GEOMATICS DEPARTMENT
SURVEY OPTION
Oregon Institute of Technology
NWCCU Assessment Report
2017-2018 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 (All Geomatics Students)

Fall Terms	Year (2013-14)	Year (2014-15)	Year (2015-16)	Year (2016-17)	Year (2017-18)
Full-time Students	48	34	37	32	41

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

Table 1.1 – Geomatics department enrollment trends

1.3 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 (2013-14)	Year (2014-2015)	Year (2015-2016)	Year (2016-2017)	Year (2017-2018)
Students	13	1	12	7	6

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

Table 1.2 – Geomatics – Survey Option degrees awarded

1.4 Employment Rates and Salaries

This question was dropped from the 2016-17 senior exit survey and re-instated in the 2017-18 survey. Graduates reported a salary range from $42,000 to $64,000 for initial starting salary. 67% of students indicated that they also received a signing bonus but did not indicate the value of these bonuses.

2. Program summary

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

On September 20, 2017 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 Survey 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 survey 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			GME351 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 (PSLOs) 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
(h) the broad education necessary to understand the impact of solutions in a global and societal context	GME 351 GME 466	Marker Marker	Spring 2018 Winter 2018	Homework Exercise Legal case brief
(i) a recognition of the need for, and an ability to engage in life-long learning	* *	* *	* *	* *
(j) a knowledge of contemporary issues	GME 351 GME 466	Marker Marker	Spring 2018 Winter 2018	Homework Exercise Final Paper
(k) an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice	GME 175 GME 351	Marker Marker	Winter 2018 Spring 2018	Lab Practical Final Exam

* Not assessed during 2017/18 academic year. Will be assessed during the 2018/19 academic year.

Table 4.1 – PSLOs to be evaluated during the 2017/2018 assessment cycle

4.2 Summaries of individual assessment activities

4.2.1 PSLO (h) – "A recognition of the need for and the ability to engage in life-long learning." GME 343 – Boundary Surveying.

Performance Criteria:

GME 343 students must understand the necessity for keeping abreast of changes in to legal documents related to their field and understand how to research historical boundary decisions in documents from the past. In GME 343, students were asked to explain the importance of historical editions of the BLM Manual of Surveying Instructions. They were also asked to explain why they may need to research these documents during their career.

Students must demonstrate the following:

1. The importance of being able to conduct historical research to address current boundary issues.

Students are rated with the following scores:

0. Scored less than 70% on the homework assignment.
1. Scored higher than 70 % on the homework assignment.

Departmentally Expected Score:

For PSLO (h), the geomatics department expects that 70% or more of students evaluated will score a "1".

Assessment Results:

Performance Criteria	Assessment Method	Measurement Scale	Minimum Acceptable Performance	Results
Scored 70% or higher on Homework Assignment	Homework Assignment	0 or 1	70%	100%

Number of students assessed = 7

Table 4.1 – Student performance on PSLO (h) in GME 343 Fall Quarter, 2018

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.

4.2.2 PSLO (h) - **"**The broad education necessary to understand the impact of solutions in a global and societal context**". –** GME 466 – Legal Aspects of Land Surveying II.

Performance Criteria:

For the geomatics professional it is critical to understand how the courts arrive at decisions about property boundary location. Students in the field of Geomatics must learn to read and interpret court decisions that have been recorded in case law. In GME 466 – Legal Aspects of Land Surveying II, students are asked to prepare legal briefs of case law related to land boundary issues. They must prepare their briefs using the IRAC (Issues, Rule, Analysis, and Conclusion) method of preparing a legal brief. The student must then present the brief to the class.

The student will

1. **Create** a legal brief using the IRAC briefing method
2. **Present** their case and briefing to the class in a five minute presentation

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 (h), 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
Create a brief using the IRAC Method	Instructor Evaluation	1-5	70%	100%
Present briefing to class	Instructor Evaluation	1-5	70%	86%

Number of students assessed = 8

Table 4.2 – Student performance on PSLO (h) in GME 466 Winter 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.

