GEOMATICS DEPARTMENT
SURVEY OPTION
Oregon Institute of Technology
NWCCU Assessment Report
2020-2021 Academic Year

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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 Bachelor of Science surveying programs nationwide to receive RAC-ABET accreditation in 1984. The geomatics program has enjoyed 68 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 degree title of the program 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. Since 2007, the department has offered the BS Surveying option (former BS Geomatics degree) and the BS GIS option on the Klamath Falls campus.

1.2 Enrollment Trends (Geomatics - Surveying Option Students)

Table 1-1 Geomatics department enrollment trends

Fall Terms	Year (2016-17)	Year (2017-18)	Year (2018-19)	Year (2019-20)	Year (2020-21)
Full-time Students	30	41	34	38	21

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

1.3 Recent Number of Graduates

Table 1.2 shows the number of geomatics degrees (Survey Option) awarded over the last five years.

Table 1-2 Geomatics - Survey Option degrees awarded

Fall Terms	Year (2016-17)	Year (2017-18)	Year (2018-19)	Year (2019-20)	Year (2020-21)
The number of degrees awarded	7	6	6	13	9

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

1.4 Employment Rates and Salaries

Graduates in 2018 reported an initial starting salary range of $42,000 to $64,000. 67% of students indicated they would receive a signing bonus, and 33% indicated they would receive other guaranteed compensation. However, it 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 18, 2020, 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.

2.1.1 Department Mission

The mission of the Geomatics Department is to provide students with fundamental knowledge and skills in the geomatics discipline. 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.

2.1.2 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.

2.1.3 Program Student Learning Outcomes (PSLO)

(1) An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.
(2) An ability to formulate or design a system, process, procedure or program to meet desired needs.
(3) An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.
(4) An ability to communicate effectively with a range of audiences.
(5) An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.
(6) An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

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, negotiations, and fulfillment of a specific scope of work, as well as the opportunity to work with other disciplines.
2. The National Society of Professional Surveyors (NSPS) National Geomatics Student Competition. If a critical mass of students are committed to participating, a fundraising drive is initiated to supplement funding provided by the department and professional organizations. In 2020, two Geomatics students won the NSPS Student Project of the Year, which involved a surveying/GIS application.
3. Professional Land Surveyors of Oregon (PLSO) annual conference. Students volunteer as runners to assist with conference details, attend technical paper presentations, and staff an Oregon Tech Geomatics department booth.
4. GME 468 Geomatics Practicum. Students are responsible for completing several community service projects for city, county, state, and federal agencies.
5. Industry speakers are invited to present at the PLSO Student Chapter meetings.
6. Students are encouraged to participate in professional organizations, such as becoming a student member of PLSO.

3 Summary of Six-Year Assessment Cycle

Table 3.1 shows the six-year PSLO/ISLO assessment cycle for the geomatics survey option. Table 3.1 indicates the PSLO/ISLO, the academic year, and the course where the learning outcome will be assessed. (ISLO: Oregon Tech's Institutional Student Learning Outcomes).

Table 3-1 Six-Year Assessment Cycle

PSLO	ISLO	AY 15/16	AY 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21
(1) An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.	6	GME175 GIS306			GME175 GIS306		
(2) An ability to formulate or design a system, process, procedure or program to meet desired needs.	4	GIS306 GME468			GIS306 GME468		
(3) An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.	2		GME241 GIS316			GME241 GIS316	
(4) An ability to communicate effectively with a range of audiences.	1		GME161 GME468			GME161 GME468	
(5) An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global,	3			GME162 GME454/455			GME162 GME454/455

economic, environmental, and societal contexts.							
(6) An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.	5			GIS205 GME468			GIS205 GME468
Additional PSLO Assessments							
Review FS Exam Results		X	X	X	X	X	X
Review IAB comments		X	X	X	X	X	X
Alumni Survey			X			X	
Employer Survey				X			X

4 Summary of Current Academic Year Assessment Activities

The Department's previous Assessment Coordinator terminated their employment with OT in the Spring of 2021. Subsequently, it was discovered that they had not filed assessment reports for the previous three academic years. None of the assessment data collected during those three years was available.

Table 4.1 summarizes the Program Student Learning Outcomes (PSLOs) assessed during the 2023/2024 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.

