



# Assessment of Program Learning Outcomes in Capstone Courses

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# Learning Outcomes

- ◆ Participants will identify institutional factors that support the use of capstone courses at their college.
- ◆ Participants will identify institutional factors that discourage the use of capstone courses at their college.
- ◆ Participants will compare their current model for program learning outcome assessment with assessment in capstone courses.



Students **graduating** with an Associate in Arts or Associate in Science degree will demonstrate the following outcomes:

- ◆ Graduates will articulate discipline-specific concepts and vocabulary and demonstrate empirical and conceptual knowledge foundational to all program disciplines.
- ◆ Graduates will demonstrate college-level critical thinking, argumentation, and analysis skills.
- ◆ Graduates will construct purposeful and effective written essays and oral presentations (QEP) that demonstrate an understanding of rhetorical strategies and use experiential evidence and appropriately documented academic research.



Students **graduating** with an Associate in Arts or Associate in Science degree will demonstrate the following outcomes:

- ◆ Graduates will demonstrate an awareness and understanding of cultural and social diversity and gain the skills necessary to interact appropriately within diverse environments.
- ◆ Graduates will demonstrate an understanding of the scientific method and its application, including interpreting and analyzing scientific data, forming hypotheses, evaluating experiments.
- ◆ Graduates will create a mathematical model of a practical problem and use the model to logically interpret and analyze the problem and make predictions
- ◆ Graduates will demonstrate competent and relevant technology skills.



# Issues that had to be addressed:

- ◆ Will we require the course(s) for graduation?
- ◆ Can we use the same course for A.A. and A.S. program students?
- ◆ Who will design the course(s)?
- ◆ Who will teach the course(s)?
  - Accreditation issues
  - Teaching load issues
- ◆ Who will collect and manage the data generated by the course(s)?
- ◆ How will data be used to address identified deficiencies?

# Associate in Arts

## English Composition (6 hours)

## Humanities/Fine Arts (12 hours)

Select four courses.

Select at least three disciplines. Must include one **200-level core English literature** and two **FL courses**.

## Social/Behavioral Sciences (12 hours)

Select four courses.

Select at least three disciplines. Must include one history.

## Natural Sciences (8 hours)

Must include accompanying labs.

## Mathematics (6 hours)

## Other Required Hours (20 hours )\*

\*Must meet computer competency requirements

## Electives (15)

Capstone Course – HUM 212 or BIO 140 (3 hours)

**Physical Education (1 hour)**

**ACA 122 (1 hour)**



# Associate in Science

## English Composition (6 hours)

## Humanities/Fine Arts (9 hours)

Select three courses.

## Social/Behavioral Sciences (9 hours)

Select three courses.

## **Natural Sciences/Math (20 hours)**

Natural Sciences (8 hours minimum)

Mathematics (6 hours minimum)

## **Other Required Hours (20 hours)\***

\*Must meet computer competency requirements

Must include one **200-level core English literature** and one **FL course**.

Select from at least three disciplines. Must include one history.

A minimum two-course sequence from the following general biology, general chemistry, or general physics is required. Must include accompanying labs.

**Natural Sciences and Mathematics (14)**

Capstone Course – BIO 140 (3 hours)

**Physical Education (1 hour)**

**Electives (4)**

**ACA 122 (1)**





# Choosing a Capstone Course

- ◆ Establish a rationale for a capstone course via discussions with faculty.
- ◆ Develop a list of course expectations.
- ◆ Review courses available for use as a capstone.
- ◆ Consider faculty qualifications to teach proposed course(s).