4.2.3 PSLO (i) – "A recognition of the need for, and an ability to engage in life-long learning."

PSLO (i) was scheduled to be assessed during the 2017/18 assessment cycle but was not due to changes to course content. PSLO (i) will be assessed during the 2018/19 academic year.

4.2.4 PSLO (j) - "A knowledge of contemporary issues**".** GME 343 – Construction and Engineering Surveying.

Performance Criteria:

In GME 351, homework exercise one asks students to read and summarize three articles with respect to new surveying technologies that are being utilized in the construction industry. The student is then asked to provide a brief (5 minute) presentation to the class outlining what they have learned from the articles and focusing on how these new technologies are impacting the profession and the construction industry.

The student will:

1. **Identify** new geomatics technologies and how they are impacting/changing the construction industry.

Students are rated on the following:

0. Scored less than 70% on the homework assignment.
1. Scored higher than 70 % on the homework assignment.

Departmentally Expected Score:

For PSLO (j), the geomatics department expects that 70% or more of students evaluated will score a "1".

Assessment Results:

Performance Criteria	Assessment Method	Measurement Scale	Minimum Acceptable Performance	Results
Exam question answered correctly	Exam Question	0 or 1	70% of class scores a 1	100%

Number of students assessed = 7

Table 4.3 – Student performance on PSLO (j) in GME 351 Spring Quarter, 2018

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.

4.2.5 PSLO (j) – "A knowledge of contemporary issues." – GME 466 – Legal Aspects of Land Surveying II

Performance Criteria:

Students in GME 466 are required to write a research paper on a current issue of boundary law. The assignment requires selection of a current issue in boundary law and legal research to determine current court opinion on the topic.

Students must demonstrate the following:

1. Proper grammar and writing mechanics.

2. Clear statement of topic and purpose of the paper.
3. Clear development of ideas supporting the topic.
4. Concise organization and structure.
5. Well documented research with citations in the APA format.

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 (j), 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
Proper grammar	Research Paper	1 to 4 scale	70%	71%
Clear statement of topic and purpose	Research Paper	1 to 4 scale	70%	86%
Clear development of ideas	Research Paper	1 to 4 scale	70%	86%
Concise organization	Research Paper	1 to 4 scale	70%	86%
Well documented and correct citation format	Research Paper	1 to 4 scale	70%	71%

Number of students assessed = 7

Table 4.4 – Student performance on PSLO (j) in GME 466, Winter 2018

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 (k) – "An ability to use the techniques, skills, and modern scientific and technical skills necessary for professional practice." assessed in GME 175 – Survey Computations and Platting, winter 2018.

Performance Criteria:

Students in GME 175 – Computations and Platting spend the quarter learning how to perform the computations and drafting required to prepare a survey plat suitable for recording at the County Surveyor's Office. The final lab consists of a practical exercise where the students must take field observations and record information and prepare a final survey plat.

Students must:

1. Complete the lab practical exercise with a 70% or better.

Students are rated on the following:

Students must be able to prepare a plat from field and record data that meets the requirements of ORS 209.250 utilizing CAD software. The department expectation is that 70% or more of the students will complete the exercise with a score of 70% or better.

Performance Criteria	Assessment Method	Measurement Scale	Minimum Acceptable Performance	Results
Completion of practical exercise	Lab Practical	0 or 1	70%	100%

Number of students assessed = 15

Table 4.5 – Student performance on PSLO (k) in GME 175, winter 2018

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 (k) – "An ability to use the techniques, skills, and modern scientific and technical skills necessary for professional practice." assessed in GME 351 – Construction and Engineering Surveying, spring 2018.

Performance Criteria:

During the quarter, students in GME 351 learn a variety of techniques and tools for the computation of points for construction layout. Students learn how to prepare layout points from manual calculations, field computer software and in CAD. The student's final exam requires them to take a plan and profile drawing of a sanitary sewer line and calculate out the appropriate reference points for field layout.

Students are rated on the following:

Students must be able to calculate the required layout points using the techniques developed in class. The department expects that 70% or more of students in the class will score a 70% or higher on the final exam.

