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# A.A.S. Geomatics

# Academic Assessment Plan

**Adopted by**

**The Geomatics faculty: 30 March 2018**

 **Submitted to the Academic Assessment Committee via:**

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## Mission Statement

The mission of the Geomatics department is to contribute to the wider body of knowledge in the geospatial sciences, and to disseminate this to society. By advancing our theoretical, professional, technical and educational capabilities, we will develop and maintain a community dedicated to the highest standards of scholarship. Within a student-centered environment, we are committed to the theoretical, professional and technical advancement of all our students, so that they may contribute to the advancement of their profession, their society, and their world, throughout their lives.

## Program Student Learning Outcomes

In Spring 2018, the Geomatics Advisory Board Approved changes to the Student Learning outcomes to align with changes made by the Applied and Natural Science Accreditation Commission of ABET. Students graduating with a AAS in Geomatics will have:

Students completing the Associate of Applied Science degree in Geomatics will be able to:

(1) An ability to identify, formulate, and solve broadly-defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.

(2) An ability to conduct experiments or test theories, as well as to analyze and interpret data

(3) An ability to function on teams

(4) An understanding of professional and ethical responsibility

(5) An ability to communicate effectively

Mapping of Student Learning Outcomes changes

Applied and Natural Science Accreditation Commission

| **Current ASAC GENERAL** **CRITERION 3. STUDENT** **OUTCOMES**  | **Changes to current general criterion**  | **ANSAC GENERAL** **CRITERION 3. STUDENT** **OUTCOMES**  |
| --- | --- | --- |
| The program must have documented student outcomes that prepare graduates to attain the program educational objectives. There must be a documented and effective process for the periodic review and revision of these student outcomes.  | No edits or changes  | The program must have documented student outcomes that prepare graduates to attain the program educational objectives. There must be a documented and effective process for the periodic review and revision of these student outcomes.  |
| B. Associate degree programs must demonstrate that graduates have:  | Reorganized to A. and edited  | A. Associate degree program student outcomes must include, but are not limited to the following :  |
| (a) an ability to apply knowledge of mathematics, sciences, and other related disciplines  | Renumbered as Item 1, incorporated (e), edited per SASC  | (1) An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.  |
| (b) an ability to conduct experiments, as well as to analyze and interpret data  | Renumbered as Item 2 and edited per SASC  | (2) An ability to conduct experiments or test theories, as well as to analyze and interpret data  |
| (c) an ability to identify, formulate, and solve applied science problems  | Combined with Item 1  | See (1)  |
| (d) an ability to function on teams  | Renumbered as Item 3  | (3) An ability to function on teams  |
|  (e) an understanding of professional and ethical responsibility  | Renumbered as Item 4  | (4) An understanding of professional and ethical responsibility  |
| (f) an ability to communicate effectively  | Renumbered as Item 5  | (5) An ability to communicate effectively  |
| (g) a recognition of the need for and an ability to engage in life-long learning  | Moved to Curriculum  |  |
| (h) a knowledge of contemporary issues  | Eliminated  |  |
| (i) an ability to use the techniques, skills, and modern applied science tools necessary for professional practice  | Moved to curriculum  | Now incorporated into Criterion 5, Paragraph 2, new item C  |

## Measures

Two principal measures are to be used to assess student attainment of the program SLOs. These include course level assessments and a graduate exit survey. The relationship between the measures and SLOs is given in Table 1. Each measure is described in its own appendix to this assessment plan.

| **Table 1: Mapping of SLOs to Measures** |  Course Level Assessment | Graduate Exit Survey |
| --- | --- | --- |
| 1. An ability to identify, formulate, and solve broadly-defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline. |  **1** | **1** |
| 2 An ability to conduct experiments or test theories, as well as to analyze and interpret data |  **1** | **1** |
| 3. An ability to function on teams |  **1** | **1** |
| 4 An understanding of professional and ethical responsibility | **1** | **1** |
| 5. An ability to communicate effectively | **1** | **1** |

## Process

Table 2 summarizes the process for administering the various measures. The department assessment coordinator is to work with the faculty each semester to identify artifacts from within the courses which can be used directly observe and assess the level to which students are attaining the SLOs.

