GEOMATICS DEPARTMENT
SURVEY OPTION
Oregon Institute of Technology
NWCCU Assessment Report
2021-2022 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 69 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 (2017-18)	Year (2018-19)	Year (2019-20)	Year (2020-21)	Year (2021-22)
Full-time Students	41	34	38	21	29

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 (2017-18)	Year (2018-19)	Year (2019-20)	Year (2020-21)	Year (2021-22)
The number of degrees awarded	6	6	13	9	2

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)

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 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21	AY 21/22
(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, economic, environmental, and societal contexts.	3		GME162 GME454/455			GME162 GME454/455	
(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

NOTE: There was no IAB meeting during 2021-2022. PLSO (1): GIS 306 and PLSO (2): GME 468 were not included in the assessment.

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 2021/2022 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 2021/2022 assessment cycle.

PSLO	Course	Faculty	Term	Method
(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.	GME 175	Maker	Winter 2022	Laboratory Exercises
	GIS 306	Ritter	Fall 2021	
(2) An ability to formulate or design a system, process, procedure or program to meet desired needs	GIS 306	Ritter	Fall 2021	Final Report
	~~GME 468~~	~~Walker~~	~~Spring 2022~~	

Note: GIS 306 and GME 468 were not included in this process because no assignments were available to evaluate.

4.1 Summaries of individual assessment activities

4.1.1 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.

Performance Criteria:

GME 175 and GIS 306 students must demonstrate the 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.

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 175

Table 4-2 Rubric For
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."
GME 175 – Introduction to Statistics for Surveying

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 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.	Little or no 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.	Some but limited 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.	Some limitations on the 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.	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.	Excellent 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.

Departmentally Expected Score:

For PSLO (1), the Geomatics Department expects 70% of students to score a 4 or 5 in all categories.

Table 4-3 GME 175: Assessment results

Performance Criteria	**Assessment Method**	**Measurement Scale**	**Minimum Acceptable Performance**	**Results**
Lab1	Score	1 to 5 scale	70%	65%
Lab2	Score	1 to 5 scale	70%	88%

Table 4-4 GME 175: The number of students assessed. See Appendix A

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	2	2	2	4	7	17
Lab2	2	0	0	0	15	17

Actions to be taken.

Lab 1 (65%) did not meet the departmentally established minimum requirement (70%), while Lab 2 exceeded the departmentally established minimum of 70%. Therefore, faculty should discuss how to improve students' success rate.

4.1.1.2 GIS 306

Table 4-5 Rubric For
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."
GIS 306 – Raster Analysis

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 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.	Little or no 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.	Some but limited 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.	Some limitations on the 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.	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.	Excellent 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.

Departmentally Expected Score:

For PSLO (1), the Geomatics Department expects 70% of students to score a 4 or 5 in all categories.

Table 4-6 GIS 306: Assessment results

Performance Criteria	**Assessment Method**	**Measurement Scale**	**Minimum Acceptable Performance**	**Results**
SWC Project Narrative	Score	1 to 5 scale	70%	100%

Table 4-7 GIS 306: The number of students assessed. See 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
SWC Project Narrative	0	0	0	0	17	17

Actions to be taken.

The result meets the departmentally established minimum of 70%. Consequently, no further action is necessary.

4.1.2 PSLO (2): An ability to formulate or design a system, process, procedure or program to meet desired needs

Performance Criteria:

GIS 306 students must demonstrate the ability to formulate or design a system, process, procedure or program to meet desired needs

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 306

Table 4-8 Rubric For
PLSO (2): An ability to formulate or design a system, process, procedure or program to meet desired needs.
GIS 306 – Geospatial Raster Analysis

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 formulate or design a system, process, procedure or program to meet desired needs	Little or no ability to formulate or design a system, process, procedure or program to meet desired needs	Some, but limited ability to formulate or design a system, process, procedure or program to meet desired needs	Some limitations on the ability to formulate or design a system, process, procedure or program to meet desired needs	Ability to formulate or design a system, process, procedure or program to meet desired needs	Excellent ability to formulate or design a system, process, procedure or program to meet desired needs

Departmentally Expected Score:

For PSLO (2), the Geomatics Department expects 70% of students to score a 4 or 5 in all categories.

Table 4-9 GIS 306: Assessment results

Performance Criteria	**Assessment Method**	**Measurement Scale**	**Minimum Acceptable Performance**	**Results**
Final Report	Score	1 to 5 scale	70%	100%

Table 4-10 GIS 306: The number of students assessed. Appendix C

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
Final Report	1	0	6	0	16	17

Actions to be taken:

The scores in all categories exceeded the departmentally established minimum of 70% for PLSO (2) at this time. Consequently, no further action is necessary.

5 Evidence of Student Learning

5.1 Summary of Department Discussions on Assessment Activities

September 20, 2022 – Geomatics Department Faculty Meeting (Convocation)

- Geomatics Department Assessment plan: Due Oct. 31. (Jack will do the Survey option, and SuJin will do the GIS option)

6 "Closing the Loop" – Changes Resulting from Assessment

The following are identified during this assessment cycle as additional monitoring is needed:

- GME 175 Lab 1 (65%) did not meet the departmentally established minimum requirement (70%). Instructors should encourage students to engage in producing outcomes.

