# GEOMATICS DEPARTMENT
# SURVEY OPTION
# Oregon Institute of Technology
# NWCCU Assessment Report
# 2011/2012

## 1. Program Introduction

### 1.1 Program History

Geomatics education has been offered virtually since the inception of the Oregon Institute of Technology, with an associate degree in Surveying initiated in 1951. The program was accredited by the Engineer's Council on Professional Development (ECPD) in 1953. ECPD is now recognized as ABET. A baccalaureate Surveying Technology degree was offered in 1966, and accredited by TAC-ABET in 1970. The program was one of the first two Bachelors of Science surveying programs in the nation to receive RAC-ABET accreditation in 1984. The geomatics program has enjoyed 57 years of continuous accreditation under ABET or its predecessor, ECPD. OIT can be proud of having the oldest BS Geomatics program in the nation! The program degree title was officially changed from Surveying to Geomatics in 2001, reflecting a global trend recognizing the broadening of the profession and the impact of a revolution in advanced technology. As of 2007 the department now offers the BS Surveying option (former BS Geomatics degree), and the BS GIS option.

### 1.2 Enrollment Trends

| Fall Terms | Year (2007-08) | Year (2008-09) | Year (2009-10) | Year (2010-11) | Year (2011-12) |
|---|---|---|---|---|---|
| **Full-time Students** | 65 | 67 | 72 | 61 | 53 |

Reported values represent enrollment during the fourth week of fall quarter as recorded by OIT Institutional Research.

**Table 1.1 – Geomatics enrollment trends**

### 1.3 Retention Rates

| Fall Terms | Year (2004-05) | Year (2005-06) | Year (2006-07) | Year (2007-08) |
|---|---|---|---|---|
| **First-time Freshman** | 0 (0%) (n=1) | 5 (55.6%) (n=9) | 6 (100%) (n=6) | 2 (40%) (n=5) |
| **Continuing Freshman: Changed major** | 0 | 2 | 0 | 0 |
| **Full-Time New Transfers** | 6 (86%) (n=7) | 7(100%) (n=7) | 3 (75%) (n=4) | TBD |

Reported values are from OIT Institutional Research retention and graduation rates statistics.

**Table 1.2 – Geomatics Retention Rates**

### 1.4 Recent Number of Graduates

A summary of the number of geomatics degrees (survey option) awarded for the last 5 years is shown below.

| Fall Terms | Year (2007-08) | Year (2008-09) | Year (2009-10) | Year (2010-11) | Year (2011-12) |
|---|---|---|---|---|---|
| **First-time Students** | 7 | 7 | 10 | 17 | 16 |

**Table 1.3 – Geomatics degrees awarded**

### 1.5 Employment Rates and Salaries

The best data regarding graduate employment rates and salaries comes from the GME Senior exit survey administered to students 2 weeks prior to graduation. Of the 16 that graduated during the 2011/2012 academic year, 9 responded to the senior exit survey. The survey was administered during week 9 of spring quarter, 2012. At this time, 6 students had employment and three were still looking. The employment rate for survey option students as of June 1, 2012 was 67%. During the summer term, Geomatics faculty was able to help two more students find fulltime employment. This brought the employment rate to 89%.

For the graduating class of 2012, students reported starting salaries ranging from $30,000 to $50,000 with an even split between employment in government and private sector jobs.

## 2. Program summary

### 2.1 Geomatics Department Mission, Objectives, and Program Student Learning Outcomes (PSLOs)

The program faculty reviewed and affirmed the mission, objectives, and program student learning outcomes during the fall 2011 convocation. The current version of these items is shown below.

**Department Mission**

The mission of the Geomatics Department is to provide students with fundamental knowledge and skills in the geomatics and GIS disciplines. The Surveying Option prepares students to pass the Fundamentals of Surveying (FS) examination and pursue licensure as a registered Professional Land Surveyor (PLS). The GIS Option prepares students to become certified GIS Professionals. All students learn the professional responsibility of protecting the health, safety and welfare of the public, and become aware of global and cultural issues.

**Objectives**

Program educational objectives are statements that describe the expected accomplishments of graduates during the first few years after graduation—usually 3-5 years. These objectives are consistent with the mission of the program and the institution**.**

Geomatics Department Program Educational Objectives

- Prepare graduates to enter into professional practice
- Provide students with a broad foundation in major geomatics and GIS disciplines
- Prepare students to function effectively on multidisciplinary teams
- Prepare graduates to become licensed or certified professionals.

**Program Student Learning Outcomes (PSLO)**

(a) An ability to apply knowledge of mathematics, science, and applied sciences
(b) An ability to design and conduct experiments, as well as to analyze and interpret data
(c) An ability to formulate or design a system, process or program to meet desired needs
(d) An ability to function on multi-disciplinary teams
(e) An ability to identify and solve applied science problems
(f) An understanding of professional and ethical responsibility
(g) An ability to communicate effectively
(h) The broad education necessary to understand the impact of solutions in a global and societal context

(i) A recognition of the need for, and an ability to engage in life-long learning
(j) A knowledge of contemporary issues
(k) An ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.

**Note:** The expected learning outcomes for the survey option are based on ABET/ASAC accreditation guidelines.

## 2.2 Survey Option Student Learning Opportunities

Geomatics student professional learning opportunities include:

1. The National Society of Professional Surveyors (NSPS) (formerly the American Congress of Surveying and Mapping) national student surveying competition. Geomatics students organize each year, and begin a fundraising drive to supplement funding provided by professional organizations. Students volunteer as runners to assist with conference details, attend technical paper presentations, and staff the OIT Geomatics department booth.
2. Professional Land Surveyors of Oregon (PLSO) annual conference. Students volunteer as runners to assist with conference details, attend technical paper presentations, and staff the OIT Geomatics department booth.
3. GME 468 Geomatics Practicum. Students are responsible for completing a number of community service projects for city, county, state, and federal agencies. Typical projects for students during the 2011/2012 academic year included a boundary survey and writing of access easements for trails in Moore Park, topographic survey for design and layout of baseball fields for the Klamath Falls Parks and Recreation Department and boundary surveys for a local non-profit organization.
4. Industry speakers are invited to make presentations at the PLSO Student Chapter meetings.
5. Students are encouraged to participate in international organizations such as FIG.

