GEOMATICS DEPARTMENT
GIS OPTION
Oregon Institute of Technology
NWCCU Assessment Report
2016-2017 Academic Year

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 62 years of continuous accreditation under ABET or its predecessor, ECPD. Oregon Tech 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 on the Klamath Falls campus.

1.2 Enrollment Trends (GIS Option Students)

Fall Terms	Year (2012-13)	Year (2013-14)	Year (2014-15)	Year (2015_16)	Year (2016_17)
Full-time Students	7	9	10	9	6

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

Table 1.1 – Geomatics GIS Option enrollment trends

1.3 Recent Number of Graduates

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

Fall Terms	Year (2012-13)	Year (2013-14)	Year (2014-2015)	Year (2015-2016)	Year (2016-2017)
Students	3	5	1	2	2

Reported values represent graduations as recorded by Oregon Tech Institutional Research for the Geomatics - GIS Option

Table 1.2 – Geomatics – GIS Option degrees awarded

1.4 Employment Rates and Salaries

This question was dropped from the 2016-17 senior exit survey. The question will be re-instated in next year's survey.

2. Program summary

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

On September 21, 2016 the Geomatics department faculty met and reviewed the department mission, program educational objectives (PEOs) and Program Student Learning Objectives (PSLOs) listed below. Faculty affirmed that the department mission, PEOs, and PSLOs still meet the goals of the program.

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.

Program Educational 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**.**

Graduates of the Oregon Tech Geomatics Options will:

1. Acquire the ability to obtain professional licensure and/or certifications in the geospatial industry.
2. Advance in the geospatial industry during their career by becoming involved in local, state, national, or international professional organizations.
3. Obtain industry positions requiring increased responsibility.
4. Assume responsibility for lifelong learning in professional and personal development.
5. Demonstrate readiness for graduate education and/or advanced technical education.

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 criteria.

2.2 GIS Option Student Learning Opportunities

Geomatics student professional learning opportunities include:

1. Geomatics Student Club community service activities. Each year, students in the Geomatics Club are encouraged to take on survey/GIS related projects that benefit the community. These projects provide the students with exposure to real-world projects, negotiation and fulfillment of a specific scope of work, and the opportunity to work with other disciplines.
2. 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.
3. Professional Land Surveyors of Oregon (PLSO) annual conference. Students volunteer as runners to assist with conference details, attend technical paper presentations, and staff the OREGON TECH Geomatics department booth.
4. GME 468 Geomatics Practicum. Students are responsible for completing a number of community service projects for city, county, state, and federal agencies.
5. Industry speakers are invited to make presentations at the PLSO Student Chapter meetings.
6. Students are encouraged to participate in international organizations such as the International Federation of Surveyors (FIG).
7. Oregon Tech annual workshop staffed by Bureau of Land Management (BLM) speakers.

3. **Summary of Six-Year Assessment Cycle**

Table 3.1 shown below depicts the six year PSLO/ISLO assessment cycle for the geomatics GIS option. Table 3.1 indicates the PSLO/ISLO and the academic year and the course where the learning outcome will be assessed.

PSLO	ISLO	AY 12/13	AY 13/14	AY 14/15	AY 15/16	AY 16/17	AY 17/18
(a) an ability to apply knowledge of mathematics, science, and applied sciences	6	GME452 GME444			GME452 GME454		
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	-	GME454 GME162			GME161 GME454		
(c) an ability to formulate or design a system, process or program to meet desired needs	4	GME351 GME454			GME351 GME372		
(d) an ability to function on multi-disciplinary teams	2		GME163 GME468			GME163 GME163	
(e) an ability to identify and solve applied science problems	-		GME351 GME452			GME351 GME452	
(f) an understanding of professional and ethical responsibility	3		GME161 GME466			GME175 GME466	
(g) an ability to communicate effectively	1		GME466 GME434			GME454 GME466	
(h) the broad education necessary to understand the impact of solutions in a global and societal context	8			GME434 GME241			GME343 GME466
(i) a recognition of the need for, and an ability to engage in life-long learning	5			GME161 GME468			GME161 GME468
(j) a knowledge of contemporary issues	-			GME351 GME454			GME351 GME466
(k) an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice	7			GME162 GME454			GME175 GME351
Additional PSLO Assessments							
Review FS Exam Results		X	X	X	X	X	X
Review IAC comments		X	X	X	X	X	X
Alumni Survey			X			X	
Employer Survey				X			X

