the trend data shown in a graph and makes reasonable predictions regarding what the data suggest about future events.</i>	Provides correct explanations of information presented in mathematical forms but further explanation may be needed to further enhance insights portrayed in mathematical forms. <i>For instance, accurately explains the trend data shown in a graph.</i>	Provides somewhat accurate explanations of information presented in mathematical forms, but occasionally makes minor errors related to computations or units. <i>For instance, accurately explains trend data shown in a graph, but may miscalculate the slope of the trend line.</i>	Attempts to explain information presented in mathematical forms, but draws incorrect conclusions about what the information means. <i>For example, attempts to explain the trend data shown in a graph, but will frequently misinterpret the nature of that trend, perhaps by confusing positive and negative trends.</i>
<b>Evaluate Assumptions and Recognize Limitations</b> <i>Make and evaluate important assumptions in estimation, modeling, and analysis of quantitative data, and recognize their limitations</i>	Assumptions are clearly and comprehensively stated. Provide compelling rationale for why each assumption is appropriate. Explains in detail that confidence in final conclusions is limited by the accuracy of the assumptions and analyses performed in the quantitative analysis.	Assumptions are stated but further clarity may be needed or they are not listed comprehensively. Shows awareness that confidence in final conclusions is limited by the accuracy of the assumptions and analyses performed in the quantitative analysis.	Generally describes some of the assumptions but may not recognize their importance. Attempts to describe the limitations of the quantitative analysis but cannot effectively connect them to the argument.	Assumptions are not stated or estimations and models of quantitative information is lacking. Does not know that limitations in the quantitative analysis exist.
<b>Communicate</b> <i>Expressing quantitative evidence in support of the argument or purpose of the work</i>	Uses the quantitative analysis of data as the basis for providing deep and thoughtful judgments. Also draw insightful, carefully qualified conclusions from this work. Presents the data in an effective format, and explicates it with consistently high quality.	Uses the quantitative analysis of data as the basis for competent judgments, drawing reasonable and appropriately qualified conclusions from this work. Uses quantitative information in connection with the argument or purpose of the work, though data may be presented in a less than completely effective format or some parts of the explication may be uneven.	Uses the quantitative analysis of data as the basis for workmanlike (without inspiration or nuance, ordinary) judgments, drawing plausible conclusions from this work. Uses quantitative information, but does not effectively connect it to the argument or purpose of the work.	Uses the quantitative analysis of data as the basis for tentative, basic judgments, although is hesitant or uncertain about drawing conclusions from this work. Presents an argument for which quantitative evidence is pertinent, but does not provide adequate explicit numerical support. (May use quasi-quantitative words such as "many," "few," "increasing," "small," "and the like in place of actual quantities.)

## ATF Report INTEGRATION

### Description of Goals of Core Area

Integrative learning asks students and faculty to connect across disciplines, to synthesize disparate areas of knowledge, and to pose the "big questions." Core curriculum components connect and build on one another, the latest advances in research are integrated into the quest for understanding, and a continuous engagement with the complex problems of our world inform the questions we ask and the answers we seek. Integrative learning is an approach that creates an opportunity for students to make connections among ideas and experiences to synthesize knowledge. The definition of integration is multifaceted and includes courses and experiences that provide students with opportunities to make connections between disciplines, apply knowledge in a variety of contexts, make connections between curricular and co-curricular activities, and to synthesize Core competencies.

At the end of their coursework at USD, students should be able to do the following:

1. **Recognize** broad connections between multiple disciplines, perspectives, and/or approaches to learning.
2. **Articulate** how the integration of different disciplines, perspectives, and approaches to learning can enhance ones' understanding of practical issues and problems.
3. **Synthesize** knowledge and/or skills from multiple disciplines or perspectives.
4. **Transfer and Apply** knowledge and/or skills from multiple disciplines or perspectives.

### List of Student Learning Outcomes

1. SLO #1 and #2 (Recognition and Articulation)  
The first two SLOs can be demonstrated at all levels, but are particularly relevant to the experiences of students in the LLCs. Through the LLCs students will be introduced to the integrated nature of learning and problem solving. We want them to be able to: 1) **recognize** that people bring different perspectives to scholarly inquiry; 2) **discuss** how real-world problem solving is inherently integrated; and, 3) **describe** the value of multiple perspectives to scholarly inquiry and problem solving.
2. SLO #3 (Synthesis)  
The third and fourth SLOs can also be demonstrated at all levels, but are particularly relevant to the experiences of more advanced students who are completing their Core Project.  
For the third SLO, we are expecting students to **draw meaningful connections between diverse perspectives** in way that enhances the overall body of knowledge

presented. We want them to be able to demonstrate that the whole (an integrated body of knowledge) is greater than the sum of its parts.

3. SLO #4 (Application)

For the fourth SLO, students are expected to **transfer and apply** an integrated body of knowledge that they have developed by synthesizing diverse perspectives and skills to new settings and/or to address complex problems within or beyond campus.

### **Assessment Criteria**

1. SLO #1 and #2 (Recognition and Articulation)

Reflection papers at the end of 2<sup>nd</sup> semester LLC experience; Paper or project comparing how two or more perspectives apply to single issue.

2. SLO #3 (Synthesis)

Paper assignments asking students to synthesize knowledge, perspectives, or approaches from different disciplinary perspectives, or from diverse learning experiences; Research Proposals; Literature Reviews; Community Engagement Pedagogy; Shared writing prompts across team taught classes (See e.g. Shared Sexual Diversity Cluster).

3. SLO #4 (Application)

Integrated research team projects or proposals (across team taught or clustered courses) (See e.g. Integrated Sustainability Capstone); Individual or group research project (or proposal) involving community partners (potentially involving CSL); Individual or group research project (or proposal) to address a real-world problem (See e.g. Integrated Sustainability Capstone); 2<sup>nd</sup> semester LLC paper addressing particular issue or problem; Project or paper addressing Changemaker theme.

### **Summary**

1. The definition of integrated learning is multifaceted and includes any courses and learning experiences that provide students with opportunities to make connections between disciplines, apply knowledge in a variety of contexts, make connections between curricular and co-curricular activities, and to synthesize Core competencies.
2. Students will meet their requirements for Integrated Learning through a two-semester sequence of LLCs during their first year at USD, and through a Core Project, which they will complete near the end of their studies. Integrated learning can also be an integral part of a variety of courses, for example, Honors team-taught courses.
3. LLCs- Integration will take place in regular LLC activities, and in the spring course. Integration is at the discretion of the spring course instructor. We believe that the spring course is positioned for genuinely academic interdisciplinarity. Each spring course will have students who in the fall studied the LLC theme from a number of different disciplinary perspectives, which sets the stage for faculty and students to explore interdisciplinarity organically within the classroom.

4. Core Projects could be, but not limited to, a discipline-specific senior project that incorporates integrative learning, a team-taught course or interdisciplinary cluster, a community engagement experience, interdisciplinary research, interdisciplinary capstone or interdisciplinary project-based course. Examples of existing curricula that might fulfill the Core Project include: several existing community-service learning courses, the Integrated Capstone on Sustainability, the Sexual Diversity Cluster, existing capstones in specific majors, and Honors team-taught courses.



