

Assurance of Student Learning 2019-2020	
Ogden College of Science and Engineering	School of Engineering and Applied Sciences
Land Surveying Certificate, 1700	

Use this page to list learning outcomes, measurements, and summarize results for your program. Detailed information must be completed in the subsequent pages.

Student Learning Outcome 1: Ability to identify, formulate, and solve complex surveying problems by applying principles of engineering, science, and mathematics.

Instrument 1	Apply Rubric to Lab & Project Reports from selected courses
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Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 1.	Met	Not Met
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Student Learning Outcome 2: Ability to apply engineering design to produce solutions that meet the specific needs of the surveying industry with consideration of public health, safety, and welfare.

Instrument 1	Apply Rubric to Lab & Project Reports from selected courses
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Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.	Met	Not Met
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Student Learning Outcome 3: Ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Instrument 1	Apply Rubric to Lab & Project Reports from selected courses
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Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.	Met	Not Met
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Program Summary (Briefly summarize the action and follow up items from your detailed responses on subsequent pages.)

The assessment of student performance under Student Learning Outcomes 1, 2 and 3 is acceptable according to rubric-based evaluation of student work. In addition, graduates are completing relevant courses with good grades, and student positive perception of skills learned. Program assessment indicates the curriculum for Land Surveying Certificate prepares graduates with the abilities and skills needed to be successful practicing land surveyors. The WKU Land Surveying Certificate Program will continue to prepare graduates with the same Student Learning Outcome activities and measures of all accrediting bodies.

Student Learning Outcome 1

Student Learning Outcome	Ability to identify, formulate, and solve complex surveying problems by applying principles of engineering, science, and mathematics.		
Measurement Instrument 1	A scoring rubric (attached) specifically structured to directly assess the attributes stated in the outcome is applied to final assessment in CE 380/381 (Boundary Surveying & Lab), which capture key aspects of surveying students' study. The rubric assesses 4 main attributes of problem solving. The selected courses have, at a minimum, CE 160/161 (Principles of Surveying) and AMS 163 (Architectural Drafting) as pre-requisites and utilize those specific skills in the solution of surveying problems. The CE surveying courses are usually taken in the junior or senior year and students have by then developed strong analytical skills and have experience applying math and science concepts in earlier design course projects and in earlier engineering science courses.		
Criteria for Student Success	Numerical results from applying the rubric to student work should reach a minimum value of 3.0 on a 4.0 scale for senior level work. Scores of sophomore/junior level work may be somewhat lower, which can be used to track student development in the curriculum.		
Program Success Target for this Measurement	Cohort Average of 3.0 on a 4.0 scale	Percent of Program Achieving Target	Cohort Average of 3.6
Methods	The final assessment from each student in the course is reviewed separately from course grading. Select questions are identified and the outcome rubric applied to assess achievement. Values from each student are recorded, and a class average is determined.		
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 1.		Met	Not Met
Actions (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.)			
The assessment of student performance under Outcome 1 is acceptable according to rubric-based direct evaluation of student work. At the completion of the course and other relevant courses with satisfactory grades in the curriculum assuring that surveying certificate graduates have the ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. The WKU Land Surveying Certificate will continue to prepare graduates with the same curriculum content, and monitor this student learning outcome with these measures. No need for programmatic adjustments has been found.			
Follow-Up (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.)			
The Land Surveying Certificate and Civil Engineering faculty will continue with program assessment on an annual basis. The accrediting agency, ABET, requires continual improvement through systematic assessment of student learning outcomes.			

Student Learning Outcome 1: Upon graduation, our students have the ability to identify, formulate, and solve complex surveying problems by applying principles of engineering, science, and mathematics.

	Capstone 4	Milestones		Benchmark 1
		3	2	
Calculation (Quantitative Literacy VALUE Rubric)	Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem. Calculations are also presented elegantly (clearly, concisely, etc.)	Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem.	Calculations attempted are either unsuccessful or represent only a portion of the calculations required to comprehensively solve the problem.	Calculations are attempted but are both unsuccessful and are not comprehensive.
Define Problem (Problem Solving VALUE Rubric)	Demonstrates the ability to construct a clear and insightful problem statement with evidence of all relevant contextual factors.	Demonstrates the ability to construct a problem statement with evidence of most relevant contextual factors, and problem statement is adequately detailed.	Begins to demonstrate the ability to construct a problem statement with evidence of most relevant contextual factors, but problem statement is superficial.	Demonstrates a limited ability in identifying a problem statement or related contextual factors.
Identify Strategies (Problem Solving VALUE Rubric)	Identifies and applies one or more approaches for solving the problem within a specific context.	Identifies and applies one or more approaches for solving the problem that generally applies within the specific context.	Identifies and applies one or more approaches for solving the problem that narrowly applies within a specific context.	Does not identify and apply one or more approaches for solving the problem within a specific context.
Solving Problems	Obtains the correct solution in a manner that addresses the problem statement	Has minor errors, but nearly obtains the correct solution in a manner that addresses the problem statement.	Has significant errors that results in an incorrect solution but still somewhat addresses the problem statement.	Has significant errors that results in an incorrect solution and does not apply or address the problem statement.