Table 4-1 – PSLOs evaluated during the 2020/2021 assessment cycle.

PSLO	Course	Faculty	Term	Method
(5) An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.	GME 162	Walker	Spring 2021	Assignment 2
	~~GME 454/455~~	~~Walker~~	~~Winter 2021~~	~~Laboratory Exercises~~
(6) An ability to function effectively in teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.	GIS 205	Ritter	Spring 2021	Laboratory Exercise
	~~GME 468~~	~~Marker~~	~~Spring 2021~~	~~Term Paper~~

Note: GME454 was not included in this process because only one student enrolled in it, and there were no submissions. GME468 also was not included in this process due to zero enrollment.

4.1 Summaries of individual assessment activities

4.1.1 PSLO (5) An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.

Performance Criteria:

GME 162 and GME 454 students must demonstrate the ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.

Students are rated based on the following scores:

1) Below 50% of the score
2) Above 50% of the score
3) Above 60% of the score
4) Above 70% of the score
5) Above 80% of the score

4.1.1.1 GME 162

Table 4-2 Rubric For

PSLO 5" An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts." GME 162 - Plane Surveying II

Performance Criteria	**Below 50% of the score (1)**	**Above 50% of the score (2)**	**Above 60% of the score (3)**	**Above 70% of the score (4)**	**Above 80% of the score (5)**
An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.	Little or no ability to understand the impact of technical and/or scientific solutions	Some, but limited ability to understand the impact of technical and/or scientific solutions	Some limitations on the ability to understand the impact of technical and/or scientific solutions	Ability to understand the impact of technical and/or scientific solutions	Excellent ability to understand the impact of technical and/or scientific solutions

Departmentally Expected Score:

For PSLO (5), the Geomatics Department expects 70% of students to score a 4 or 5 in all categories.

Table 4-3 GME 162: Assessment results

Performance Criteria	**Assessment Method**	**Measurement Scale**	**Minimum Acceptable Performance**	**Results**
Assignment 2	Score	1 to 5 scale	70%	50%

Note: It was evaluated again by Professor Lee using a 1 to 5 scale.

Table 4-4 GME 162: The number of students assessed. See Appendix A

Performance Criteria	**Below 50% of the score (1)**	**Above 50% of the score (2)**	**Above 60% of the score (3)**	**Above 70% of the score (4)**	**Above 80% of the score (5)**	**Total**
Number of students assessed	3	1	0	1	3	8

Actions to be taken.

Four out of eight students did not exceed the departmentally established minimum of 70%. Three of them did not submit the assignments. I assume that it was a consequence of the pandemic.

4.1.2 PSLO (6): An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

Performance Criteria:

GIS 205 and GME 454/455 students must demonstrate the ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.

Students are rated based on the following scores:

6) Poor work or no contribution at all: below 50% of the score
7) Above 50% of the score
8) Above 60% of the score
9) Above 70% of the score
10) Above 80% of the score

4.1.2.1 GIS 205

Table 4-5 Rubric For
PLSO (6): An ability to function effectively in teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty. GIS 205 - Mobile and Web GIS

Performance Criteria	**Below 50% of the score (1)**	**Above 50% of the score (2)**	**Above 60% of the score (3)**	**Above 70% of the score (4)**	**Above 80% of the score (5)**
An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.	Little or no ability to understand the impact of technical and/or scientific solutions	Some, but limited ability to understand the impact of technical and/or scientific solutions	Some limitations on the ability to understand the impact of technical and/or scientific solutions	Ability to understand the impact of technical and/or scientific solutions	Excellent ability to understand the impact of technical and/or scientific solutions

Departmentally Expected Score:

For PSLO (6), the Geomatics Department expects 70% of students to score a 4 or 5 in all categories.

Table 4-6 GIS 205: Assessment results

Performance Criteria	**Assessment Method**	**Measurement Scale**	**Minimum Acceptable Performance**	**Results**
Lab1	Score	1 to 5 scale	70%	89%

Table 4-7 GIS 205: The number of students assessed. Appendix B

Performance Criteria / Number of Students Assessed	Below 50% of the score (1)	Above 50% of the score (2)	Above 60% of the score (3)	Above 70% of the score (4)	Above 80% of the score (5)	Total
Lab1	1	0	0	0	8	9

Actions to be taken:

Lab1 exercise is designed to create multiple layers, which requires analytical approaches. The result meets the departmentally established minimum of 70%. Consequently, no further action is necessary.