ATF Report – 11/4/2015  
CRITICAL THINKING AND INFORMATION LITERACY

ATF Members: Anne Koenig (chair), Martha Adkins, Susan Babka, Annalisa Barrett, Jack Crumley

**Description of Goals of Core Area**

CTIL is an embedded competency – one that is developed in many classes within the Core curriculum and within major areas of study. Critical thinking is defined by the AAC&U as a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion. Critical thinking is defined as the students' ability to explain an issue/problem, construct a thesis, gather support for a claim, consider assumptions, and reach conclusions. According to Peter Facione in "Critical Thinking: What It Is and Why It Counts," critical thinking as a habit of mind fosters inquisitiveness on a wide range of issues; the desire to become and remain well informed; alertness to opportunities to use critical thinking; trust in the process of reasoned inquiry; self-confidence in one's own abilities to reason and think through a problem; open-mindedness to divergent views; flexibility in considering alternatives and opinions; understanding the opinions of others; fair-mindedness in appraising reasoning; honestly facing one's own biases, judgments, prejudices, stereotypes; discretion in suspending, altering, or making judgments; and willingness to reconsider and revise views where necessary.

In order to achieve critical thinking, a student must also be information literate. Information literacy provides students with the necessary skills to gather and analyze various sources of information, including access the needed information through well-designed search strategies, evaluate the credibility of the information, use the information to accomplish a specific purpose, and use information ethically and legally. The Association of College and Research Libraries (ACRL) defines information literacy as the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning.

CTIL requires the ability to analyze and evaluate arguments and evidence appropriate to each discipline. Thus, the CTIL student learning outcomes are purposefully broad in order to apply to a wide range of disciplines, designed to encourage the development of students' abilities to generate ideas, arguments, research, artworks, methods, approaches and perspectives that are appropriate to the area and level of study.

In the core, CTIL has been formally and fully embedded in Historical Inquiry. The Historical Inquiry area has student learning outcomes that align with our definition and outcomes for CTIL, and the assessments used in these classes will also be used to assess CTIL (see Assessment Criteria below).

Because we recognize that many other areas of the core contain elements of CTIL within their student learning objectives, we have also earmarked these areas and their relevant outcomes below. However, it should be noted that these are areas of the core that contain part of CTIL without a formal embedding process, and thus are not used for assessment purposes. This list is given as a mechanism for understanding the wide range of critical thinking that occurs in many areas of the core. Thus, USD students are exposed to CTIL in many places, even though Historical Inquiry is the formal “home” for CTIL.

**CTIL Student Learning Outcomes**

CTIL Goal: Students will be able to identify, evaluate, and use information to think critically about issues and claims, including creating an appropriate thesis statement, evaluating evidence, and coming to a conclusion.

Students will:

- 1) Support a conclusion or thesis using recognized techniques of argument analysis, argument construction, and the analysis of evidence in a manner appropriate to the relevant discipline of the course
- 2) Identify and evaluate appropriate and credible evidence, data, or arguments
- 3) Appropriately and ethically acknowledge sources

**CTIL Formal Embedding in Historical Inquiry**

These Learning Outcomes are embedded in Historical Inquiry as follows:

CTIL OUTCOME	HISTORICAL INQUIRY FORMAL EMBEDDING
1) Support a conclusion or thesis using recognized techniques of argument analysis, argument construction, and the analysis of evidence in a manner appropriate to the relevant discipline of the course	<p>LO 3: Students analyze a range of primary sources (texts, photographs, visual art, audio recordings, films), articulate historical context, and use these sources as evidence to support an argument.</p> <p>LO 4: Students find secondary sources to weigh against competing scholarly interpretations and learn to employ various interpretive strategies.</p>
2) Identify and evaluate appropriate and credible evidence, data, or arguments	<p>LO 2: Students access information effectively.</p> <p>LO 3: Students analyze a range of primary sources (texts, photographs, visual art, audio recordings, films), articulate historical context, and use these sources as evidence to support an argument.</p>
3) Appropriately and ethically acknowledge sources	LO 4: Students effectively communicate their findings in written form and use information ethically and legally.

## **CTIL Embedded Elements within Other Core Areas**

In addition to the formal embedding and assessment of CTIL within Historical Inquiry, we believe that many other areas of the core involve some elements of CTIL. We list these areas and their CTIL-related outcomes here [in the order they are listed in the core documents] to show the broad nature of CTIL and highlight the many different areas in which students will be exposed to CTIL principles in the core. [Below is a first draft of these outcomes, which are open to revision.]

### *WRITING COMPETENCY*

Students will:

- use credible sources to develop ideas and arguments that are effective within assigned disciplines and discourses
- cite sources accurately according to the style of the area of study

### *MATHEMATICAL REASONING AND PROBLEM SOLVING*

2. Mathematical reasoning, argumentation, and proof. Demonstrate mathematical reasoning by being able to

- a. create, follow, and assess chains of mathematical arguments,
- b. explain, interpret, and correctly apply definitions, theorems, and results

### *QUANTITATIVE REASONING*

- Identification: Recognize and select quantitative information that is relevant to the argument (e.g., extract necessary data from larger datasets that may also contain non-relevant information).
- Interpretation: Interpret and explain data in mathematical forms, such as analyzing trends in graphs and making reasonable predictions about what the data suggest about future events.
- Evaluate Assumptions and Recognize Limitations: Make and evaluate important assumptions in estimating, modeling, and analysis of quantitative data as well as recognizing their limitations.
- Justification: Communicate carefully qualified conclusions and express quantitative evidence to support arguments.

### *THEOLOGICAL AND RELIGIOUS INQUIRY*

Students will demonstrate:

1. a critical understanding of Christian traditions, including Catholic Christianity at a basic college level, OR an understanding of the diversity of religious traditions with attention to Catholic Christianity at a basic college level;
2. a critical understanding of theory and method in biblical studies, Christian theology, or religious studies

### *PHILOSOPHICAL INQUIRY*

DOING: READING, WRITING AND SPEAKING

- Identify and effectively use appropriate resources for philosophical research and including books, journals and online materials
- Become proficient in reading both primary and secondary sources in philosophy, analyzing their argumentation critically and systematically
- Construct well-reasoned, well-integrated essays based on research in philosophical texts, supporting conclusions and replying to reasoned objections

#### THINKING: CRITICAL REASONING AND PROBLEM SOLVING

- Develop and demonstrate ability to reason critically using both natural and artificial languages
- Identify and define issues and problems of concern, asking relevant questions, examine different sides of an issue, and evaluating arguments
- Support conclusions by evidence and reasoning
- Express conclusions with awareness of the degree to which these conclusions are supported by evidence.

#### ETHICAL INQUIRY

- 3. PERSPECTIVAL REFLECTION: Analyze a contemporary ethical issue from multiple perspectives, including identifying potential biases on the basis of social location (e.g., historical, cultural, gender, racial, economic, religious, ability, etc.).
- 4. CLARITY OF ARGUMENT: Develop, articulate, and defend a well-reasoned judgment on a particular ethical issue, demonstrating appreciation of nuance and ambiguity, as well as clarity and precision, in their thinking and writing about moral problems, concepts, and ideals.