## 3. **Summary of Three-Year Assessment Cycle**

Table 3.1 shown below depicts the PSLO/ISLO three year assessment cycle for the geomatics survey option. The table below indicates the PSLO/ISLO and the academic year and quarter where the learning outcome will be assessed.

| PSLO | ISLO | AY 09/10 | AY 10/11 | AY 11/12 |
|---|---|---|---|---|
| (a) an ability to apply knowledge of mathematics, science, and applied sciences | 6 | | Fall<br>Spring | |
| (b) an ability to design and conduct experiments, as well as to analyze and interpret data | - | | Winter<br>Spring | |
| (c) an ability to formulate or design a system, process or program to meet desired needs | 4 | | | Winter<br>Spring |
| (d) an ability to function on multi-disciplinary teams | 2 | Fall<br>Spring | | |
| (e) an ability to identify and solve applied science problems | - | | Winter | |
| (f) an understanding of professional and ethical responsibility | 3 | Fall | | |
| (g) an ability to communicate effectively | 1 | | Winter | Winter |
| (h) the broad education necessary to understand the impact of solutions in a global and societal context | 8 | Winter | | |
| (i) a recognition of the need for, and an ability to engage in life-long learning | 5 | | Fall | Winter<br>Spring |
| (j) a knowledge of contemporary issues | - | | | Winter<br>Spring |
| (k) an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice | 7 | Winter<br>Spring | | |

**Table 3.1 – Three Year Assessment Cycle**

# 4. Summary of Current Academic Year Assessment Activities

## 4.1 Matrix Summary of 2011/2012 PSLO/ISLOs.

Table 4.1 summarizes the PSLO/ISLOs that will be assessed during the 2011/2012 academic year. The matrix also indicates what course the outcome will be assessed in, the quarter of assessment, the instructor who will perform the assessment, and the method that will be utilized.

| PSLO | ISLO | Course | Faculty | Term | Method |
|---|---|---|---|---|---|
| (a) an ability to apply knowledge of mathematics, science, and applied sciences | 6 | GME 451 | Walker | Fall | Test Problem |
| (c) an ability to formulate or design a system, process or program to meet desired needs | 4 | GME 163<br>GME 468 | Marker<br>Duryea | Winter<br>Spring | Rubric Scored Projects |
| (g) an ability to communicate effectively | 1 | GME 454<br>GME 466 | Marker<br>Duryea | Winter<br>Winter | Rubric Scored Paper (466) and Presentation (454) |
| (i) a recognition of the need for, and an ability to engage in life-long learning | 5 | GME 161<br>GME 343 | Marker<br>Duryea | Fall<br>Fall | Quiz Question<br>Homework Exercise |
| (j) a knowledge of contemporary issues | - | GME 351<br>GME 241 | Marker<br>Duryea | Spring<br>Fall | Homework Exercise<br>Homework Exercise |

**Table 4.1 – PSLO/ISLOs to be evaluated during the 2011/2012 academic year**

## 4.2 Summaries of individual assessment activities

### 4.2.1 PSLO (a) / ISLO (6) – "Students will demonstrate an ability to apply knowledge of mathematics, science, and applied sciences".

PSLO (a)/ISLO (6) was not scheduled for assessment during the 2011/2012 academic year per Table 3.1. PSLO (a) is being assessed during 2011/2012 because the assessment results fell below the established criteria during the 2010/2011 assessment. PSLO(a)/ISLO(6) is being re-assessed during the 2011/2012 year to verify that better clarification of course expectations increased the number of students successfully meeting the assessment requirements.

Performance Criteria: The student will

1. Be able to demonstrate mathematical ability by applying mathematical theory to the solution of a practical/applied problem.
2. Be able to demonstrate knowledge of applied science by defining and explaining the relevance of a theoretical concept to an applied problem.
3. Be able to show understanding of computed results by discussing the significance of the results in relation to the computational method used to obtain them.

**Fall Quarter 2011 PLSO(a)/ISLO (6) Assessment in GME 451- Geodesy**

The students in GME 451 (Geodesy) were evaluated by exam for their ability to apply knowledge of mathematics to a practical problem. The students were expected to be able to perform the following on their final exam:

1. 2D or 3D coordinate computations were used to assess the student's ability to perform a standard computation.
2. Students were asked to explain the gravitational potential effect referred to as the "orthometric correction" as a measure of comprehension of applied science knowledge.
3. Students were asked to complete a mathematical proof, or explain theoretical concepts.

| Performance Criteria | Assessment Method | Measurement Scale | Minimum Acceptable Performance | Results |
|---|---|---|---|---|
| Computation | Exam Problem | Percent Completion | 70% | 80% |
| Comprehension of Applied Science Knowledge | Exam Problem | Percent Completion | 70% | 80% |
| Understanding of computed results and/or theoretical concepts | Exam Problem | Percent Completion | 70% | 80% |

**Table 4.2 – Student performance on PSLO (a) / ISLO (6) Fall Quarter, 2011**

**Assessment Results**

Class performance meets or exceeds the minimum criteria in these three categories. The instructor was looking for students to compute meridian convergence, understand the relationship between geodetic and astronomic azimuth, and understand the orthometric correction for this assessment. Students were generally able to explain concepts, but did not list the appropriate equation. Students generally completed a computation process correctly, but often made minor mistakes with intermediate computations, or unit

conversions. Since the setting was an examination, with limited time, these shortcomings are to be expected.

**Actions to be taken**

No specific action is required as a result of this assessment.