5 Evidence of Student Learning

5.1 Summary of Department Discussions on Assessment Activities

September 18, 2020 – Geomatics Department Faculty Meeting (Convocation)

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

- No changes were deemed necessary for the department's mission statement, Program Learning Objectives (PLSOs), or Student Learning Objectives.
- Changes had been made to the PLSOs during the 2018/19 academic year to align with the new ABET 1-7 student outcomes so that the new six-year cycle can be started with the new PSLOs.
- GME 425 (Photogrammetry) underwent a course redesign during the 2017/18 academic year in order to incorporate drone imagery and flight planning for the department's new drone.
- Geomatics faculty are very happy with the 100% pass rate on the NCEES FS exam in recent 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 ensure that they have had course work on all of the topics covered on the FS exam.

January 28, 2021 – Geomatics Department Faculty Meeting

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

- Reviewed which assessments will take place in which term and assigned each instructor the task of identifying assignment/test/project to be assessed and preparing assessment criteria and rubric.
- Faculty discussed the movement of proposing a graduate GIS program to work in tandem with a simultaneously proposed Community Research Center.
- Faculty agreed on a common, easily accessible location for department syllabi.
- Updates of curriculum maps were discussed as per changes in General Education courses.

- Discussion was had on the possibility of adopting MIS 285 instead of MIS 118 for surveying students and how each would mesh with PLSOs.
- Discussion was had on the progress of the online GIS degree and a possible GIS certificate.
- Discussion was had on a transfer agreement with East Los Angeles College for both degree options.

March 19, 2021 – Geomatics Department Faculty Meeting

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

- Student Satisfaction Survey
- Status of assessment activity to date for the current academic year
- Catalog narrative changes
- Status of online degrees

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:

- While students generally meet all of the departmentally required minimums, the scores in communication are generally lower than desired and in need of improvement. Historically, writing assignments and presentations have been scored by one faculty member. The idea of having the faculty will meet corporately to evaluate these PSLOs and develop a group score was discussed. Faculty could then decide if additional measures need to be taken in order to improve student writing and public speaking capabilities.

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 – data from the Senior Exit Survey for 2020 is not available.

Casual conversations during the year indicate that student progress toward the program and student learning objectives were adequate to excellent for the courses under assessment for the 2020-2021 academic year.

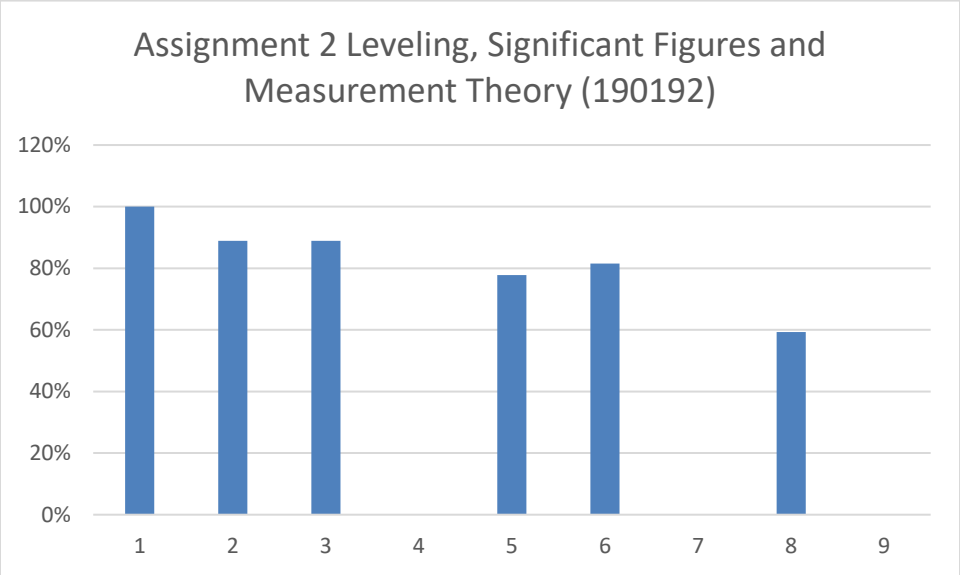
After re-evaluating PSLOs 5 and 6, we could conclude that the pandemic influenced students' activities.