Table 3.1 – Six Year Assessment Cycle

4. Summary of Current Academic Year Assessment Activities

4.1 Matrix Summary of 2016/2017 PSLOs Evaluated During this Assessment Cycle.

Table 4.1 summarizes the Program Student Learning Outcomes (PSLO) that will be assessed during the 2016/2017 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	Course	Faculty	Term	Method
(d) an ability to function on multi-disciplinary teams	GME163 GME163	Marker Marker	Fall 2016 Fall 2016	Final Exam Question Team Peer Evaluation
(e) an ability to identify and solve applied science problems	GME351 GME452	Marker Walker	Spring 2017 Winter 2017	Homework Exercise Lab Exercise
(f) an understanding of professional and ethical responsibilities	GME241 GME466	Marker Marker	Fall 2016 Winter 2017	Exam Question Lab Project
(g) an ability to communicate effectively	GME 454 GME 466	Marker Marker	Winter 2017 Winter 2017	Presentation Final Paper

Table 4.1 – PSLOs to be evaluated during the 2016/2017 assessment cycle

4.2 Summaries of individual assessment activities

Note on PSLO (d) – PSLO(d) was assessed in GME 163 and GME 468 during the 2013/14 academic year. The GME 468 (Senior Practicum) class of 2017 was small and the students worked on individual projects that did not have a multi-disciplinary component. As result, the assessment was shifted to GME 163 – Route Surveying. In the next assessment cycle, the assessment will be made in GME 468 in order to maintain the assessment of a lower division course and an upper division course.

4.2.1 PSLO (d) - **"**An ability to function on multi-disciplinary teams**".** GME 163 – Route Surveying.

Performance Criteria:

In lecture, GME 163 students are walked through a flow chart that depicts the basic route survey and design project. Each segment of the project is discussed and, in particular, who has responsibility for that segment. The goal of the exercise is to familiarize students with all of the tasks that must be completed in route project and the multiple disciplines that are required to execute them. On their final exam, students are given a copy of the flow chart and are required to identify where three professions (other than surveying) fit into the work flow and what that profession contributes to the project.

The student will:

1. **Demonstrate an understanding** of the contributions made by other disciplines in a route design/construction project.

Students are rated with the following scores:

0. Cannot correctly identify three professions involved in a route design/construction project
1. Can correctly identify three professions involved in a route design/construction project

Departmentally Expected Score:

For PSLO (d), the geomatics department expects that 70% or more of students evaluated will correctly answer the exam question and receive a score of "1".

Assessment Results:

Performance Criteria	Assessment Method	Measurement Scale	Minimum Acceptable Performance	Results
Correctly identify three professions (other than surveying) that participate in a route design/construction project	Exam Question	0 or 1	70%	75%

Number of students assessed = 8

Table 4.1 – Student performance on PSLO (d) in GME 163 Fall Quarter, 2016

Actions to be taken

As the scores in all categories exceeded the departmentally established minimum of 70%, no formal actions will be taken for this PSLO at this time. However, for future courses, a similar question will be introduced in a homework assignment or midterm exam in order to keep the concept fresh in the student's minds. In this course, the topic was introduced in the second week of the quarter and was not formerly revisited via an assigned problem until the final exam.