**4.2.2 PSLO (c) – "**An ability to formulate or design a system, process or program to meet desired needs**"**

Performance Criteria: The student will

1. Break a problem into component parts and develop a work plan for problem solution.
2. Establish a time line for completion of work plan.
3. Data and drawings are completed to established project specifications.
4. Instructor is notified of any changes to project or completion timeline.
5. All deliverables are completed on time.

**Fall Quarter 2011 PLSO(c) Assessment in GME 163 – Route Surveying**

In GME 163, students are expected to complete the design and layout of a 1000 foot section of road. The goal of the project is to convert the road segment from an existing gravel road to a paved road that meets the specifications for a collector street given by the City of Klamath Falls Public Works Department. Since GME 163 is a freshman level course, the students are provided guidance on how to complete the tasks required to meet the performance criteria. The students are expected to adhere to project specifications and deadlines. Their final lab project is assessed using a proficiency rubric.

| Performance Criteria | Assessment Method | Measurement Scale | Minimum Acceptable Performance | Results |
|---|---|---|---|---|
| Break problem into parts and develop work plan | Rubric graded project | 1 to 4 scale | 70% | 80% |
| Establish timeline for work completion | Rubric graded project | 1 to 4 scale | 70% | 80% |
| Data and drawings are completed to project specifications | Rubric graded project | 1 to 4 scale | 70% | 70% |
| Instructor is notified of any changes to project or completion timeline | Rubric graded project | 1 to 4 scale | 70% | 70% |
| All deliverables are completed on time | Rubric graded project | 1 to 4 scale | 70% | 70% |

Number of students assessed = 10

**Table 4.3 – Student performance on PSLO (c) in GME 163 Fall Quarter, 2011**

**Assessment Results**

Students exceeded the departmentally established minimums in two areas and met it in the remaining three. Students only meeting the minimum requirements in three areas is most likely due to this being the first time PSLO (c) has been assessed in a freshman level course.

**Actions to be taken**

In future assessments of PSLO(c) in freshman level courses, greater care will be taken to explain the importance of meeting project specifications, communication of project changes and the importance of meeting delivery deadlines. Since minimum acceptable performance was obtained in all areas, this PSLO will next be assessed on the regular assessment schedule.

**Spring Quarter 2012 PLSO(c) Assessment in GME 468 – Senior Practicum**

Seniors in the geomatics survey option are expected to be able to take a real-world survey problem, define a scope of work and time schedule, communicate with their client, and deliver a final project in a timely fashion. Students in GME 468 are assigned real-world projects that come to Oregon Tech from local government, non-profits, and the Bureau of Land Management. Each student in the class is assigned to a project as the project manager and they are expected to select the appropriate methods and instruments to complete the project. They are also expected to organize work schedules with other

students so that their project can be completed in a timely fashion. Most senior projects take between 90 and 120 hours to complete and result in a written report, a map or plat suitable for filing with the appropriate government agency, and a final presentation of results to the client. This is a final, capstone project that brings together the knowledge gained by the student over the last four years.

| Performance Criteria | Assessment Method | Measurement Scale | Minimum Acceptable Performance | Results |
|---|---|---|---|---|
| Break problem into parts and develop work plan | Rubric graded project | 1 to 4 scale | 70% | 100% |
| Establish timeline for work completion | Rubric graded project | 1 to 4 scale | 70% | 100% |
| Data and drawings are completed to project specifications | Rubric graded project | 1 to 4 scale | 70% | 83% |
| Instructor is notified of any changes to project or completion timeline | Rubric graded project | 1 to 4 scale | 70% | 67% |
| All deliverables are completed on time | Rubric graded project | 1 to 4 scale | 70% | 67% |

Number of students assessed = 6

**Table 4.4 – Student performance on PSLO (c) in GME 163 Fall Quarter, 2011**

**Assessment Results**

Students performed well above the established minimum of 70% in breaking their problem into manageable parts, developing a timeline for work completion, and adhering to project specifications. Unfortunately, two students performed poorly in the area of notifying the instructor of project changes and delivery of final products on the agreed upon due date. This dropped the last two assessed items below the 70% minimum. During the next senior practicum course, the instructor will place greater emphasis on the need for communicating project changes and meeting project deadlines. It is also expected that by taking greater care to emphasize these items in GME 163, future students in GME 468 will have a better understanding of the requirements for project management than current students have.

**Actions to be taken**

Additional lecture time will be spent in GME 468 next spring discussing the importance communication and timeliness in managing surveying projects. PSLO(c) will be re-assessed during spring 2013 in GME 468 to check for improvement in assessment scores.

**4.2.3 PSLO (g) – "Students will demonstrate an ability to communicate effectively"**

For this PSLO, students will be assessed for the abilities in both written and verbal communication. An in-class presentation was assessed in GME 454 for verbal communication and a term paper was assessed in GME 466 for written communication. The performance criteria used to assess verbal and written communication are listed below.

**Written Communication**

Performance Criteria: The student will

1. Clearly state the purpose and idea of the paper
2. Demonstrate efficient and consistent organization
3. Support arguments with sufficient detail and documentation
4. Utilize a writing style appropriate to a professional report
5. Use standard writing conventions
6. Document all research

**Verbal Communication**

Performance Criteria:

1. Topic meets assignment criteria
2. Presentation contains appropriate content
3. Organization is clear and easy to follow
4. Presentation is in a style consistent with professional presentation
5. Delivery is professional
6. Visual aids are utilized effectively

**Winter Quarter 2012 PLSO (g) Assessment in GME 466- Boundary Law II for Written Communication**

This assessment consisted of students writing a ten to fifteen page paper that investigated the impact of recent court decisions on boundary disputes and how the court opinions will affect decisions made by the surveyor on the location of disputed boundary lines. Students were informed that their papers would be graded on both content and mechanics. Students were given instruction on utilizing the Chicago style for documenting their sources and were told that their papers must be properly documented. The expectation was that the student would produce a professional document suitable for publication.