Performance Criteria	Assessment Method	Measurement Scale	Minimum Acceptable Performance	Results
Score of 70% or more on final exam	Exam	0 or 1	70%	100%

Number of students assessed = 13

Table 4.6 – Student performance on PSLO (k) in GME 351, spring 2018

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 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.

4.2.9 – Industrial Advisory Committee (IAC) Meetings

During this assessment period Geomatics faculty met with the Industrial Advisory Committee (IAC) two times. The meetings took place on November 30th 2017 and May 11th 2018. No assessment items were discussed at either meeting, but the committee did discuss the need for getting both the survey option and the GIS option online. The IAC agreed to help the department seek support for development of online offerings from the administration.

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.

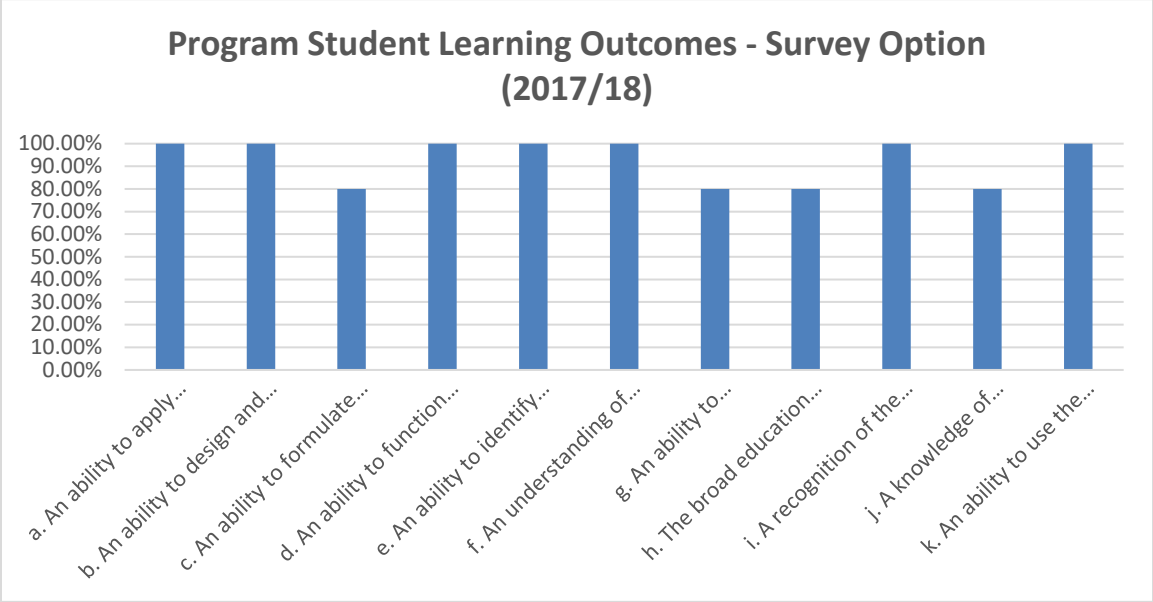

Figure 4.1 – Senior exit survey results for student individual feeling of preparation for each PSLO. Graphs represents results of spring 2018 survey.