4.2.2 PSLO (d) - "An ability to function on multi-disciplinary teams**".** GME 163 – Route Surveying

Performance Criteria:

GME 163 – Route Surveying includes a lab section where students are expected to work in teams to collect field data, reduce the data, create a road design, and stake the design in the field. During this project, the students work in teams. The course often has both civil and geomatics students so they are working in a multi-disciplinary environment such as they will find when they graduate. Each team's performance is rated by their instructor for how well they work together and the quality of the work that they produce.

The student will

1. **Produce high quality work**
2. **Participate fully in all assigned tasks**
3. **Complete work in a timely fashion**
4. **Produce work that is professional**

Students are rated on the following:

Students were assessed on a 1 to 5 scale with a 1 being unsatisfactory and a 5 being superior. The department goal is that 70% or more of the students receive a 4 or 5 rating in the areas of quality, quantity, timelines, and level of work.

Departmentally Expected Score:

For PSLO (d), the geomatics department expects that 70% or more of students evaluated will score a 4 or 5 in each assessed category.

Assessment Results:

Performance Criteria	Assessment Method	Measurement Scale	Minimum Acceptable Performance	Results
Quality	Instructor Evaluation	1-5	70%	100%
Quantity	Instructor Evaluation	1-5	70%	75%
Timeliness	Instructor Evaluation	1-5	70%	75%
Level of work	Instructor Evaluation	1-5	70%	75%

Number of students assessed = 8

Table 4.2 – Student performance on PSLO (d) in GME 163 Fall Quarter, 2016

Actions to be taken

As the scores in all categories exceeded the departmentally established minimum of 70%, no actions will be taken for this PSLO at this time.

4.2.3 PSLO (e) – "An ability to identify and solve applied science problems." GME 351 – Construction and Engineering Surveying homework exercise.

Performance Criteria:

GME 351 – Construction and Engineering Surveying students must be able to combine field measurements, engineering design drawings, and project specifications in order to layout construction reference points for builders in the field. In Homework 5, students are asked to take engineering drawings (plan and profile of a proposed street), typical street section details, and contractor requirements and compute required reference points both by hand and with the aid of a field computer.

Students must demonstrate the following:

1. **Correctly calculate** by hand layout points for the south side of the given street
2. **Correctly calculate** with the use of a field computer the layout points for the north side of the given street. This portion includes building a horizontal alignment, vertical alignment, and cross section template in the field computer.

Students are rated on the following:

Students are expected to score a 70% or better for each of the performance criteria.

Departmentally Expected Score:

For PSLO (d), the geomatics department expects that 70% or more of students evaluated will score a 70% or higher in each assessed category.

Assessment Results:

Performance Criteria	Assessment Method	Measurement Scale	Minimum Acceptable Performance	Results
Calculate layout points for south side of street (Hand)	Homework Problem	10 Points	70% of class scores 7 or higher	86%
Calculate points for north side of street (Field Computer)	Homework problem	10 Points	70% of class scores 7 or higher	86%

Number of students assessed = 14

Table 4.3 – Student performance on PSLO (e) in GME 351 Spring Quarter, 2017

Actions to be taken

As the scores in all categories exceeded the departmentally established minimum of 70%, no actions will be taken for this PSLO at this time.

4.2.4 PSLO (e) – "An ability to identify and solve applied science problems." – GME 452 – Map projections

Performance Criteria:

Students in GME 452 must be able to recognize the need for a low distortion projection within a mapping project and be able to utilize mathematical principals to develop the projection.

Students must demonstrate the following:

3. **Understand** the theoretical concepts necessary to construct a map projection
4. **Perform** the calculation necessary to develop a map projection
5. **Be able to design** a projection to fit a specific mapping problem.

Students are rated on the following scores:

1. Poor
2. Significantly below average
3. Slightly below average
4. Average
5. Above average

Departmentally Expected Score:

For PSLO (e), the geomatics department expects that 70% or more of students evaluated will score a 4 or 5 in all categories.