| Performance Criteria | Assessment Method | Measurement Scale | Minimum Acceptable Performance | Results |
|---|---|---|---|---|
| Purpose and Ideas | Rubric-scored assignment | 1 to 4 scale | 70% score at 3 or 4 | 73% |
| Organization | Rubric-scored assignment | 1 to 4 scale | 70% score at 3 or 4 | 73% |
| Support | Rubric-scored assignment | 1 to 4 scale | 70% score at 3 or 4 | 82% |
| Style | Rubric-scored assignment | 1 to 4 scale | 70% score at 3 or 4 | 82% |
| Conventions | Rubric-scored assignment | 1 to 4 scale | 70% score at 3 or 4 | 55% |
| Documentation | Rubric-scored assignment | 1 to 4 scale | 70% score at 3 or 4 | 100% |

Number of students assessed = 11

**Table 4.5 – Student performance on PSLO (g) Winter Quarter, 2012 for written communication**

**Assessment Results**

The students who were evaluated for this assessment met all of the minimum requirements except in the category of conventions. GME students writing skills were evaluated during the 2010/2011 academic year as part of the institutional outcomes assessment schedule. Students also performed low in the category of "Conventions" but did stay above the minimum 70% requirement (75% of students successfully completed this item in the 2010/2011 assessment). It is apparent that students need more guidance in the areas of grammar, punctuation, and spelling.

**Actions to be taken**

During the winter 2012 GME 466 course, students will be required to have their draft papers read by a writing tutor in CFLAT prior to turning in the final draft. Students will also be required to develop a paper outline and submit it for instructor approval prior to the third week of the term. The instructor for this course believes that many of the students assessed this quarter put the paper off until the end of the quarter and did not leave sufficient time for refinement and editing of the completed document.

**Winter Quarter 2012 PLSO (g) Assessment in GME 454 – GNSS Survey Applications for Verbal Communication**

GME 454 students were expected to research a specific application of GNSS technology not covered in the regular course lectures or reading and present their findings to the class. Students were expected to make use of books, peer reviewed journals, and online

sources in the development of their presentation. All students were required to use Microsoft Power Point or similar presentation software.

| Performance Criteria | Assessment Method | Measurement Scale | Minimum Acceptable Performance | Results |
|---|---|---|---|---|
| Topic Selection | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 100% |
| Content | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 90% |
| Organization | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 90% |
| Style | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 90% |
| Delivery | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 100% |
| Visuals | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 90% |

Number of students assessed = 10

**Table 4.6 – Student performance on PSLO (g) Winter Quarter, 2012 for verbal communication**

**Assessment Results**

GME 454 students did very well with their presentations. All categories were above 90% with only one student delivering a marginal presentation. The class make-up helped to support the high assessment rating. This class was made up of a number of very outgoing individuals that were very skilled at public speaking. This set the bar very high for the less skilled individuals, but they worked hard to keep up with their peers. This resulted in excellent presentations and high assessment results.

**Actions to be taken**

All assessed items were above the 70% minimum. No action will be taken on this item until its next regular assessment date.

### 4.2.4 PSLO (i) /ISLO (5) – "Students will demonstrate a recognition of the need for and an ability to engage in life-long learning"

Performance Criteria: The student will be able to:

1. Define what lifelong learning is.
2. Describe why lifelong learning is important to the practicing professional

**Fall Quarter 2011 PLSO(i) Assessment in GME 161 – Plane Surveying I**

Lifelong learning was assessed in GME 161 using a question on the final exam asking the student to define what lifelong learning is and to describe why it is important to the practicing professional. Students were deemed to be either successful or not successful. The goal for the assessment was that 70% or more of the students would be successful answering the two questions regarding lifelong learning.

| Performance Criteria | Assessment Method | Measurement Scale | Minimum Acceptable Performance | Results |
|---|---|---|---|---|
| Definition of lifelong learning | Rubric-scored test question | 1 to 4 scale | 70% score at 3 or 4 | 81% |
| Description of importance of lifelong learning | Rubric-scored test question | 1 to 4 scale | 70% score at 3 or 4 | 100% |

Number of students assessed = 10

**Table 4.7 – Student performance on PSLO (i) Fall Quarter, 2011**

**Assessment Results**

GME 161 students were able to define lifelong learning and recognize its importance to the practicing professional. Students had more trouble with the definition then recognizing its importance, but both areas were above the minimum 70% required.

**Actions to be taken**

No action will be taken on this item until the next regularly scheduled assessment.

**Fall Quarter 2011 PSLO (i) Assessment in GME 241 – Boundary Law I**

The same assessment that was used in GME 161 was to be given in GME 241 to assess the level of understanding of lifelong learning at the sophomore level. Lifelong learning was not assessed in this class as scheduled. GME faculty felt that the assessment of lifelong learning in a second lower division course would not add to overall program assessment. In the next regularly scheduled assessment of PSLO (i), an assessment will be performed in both a lower division course and an upper division course.

**4.2.6 – PSLO (j) – "A knowledge of contemporary issues"**

For PSLO (j), students are assessed on their knowledge of contemporary issues and how they do/will impact the profession of land surveying. For this assessment, students were evaluated for their contemporary knowledge of technical issues in surveying and for

contemporary legal issues in surveying. Contemporary technical knowledge was assessed in GME 351 – Construction & Engineering Surveying and legal knowledge was assessed in GME 241 – Boundary Surveying I. The following performance criteria were used.

Performance Criteria: The student will

1. Be able to identify sources of information on contemporary issues pertinent to surveying.
2. Be able to identify how new equipment, techniques, methodologies, etc. will impact their profession.
3. Be able to evaluate the usefulness of new equipment, techniques, methodologies to professional practice.
4. Be able to effectively communicate research results on a contemporary issue to peers through written or verbal communication.