The data obtained from the various measures will be presented and discussed annually at the end of the spring semester. In this meeting, faculty will evaluate the collected data and explicitly review each SLO and make a judgment as to the level of student attainment of each outcome. Faculty will also discuss and recommend changes to curriculum, advising procedures, assessment plans, and other factors which will aid future students in better attainment of the SLOs. The results of these discussions will be summarized by the assessment coordinator in brief report which will include, for each SLO:

* Level of student attainment of the SLO.
* A rationale for the level determination
* Potential actions which could enhance student performance relative to the SLO
* Recommendations for improving the applicable measures

This report will be filed on the department’s directory on the college’s shared drive so that they can be used for reporting to OAA.

**Table 2**

**Program SLO Assessment Measures and Administration**

| **Tool** | **Description** | **Frequency/ Start Date** | **Collection Method** | **Administered by** |
| --- | --- | --- | --- | --- |
| Course Level Assessment | Faculty each year will identify specific courses and assignments where student attainment of SLOs can be directly observed/measured  | Occurs Every Academic yearEach SLO will be assessed on a two year cycle, SLO’s will be assessed at least twice in a six year cycle | Faculty provide results for the courses they teach | Geomatics Assessment Coordinator and Faculty |
| Graduate Exit Survey | Survey of graduating students administered by faculty advisors | Every Year | Face to Face meetings or email | Capstone course instructor |

## Implementation Concern

Now that the AAS is no longer a path to state licensure, we expect that there will be few graduates each year, making the data statistically unreliable. We will monitor this, and possibly aggregate results over several years to get more reliable results.

Appendix A: Course Level Assessment

Tool Description:

The primary means of assessing student attainment of the SLOs. Student artifacts from across the curriculum will be used to determine the level to which students are attaining each SLO.

At the start of each fall semester the faculty will meet and produce a mapping matrix between courses and SLOs where they will identify the BEST two places in the curriculum where each SLO can be observed and assessed. Table A.1 gives the general form of the mapping matrix.

**Table A.1
Course to SLO Mapping (Conceptual)**

| **SLO/Course** | **Instructor** | **SLO #1** | **SLO #2** | **SLO #3** |
| --- | --- | --- | --- | --- |
| Course #1 | Faculty A |  |  |  |
| Course #2 | Faculty A | Yes |  | Yes |
| Course #3 | Faculty B |  |  |  |
| Course #4 | Faculty C |  | Yes |  |
| Course #5 | Faculty A | Yes |  | Yes |
| Course #n | Faculty C |  | Yes |  |

The faculty member responsible for the identified courses, will submit a department approved form at the end of each semester which will collect the result of the assessment activity for each SLO evaluated in their course.

Typical information collected:

* Course identification information
* Faculty member
* SLO being assessed
* Short description of the student work product used for the assessment
* Criteria (rubric) used for determining level of attainment
* Summary of student attainment of the SLO in the course
* Copy of the prompting document for the work product.
* Copy/example of a work product meeting each level of attainment.

The assessment coordinator collects these forms and prepares a summary report for the end-of-year assessment meeting.

Factors that affect the collected data:

* The quality of the prompting document. Students need to be clear on what is being requested.
* Single person review of the artifacts may skew the results of faculty are not in agreement on the rubric elements used in the evaluation.

How to interpret the data:

The faculty will develop and refine rubrics which can be used to interpret the data. Also, the faculty will have a chance to review the submitted data annually at the end-of-year meeting and come to a consensus regarding the meaning of the results.

UAA Geomatics Program

**Example of Course Level Assessment of Program Student Learning Outcomes**

Fall 2016-Spring 2017

Date: 5/5/2017

Course: Prefix GEO GEO Numbers: 359 GIS Numbers: Choose an item.

Course Title Geodesy and Map Projections

Instructor: Jeffery Hollingsworth

Program Outcome Assessed: 1a. An ability to apply knowledge of mathematics

Description of student work product(s) used for this assessment:

Exam Question

Additional Information Computing Radius of Curvature

Criteria for being rated as below expectation:

 Answer is missing or incorrect (Poor).

Criteria for being rated as meeting expectation:

 Answer is correct or in the right direction (Developing or Satisfactory).

Criteria for being rated as above expectation:

 Answer is perfectly correct (Excellent).