Assessment results:

Performance Criteria	Assessment Method	Measurement Scale	Minimum Acceptable Performance	Results
Understand theoretical concepts	Lab Exercise	1 to 4 scale	70%	75%
Demonstrate ability to perform computations	Lab Exercise	1 to 4 scale	70%	88%
Demonstrate ability to design application	Lab Exercise	1 to 4 scale	70%	88%

Number of students assessed = 8

Table 4.4 – Student performance on PSLO (e) in GME 452, Winter 2017

Actions to be taken

As the scores in all categories exceeded the departmentally established minimum of 70%, no actions will be taken for this assessment.

4.2.5 PSLO (f) – "An understanding of professional and ethical responsibility" assessed in GME 175 – Survey Computations and Platting, Winter 2017.

Performance Criteria:

Surveyor's and the American legal system have long recognized that measurement is not a precise science and that locating lines of real property ownership based strictly on recorded measurements often produces inaccurate results. As a result, the surveying profession seeks to "Follow in the footsteps of the original surveyor." This statement encapsulates the professional responsibility of every boundary surveyor to remark boundary lines were they were actually placed and not simply where measurement says they "should" be. In GME 175, students are first introduced to this concept and how it should be applied to boundary surveys. For this assessment, students are asked to describe the meaning of this statement.

Students must describe the following:

1. **The meaning** of the professional principle "Follow the footsteps of the original surveyor".

Students are rated on the following:

Students are expected to be able to describe the meaning of the principle "Follow in the footsteps of the original surveyor". A score of "0" is given if the cannot correctly describe the principle and a score of "1" is given if they can. The Geomatics Department expects that 70% of students will be able to correctly describe this principle on their final exam.

Performance Criteria	Assessment Method	Measurement Scale	Minimum Acceptable Performance	Results
Correctly describe principle	Exam Question	0 or 1	70%	88%

Number of students assessed = 7

Table 4.5 – Student performance on PSLO (f) in GME 175, Winter 2016

Actions to be taken

As the scores in all categories exceeded the departmentally established minimum of 70%, no actions will be taken for this assessment.

4.2.6 PSLO (f) – "An understanding of professional and ethical responsibility" assessed in GME 466 – Boundary Law II winter 2016.

Performance Criteria: Students in GME 466 – Boundary Law II must be able to recognize an ethical problem when presented within the context of a specific scenario. The student is then expected to be able to provide at least two alternative solutions to the problem:

Students are rated on the following:

Students are able to identify that there is an ethical problem with a given scenario and provide alternatives that will eliminate the ethical problem. The student must provide two alternatives to score satisfactorily on this exercise.

Performance Criteria	Assessment Method	Measurement Scale	Minimum Acceptable Performance	Results
Provided two viable alternatives to an ethical problem	Lab Exercise	0 or 1	70%	100%

Number of students assessed = 7

Table 4.6 – Student performance on PSLO (c) in GME 466, Winter 2016

Actions to be taken

As the scores in all categories exceeded the departmentally established minimum of 70%, no actions will be taken for this assessment.

4.2.7 PSLO (g) – "An ability to communicate effectively" assessed in GME 466 – Boundary Law II winter 2017.

Performance Criteria:

Geomatics graduates are expected to be able to communicate effectively through writing. In GME 466 – Boundary Law II, students must write a twelve page research paper on a topic of boundary law. The student is expected to write the paper as an informative document for surveyors or similar disciplines (engineering, law, etc.) that provides an introduction to a specific boundary law problem. The paper must demonstrate research ability, writing ability, writing style, and the ability to document work.

Students must demonstrate the following:

1. **Sufficient research** to adequately define the topic being covered and provide new information that the average, practicing professional would not be aware of.
2. **Organization** must be sufficient to move the audience through the report with ease, provide information in a logical order, and give adequate conclusions to tie the paper together.
3. **Style** must be professional
4. **Documentation** must follow the APA style and provide references for all of the research materials utilized in the paper

Students are rated on the following scores:

1. Poor
2. Significantly below average
3. Slightly below average
4. Average
5. Above average

Departmentally Expected Score:

For PSLO (g), the geomatics department expects that 70% or more of students evaluated will score a 4 or 5 in all categories.