**Fall Quarter 2011 PLSO(j) Assessment in GME 241 – Boundary Law I**

| Performance Criteria | Assessment Method | Measurement Scale | Minimum Acceptable Performance | Results |
|---|---|---|---|---|
| Sources of information on contemporary issues | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 86.7% |
| Ability to identify new equipment, technologies, or methodologies that will impact profession | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 86.7% |
| Evaluate usefulness of new equipment, technologies, or methodologies | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 93% |
| Communicate research results effectively | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 93% |

Number of students assessed = 15

**Table 4.8 – Student performance on PSLO (j) Fall Quarter, 2011**

**Assessment Results**

GME 241 students were able to readily locate and identify new court decisions that will impact how a surveyor interprets boundary problems. The students were also able to effectively communicate this information to their peers.

**Actions to be taken**

No action will be taken on this item until the next regularly scheduled assessment.

**Spring Quarter 2012 PLSO(j) Assessment in GME 351 – Construction & Engineering Surveying**

| Performance Criteria | Assessment Method | Measurement Scale | Minimum Acceptable Performance | Results |
|---|---|---|---|---|
| Sources of information on contemporary issues | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 91% |
| Ability to identify new equipment, technologies, or methodologies that will impact profession | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 82% |
| Evaluate usefulness of new equipment, technologies, or methodologies | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 73% |
| Communicate research results effectively | Rubric-scored presentation | 1 to 4 scale | 70% score at 3 or 4 | 82% |

Number of students assessed = 11

**Table 4.9 – Student performance on PSLO (j) Spring Quarter, 2012**

**Assessment Results**

GME 351 students were able to identify sources of information on new equipment and procedures that are relevant to construction and engineering surveys. They were also able to communicate that information to their peers. Students were not as skilled at evaluating the usefulness of new technologies or methodologies. This is most likely because they receive little practice in the academic environment. In most classes, students are told what technology/methodology they will use and what its limitations are. They get little practice in comparison.

**Actions to be taken**

No action will be taken on this item until the next regularly scheduled assessment.

**4.2.7 - Industrial Advisory Committee (IAC) Meetings**

**Assessment Results**

Geomatics faculty met with the IAC three times during academic year 2011/2012. The meetings occurred in September during convocation, March during the annual Professional Land Surveyors of Oregon (PLSO) conference, and at the end of spring quarter on the OIT campus. The IAC had not identified any program issues for the

survey option to consider and the meeting time was dedicated to discussion on how to improve recruiting efforts and development of a geomatics program at the Oregon Tech Wilsonville campus. During the May meeting, IAC members also recommended that geomatics faculty reduce credit hours in some courses such as GME 162 and GME 466 and use the time to develop a second course in Remote Sensing and Laser Scanning. As these technologies become more common in surveying practice, the IAC felt that dedicated time should be found in the curriculum for their instruction.

**Actions to be taken**

During the 2012/2013 academic year, GME faculty will work to develop a program at the Oregon Tech Wilsonville campus that includes the upper division course work in the survey option curriculum. GME faculty will also develop a second Remote Sensing/Laser Scanning course to add to the curriculum during the 2013/2014 academic year.

### 4.2.8 – Senior Exit Survey

At the end of the GME 468 (Senior Practicum) course, students are given the opportunity to answer a short survey regarding their experience in the program. One of the questions asks the student to rate how well prepared they felt that they were for each of the program student learning outcomes a-k. This provides an indirect assessment from the students on how well they feel they have been prepared for each of the objectives stated for the program. The survey is administered online to graduating seniors with the Survey Monkey website.

**Performance Criteria:** The student will feel that they are prepared or highly prepared in PSLO a-k recognized by the geomatics department.

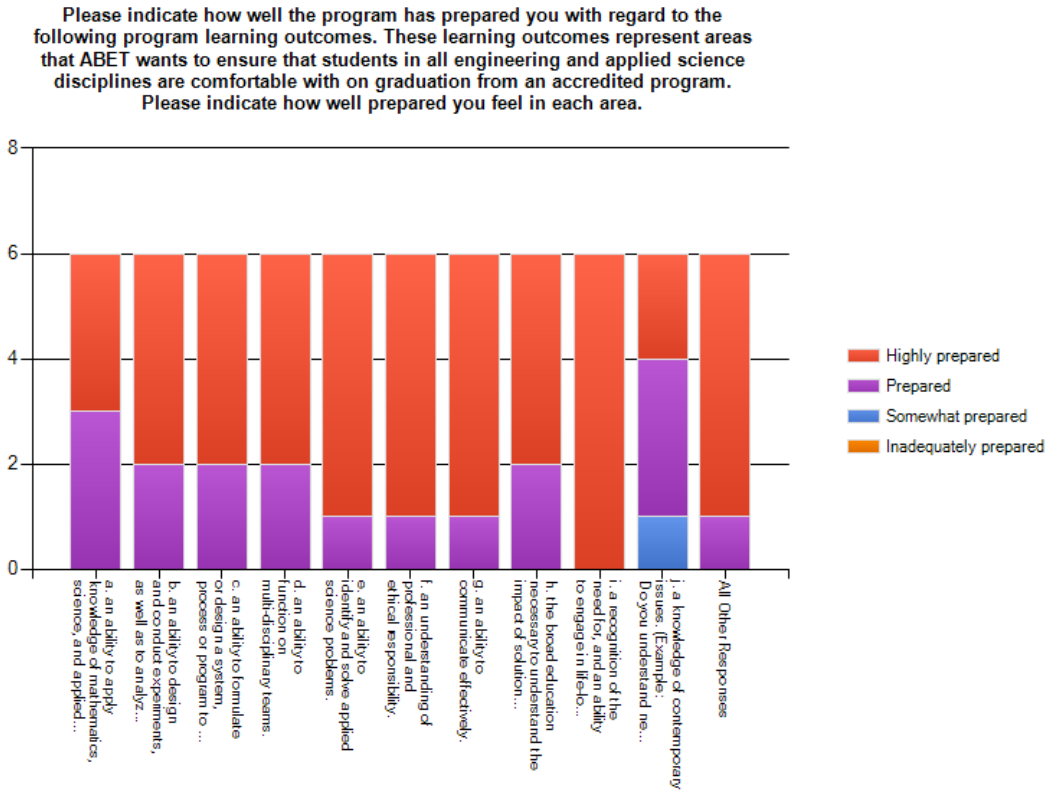


**Figure 4.1 – Senior exit survey results for student individual feeling of preparation for each PSLO for academic year 2011/2012.**