Number of BS Geomatics students whose work was rated as being:

Below expectation: \_\_\_\_\_\_\_

Meeting expectation: \_\_\_\_\_19\_\_\_\_\_\_

Above expectation: \_\_\_\_\_\_\_\_\_\_

Attachments:

* Prompting document for the work product
* Example of work rated as being below expectations (remove student identifiers)
* Example of work rated as meeting expectations (remove student identifiers)
* Example of work rated as above expectations (remove student identifiers)

**Assessment Rubric:**

**Outcome 1a:** **an ability to apply knowledge of mathematics**

| **Performance Indicator (PI)** | **Poor** | **Developing** | **Satisfactory** | **Excellent** |
| --- | --- | --- | --- | --- |
| 1. Selects appropriate theory, model or governing equation
 | Does not demonstrate understanding of appropriate model | Demonstrates some idea of appropriate model | Selects appropriate model or theory for the problem | Judgment exceeds expectations when selecting model for problem |
| 1. Understands simplifying assumptions or limitations of the chosen model
 | Does not demonstrate understanding of simplifying assumptions or limitations | Demonstrates incomplete understanding of simplifying assumptions or limitations | Demonstrates understanding of simplifying assumptions or limitations | Demonstrates particularly thorough understanding of limitations of model |
| 1. Implements theory, model or governing equation correctly to perform analysis
 | Is unable to implement theory or model to perform analysis | Begins analysis but is unable to see it to completion | Implements theory or model correctly to perform analysis | Implements theory or model to perform analysis in a way that exceeds expectations |

**Summary of results:**

**Number of Students Achieving this Level**

| **PI** | **Assessment method** | **Poor (1)** | **Developing (2)** | **Satisfactory (3)** | **Excellent (4)** | **% Students scoring 3 or 4** |
| --- | --- | --- | --- | --- | --- | --- |
| 1 |  |  |  |  | 19 | 100 |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |

**Direct Assessment Action:**

 Meets expectations

**Comments and Proposed Improvement:**

 Give repeatable questions in blackboard to add additional practice with computations

## Related Instruction

Students in the Associate in Applied Science in Geomatics (Geomatics) program build knowledge and skills needed to carry out specific tasks while they develop abilities in the essential elements of communication, computation, and human relations. Geomatics students obtain the element of communication through the requirement to complete WRTG A111 Writing Across Contexts and WRTG A212 Writing and the Professions or WRTG A213 Writing and the Sciences, obtain the element of computation through the requirement to complete MATH A105 Intermediate Algebra or higher, and obtain the element of human relations through the requirement to complete an Oral Communication Skills course.

The essential elements of communication and computation, are further developed in Geomatics-specific courses. Those elements are addressed through related instruction and assessment in the following courses: GEO A267 Boundary Law I, GIS A201 Intermediate GIS and GEO A157 CAD for Surveyors build the element of communication, and GEO A146 Geomatics Computation build on the element of computation.

Appendix B: Graduate Exit Survey

Tool Description:

The graduating students will be surveyed annually.

This survey may vary from year to year, depending on what other information may be desired each year, but at a minimum the students will be asked how well they were instructed relative to each SLO and what they feel their level of attainment has been.

The questions could take the form of:

The UAA AAS Geomatics program has adopted 6 student learning outcomes. Please rate your knowledge/skills and the program’s effectiveness in teaching you knowledge/skills relative each student learning outcome.

The program states that students graduating with an AAS in Geomatics will be able to:

1) Operate industry standard field surveying equipment;

What is your ability now? □ poor, □ fair, □ good, □ excellent,

□ outstanding, □ No opinion

How well did we do teaching this? □ poor, □ fair, □ good, □ excellent,

□ outstanding, □ No opinion

2) Keep surveying records

What is your ability now? □ poor, □ fair, □ good, □ excellent,

□ outstanding, □ No opinion

How well did we do teaching this? □ poor, □ fair, □ good, □ excellent,

□ outstanding, □ No opinion

Add questions until all SLOs are covered.

Factors that affect the collected data:

* Research has shown that self-assessments are often inaccurate..

How to interpret the data:

The faculty is to compare these results to the more direct measures and discuss comparison. If student perceptions are significantly different that direct performance measures, then additional investigation may need to be establish the validity of the direct measures.