Assessment results:

Performance Criteria	Assessment Method	Measurement Scale	Minimum Acceptable Performance	Results
Sufficient Research	Research Paper	1 to 5 scale	70%	100%
Organization	Research Paper	1 to 5 scale	70%	100%
Style	Research Paper	1 to 5 scale	70%	80%
Documentation	Research Paper	1 to 5 scale	70%	80%

Number of students assessed = 5

Table 4.7 – Student performance on PSLO (g) in GME 466, Winter 2017

Actions to be taken

As the scores in all categories exceeded the departmentally established minimum of 70%, no actions will be taken for this assessment.

4.2.8 PSLO (g) – "An ability to communicate effectively" assessed in GME 454/455 – GNSS Applications winter 2017.

Performance Criteria:

Geomatics graduates are expected to be able to communicate effectively through speech. In GME 454/455, students are expected to be able to communicate through presentations to their peers. In this course, students are expected to research a current topic in GNSS applications and present their research to the class through a ten minute presentation that is followed by a five minute question/answer period. Students are expected to incorporate different media into their presentation and/or demonstration. Students are also expected to be suitably knowledgeable about their topic so that they can answer questions and lead a discussion on their topic after the presentation.

Students must demonstrate the following:

1. **Topic Selection** should demonstrate a knowledge of current and relevant topics to GNSS applications.
2. **Content** should be beyond what students typically know from about GNSS from earlier course work and class work in GME 454/455.
3. **Organization** must be professional. The presentation should have a logical structure a provide information about GNSS clearly.
4. **Delivery** should be effective and engaging to the audience.
5. **Visuals** should enhance the presentation and clarify the topic being discussed.

Students are rated on the following scores:

1. No/Limited Proficiency
2. Some Proficiency
3. Proficiency
4. High Proficiency

Departmentally Expected Score:

For PSLO (g), the geomatics department expects that 70% or more of students evaluated will score a 3 or 4 in all categories.

Assessment results:

Performance Criteria	Assessment Method	Measurement Scale	Minimum Acceptable Performance	Results
Topic Selection	Presentation	1 to 5 scale	70%	75%
Content	Presentation	1 to 5 scale	70%	100%
Organization	Presentation	1 to 5 scale	70%	100%
Style	Presentation	1 to 5 scale	70%	100%
Delivery	Presentation	1 to 5 scale	70%	75%
Visuals	Presentation	1 to 5 scale	70%	100%

Number of students assessed = 4

Table 4.8 – Student performance on PSLO (g) in GME 454/455, Winter 2017

Actions to be taken

As the scores in all categories exceeded the departmentally established minimum of 70%, no actions will be taken for this assessment.

4.2.9 – Industrial Advisory Committee (IAC) Meetings

During this assessment period Geomatics faculty met with the Industrial Advisory Committee (IAC) one time. The meeting took place on May 19th, 2017. No items with respect to assessment were covered in this meeting.

4.2.10 – 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 using the Qualtrics survey tool.

The students are asked how well prepared they felt for each of the Program Student Learning Outcomes (A-K) and are asked to assign a score with 1 being "Inadequately Prepared" and 4 being "Highly Prepared". The department goal is for 70% or more of students to score three or four in each category indicating that the student feels either "Prepared" or "Highly Prepared".

Performance Criteria: Seventy percent or more of students will feel that they are prepared or highly prepared in PSLO a-k recognized by the geomatics department.

