Training the Next Generation of RISA

Connecting Environmental Science and Decision Making (CESD) – a Graduate Certificate Program

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What is a Graduate Certificate Program at the UA?

A “linked series of credit-bearing graduate courses that constitute a coherent body of study. Graduate certificates are designed to enhance the education of matriculated graduate and professional students or to provide continuing education to local professionals.”

Some of the general guidelines:

• Enhances existing programs, not take the place of them.

• A specialized set of courses, minimum of 9 credits.

• Time to complete: within 4 years.

• **Sufficient resources must exist to support the certificate without penalizing existing academic programs.**
CESD program development: a collaborative process

Contributions from UA Colleges of Science, Humanities, Social and Behavioral Sciences, Agriculture and Life Sciences, Law, Public Health; Departments/Schools of Ag and Education, Anthropology, Geography, Journalism, Communication, Soil, Water & Environment, Public Administration, American Indian Studies, Planning, Natural Resource & Environment, Statistics, Watershed Management ....and more....
CESD Certificate Program

Overall goal: help students develop into professionals who are comfortable working with both scientific and decision-making communities in a variety of capacities.

Through course work and an internship, CESD students:

• Develop a foundation in the theoretical basis of the interface between science and decision making.

• Critically examine, evaluate, and practice methods of engagement between scientists and decision makers

• Acquire expertise in methods and skills needed for research that incorporates science-decision making interactions
## CESD CURRICULUM

### Core 1
**Overview course:**

- GEOG 596M
  - Making the Connection between Science and Decision Making

### Core 2
**Methods in social science:**

- AED 617
  - Research, Methods and Project Design
- ANTH 537
  - Data Management and Analysis
- ANTH 609
  - Mixed Methods in Applied Anthropology
- CPH 544
  - Fundamentals of Evaluation
- GEOG 696Q
  - Participatory Systems Design and Delivery
- JOUR 489/589
  - Survey of Research Methods
- MGMT 600
  - Behavioral Science Theory and Method in Management
- PA 553
  - Quantitative Policy Analysis

### Core 3
**Communications:**

- AED 537
  - Methods of Facilitating Learning
- AGMT 422/522
  - Communicating Knowledge in Agriculture and the Life Sciences
- COMM 550
  - Communication and Cognition
- COMM 620
  - Social Influence
- JOUR 472/572
  - Science Journalism
- JOUR 480/580
  - Multimedia Storytelling: Science and Technology
- JOUR 496D/596D
  - International Opinion Writing
- SWES 415/515
  - Translating Environmental Science
- WFSC 595A
  - Biopolitics: Communication and Public Relations Skills

### 4th course electives:

- AED 621
  - Program Planning and Evaluation
- AIS 531A
  - Tradition Ecological Knowledge
- AREC 575*
  - Econ Eval Wtr+Env Policy
- DVP 621
  - Nat Resource Mgmt:Applications
- GEOG 424/524
  - Integrated Geographic Information Systems (IGIS)
- GEOG 516E
  - Geovisualization
- GEOG 517
  - Geog Inf Sys/ Nat+ Soc Sci
- GEOG 596J
  - Water Management & Policy
- GEOG 596K
  - Risk and Society
- GEOG 696O
  - Resilience and Adaptation
- LAW 603J
  - Sustainability and Environmental Policy
- LAW 643D
  - Native Am Nat Resources
- MGMT 696D
  - Judgment and Decision Making
- PA 581
  - Environmental Policy

12 credits with a 3-credit internship
CESD Internship

Goal: to create an opportunity for the student to interact with a decision maker in order to gain experience and insight on the challenges of working at the interface between science and decision making.

Criteria:
• Requires close interaction with a decision maker or decision making organization
• Entails interactive, iterative engagement
• Results in an end product/contribution as the result of a collaborative effort

Internships to date:
• City of Tucson Office of Sustainability
• City of Tucson Office of the Mayor
• Weyerhaeuser
• Salt River Project
Graduate seminar: Making the Connection between Science and Decision Making

Goal: to provide students with some understanding of the dynamics behind the interface between science and decision making that result in scientific information being incorporated into planning, policy, and management decisions.

3 Components:

• foundational concepts related to the use of science in decision making
• interactions between scientists and decision makers, and models for these interactions
• written and orals skills for translational science
CESD Students

Certificate:
• First students enrolled in spring 2013
• To date: 3 have finished, 3 in progress, 2 incomplete
• A large number of inquiries but funding for non grads a problem

Seminar:
Numbers
• 48 students have taken the seminar over 4 years
• 12 enrolled for 2015

Background
• Social/physical/undecided background variable from over ½ physical to 1/3 in each category
• Typically most are grad students, with several non-degree or certificate-seeking students in most classes
A few outcomes, based on seminar exit surveys
Long-term career objectives
(select all that apply)

2013
N = 13
2 PhD
7 masters
3 certificate
1 non-degree

2014
N = 15
7 PhD
8 masters
Perspectives on the importance of science and policy in decision making

* Science most important source of information
* Politics is ultimately more important than science in solving these problems
  “Neither” was not a response option in this year
Some of the most important things students said they learned from the seminar

“I now appreciate the effort and time it takes to listen to stakeholder needs”

“More information does not equal better decisions.”

“The social science theory behind how science and policy do interact, can interact, and should interact.”

“Being exposed to the body of work (social science literature) and some case studies.”

“I was introduced to the realm of social science literature (while difficult and unusual it was useful) and the process of stakeholder engagement.”