#### DIVERSITY, INCLUSION, AND SOCIAL JUSTICE (DISJ)

- KNOWLEDGE: Critical self-reflection – Critically reflect on and describe how you and others have experienced privilege and oppression.
- SKILLS: Analyze the complexities of diversity, inclusion, and social justice – Critically examine the intersections of categories such as race, ethnicity, class, gender and sexuality in local and/or global contexts of unequal power relationships and social justice.

#### SCIENCE & TECHNOLOGICAL INQUIRY

Students who complete this course should be able to:

1. Design and conduct an iterative investigation to generate scientific knowledge or a technological solution to a problem.
3. Analyze data using tools, technology, and models in order to make valid and reliable claims.
4. Use appropriate and sufficient evidence and scientific reasoning to evaluate claims and explanations about the natural and designed world

#### SOCIAL & BEHAVIORAL INQUIRY

- a. Articulate and compare social scientific theories as appropriate to the course/discipline.

- b. Evaluate the quality, objectivity, and credibility of evidence using theories, methods, or ways of thinking that define inquiry in a social science discipline.
- c. State a conclusion that is a logical extrapolation from the inquiry process.

#### *LITERARY INQUIRY*

- Analyze literary interpretations, theories, and arguments; identify and critique unexamined assumptions; understand diverse theoretical movements and traditions, their fundamental characteristics, their development over time, and their long-term influences.
- Demonstrate deep textual engagement and mastery of literary analysis techniques by means of high-quality oral contributions in class and writings that contain acute observations and ethical interpretations.

#### *ARTISTIC INQUIRY*

- AI Outcome 2: (Engagement with Theoretical Principles) Recognize and describe the relationships between the component parts of an artistic medium using discipline specific vocabulary and analytic systems.
- AI Outcome 3: (Historic and Cultural Contextualization) Situate and contextualize artistic practices within historic and cultural frames methods of inquiry specific to the discipline.

#### **CTIL Assessment Criteria**

Assessment of CTIL is best accomplished with a short writing assignment or presentation – an essay, short paper, or presentation which requires students find, evaluate, and use sources of evidence in the service of an argument or thesis. Historical Inquiry uses such an assessment, which can then also be used to assess CTIL with a rubric similar to the one attached, which is based on the AAC&U rubrics for Critical Thinking and Information Literacy.

- 1) Support a conclusion or thesis using recognized techniques of argument analysis, argument construction, and the analysis of evidence in a manner appropriate to the relevant discipline of the course
  - *Come to an appropriate conclusion or support a thesis using arguments and evidence*
  - *Assess the credibility of claims/arguments/hypotheses*
- 2) Identify and evaluate appropriate and credible evidence, data, or arguments
  - *Plan and implement search strategies that align with information needs*
  - *Critically evaluate information sources for relevance to issue, quality, and credibility*

3) Appropriately and ethically acknowledge sources

- *Give credit to the original ideas of others through proper and ethical attribution and citation*

**Summary**

The CTIL ATF will not separately approve courses for CTIL, as given the formal embedding process any course within Historical Inquiry will satisfy CTIL student learning outcomes. Thus, courses approved by Historical Inquiry will also be approved as CTIL and the current CTIL committee will work with the Historical Inquiry ATF to approve these courses. Faculty will not need to apply for separate CTIL approval, but faculty submitting courses to History Inquiry should incorporate relevant assignments that require students to find and evaluate evidence in the service of an argument or thesis (that can be assessed using a rubric similar to that given below). The designated CTIL representative on the future core committee can make sure CTIL is being appropriately embedded in Historical Inquiry courses.



POSSIBLE ASSESSMENT RUBRIC (based on AAC&U rubrics for critical thinking and information literacy)

*Given the norms and standards of the discipline, at what level does the work demonstrate that the student:*

	1 - Initial	2 - Emerging	3 - Developing	4 - Accomplished
<i>Comes to an appropriate conclusion or supports a thesis using arguments and evidence</i>	Conclusion is inconsistently tied to some of the information discussed, consequences and implications are oversimplified; specific position/thesis/hypothesis is stated but is simplistic and obvious	Conclusion is logically tied to information because information is chosen to fit the desired conclusion; some consequences and implications are identified clearly; specific position/thesis/hypothesis acknowledges different sides of an issue	Conclusion is logically tied to a range of information, including opposing viewpoints; consequences and implications are identified clearly; specific position/thesis/hypothesis takes into account the complexities of an issue	Conclusions and consequences and implications are logical and reflect student's informed evaluation; specific position/thesis/ hypothesis takes into account the complexities of an issue and acknowledges limits
<i>Assesses the credibility of claims/arguments/ hypotheses</i>	Information is taken from sources without any evaluation; viewpoints of experts are taken as fact, without question	Information is taken from sources with some evaluation; viewpoints of experts are taken mostly as fact, with little questioning	Information is taken from sources with enough evaluation to develop a coherent analysis; viewpoints of experts are subject to questioning	Information is taken from sources with enough evaluation to develop a comprehensive analysis; viewpoints of experts are questioned
<i>Plans and implements search strategies that align with information needs</i>	Accesses information randomly, retrieves information that lacks relevance and quality	Accesses information using simple search strategies, retrieves information from limited and similar sources	Accesses information using variety of search strategies and some relevant information sources	Accesses information using effective, well-designed search strategies and appropriate and relevant information sources
<i>Critically evaluates information sources for relevance to issue, quality, and credibility</i>	Chooses a few sources. Uses limited criteria (such as relevance to the research question or problem) to select sources	Chooses a small variety of sources. Uses basic criteria (such as relevance to the research question or problem, currency, primary vs. secondary sources) to select sources	Chooses a variety of sources appropriate to the scope and discipline of the question or problem. Uses a few criteria (such as relevance to the research question or problem, currency, primary vs. secondary sources,	Chooses a variety of sources appropriate to the scope and discipline of the question or problem. Uses multiple criteria (such as relevance to the research question or problem, currency, primary vs.



			authority, audience, and bias/point of view) to select sources	secondary sources, authority, audience, and bias/point of view) to select sources
<i>Gives credit to the original ideas of others through proper and ethical attribution and citation</i>	Infrequently or incorrectly uses citations and references, not generally preserving original integrity of sources; infrequently distinguishes between common knowledge, personal opinion, and ideas requiring attribution	Mostly uses citations and references when necessary, usually preserving original integrity of sources with paraphrasing, summary, and quotation; sometimes distinguishes between common knowledge, personal opinion, and ideas requiring attribution	Usually uses citations and references when necessary, preserving original integrity of sources with paraphrasing, summary, and quotation; sometimes distinguishes between common knowledge, personal opinion, and ideas requiring attribution	Uses citations and references when necessary, preserving original integrity of sources with paraphrasing, summary, and quotation; distinguishes between common knowledge, personal opinion, and ideas requiring attribution

ATF Report  
November 16, 2015  
HISTORICAL INQUIRY /  
CRITICAL THINKING AND INFORMATION LITERACY

“Who controls the past controls the future: who controls the present controls the past.”  
George Orwell, *1984*

“Easily the most boring class was History of Magic, which was the only one taught by a ghost. Professor Binns had been very old indeed when he had fallen asleep in front of the staff room fire and got up the next morning to teach, leaving his body behind him. Binns droned on and on while they [the students] scribbled down names and dates, and got Emeric the Evil and Uric the Oddball mixed up.”