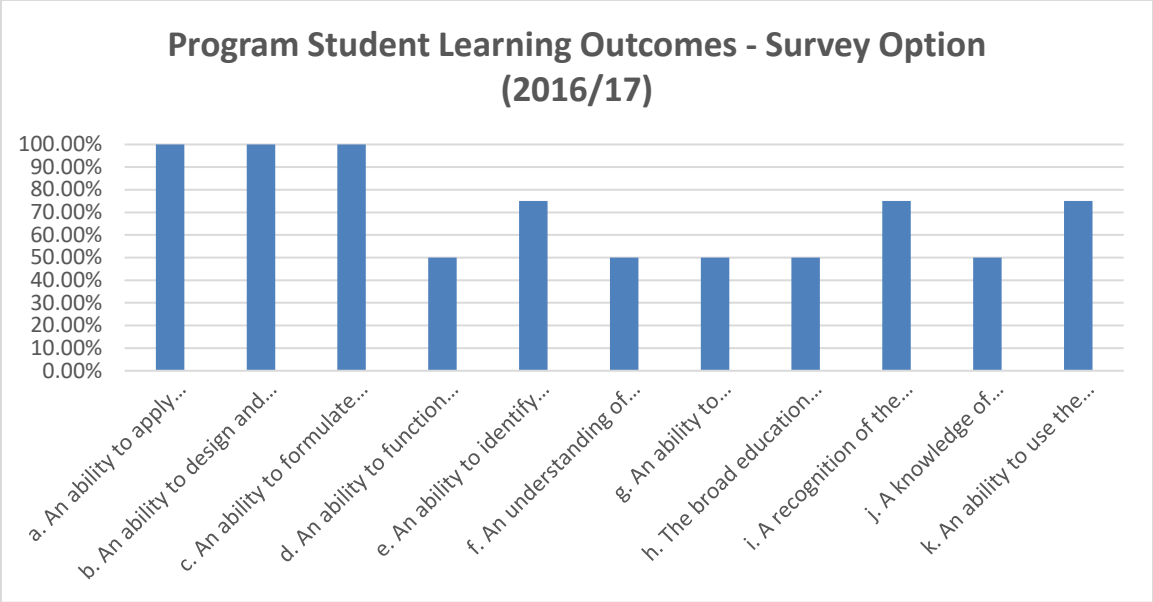

Figure 4.1 – Senior exit survey results for student individual feeling of preparation for each PSLO. Graphs represents results of spring 2017 survey.