7 NCEES Fundamentals of Surveying Exam Results

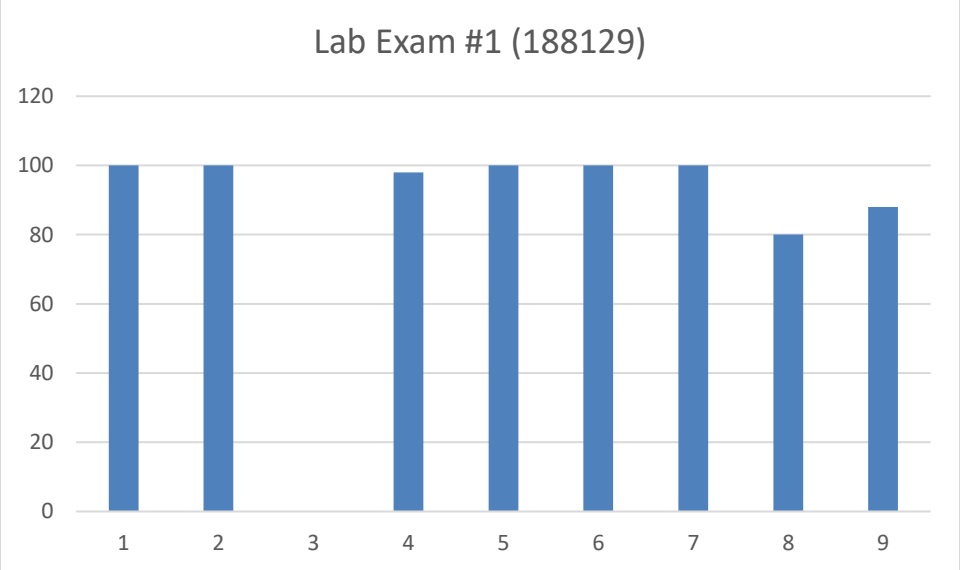
The department expectation for students taking the NCEES Fundamentals of Surveying Exam is 90%. The data available from NCESS for this assessment cycle shows students passing this exam at the 100% level. Faculty will continue to encourage students to form study groups and take the exam during the spring quarter of their senior year. This approach has now produced three consecutive years (Spring 2019 - Fall 2021) of 100% pass rates.

8 Appendices

8.1 Appendix A: GME 162



8.2 Appendix B – GIS 205



8.3 PSLO Curriculum Map 2020/2021

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

(5) An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.

	Freshman		Sophomore		Junior		Senior	
Fall	GIS 103		GME 163		GIS 306		BUS 304	
	GME 161		GME 241		GME 343		GME 425	
	MATH 112		MATH 254		MIS 113		GME 451	
	WRI 121		PHY 221		WRI 227		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		Social Science Elec.	
	MATH 251		WRI 227		ENV/GIS/GME Elec.		Science Elec.	
	Social Science Elec.		Social Science Elec.		Math Elec.			
Spring	GIS 205		GME 372		BUS 226		GME 468	
	GME 162		MATH 361		GME 351		Business Elec.	
	MATH 252		PHY 223		MGT 345		Humanities Elec.	
	SPE 111		Humanities Elec.		GME 444		Science Elec.	
					Humanities Elec.			

(6) An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

	Freshman		Sophomore		Junior		Senior	
Fall	GIS 103		GME 163		GIS 306		BUS 304	
	GME 161		GME 241		GME 343		GME 425	
	MATH 112		MATH 254		MIS 113		GME 451	
	WRI 121		PHY 221		WRI 227		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		Social Science Elec.	
	MATH 251		WRI 227		ENV/GIS/GME Elec.		Science Elec.	
	Social Science Elec.		Social Science Elec.		Math Elec.			
Spring	GIS 205		GME 372		BUS 226		~~GME 468~~	
	GME 162		MATH 361		GME 351		Business Elec.	
	MATH 252		PHY 223		MGT 345		Humanities Elec.	
	SPE 111		Humanities Elec.		GME 444		Science Elec.	
					Humanities Elec.			