# DTCC Capstone Courses

- ◆ **BIO 140 Environmental Biology (3)**

Prerequisites: *General Education Core*

This course introduces environmental processes and the influence of human activities upon them. Topics include ecological concepts, population growth, natural resources, and a focus on current environmental problems from scientific, social, political, and economic perspectives. Upon completion, students should be able to demonstrate an understanding of environmental interrelationships and of contemporary environmental issues. *This course has been approved to satisfy the Comprehensive Articulation Agreement general education core requirement in natural sciences/mathematics.*



# DTCC Capstone Courses

## ◆ **HUM 212**      **Humanities II**

Prerequisites:      *General Education Core*

This course introduces the humanities as a record in literature, music, art, history, religion, and philosophy of humankind's answers to the fundamental questions of existence. Emphasis is placed on the interconnectedness of various aspects of cultures from early modern times to the present. Upon completion, students should be able to identify significant figures and cultural contributions of the periods studied. *This course has been approved to satisfy the Comprehensive Articulation Agreement general education core requirement in humanities/fine arts.*



# Capstone Course Expectations

- ◆ The course is multi-disciplinary, and, when possible, interdisciplinary.
- ◆ Multiple texts are used.
- ◆ The course design includes the embedded assessments of Program Learning Outcomes.
- ◆ The course is programmatically holistic.
- ◆ Available instructional technologies are used.

# Multi-disciplinary

- ◆ Multi-disciplinary is defined as the development and use of materials that reflect the views and “voices” of different rhetors from different disciplines.
- ◆ Interdisciplinary is defined as multiple instructors teaching the course (co-teaching).
- ◆ The course is organized around one overarching theme.





# Embedded Assessments

- ◆ The capstone course assesses all program outcomes in multiple ways throughout the semester.
- ◆ A final project that is both independently developed and conducted is the “ideal.”
- ◆ All outcomes are evaluated via the final project.
- ◆ Rubrics for evaluation of outcomes will be developed and used by all faculty teaching capstone courses.



# Programmatically holistic

- ◆ Course projects reflect a variety of perspectives and academic disciplines.
- ◆ Students are prepared to examine multiple, and possibly conflicting, perspectives.
- ◆ Course activities are multi-faceted and work to achieve synthesis on a topic.



# Course design includes

- ◆ multiple instructors or instructional units developed by multiple instructors;
- ◆ heavy use of BlackBoard resources;
- ◆ writing integrated into multiple assignments;
- ◆ clearly identified assessment tools; and
- ◆ cross-course assignments.

# Capstone Implementation Timeline

- ◆ Spring 2007 – piloted capstone format via existing program course.
- ◆ Spring 2007/Summer 2007 – identified capstone courses for Spring 2008
- ◆ Fall 2007 – faculty developed initial capstone courses
- ◆ Spring 2008 – first capstone courses (2) taught
- ◆ Fall 2008- two capstone courses offered
- ◆ Spring 2009-three capstone courses offered
- ◆ Fall 2009- four sections (with one new instructor) scheduled
- ◆ Spring 2010 – five sections (with two new instructors) planned.





# Spring 2009 BIO 140

The purpose of this course is to provide a thematic context for assessment of Associate in Arts/Associate in Science Program goals and learning outcomes. During Spring 2009, BIO 140 will focus on the biosphere and the management of environmental resources and environmental threats. The course is organized around five topics: Science and the scientific method; the biosphere; environmental resources; environmental threats; and public policy. Integration of concepts, analysis and synthesis of information, critical thought, and evaluation of real world events make up the foundational core of this course.



# Spring 2009 HUM 212 Capstone

The purpose of this course is to provide a thematic context for assessment of Associate in Arts and/or Associate in Science Program goals and learning outcomes. During Spring 2009, our topic will be *Cultural Diversity: Fundamental Aspects of Human Experience and Methods of Exploration*. The course is designed in four interwoven segments: a scientific examination of mummies from around the world; a discussion of concepts of personhood across the human lifespan; an ethnographic study of language and culture; and an introduction to issues of globalization using mathematical models. Students and faculty will elaborate on the theme of cultural diversity to create a holistic course reflective of the goals of a foundational liberal arts education at the university level.



# Fall 2009 HUM 212

The purpose of this course is to provide a thematic context for assessment of Associate in Arts and/or Associate in Science Program goals and learning outcomes. In this section, our topic will be the Limits of Knowledge. The course is designed in four interwoven segments: a study of literature in which humans have attempted to exceed the usual limits of human knowledge (some myths, Mary Shelley's Frankenstein, and Goethe's Faust), an exploration of emerging sciences that seek to solve mysteries of life and the universe; mathematical modeling of ways of raising IQ; and a consideration of ethical decision making as humans seek ever greater control over existence. Students and faculty will elaborate on the theme of the limits of human knowledge to create a holistic course reflective of the goals of a foundational liberal arts education at the university level.