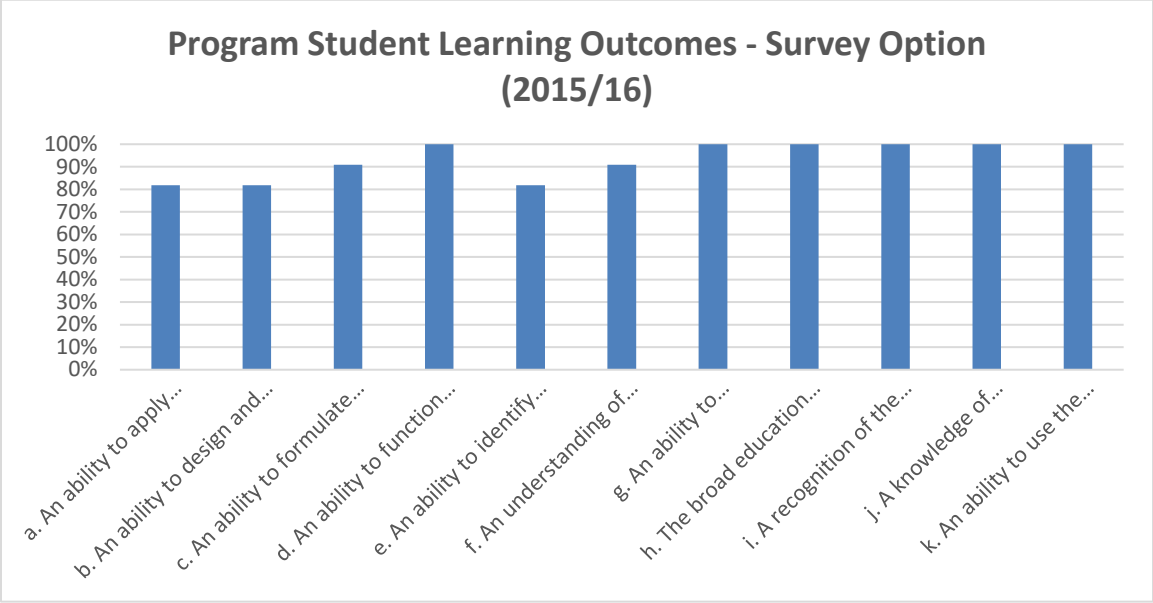

Figure 4.2 – Senior exit survey results for student individual feeling of preparation for each PSLO. Graph represents results of spring 2016 survey.

Assessment Results

Examination of Figure 4.2 shows that 70% or more of students graduating spring of 2016 felt "prepared" or "highly prepared" in all categories. Review of Figure 4.1 shows that students graduating spring of 2017 fell short of the 70% goal in five categories. These were PSLOs d, f, g, h, and j. Faculty find the scores on PSLO d (…ability to function on multidisciplinary teams) and PSLO j (a knowledge of contemporary issues) to not be unusual. Students have scored these two PSLOs low in the past and faculty have tried to emphasize these PSLOs in the curriculum. The results for this exit survey indicate that faculty need to increase efforts to include multidisciplinary problems in the curriculum and emphasize contemporary issues that are currently embedded in the curriculum.

The low scores on PSLOs 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, economic, environmental, and social context) are unusual and (as demonstrated by the 2015/16 results). Faculty will discuss the program outcomes with students in more detail when assignments that cover them are given out.

Actions to be taken

Faculty will continue to try and tie PSLOs to class work to help students understand how what they learn in the classroom is related to the overall program objectives. The 2017 results will be compared to the 2018 results to see if scores return to the established 70% or higher goal.

5. Evidence of Student Learning

5.1 Summary of Department Discussions on Assessment Activities

September 21, 2016 – Geomatics department faculty met to review the department mission, Program Learning Objectives, and Program Student Learning Outcomes. Faculty agreed to continue with the above stated items as listed in the 2015/2016 assessment report. Faculty also agreed to continue with the six year assessment plan until its 2017/18 conclusion.

5.2 Summary of Faculty Decisions on Program Improvements

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

1. During the 2016/17 assessment cycle, only one item fell below department expectations. Student self-evaluation of their preparedness for the PSLOs was significantly below the department expectations for PSLOs d, f, g, h, and j. While student self-evaluation scores on their preparedness with respect the PSLOs has been on a continuous rise since the 2013/14 assessment report, this assessment shows a dramatic reduction in perceived preparedness. Faculty will reevaluate

how the PSLOs are being discussed in class and with respect to specific assignments. Faculty feel that we have most likely become complacent with this task given the continuous rise in scores over the last three assessment cycles.

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

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

Senior Exit Survey - The 2016 senior exit survey showed an improvement in how students view themselves as being prepared for the (a) through (k) assessed outcomes over the 2015 senior exit survey. The 2017 survey shows a dramatic drop in how well students felt prepared in the PSLOs a-k. Faculty will again make a concerted effort to discuss PSLOs in class so students understand the connection be course materials and the outcomes.

7. References

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

8. Appendices

Geomatics – GIS Option
Appendix A - PSLO Curriculum Map
2016/2017

PSLO (d) "An ability to function on multi-disciplinary teams".