J.K. Rowling, *Harry Potter and the Sorcerer’s Stone*

### Description of Goals of Core Areas

USD students taking a “Historical Inquiry” and “Critical Thinking/Information Literacy” Core Class should not be asked to sit through long-winded lectures, regurgitate memorized facts, or uncritically accept what now may be considered “the truth.” Instead, they must *formulate and investigate significant historical questions, analyze a range of primary sources, weigh competing scholarly interpretations, and effectively communicate findings*. Students in a History Inquiry Core Class thus will be well disposed to engage in critical thinking and acquire a sense of information literacy by learning how to access sources from the library and on-line databases.

Students of history start by considering historical questions. For example, “How did large-scale agriculture contribute to the Dust Bowl in the 1930s?” or, “What role did imperialism play in the demise of the Qing dynasty? or, “To what extent did the English Civil War force innovation and radical change upon Parliament and its supporters, 1642-46?” or, “How did the landscapes of Caribbean slave societies become sites for struggles over memory and memorialization?” or, “What role did charisma play in the establishment and consolidation of Mussolini and Hitler’s respective regimes?” or, “How did the diagnosis of ‘hysteria’ reflect 19<sup>th</sup>-century ideas about women’s nature and their social role?” or, “What do new diplomatic practices in the 18<sup>th</sup> century reveal about the Ottomans’ perception of their place in the world?”

When using historical evidence, students will weigh competing scholarly interpretations and express their opinions both verbally and in writing. In the end, students will develop a more critical eye to seek, find, and evaluate the evidence to understand world in which they live.

## List of Student Learning Outcomes

### Goal:

*Students must identify and formulate significant historical questions, analyze a range of primary sources, weigh competing scholarly interpretations, and effectively communicate their findings.*

LO 1: Students identify and formulate significant historical questions.

LO 2: Students access information effectively, and use information ethically and legally.

LO 3: Students analyze a range of primary sources (texts, photographs, visual art, audio recordings, films), articulate historical context, and use these sources as evidence to support an argument.

LO 4: Students find secondary sources to weigh against competing scholarly interpretations and learn to employ various interpretive strategies.

These Learning Outcomes align with the Critical Thinking and Information Literacy (CTIL) Outcomes. Thus, CTIL is formally embedded in Historical Inquiry, and courses that satisfy Historical Inquiry will also satisfy CTIL. Faculty who submit their courses for approval in Historical Inquiry should also read the CTIL report as their courses will also be approved for CTIL and used in CTIL assessments.

### Assessment Criteria

To ensure students can identify, and employ, the techniques that comprise historical literacy, the instructors must assign an essay between 5 to 10 pages. The essay must address the following areas:

- LO 1: Students identify and formulate significant historical questions. In so doing, they:
- Distinguish the significant cause(s) and/or effects of a given historical process.
  - Investigate questions that explore change and continuity over time.
  - Consider significant turning points in history.
  - Seek to understand the worldview of historical actors and the ways this affected their choices and actions.
  - Distinguish elements of, or patterns in, past events and periods that are similar to and different from a contemporary situation.
  - Pay attention to multiple perspectives or experiences.
- LO 2: Students identify and access information effectively, and use information ethically and legally. In doing so, they:
- Select efficient and effective approaches for accessing information.
    - Identify the value and differences of potential resources in a variety of formats (texts, photographs, visual art, audio recordings, films).
    - Identify key words, synonyms, and related terms for information needed.
    - Locate resources in the library or on the Internet using databases and search engines.

- Give credit to the original ideas of others through proper and ethical attribution and citation.
- Explain the function of footnotes; and cite books, journal articles, newspaper articles, and web pages in accordance with a major style manual (APA, Chicago, MLA).

LO 3: Students analyze a range of primary sources (texts, photographs, visual art, audio recordings, films), articulate historical context, and use these sources as evidence to support an argument. In so doing, they:

- Compare/contrast a range of primary sources in order to fully understand the complexity and importance of any historical event, era, person, or group.
- Analyze a range of primary sources for their credibility, position, and perspective.
  - Identify the author/creator of a primary source, examine his/her perspective and knowledge about events, identify the purpose for which the source was created, and the intended audience.
  - Recognize how the process of translation and transmission of historical documents affects interpretation.
- Use primary sources as evidence to support an argument or interpretation of a historical event, a historical process, or a cultural/social activity in the past.
- Recognize that primary sources can include texts, photographs, visual art, audio recordings, films, propaganda posters, police records, diary entries, interviews, declarations, songs, blueprints, or other historical materials.

LO 4: Students weigh competing scholarly interpretations and employ various interpretive strategies. In so doing, they:

- Analyze secondary sources for their strength of argument, position, and perspective.
- Identify the author/creator of a secondary source, examine his/her perspective and knowledge about historical events, identify the purpose for which the secondary source was created, and the intended audience.
- Use secondary sources as evidence to support an argument or interpretation of a historical event, a historical process, and/or a cultural/social activity in the past.
- Produce written work that is thesis driven, evidence based, effectively organized, and persuasive.
- Produce written work with strong topic sentences; effective transitions; and straightforward language that communicates meaning to readers with clarity and fluency.

### Summary

With the necessary adjustments, many classes at USD can satisfy the requirements for Historical Inquiry. Accordingly, these classes seek to engage students' minds and imaginations by teaching them to find a primary source, ask a question inspired by that primary source, learn more about that primary source by reading secondary sources and then present a clear, coherent, fluid analysis that answers the question raised by the

primary source. When students pose and answer a question, they participate in an historical debate about why people in the past behaved as they did.

## QUESTIONS – HISTORICAL INQUIRY APPENDIX I

The following questions used in the process of historical inquiry:

1. When and by whom was this particular document written? What is the format of the document? Has the document been edited? Was the document published? If so, when and where and how? How do the layout, typographical details, and accompanying illustrations provide information about the purpose of the document, the author's power and status, and that of the intended audience?
2. Who is the author, and why did he or she create the document? Why does the author choose to present the text in the manner chosen? Remember that the author of the text (i.e., the person who creates it) and the narrator of the text (i.e. the person who tells it) are not necessarily one and the same.
3. Using clues from the document itself, its form, and its content, who is the intended audience for the text? Is the audience regional? National? International or global? A particular subset of "the American people" or any people, for that matter? How was the text received by this audience? How might the text be received by those for whom it was NOT intended?
4. How does the text reflect or mask such factors as the class, race, gender, ethnicity, or regional background of its creator/narrator? (Remember that "race" is a factor when dealing with people who identify as "white" "black," "Asian," or a combination of the three, that "men" possess "gender," and that Europe, Asia, Africa, the Middle East, and the Americas include regions of local as well as national significance.)
5. How does the author describe, grapple with, or ignore contemporaneous historical events? Why? Which cultural myths or ideologies does the author endorse or attack? Are there any oversights or "blind spots" that appear particularly salient? What kind of ideas or beliefs does the writer/narrator embrace?
6. From a literary perspective, does the writer use symbols, images, metaphor, simile, or other turns of phrase to present his/her perspective?
7. With what aspects of the text (content, form, style) can you most readily identify? Which seem most unfamiliar to you? Why? Does the document parallel contemporaneous or present-day events that you have encountered, witnessed, or experienced? How and why?