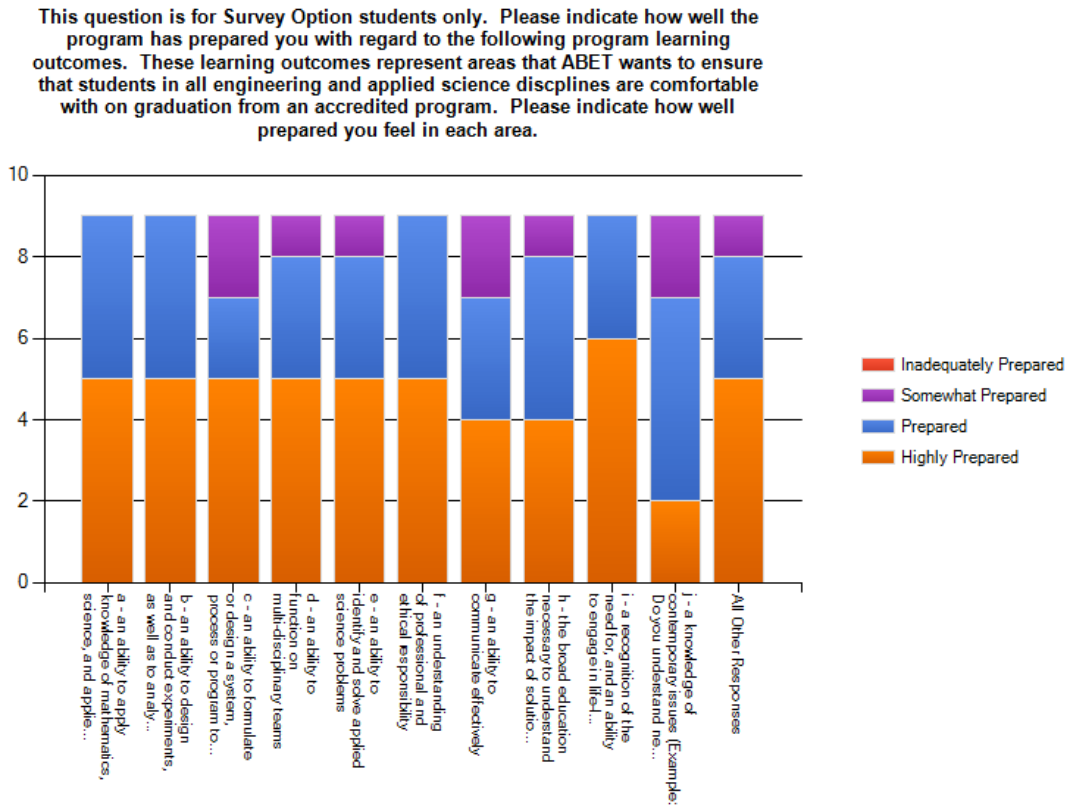


**Figure 4.2 – Senior exit survey results for student individual feeling of preparation for each PSLO for academic year 2010/2011.**

## Assessment Results

Results of the senior exit survey continue to improve. This year, only one graduating senior felt that they were only "somewhat prepared" for any of the PSLOs. This is the same as it was for the 2010/2011 survey. For 2011/2012, there was a significant increase in the number of students that indicated that they felt "Highly Prepared". This indicates that students are getting a better understanding of the PSLOs and a feeling that their course work is preparing them well. Comparison of Figures 4.1 and 4.2 show the improvements made from last year's assessment.

## Actions to be taken

Faculty will continue to tie a-k PSLOs to individual class work in course syllabi so that students better understand the relationship between what they learn in class and the program outcomes. Faculty will also continue to improve class exercises in "understanding contemporary issues" in order to improve student understanding of this program objective.

### 4.2.9 – Professional Exam Results (Fundamentals of Land Surveying (FS))

Each year, geomatics students in the surveying option are eligible to sit for the Fundamentals of Land Surveying (FS) exam given by the State of Oregon. Students may take the exam in either October or April, depending on their graduation date. Our student's ability to pass this exam is a critical measure of the program's success in conveying knowledge to our students as this exam grants entry into the profession of land surveying. Students are expected to work for four years in the profession before being admitted to the professional practice exam, but the FS insures that those entering the profession meet preliminary knowledge requirements for becoming a professional. The results for the October 2011 and April 2012 exams are summarized in the Table 4.10 below.

| Exam Date | Pass Rate |
|---|---|
| October 2011 | 100% |
| April 2012 | 100% |

**Table 4.10 – FLS Exam pass rates for October 2011 and April 2012**

**Assessment Results**

2011/2012 was a great year for GME Survey Option Students taking the FS Exam. For both the October and April exams students achieved a 100% pass rate. NCEES breaks the exam results down by subject category and of the fifteen subject categories, Oregon Tech geomatics students scored above the national average on twelve categories and below the national average on only three categories. The three categories include: 1)Photo and image data acquisition, 2) Higher Math, and 3) Computer Operations. With the introduction of a second course in remote sensing during the 2013/2014 academic year it is hoped that our students will again score at or above the national average in this category. Faculty are currently at a loss for why our students scored below the national average in the higher math section as they are required to have a year of calculus, an upper division elective math course, and a year of calculus based physics. It is hoped that Oregon Tech students will score better in the computer operations portion of the exam next year as the 2012/2013 academic year will be the first year our students take the new MIS 118 computer course.

**Actions to be taken**

GME faculty will continue to monitor student performance on the FS Exam and monitor how changes to the curriculum change exam scores in the areas of higher math, photo and image acquisition, and computer operations.