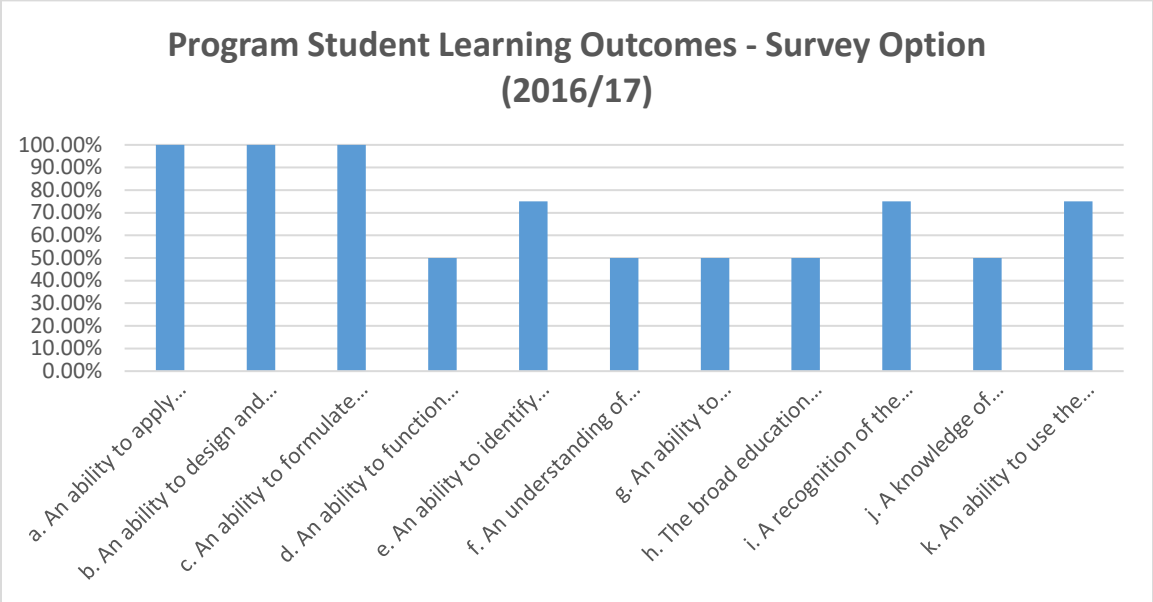

Figure 4.2 – Senior exit survey results for student individual feeling of preparation for each PSLO. Graph represents results of spring 2017 survey.

Assessment Results

Review of the 2016/17 student self-evaluation of preparation in the program student learning outcomes shows that students scored themselves below the departmentally established 70% on PSLOs d, f, g, h, and j. As a result of this low scoring, faculty increased their effort to explain the connection between individual classes, the overall program curriculum, and the PSLOs. This improved the student's view of how well that they feel they are prepared for each of the PSLOs. The lowest scores were 80% in the PSLOs c, g, h, and j. All other PSLOs were at the 100% level indicated that the students in the 2017/18 class felt either highly prepared or prepared for the outcome.

Actions to be taken

Faculty will continue to tie PSLOs to class work to help students understand how what they learn in the classroom is related to the overall program objectives. The 2018 results will be compared to the 2019 results to see if scores can be further imporved.

4.2.11 – Professional Exam Results (Fundamentals of Land Surveying (FS))

Performance Criteria: The geomatics department expects a 90% passing rate for seniors taking the Fundamentals of Land Surveying Exam.

Exam Date	Pass Rate
Jul 01 – Dec 31, 2017 (1 examinee)	100%
Jan 01 – Jun 30, 2018 (5 examinees)	100%

Table 4.8 – FS Exam pass rates for fall 2017 and spring 2018.

Assessment Results

FS exam results for this assessment period exceeded departmentally established goals. During the 2017/18 academic year, 100% of students that took the fundamentals exam passed.

Actions to be taken

No additional actions will be taken by faculty at this time.

5. Evidence of Student Learning

5.1 Summary of Department Discussions on Assessment Activities

September 20, 2017 – Geomatics Department Faculty Meeting (Convocation)

The department faculty met and discussed the following items with respect to assessment:

- Review of department mission statement. No changes were made and the department will continue with current mission statement.
- Review of program learning objectives. No changes were made and the department will continue with the current program learning objectives.
- Review of program student learning objectives. No changes were made and the department will continue with current student learning objectives. Department faculty did discuss changing the PSLOs fall of the 2018/19 academic year to align with the new ABET 1-7 student outcomes. This step will be taken during the 2018/19 academic year so that the current six year assessment cycle can be completed without a change to the PSLOs and the new six year cycle can be started with the new PSLOs.
- GME 425 (Photogrammetry) will undergo a course redesign during the 2017/18 academic year in order to incorporate drone imagery and flight planning for the department's new drone. This should not impact assessment activities during this academic year.

March 2, 2018 – Geomatics Department Faculty Meeting

The department faculty met and discussed the following items with respect to assessment:

- The department faculty met to review and edit the Geomatics department description in the 2018/19 catalog. The description change is designed to better reflect the integration of land surveying and Geographic Information Systems (GIS) within the program.
- Faculty discussed requirements for developing a MS degree program in the GIS option. Professor Ritter will move forward with developing a proposal for this per the request of the Provost.