# Mathematical Reasoning and Problem Solving

## ATF Report

### Description of Goals of Core Area

We offer the following as a definition of mathematical reasoning: creating, following and assessing chains of mathematical arguments; explaining, interpreting, and correctly applying definitions, theorems, and results; having familiarity with the idea of mathematical proof (including the ability to understand and explain simple proofs, to understand and derive mathematical formulas, and to recognize the difference between proofs and informal arguments). This type of reasoning is crucial when creating and stating problems to be solved, building mathematical models, solving problems, understanding the results and solutions of others, and correctly using our current (and ever-increasing) body of knowledge in mathematics and other fields. This type of reasoning should not be confused with nor limited to the ability to use methods to compute and manipulate quantities.

The language of mathematics is used to model real-world processes. Mathematical models enable us to describe and study the behavior of these processes, which can allow us to discover and describe phenomena and properties of these processes that were not easily noticeable without the use of the model. The language of mathematics is independent of any field and it is often the bridge that allows experts in different fields to communicate and work together and expand our current body of knowledge.

### List of Student Learning Outcomes

1. **Mathematical problem solving.** Apply mathematical methods to solving both
  - a. abstract problems and
  - b. problems with applications to other disciplines
  
2. **Mathematical reasoning, argumentation, and proof.** Demonstrate mathematical reasoning by being able to
  - a. create, follow, and assess chains of mathematical arguments,
  - b. explain, interpret, and correctly apply definitions, theorems, and results, and
  - c. understand the idea of a mathematical proof
  
3. **Mathematical explanation.** Clearly communicate mathematical reasoning by
  - a. explaining and justifying solutions to problems and
  - b. using correct mathematical notation, terminology, and symbolism

## Assessment Criteria

**Outcome 1a.** Apply mathematical methods to solving abstract problems.

**Exceeds Expectations.** Student consistently and effectively selects and correctly applies appropriate techniques to a variety of abstract problems, of increasing levels of difficulty.

**Meets Expectations.** Student generally and effectively selects and correctly applies appropriate techniques to a variety of abstract problems, of increasing levels of difficulty.

**Fails to Meet Expectations.** Student generally misunderstands abstract problems, or generally attempts to apply inappropriate techniques or selects appropriate techniques but is unable to successfully apply them to abstract problems of moderate levels of difficulty.

**Outcome 1b.** Apply mathematical methods to solving problems with applications to other disciplines.

**Exceeds Expectations.** Student consistently and effectively selects and correctly applies appropriate techniques to a variety of applied problems, of increasing levels of difficulty.

**Meets Expectations.** Student generally and effectively selects and correctly applies appropriate techniques to a variety of applied problems, of increasing levels of difficulty.

**Fails to Meet Expectations.** Student generally misunderstands applied problems, or generally attempts to apply inappropriate techniques or selects appropriate techniques but is unable to successfully apply them to applied problems of moderate levels of difficulty.

**Outcome 2a.** Demonstrate mathematical reasoning by being able to create, follow, and assess chains of mathematical arguments.

**Exceeds Expectations.** Student is able to consistently create, follow and assess chains of mathematical arguments of increasing levels of difficulty.

**Meets Expectations.** Student is able to generally create, follow and assess chains of mathematical arguments of increasing levels of difficulty.

**Fails to Meet Expectations.** Student is unable to understand, follow or create any but the simplest mathematical arguments.

**Outcome 2b.** Demonstrate mathematical reasoning by being able to explain, interpret, and correctly apply definitions, theorems, and results.

**Exceeds Expectations.** Student is able to consistently explain, interpret and apply definitions, theorems and results, including complex definitions and theorems. The student is



able to explain the difference between a definition and a theorem and the roles that each of these play in mathematics.

**Meets Expectations.** Student is generally able to explain, interpret and apply definitions, theorems and results of a moderate level of complexity. The student is able to explain the difference between a definition and a theorem and the roles that each of these play in mathematics.

**Fails to Meet Expectations.** The student is not able to clearly explain the definition between a theorem and a definition. The student will often misapply definitions and theorems. The student is not able to clearly interpret or apply any but the simplest definitions, theorems and results.

**Outcome 2c.** Demonstrate mathematical reasoning by being able to understand the idea of a mathematical proof.

**Exceeds Expectations.** The student is able to clearly explain the idea of a mathematical proof. The student is able to clearly explain the role that proof plays in mathematics. The student is able to recognize errors in proofs and correct them. The student is able to clearly explain the difference between a proof and an example, and the role that each of these plays in mathematics.

**Meets Expectations.** The student is able to explain the role that proof plays in mathematics. The student is able to recognize errors in proofs. The student is able to explain the difference between a proof and an example, and the role that each of these plays in mathematics..

**Fails to Meet Expectations.** The student is not able to clearly explain the role that proof plays in mathematics. The student is unable to recognize or correct errors in proofs. The student sometimes will mistake an example for a proof.

**Outcome 3a.** Clearly communicate mathematical reasoning by explaining and justifying solutions to problems.

**Exceeds Expectations.** The student is consistently able to clearly explain and justify solutions to problems, using complete sentences and correct grammar.

**Meets Expectations.** The student is generally able to clearly explain and justify solutions to problems, using complete sentences and correct grammar.

**Fails to Meet Expectations.** The student is generally unable to explain or justify solutions to problems. The student does not use complete sentences and makes many grammatical errors.

**Outcome 3b.** Clearly communicate mathematical reasoning by using correct mathematical notation, terminology, and symbolism.

**Exceeds Expectations.** The student consistently uses correct mathematical notation, terminology and symbolism.

**Meets Expectations.** The student generally uses correct mathematical notation, terminology and symbolism.

**Fails to Meet Expectations.** The student often incorrectly uses mathematical notation, terminology and symbolism.

These learning outcomes will best be assessed in courses through either homework questions/exercises or quiz and exam questions. We have attached some example homework/exam questions for each of the learning outcomes/assessment criteria. These example questions are drawn from typical lower-level mathematics courses (including college algebra and calculus), but any topic in mathematics can be used to satisfy this core competency as long as the learning objectives are met.

Since communication is a learning outcome, students should be required to write out answers to questions using complete sentences and to explain their reasoning. While it is acceptable for courses to involve some homework, test or quiz problems that are multiple choice or only require a numerical answer, the majority of questions should require a detailed written explanation.

Courses that fulfill this core competency area should assess every component of each learning outcome. However, we recognize that since there is overlap between these learning outcomes, some questions/exercises may be used to address more than one component or even more than one learning outcome. Attached find sample questions that address each of the learning outcomes. Questions of this type would be assessed according to the general assessment criteria that appear below for each of the learning outcomes.