# Data collection and management

- ◆ The Associate Dean of Arts and Sciences is currently responsible for data management.
- ◆ Capstone course instructors discuss assignments, course structure, and possible cross-course assignments on an ongoing basis (formal meetings at the beginning and end of each semester).
- ◆ All capstone instructors will have access to the data management system for direct data entry.

# Access Database

**SACS Assesment Database**

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**Survey Entry**

GELO: Critical Thinking

Course: BID140

Outcome:

- Discipline Vocabulary
- Diversity
- Technology
- Critical Thinking
- Scientific Method
- Mathematical Modeling
- Communication

Taxonomy:

- Create
- Evaluate
- Analyze

Assignment Summary	Instructional Strategy	Assessment Method	When Assessed	Student F
Pre-test to measure understanding of the scientific method.	Pre-course measurement of Learning Outcome	Multiple Choice assessment; Short answer assessment	Spring 2008	Students co multiple cho assessem knowledge/ the scientific

Results: (N = 12) The average grade on the assessment was 69% correct with a range of 50% - 100%. On a separate assessment, 75% of students were correctly identify the steps in the scientific method and align terms (e.g. hypothesis) with their appropriate definitions.

Record: 1 of 23

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SACS Assesment Database | Survey Entry





# Preliminary Data

- ◆ Spring 2008 – Spring 2009
  - 72% of students (N = 76) have completed a capstone course with a grade of C or higher.
  - 70% of students appropriately cited sources in a written assignment.
  - 92% of students have successfully developed an appropriate PowerPoint Presentation.
  - 75% of BIO 140 students (N = 22) were able to successfully interpret the Kuznets Curve.
  - BIO 140 students (N=22) received an average rubric score of 2.3 on the first Discussion Forum posting (using a four-point written communication rubric).

# Example Assignment

## ◆ Mathematical Modeling – HUM 212

The Economist's Pocket World in Figures (2007 Edition) lists recent statistics for over 60 of the world's countries. These statistics serve as a sample for defining trends in globalization. Each student will choose two or three entities listed in the latter half of the book (the Country Profiles) to compare. For instance, a student may want to compare adult literacy (as one element) with fertility (another aspect).

Considering the data in these categories from as many countries as possible – for a broad sample – students will use mathematical regression techniques to make a projection of the future based on the trend that is identified in the comparison of these two elements. Part of the work is to consider, carefully, which elements to compare by giving thought to the possibility of meaningful relationships (correlations) between aspects of globalization. For example, when comparing adult literacy with fertility rate, is there a correlation between education and family size? What might this relationship be? Or, a student may compare energy consumption with life expectancy, for example.





# Example Assignment

- ◆ Mathematical Modeling – BIO 140

Review the Ice Core Data found in Course Documents. The first set of data represents the most recent sample historically. Increased levels of sulfate indicate possible volcanic eruptions.

Review the sulfate data and estimate the points at which volcanoes might have erupted. Use this information to date the core sample levels. Note that scientists believe that it takes about one year for volcanic ash to reach the glacier. Explain how you arrived at your answer.

# What's Next?

- ◆ We have recently established a benchmark, and minimum sample size for data reporting.
- ◆ We are preparing a “template” for new capstone instructors.
- ◆ We are identifying cross-course assignments.
- ◆ We are developing cross-course assessment tools.
- ◆ We are examining alternatives to the BIO 140 course.



# Final Thoughts

- ◆ The development and implementation of capstone courses can provide an exciting academic challenge for faculty.
- ◆ Give yourself time to experiment with course format and structure before you begin formal assessment.
- ◆ Recognize that the course can be both a “blessing and a curse.”
- ◆ Understand that faculty may not be ready to hear what you have to report.





Questions?

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