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:

- While students met all of the departmentally required minimums for assessed items during the 2017/18 academic year, the scores in communication were considered low and in need of improvement. Historically, writing assignments and presentations have been scored by one faculty member. For the 2018/19 academic year, faculty will meet to evaluate these PSLOs and develop a group score. After group scoring, faculty will decide if additional measures may need to be made in order to improve student writing and public speaking capabilities.
- Geomatics faculty are very happy with the 100% pass rate on the NCEES FS exam for the last two academic years. Faculty will continue to incorporate discussions of FS exam topics into relevant courses and support students in forming study groups to prepare for the exam. Faculty will also encourage students to wait until spring quarter of their senior year in order to insure that they have had course work on all of the topics covered on the FS exam.

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 2017 senior exit survey showed a drastic reduction in student perceived preparedness for PSLOs, d, f, g, h, and j. Faculty incorporated more discussion of the a-k outcomes in class discussions. The results for the 2017/18 assessment show a marked improvement over those in the 2016/17 assessment. This assessment will continue to be monitored and effort will continue to try and improve the results.

NCEES Fundamentals of Surveying Exam Results – The department expectation for students taking the NCEES Fundamentals of Surveying Exam is 90%. The data available from NCESS for this assessment cycle shows students passing this exam at the 100% level. Faculty will continue to encourage students to form study groups and take the

exam during the spring quarter of their senior year. This approach has now produced two consecutive years of 100% pass rates.

7. References

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

8. Appendices

Geomatics – Survey Option
Appendix A - PSLO Curriculum Map
2017/2018

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

PSLO (h) "The broad education necessary to understand the impact of solutions in a global and societal context".

	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		MATH 361		MIS 118	
					Social Science Elec.			
Winter	CE 203		GME 242		GIS 316		GME 452	
	GIS134		GME 264		GME 444		GME 454	
	GME 175		PHY 222		GME 466		Science Elec.	
	MATH 251		WRI 227		MATH Elec.		Social Science Elec..	
	WRI 122		Social Science Elec.		GME/GIS/ENV Elec.			
Spring	GIS 205		GME 351		BUS 226		GME 468	
	GME 162		GME 372		MGT 345		Business Elec.	
	MATH 252		PHY 223		SPE 321		Humanities Elec.	
	SPE 111		Humanities Elec.		WRI 327		Science Elec.	
	Social Science Elec				Humanities Elec.			

PSLO (j) "A knowledge of contemporary issues".

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		MATH 361		MIS 118	
					Social Science Elec.			
Winter	CE 203		GME 242		GIS 316		GME 452	
	GIS134		GME 264		GME 444		GME 454	
	GME 175		PHY 222		GME 466		Science Elec.	
	MATH 251		WRI 227		MATH Elec.		Social Science Elec..	
	WRI 122		Social Science Elec.		GME/GIS/ENV Elec.			
Spring	GIS 205		GME 351		BUS 226		GME 468	
	GME 162		GME 372		MGT 345		Business Elec.	
	MATH 252		PHY 223		SPE 321		Humanities Elec.	
	SPE 111		Humanities Elec.		WRI 327		Science Elec.	
	Social Science Elec				Humanities Elec.			

PSLO (k) "An ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice".

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		MATH 361		MIS 118	
					Social Science Elec.			
Winter	CE 203		GME 242		GIS 316		GME 452	
	GIS134		GME 264		GME 444		GME 454	
	GME 175		PHY 222		GME 466		Science Elec.	
	MATH 251		WRI 227		MATH Elec.		Social Science Elec..	
	WRI 122		Social Science Elec.		GME/GIS/ENV Elec.			
Spring	GIS 205		GME 351		BUS 226		GME 468	
	GME 162		GME 372		MGT 345		Business Elec.	
	MATH 252		PHY 223		SPE 321		Humanities Elec.	
	SPE 111		Humanities Elec.		WRI 327		Science Elec.	
	Social Science Elec				Humanities Elec.			