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

	Freshman		Sophomore		Junior		Senior	
Fall	GIS 103		GME 163		GIS 306		BUS 304	
	GME 161		GME 241		GME 343		GME 425	
	MATH 112		MATH 254N		MIS 113		GME 451	
	WRI 121		PHY 221		WRI 327		MIS 118	
					Social Science Elec.			
Winter	CE 203		GME 242		GIS 316		GME 452	
	GIS134		GME 264		GME 466		GME 454	
	GME 175		PHY 222		SPE 321		Science Elec.	
	MATH 251		WRI 227		MATH Elec.		Social Science Elec..	
	WRI 122		Social Science Elec.		GME/GIS/ENV Elec.			
Spring	GIS 205		GME 372		BUS 226		GME 468	
	GME 162		MATH 361		GME 351		Business Elec.	
	MATH 252		PHY 223		GME 444		Humanities Elec.	
	SPE 111		Humanities Elec.		MGT 345		Science Elec.	
	Social Science Elec				Humanities Elec.			

PSLO (e) "An ability to design a system, process or program to meet desired needs".

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

	Freshman		Sophomore		Junior		Senior	
Fall	GIS 103		GME 163		GIS 306		BUS 304	
	GME 161		GME 241		GME 343		GME 425	
	MATH 112		MATH 254N		MIS 113		GME 451	
	WRI 121		PHY 221		WRI 327		MIS 118	
					Social Science Elec.			
Winter	CE 203		GME 242		GIS 316		GME 452	
	GIS134		GME 264		GME 466		GME 454	
	GME 175		PHY 222		SPE 321		Science Elec.	
	MATH 251		WRI 227		MATH Elec.		Social Science Elec..	
	WRI 122		Social Science Elec.		GME/GIS/ENV Elec.			
Spring	GIS 205		GME 372		BUS 226		GME 468	
	GME 162		MATH 361		GME 351		Business Elec.	
	MATH 252		PHY 223		GME 444		Humanities Elec.	
	SPE 111		Humanities Elec.		MGT 345		Science Elec.	
	Social Science Elec				Humanities Elec.			

PSLO (f) "An understanding of professional and ethical responsibility".

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

	Freshman		Sophomore		Junior		Senior	
Fall	GIS 103		GME 163		GIS 306		BUS 304	
	GME 161		GME 241		GME 343		GME 425	
	MATH 112		MATH 254N		MIS 113		GME 451	
	WRI 121		PHY 221		WRI 327		MIS 118	
					Social Science Elec.			
Winter	CE 203		GME 242		GIS 316		GME 452	
	GIS134		GME 264		GME 466		GME 454	
	GME 175		PHY 222		SPE 321		Science Elec.	
	MATH 251		WRI 227		MATH Elec.		Social Science Elec..	
	WRI 122		Social Science Elec.		GME/GIS/ENV Elec.			
Spring	GIS 205		GME 372		BUS 226		GME 468	
	GME 162		MATH 361		GME 351		Business Elec.	
	MATH 252		PHY 223		GME 444		Humanities Elec.	
	SPE 111		Humanities Elec.		MGT 345		Science Elec.	
	Social Science Elec				Humanities Elec.			

PSLO (g) "An ability to communicate effectively".

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

	Freshman		**Sophomore**		**Junior**		**Senior**	
Fall	GIS 103		GME 163		GIS 306		BUS 304	
	GME 161		GME 241		GME 343		GME 425	
	MATH 112		MATH 254N		MIS 113		GME 451	
	WRI 121		PHY 221		WRI 327		MIS 118	
					Social Science Elec.			
Winter	CE 203		GME 242		GIS 316		GME 452	
	GIS134		GME 264		GME 466		GME 454	
	GME 175		PHY 222		SPE 321		Science Elec.	
	MATH 251		WRI 227		MATH Elec.		Social Science Elec..	
	WRI 122		Social Science Elec.		GME/GIS/ENV Elec.			
Spring	GIS 205		GME 372		BUS 226		GME 468	
	GME 162		MATH 361		GME 351		Business Elec.	
	MATH 252		PHY 223		GME 444		Humanities Elec.	
	SPE 111		Humanities Elec.		MGT 345		Science Elec.	
	Social Science Elec				Humanities Elec.			