### **Summary**

Faculty that are interested in proposing courses for the Mathematical Reasoning and Problem Solving core area should be prepared to show sample homework, quiz or exam questions that address all parts of the three learning outcomes.

# ATF REPORT: PHILOSOPHICAL INQUIRY

November 13, 2015

## DESCRIPTION OF GOALS OF THE CORE AREA

Philosophical inquiry is the analysis, clarification and critique of a range of issues, including not only the traditional 'big questions' but also the foundational questions of all academic disciplines in the interests of developing argumentative and analytical skills essential for careful and clear reasoning, efficient communication, and the critical assessment of knowledge claims.

## GOALS

### SKILLS: ANALYSIS AND ARGUMENT

To develop and promote argumentative and analytical skills essential for careful and clear reasoning, efficient communication, and the preservation of high standards for knowledge claims.

#### **Learning Outcome: Analysis**

Identify and define issues and problems of concern, analyzing them critically and systematically by asking relevant questions, examining different sides of an issue and evaluating arguments and, where appropriate, using the language and techniques of formal logic to articulate and assess argumentation.

#### **Learning Outcome: Argumentation**

Construct clear, rigorous arguments for well-delineated theses.

### KNOWLEDGE: FIELDS, PROBLEMS & HISTORY OF PHILOSOPHY

Philosophy courses will be directed to the achievement of one or more of the following learning outcomes:

#### **Learning Outcome: Central Problems of Philosophy**

Demonstrate awareness of the central areas of philosophical inquiry, including logic, metaphysics, philosophy of mind, epistemology, and ethics and of the major questions explored in these fields.

#### **Learning Outcome: History of Philosophy**

Demonstrate knowledge of the views of selected major figures, movements, and important theories in central areas of ancient, modern and contemporary philosophy.

### **Learning Outcome: Philosophy and Other Disciplines**

Integrate the study of philosophic problems and problem-solving techniques with work in other academic disciplines.

## **EXAMPLES OF TESTING METHODS**

**OBJECTIVE TYPE TESTS:** While we employ multiple choice and true/false tests to make sure that students have kept up with class readings and understand the fundamental concepts introduced in class, our objective-type tests are primarily inferential. We do not test to determine whether students have memorized definitions or factual information: we formulate test questions to determine whether students understand the concepts to which they have been introduced and can apply the definitions and use the factual information they have acquired to solve problems.

**PROBLEM SOLVING:** Students are assessed on their ability to do a variety of exercises in critical reasoning, from recognizing the conclusions of ordinary language arguments to doing formal proofs. We also expect students to use the skills they have learnt to solve problems that have not been explicitly presented and assess students on their ability to use what they've learnt to go further.

**ORAL OR ONLINE ARGUMENT:** Students are assessed on their participation in class, individually and through their participation in panels and other group projects. As an extension of this, we maintain blogs for our classes in which students may continue the discussion and be assessed on their participation. We recognize that, though we make every effort to promote inclusivity in class discussions, a number of students, in particular women and minorities, may not find class discussion comfortable. We, therefore, provide alternative venues for discussion in which all students can participate and through which they can be assessed more fairly.

**ESSAYS:** The fundamental unit of philosophical writing is the critical essay. In writing a critical essay, in the form of a term paper or 'blue book' test, students are assessed on their ability to do the following:

- ϕ **Articulate a thesis:** Students are assessed on their ability to articulate a thesis, either their own or, more often, one reconstructed from a philosophical work under consideration
- ϕ **Defend a thesis:** Students are assessed by their ability to defend a thesis, most often by the exposition or 'rational reconstruction' of a journal article, book section or historical source
- ϕ **Criticize argumentation:** Students are assessed on their statement and development of objections to a thesis and arguments in support of the thesis
- ϕ **Respond to objections:** Students are assessed on the clarity of their presentation and their ability to develop concise, well-organized critical essays including compelling arguments.

## ASSESSMENT CRITERIA: ANALYSIS AND ARGUMENT

	Excellent	Good	Fair	Unacceptable
Articulate a thesis	<p>A clear statement of the main conclusion of the paper.</p> <p>Examples are original, relevant, insightful, and well-used</p>	<p>The thesis is obvious, but there is no single clear statement of it.</p> <p>Examples are original, relevant and well-used.</p>	<p>The thesis is present, but must be uncovered or reconstructed from the text of the paper.</p> <p>Examples are slightly off-topic or not worth citing.</p>	<p>There is no thesis.</p> <p>Examples are missing, irrelevant or misused.</p>
Defend a thesis	<p>Each reason for believing the theses is stated clearly and concisely.</p> <p>Premises which are taken as given are at last plausible.</p> <p>Controversial premises are supported by subarguments.</p> <p>The premises clearly support the thesis.</p>	<p>The premises are clear but may not stated concisely.</p> <p>Premises which are taken as given are at last plausible.</p> <p>Controversial premises are supported by subarguments.</p> <p>The premises support the thesis.</p>	<p>The premises must be reconstructed from the text.</p> <p>It is not clear which premises are to be taken as given and which will be supported by subarguments.</p> <p>The student does not provide adequate subarguments for controversial premises. The plausibility of premises taen as given is questionable.</p>	<p>There are no premises: the student merely restates the thesis.</p> <p>Or, if there are premises, they are much more likely to be false than true.</p> <p>The premises, whether plausible or implausible, to not support the thesis.</p>
Criticize argumentation	<p>The student successfully breaks the argument or problem into relevant parts.</p> <p>The student evaluates the argument for validity and soundness, checking for informal fallacies.</p> <p>The student suggests ways in which the argument may be improved.</p>	<p>The student integrates most relevant parts of the argument into a largely coherent whole</p> <p>The student evaluates the argument for validity and soundness, checking for informal fallacies.</p>	<p>The student evaluates the argument in question by checking only the truth of the premises or conclusion and does not check for informal fallacies.</p>	<p>The student evaluates the argument according to whether the author agrees or disagrees with the conclusion or with a premise</p>
Respond to objections	<p>The student considers and responds to both obvious and unobvious counterexamples and counterarguments, providing original and thoughtful responses.</p>	<p>The student considers obvious counterexamples and counterarguments, and provides responses.</p>	<p>The student may consider some obvious counterexamples and counterarguments but some obvious ones are missed. Responses are missing or inadequate.</p>	<p>No counterexamples, counterarguments or opposing positions are considered.</p>

# SUMMARY

Philosophy, in an important sense, has no content of its own. It is the activity that reflects critically on all other activities.

The study of philosophy develops the skills and intellectual muscle for engaging with any subject matter. It therefore facilitates work in all other academic disciplines and so is an essential component of core curriculum.

## MEMBERS OF THE TASK FORCE

H. E. Baber, Chair (CAS, Philosophy)

Michael Kelly (CAS, Philosophy),

Mitch Malachowski (CAS, Chemistry)

## ATF Report Revised 10.27.15 SOCIAL & BEHAVIORAL INQUIRY

### **Description of Goals of Core Area**

The American Association of Colleges & Universities (AAC&U) describes inquiry as a systematic process of exploring issues, objects or works through the collection and analysis of evidence that results in informed conclusions or judgments.