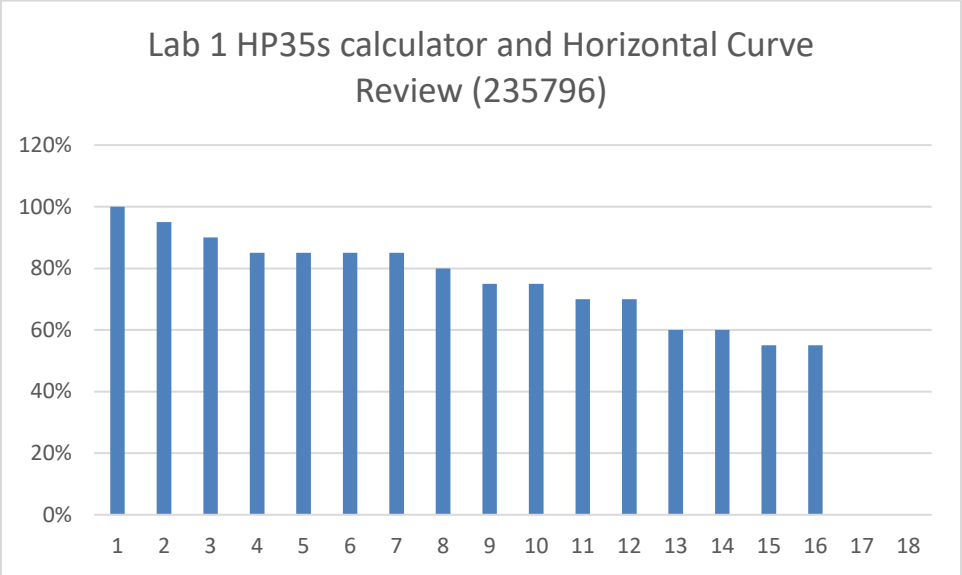
No other significant shortcomings were identified, and with the department currently understaffed, no major curriculum changes will be undertaken.

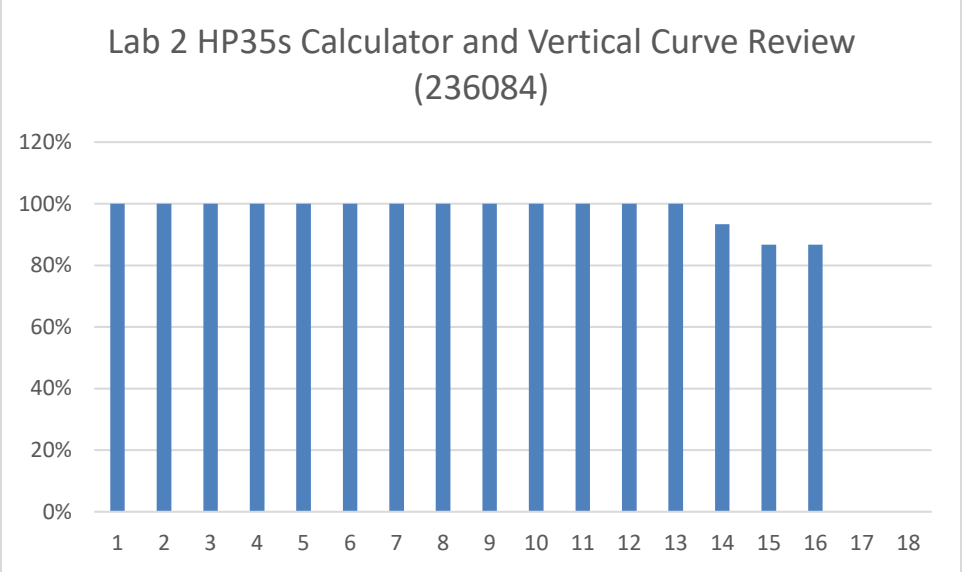
7 NCEES Fundamentals of Surveying Exam Results –

The department expectation for students taking the NCEES Fundamentals of Surveying Exam is 90%. The data available from NCESS for this assessment cycle shows that students' passing percentages are 100% (Fall 2021), 89% (Spring 2021), 67% (Fall 2022), and 50% (Spring 2022). Students are required to take the FS exam as a graduation requirement and are encouraged to form study groups during the winter term and take the exam during the spring quarter of their senior year.

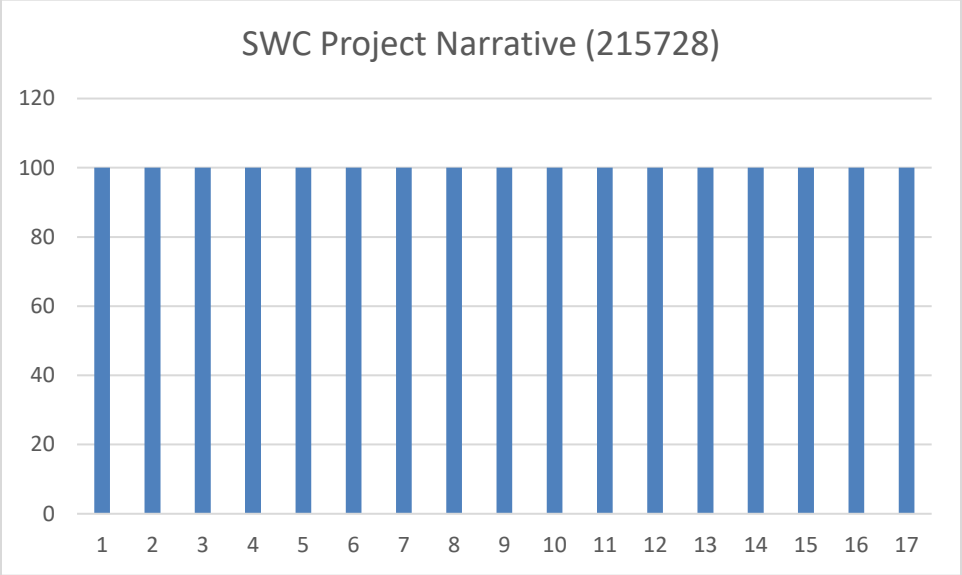
8 Appendices

8.1 Appendix A: GME 175





8.2 Appendix B: GIS 306 SWC Project Narrative



8.3 Appendix C: GIS 306 SWC Final Report