# 5. Evidence of Student Learning

## 5.1 Summary of Department Discussions on Assessment Activities

Geomatics faculty met during the start of fall quarter, 2011 to plan assessment activities for the upcoming year and to assign assessment tasks to individual instructors. Faculty met again at the end of spring quarter, 2012 discuss the results of the year's assessment activities. All assessment meetings were attended by faculty from both the survey option and the GIS option.

## 5.2 Summary of Faculty Decisions on Program Improvements

The following is a summary of areas identified during this assessment cycle as areas that need additional monitoring or improvement:

**PSLO (c) – "**An ability to formulate or design a system, process or program to meet desired needs**".** This PSLO was assessed in GME 163 and in GME 468. Assessment scores were below the departmentally established minimum in the categories of timely notification of project changes and timely delivery of final products. It was decided during the 2012/2013 year, more emphasis would be placed on communication and timeliness in relation to projects in not just GME 468, but all courses that have a significant project component. Faculty believe this is a culture issue. If students have constant reinforcement of the need to communicate and meet deadlines, they will succeed in this area.

**PSLO 9 (g)** – "An ability to communicate effectively". Assessment scores fell short of the established minimum in only one performance criteria in the writing assessment in GME 466. The performance criteria "Conventions", or spelling, grammar, and punctuation, was the only criteria below the established minimum. Faculty will continue to emphasize the importance of professional written communication in classes requiring reports or written exercises. This PSLO will be re-assessed during the 2012/2013 academic year.

**Senior Exit Survey -** The senior exit survey continues to have some respondents to the question on how well they were prepared for the a-k PSLO answer that they were only "somewhat prepared". While the number responding as being only "somewhat prepared" dropped was relatively steady between 2010/201 and 2011/2013, GME faculty would like to see all response as "Prepared" or "Highly Prepared". To attain this, faculty will continue to place statements regarding program learning outcomes on course syllabi and build awareness of the learning outcomes within the student body. The senior exit survey will be administered again next year and performance in this area will be re-evaluated at that time.

**FS Exam Results** – Faculty will continue to monitor both the passing rates and the comparison between Oregon Tech student passing rates versus the national average in individual subject categories on the FS Exam. It is hoped that the changes to curriculum

this year (dropping MIS 115 in favor of MIS 118) and the proposed curriculum changes for next year will place Oregon Tech students above the national average in the areas of computer operations and photo and image acquisition. As Oregon Tech students have been above the national average in higher math for the last six exam cycles, faculty will evaluate next year's exam results before making decisions on changes to the survey option math requirements.

## 6. "Closing the Loop" – Changes Resulting from Assessment

During the 2010/2011 assessment, four items were identified as requiring either monitoring or action for improvement.

1. PSLO (a) was re-assessed in GME 451 (Geodesy) during fall quarter of 2011. The evaluation of the performance criteria "Understanding computed results and/or theoretical concepts" resulted in a score of only 60%. The minimum performance level for this criteria was 70%. The instructor reworded the exam question that was used for the assessment and the score for the criteria raised to an 80%.
2. PLSO (i) was re-assessed in GME 161 (Plane Surveying I) by use of a test question during fall quarter 2011. The evaluation of the performance criteria "…understanding the need for lifelong learning " resulted in a score of 38% when it was evaluated during the 2010/2011 assessment cycle. Student understanding of the need for lifelong learning was improved by increasing lecture time in class discussing lifelong learning and the reasons for it. The percent of students meeting this criteria as 100% on this assessment cycle. Reflection on why students scored so low during the 2010/2011 assessment cycle points to not enough time being spent on the topic during class.
3. The student response to how well they felt that they were prepared in outcomes a through k improved again this year on the senior exit survey. The department goal is for all students to feel either "prepared" or "highly prepared" on outcomes a-k. During the 2011-2012 assessment, only one student felt "somewhat prepared". This seems to indicate that faculty efforts to explain the outcomes and how they relate to the material that students are learning is helping to improve students perception of their preparedness to enter the profession of geomatics.

## 7. References


1. Oregon Institute of Technology. Institutional Research Home Page. June 9, 2011 <http://www.oit.edu/ir>


## 8. Appendices

## Appendix A – SLO Curriculum Maps

# Geomatics – Survey Option
# Appendix A - PSLO Curriculum Map
# 2011/2012

**PSLO (a):** An ability to apply knowledge of mathematics, science, and applied sciences.

Shaded courses indicate that the PLSO is taught in the course and that students are evaluated on the outcome.

| | **Freshman** | | **Sophomore** | | **Junior** | | **Senior** | |
|---|---|---|---|---|---|---|---|---|
| **Fall** | GME 161 | | GME 163 | | GME 343 | | GME 425 | |
| | WRI 121 | | GME 241 | | MIS 115 | | GME 451 | |
| | MATH 112 | | MATH 254N | | WRI 327 | | Humanities Elec. | |
| | Social Science Elec. | | PHY 221 | | Science Elec. | | Social Science Elec. | |
| | | | | | | | | |
| **Winter** | CIV 112 | | GME 242 | | GME 466 | | GME 434 | |
| | GME 175 | | GME 264 | | GIS 316 | | GME 452 | |
| | MATH 251 | | PHY 222 | | SPE 321 | | GME 454 | |
| | WRI 122 | | WRI 227 | | GME/GIS Elec. | | Science Elec. | |
| | | | Social Science Elec. | | MATH Elec. | | | |
| **Spring** | GME 134 | | GME 372 | | GME 351 | | GME 468 | |
| | GME 162 | | MATH 361 | | GME 444 | | Business Elec. | |
| | MATH 252 | | MIS 275 | | BUS 226 | | Humanities Elec. | |
| | SPE 111 | | PHY 223 | | MGT 345 | | Social Science Elec. | |
| | | | | | Humanities Elec. | | | |

# Geomatics – Survey Option
# Appendix A - PSLO Curriculum Map
# 2011/2012

**PSLO (c):** An ability to design a system, process, or program.

Shaded courses indicate that the PLSO is taught in the course and that students are evaluated on the outcome.