The social and behavioral sciences examine the human condition from various perspectives, including the study of individuals, communities, and institutions around the world and over time. The methods, theories, and empirical findings of the social and behavioral sciences are essential to public discourse and constitute a basis for self-reflection, critical evaluation, public and social policy decisions, and social and cultural changes.

The courses that will meet the USD Core Social & Behavioral Inquiry requirement, in the process of or in addition to meeting departmental learning outcomes, will use systematic theoretical and/or empirical inquiry to critically analyze human behavior and social organization. Students will learn to take an informed stance that will allow them to weigh and apply ideas and claims from the discipline to issues outside the classroom. The critical component of the requirement is that students learn skills of inquiry that enable them to analyze social and behavioral issues.

The traditional social sciences are a group of fields that ask questions about human behavior but do not have one dominant mode of inquiry. Because the disciplines allow for methodological pluralism, the learning outcomes have been designed to be as inclusive as possible.

There are two overall course goals elaborated in four student learning outcomes.

### **Course Goals**

**Goal 1 Inquiry:** Students will use a disciplinary toolkit of theories and methods to analyze claims and develop informed judgments

**Goal 2 Application:** Students will apply the tools of social and behavioral inquiry in evaluating real-world issues.

### **List of Student Learning Outcomes**

#### Learning Outcomes

- a. Articulate and compare social scientific theories/concepts as appropriate to the course/discipline.

- b. Evaluate the quality, objectivity, and credibility of evidence using theories, methods, or ways of thinking that define inquiry in a social science discipline.
- c. State a conclusion that is a logical extrapolation from the inquiry process.
- d. Apply the discipline-specific inquiry process to analyze a new set of events/fact patterns representing real-world problems or issues.

**Assessment Criteria**

Given the emphasis the learning outcomes place on working through the logic of a theory and then critically applying that analysis to real-world situations, assessments of these learning outcomes would be best accomplished with open-ended questions (e.g. a short answer free response question). For example a prompt might present a claim and ask students to use the tools of social and behavioral inquiry to evaluate the claim and state a conclusion. Although an open-ended assessment of inquiry does not rule out the use of other testing methods (e.g. multiple choice) *within a course*, students can best demonstrate the process of inquiry by writing out their thought process with a minimum of guidance/prompting.

S&BI inquiry assessment evaluation criteria

Articulate claim	Demonstrates clear understanding of the problem. Identifies and employs major analytic and critical frameworks in appropriate contexts.  Considers influence of held assumptions, own and others.
Evaluate evidence	Uses discipline specific procedures, practices, or techniques to evaluate frameworks.
Draw conclusion	Conclusions are logical and reflect students' informed evaluation and ability to place evidence in context.

**Summary**

**Considerations for an inquiry model course**

**Development of inquiry.** It is expected that faculty teach what is expected and assess what has been taught. Modeling of and practice in inquiry is expected throughout the class and should be demonstrated in the syllabus and/or in a description of the course. Therefore, the course should include activities in which students develop their understanding and application of inquiry tools.



**Remember that these are CORE classes.** Under the new Core, all students will take ONE social and behavioral inquiry class. Although lower division courses that have traditionally counted towards the Core may be important recruitment classes for departments, and may need to serve as prerequisites for majors, students will now only be required to take one course in the social sciences. A course that qualifies for the new Core Curriculum, therefore, needs to teach all students something fundamental about social and behavioral inquiry (to the degree there is fundamental about all of our diverse approaches to understanding human behavior!) The goals articulated here are not meant to supplant course or departmental learning goals, but rather to ensure that all courses that qualify for the Core impart some similar skills and have a baseline level of rigor.

**Addressing process not content.** Reasoned argument, critical thinking, and the application of theory to new facts are skills common throughout the social sciences. In their social and behavioral inquiry course, students should develop abilities to articulate, compare and evaluate theories (as appropriate to the course/discipline). It is the process of asking questions and critically evaluating potential answers that is the focus of the learning outcomes—NOT anything specific to a course or field.

**Perspective on critical thinking.** The key characteristic of critical thinking in this inquiry process is informed judgment. Students will use theory to predict outcomes, and will use evidence to evaluate theory. The key feature is that students can “close the loop”: they know what a given theory would predict in this situation, but they also critically evaluate how well the theory’s predictions match observed reality.

**Forms of evidence.** Evidence can take many forms: from a controlled experiment or statistical analysis to an essay that evaluates how well theoretical predictions fit a given case or fact pattern. Students taking a course in a social and behavioral inquiry should evaluate evidence and apply evidence based knowledge to real-world issues or novel fact patterns regardless of whether the course they take addresses qualitative or quantitative approaches.

### **Criteria for syllabus/course evaluation**

Submit an example of a syllabus that will be used to teach this course.

Please also answer the following questions about the likely ways that courses meeting this S&BI requirement will do so.

1. What theories or analytical frameworks will students be able to articulate at the end of this course?
2. How will students learn to analyze claims using the theories, methods, or ways of thinking that are appropriate to this course?
3. How will students practice analyzing and justifying their claims in this course?

4. How will students practice stating a conclusion that is a logical extrapolation from the inquiry process?
5. Describe the types of assignments in which students might be asked to apply the discipline specific inquiry processes or theories to a new set of events or fact patterns representing real world problems.
6. Briefly describe the assignment that will be used to demonstrate achievement of these learning outcomes.
7. By what mechanisms will the department ensure that all courses satisfying this goal will meet all of these learning outcomes?

# Scientific & Technological Inquiry

## Description of Goals of Core Area

The impact of science and technology on our daily lives is enormous and ever growing. It calls for a citizenry that is knowledgeable about the ways scientific and technological knowledge is advanced. In order to meet that goal we envision that all students taking a course to fulfill the Scientific & Technological Inquiry core requirement will have an experience similar to the following. The primary focus of the course will be the laboratory/field period where students will use the guided inquiry process or other suitable approach to ask scientific questions and collect and analyze data to test hypotheses and answer questions. Overall structure of courses, and length of laboratory periods can vary from course to course, but lab/field work must make up at least 40% of the weekly contact hours. It is envisioned that lecture will serve the lab inquiry by introducing students to the foundational concepts of the field, with a goal of developing a deeper knowledge of these concepts. Students will apply their understanding of this approach to evaluate scientific and technological claims made by others. Such knowledge enables students to critically evaluate information about the world and understand the role of science and technology in modern society. Courses that meet the USD Core Scientific and Technological Inquiry requirement will achieve the following learning outcomes in addition to any department or course specific learning outcomes.

## Student Learning Outcomes

Students who complete this course should be able to:

1. Design and conduct an experimental and/or observational investigation to generate scientific knowledge or a technological solution to a problem.
2. Analyze data using methods appropriate to the natural sciences and/or engineering in order to make valid and reliable interpretations.
3. Explain the basic scientific concepts and theories relevant to the area of study.
4. Identify and use appropriate and sufficient scientific evidence to evaluate claims and explanations about the natural and designed world.