| | Freshman | | Sophomore | | Junior | | Senior | |
|---|---|---|---|---|---|---|---|---|
| **Fall** | GME 161 | | GME 163 | | GME 343 | | GME 425 | |
| | WRI 121 | | GME 241 | | MIS 115 | | GME 451 | |
| | MATH 112 | | MATH 254N | | WRI 327 | | Humanities Elec. | |
| | Social Science Elec. | | PHY 221 | | Science Elec. | | Social Science Elec. | |
| | | | | | | | | |
| **Winter** | CIV 112 | | GME 242 | | GME 466 | | GME 434 | |
| | GME 175 | | GME 264 | | GIS 316 | | GME 452 | |
| | MATH 251 | | PHY 222 | | SPE 321 | | GME 454 | |
| | WRI 122 | | WRI 227 | | GME/GIS Elec. | | Science Elec. | |
| | | | Social Science Elec. | | MATH Elec. | | | |
| **Spring** | GME 134 | | GME 372 | | GME 351 | | GME 468 | |
| | GME 162 | | MATH 361 | | GME 444 | | Business Elec. | |
| | MATH 252 | | MIS 275 | | BUS 226 | | Humanities Elec. | |
| | SPE 111 | | PHY 223 | | MGT 345 | | Social Science Elec. | |
| | | | | | Humanities Elec. | | | |

# Geomatics – Survey Option
# Appendix A - PSLO Curriculum Map
# 2011/2012

**PSLO (g):** An ability to communicate effectively.

Shaded courses indicate that the PLSO is taught in the course and that students are evaluated on the outcome.

| | Freshman | | Sophomore | | Junior | | Senior | |
|---|---|---|---|---|---|---|---|---|
| **Fall** | GME 161 | | GME 163 | | GME 343 | | GME 425 | |
| | WRI 121 | | GME 241 | | MIS 115 | | GME 451 | |
| | MATH 112 | | MATH 254N | | WRI 327 | | Humanities Elec. | |
| | Social Science Elec. | | PHY 221 | | Science Elec. | | Social Science Elec. | |
| | | | | | | | | |
| **Winter** | CIV 112 | | GME 242 | | GME 466 | | GME 434 | |
| | GME 175 | | GME 264 | | GIS 316 | | GME 452 | |
| | MATH 251 | | PHY 222 | | SPE 321 | | GME 454 | |
| | WRI 122 | | WRI 227 | | GME/GIS Elec. | | Science Elec. | |
| | | | Social Science Elec. | | MATH Elec. | | | |
| **Spring** | GME 134 | | GME 372 | | GME 351 | | GME 468 | |
| | GME 162 | | MATH 361 | | GME 444 | | Business Elec. | |
| | MATH 252 | | MIS 275 | | BUS 226 | | Humanities Elec. | |
| | SPE 111 | | PHY 223 | | MGT 345 | | Social Science Elec. | |
| | | | | | Humanities Elec. | | | |

# Geomatics – Survey Option
# Appendix A - PSLO Curriculum Map
# 2011/2012

**PSLO (i):** Recognition of the need for lifelong learning.

Shaded courses indicate that the PLSO is taught in the course and that students are evaluated on the outcome.

| | Freshman | | Sophomore | | Junior | | Senior | |
|---|---|---|---|---|---|---|---|---|
| **Fall** | GME 161 | | GME 163 | | GME 343 | | GME 425 | |
| | WRI 121 | | GME 241 | | MIS 115 | | GME 451 | |
| | MATH 112 | | MATH 254N | | WRI 327 | | Humanities Elec. | |
| | Social Science Elec. | | PHY 221 | | Science Elec. | | Social Science Elec. | |
| | | | | | | | | |
| **Winter** | CIV 112 | | GME 242 | | GME 466 | | GME 434 | |
| | GME 175 | | GME 264 | | GIS 316 | | GME 452 | |
| | MATH 251 | | PHY 222 | | SPE 321 | | GME 454 | |
| | WRI 122 | | WRI 227 | | GME/GIS Elec. | | Science Elec. | |
| | | | Social Science Elec. | | MATH Elec. | | | |
| **Spring** | GME 134 | | GME 372 | | GME 351 | | GME 468 | |
| | GME 162 | | MATH 361 | | GME 444 | | Business Elec. | |
| | MATH 252 | | MIS 275 | | BUS 226 | | Humanities Elec. | |
| | SPE 111 | | PHY 223 | | MGT 345 | | Social Science Elec. | |
| | | | | | Humanities Elec. | | | |

# Geomatics – Survey Option
# Appendix A - PSLO Curriculum Map
# 2011/2012

**PSLO (j):** Knowledge of contemporary issues.

Shaded courses indicate that the PLSO is taught in the course and that students are evaluated on the outcome.

| | Freshman | | Sophomore | | Junior | | Senior | |
|---|---|---|---|---|---|---|---|---|
| **Fall** | GME 161 | | GME 163 | | GME 343 | | GME 425 | |
| | WRI 121 | | GME 241 | | MIS 115 | | GME 451 | |
| | MATH 112 | | MATH 254N | | WRI 327 | | Humanities Elec. | |
| | Social Science Elec. | | PHY 221 | | Science Elec. | | Social Science Elec. | |
| | | | | | | | | |
| **Winter** | CIV 112 | | GME 242 | | GME 466 | | GME 434 | |
| | GME 175 | | GME 264 | | GIS 316 | | GME 452 | |
| | MATH 251 | | PHY 222 | | SPE 321 | | GME 454 | |
| | WRI 122 | | WRI 227 | | GME/GIS Elec. | | Science Elec. | |
| | | | Social Science Elec. | | MATH Elec. | | | |
| **Spring** | GME 134 | | GME 372 | | GME 351 | | GME 468 | |
| | GME 162 | | MATH 361 | | GME 444 | | Business Elec. | |
| | MATH 252 | | MIS 275 | | BUS 226 | | Humanities Elec. | |
| | SPE 111 | | PHY 223 | | MGT 345 | | Social Science Elec. | |
| | | | | | Humanities Elec. | | | |