## Assessment Criteria

### Learning Outcome #1

Assessment of the first learning outcome will evaluate students' ability to design and conduct an investigation. This outcome could be assessed through one or more of the following.

- A complete, scientific lab report that includes proposed hypotheses or mathematical models and descriptions of the methods used to test the hypotheses.
- An exam question that asks students to propose an experiment, controls, and/or methods to test a scientific hypothesis or possible technological solution to a problem, based on some given information

### **Learning Outcome #2**

Assessment of the 2<sup>nd</sup> learning outcome will evaluate students' ability to analyze and interpret data. This outcome could be assessed through one or more of the following.

- A lab report or focused homework assignment where students present and analyze results that they collected, as well as present their conclusions.
- Exam questions that asks students to calculate and interpret statistical properties of a dataset, such as mean, standard deviation, and confidence intervals.
- An assignment that requires students to analyze collected or provided data, then interpret and communicate the meaning of the results.

### **Learning Outcome #3**

Assessment of the 3<sup>rd</sup> learning outcome will evaluate students' ability to identify and explain relevant scientific concepts. This outcome could be assessed through one or more of the following.

- Exam or quiz questions that assess a student's ability to identify and describe the relevant foundational concepts that are important in a given situation would be suitable to assess this outcome.
- A lab assignment in which students propose a hypothesis and provide a rationale that focuses on the underlying theory.

### **Learning Outcome #4**

Assessment of the 4<sup>th</sup> learning outcome will evaluate students' ability to weigh scientific evidence supporting a claim or explanation. This outcome could be assessed through one or more of the following.

- In exam questions or as stand-alone assignments students could be given relevant information regarding a scientific or technological claim made by someone in the news and asked to analyze the claim for reasonableness and reliability.
- An assignment that requires students to evaluate competing solutions to a design problem based on any one or combination of the following: scientific ideas and principles, empirical evidence, and logical arguments regarding relevant factors (e.g. economic, societal, environmental, ethical considerations).

### **Additional Information**

These thoughts are presented to guide faculty looking to design a course for this area. They reflect the intentions of the committee that put these learning outcomes together.

- The term "laboratory" is a generic term intended to refer to work in an actual laboratory as well as field work, as may be appropriate in courses like Ecology, Astronomy, or Geology.
- Learning Outcomes #1 and #2 are the principal components of this mode of inquiry. It is thought that there will be a diversity of approaches to investigation in this area depending upon the area of study. Experimental and observational approaches to testing hypotheses in science classes are equally valid.

- Our vision for a class that meets the outcomes reverses the traditional focus in such classes. The lab, where students actively design and conduct inquiries, should be the primary focus of the course. Lecture should serve the lab by introducing basic concepts that underlie the lab investigations, and give students opportunities to develop a deeper knowledge of them.
- Courses may spend more than 40% of their weekly time in lab. In fact, with lab being the focus of the course, it is strongly encouraged. (The 40% minimum requires students to have at least two hours of lab per week or one four-hour lab period every other week if they also have three hours of classroom meetings per week.)"
- While we expect many courses will have a designated period for laboratory, other courses may blend classroom and lab times more fluidly. This blending is also encouraged.
- When new course proposals are submitted they will have to clearly indicate (or estimate for blended courses) how many hours/week are spent in lab and lecture.
- Scientific methods of analysis may include, but are not limited to, spreadsheet calculations, graphing, and software, simulations.
- As a result of their investigation, students will offer interpretations of their results and support their assertions using evidence-based logic.
- As part of the course, student will critically evaluate claims made by others. Such evaluations will likely include distinguishing between good scientific questions and ones that are not about science.
- It is expected that faculty will make use of innovative, effective pedagogical techniques in their course design. These techniques should be specified in course proposals. Examples of possible techniques include guided inquiry learning and peer instruction.

## ATF REPORT FOR THEOLOGICAL AND RELIGIOUS INQUIRY

“The study of theology and religion is a distinguishing characteristic of a Catholic university.”

-USD 2013 Report of the Committee on Catholic Intellectual Tradition

### Description of Goals of Core Area

USD’s learning outcomes demonstrate our respect for each of three distinct modes of critical engagement with religion: biblical studies, Christian theology, and religious studies. Historically, Catholic universities have required their students to engage in extensive study of the Hebrew Bible (Old Testament), Christian Scriptures (New Testament), and Christian theology, which is why many of these universities had three required courses in the study of religion. Especially since *Nostra Aetate*, Catholic universities have additionally invested considerable resources in the teaching of non-Christian traditions; at USD, this has resulted in the hiring of tenure-track scholars who are experts in non-Christian traditions, now including Buddhism, Daoism, Hinduism, Islam, and Judaism. The study of non-Christian traditions, both to clarify Christianity and because of the inherent value of such study, is now well established as a desideratum of Catholic higher education generally and at USD specifically.

Our learning outcomes are designed to afford students the latitude to pursue college-level study of religion utilizing any one of these three disciplines or some combination of them, and culminates in the in-depth study of a particular tradition or sacred text at the upper-division level. Our learning outcomes further ensure that all of our graduates have a college-level understanding of Christianity (especially as understood in the Catholic tradition) and, in many cases, substantial exposure to one or more non-Christian traditions. In this way, we seek to produce students who have a sophisticated understanding of Christianity and who can critically reflect upon the nature of religion.

### Student Learning Outcomes (LOs)

Students will **demonstrate**:

1. a critical understanding of Christian traditions, including Catholic Christianity at a basic college level, OR an understanding of the diversity of religious traditions with attention to Catholic Christianity at an introductory level;
2. a critical understanding of theory and method in biblical studies, Christian theology, or religious studies; and
3. in depth knowledge of at least one religious tradition, foundational sacred text, or important historical or contemporary issue in the study of theology or religion .

Typically students will satisfy LO1 and LO2 at the lower-division level in a single course. Students can satisfy LO3 only through upper-division courses.

### Assessment Criteria

LO1 - Students will be able to:

- **describe** some basic beliefs and/or practices of Catholic Christianity at a college level
- **reflect critically** on some common assumptions about Catholic Christianity and/or reflect critically on the nature of religious diversity

LO2 - Students will be able to:

- **describe** basic methods of studying religion in either Christian theology, biblical studies, or religious studies,
- **apply** these methods to diverse religious exempla as understood within the context of Christian theology, biblical studies, or religious studies respectively,
- **reflect critically** on the scope and limitation of these methods.

LO3 - Students will be able to:

- **apply** the methods of Christian theology, biblical studies, religious studies, or some combination thereof, to provide a comprehensive and nuanced description of an important question/s relevant to how one or several of these three disciplines understand a particular religious tradition, foundational sacred text, or important historical or contemporary issue in theology or religious studies.
- **articulate** their own, critically informed, responses to the question/s in clear, well-formed prose.

### Summary

Students are provided the latitude to pursue college-level study of religion utilizing the methods of biblical studies, Christian theology, religious studies, or some combination thereof. In this way, USD produces students who have a sophisticated understanding of Christianity and who can critically reflect upon the nature of religion.