Student Learning Outcome 2

Student Learning Outcome	Ability to apply engineering design to produce solutions that meet the specific needs of the land surveying industry with consideration of public health, safety, and welfare.		
Measurement Instrument 1	Program faculty apply a scoring rubric (attached), specifically structured to directly assess the attributes stated in the outcome, to selected student work from CE 378/379 (Route Surveying & Laboratory) This course captures the many aspects of public health, safety, and welfare , and the use of engineering judgement that are undertaken to prepare the students to be capable land surveyors. The rubric assesses 6 main attributes. The selected courses have, at a minimum, CE 160/161 (Principles of Surveying) and AMS 163 (Architectural Drafting) as pre-requisites and utilize those specific skills in the solution of surveying problems. The CE surveying courses are usually taken in the junior or senior year and students have by then developed strong analytical skills and have experience applying math and science concepts in earlier design course projects and in earlier engineering science courses.		
Criteria for Student Success	Numerical results from applying the rubric to student work should reach a value of 3.0 on a 4.0 scale for senior level work. Scores of sophomore/junior level work may be somewhat lower, which can be used to track student development in the curriculum.		
Program Success Target for this Measurement	Score of 3.0 out of 4.0	Percent of Program Achieving Target	Score 3.3 out of 4.0
Methods	The final assessment from each team in the course is reviewed separately from course grading. The outcome rubric is applied to assess achievement. Values from each report are recorded, and a class average is determined. This approach captures every student in the assessment year.		
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.		Met	Not Met
Actions (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.)			
The assessment of student performance under Outcome 2 is acceptable according to rubric-based direct evaluation of student work. At the completion of the course and other relevant courses with satisfactory grades in the curriculum assuring that surveying certificate graduates have the ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. The WKU Land Surveying Certificate will continue to prepare graduates with the same curriculum content, and monitor this student learning outcome with these measures. No need for programmatic adjustments has been found.			
Follow-Up (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.)			
The Land Surveying Certificate and Civil Engineering faculty will continue with program assessment on an annual basis. The accrediting agency, ABET, requires continual improvement through systematic assessment of student learning outcomes.			

Student Learning Outcome 2: Upon graduation, our students have the ability to apply engineering design to produce solutions that meet specific needs of the land surveying industry with consideration of public health, safety, and welfare.

	Capstone 4	Milestones		Benchmark 1
		3	2	
Acquiring Competencies (Creative Thinking VALUE Rubric)	Reflect: Evaluates creative process and product using domain-appropriate criteria.	Create: Creates an entirely new object, solution or idea that is appropriate to the domain.	Adapt: Successfully adapts an appropriate exemplar to his/her own specifications.	Model: Successfully reproduces an appropriate exemplar.
Solving Problems (Creative Thinking VALUE Rubric)	Not only develops a logical, consistent plan to solve problem, but recognizes consequences of solution and can articulate reason for choosing solution.	Having selected from among alternatives develops a logical, consistent plan to solve the problem.	Considers and rejects less acceptable approaches to solving problem.	Only a single approach is considered and is used to solve the problem.
Embracing Contradictions (Creative Thinking VALUE Rubric)	Integrates alternate, divergent, or contradictory perspectives or ideas fully.	Incorporates alternate, divergent, or contradictory perspectives or ideas in an exploratory way.	Includes (recognizes the value of) alternate, divergent, or contradictory perspectives or ideas in a small way.	Acknowledges (mentions in passing) alternate, divergent, or contradictory perspectives or ideas.
Connecting, Synthesizing, Transforming (Creative Thinking VALUE Rubric)	Transforms ideas or solutions into entirely new forms.	Synthesizes ideas or solutions into a coherent whole.	Connects ideas or solutions in novel ways.	Recognizes existing connections among ideas or solutions.
Implement Solutions (Problem Solving VALUE Rubric)	Implements the solution in a manner that addresses thoroughly and deeply multiple contextual factors of the problem.	Implements the solution in a manner that addresses multiple contextual factors of the problem in a surface manner.	Implements the solution in a manner that addresses the problem statement but ignores relevant contextual factors.	Implements the solution in a manner that does not directly address the problem statement.
Identifying specific project objectives, standards, and constraints based on general project requirements	All important objectives, standards, and constraints are identified and clearly implemented	Most important objectives, standards, and constraints are identified and implemented with minor deficiencies	Some objectives, standards, and constraints are identified with some deficiencies	Objectives, standards, and/or constraints not clearly identified or contain significant deficiencies

Student Learning Outcome 3

Student Learning Outcome	Ability to acquire and apply new knowledge as needed, using appropriate learning strategies.		
Measurement Instrument 1	Program faculty apply scoring rubrics (attached) specifically structured to directly assess 3 major attributes supporting the outcome, to selected student work from CE 378/379 (Route Surveying & Laboratory) and CE 380/381 (Boundary Surveying & Laboratory). These courses capture the many aspects of land surveying that prepare the students to be effective land surveyors. The selected courses have students create artifacts which represent those specific skills.		
Criteria for Student Success	Numerical results from applying the rubric to student work should reach a value of 3.0 on a 4.0 scale for senior level work.		
Program Success Target for this Measurement	3.0 out of 4.0	Percent of Program Achieving Target	Score of 3.2 out of 4.0
Methods	The artifacts from each team in the course is reviewed separately from course grading. The outcome rubric is applied to assess achievement. Values from each report are recorded, and a class average is determined. This approach captures every student in the assessment year.		
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.		Met	Not Met
Actions (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.)			
The assessment of student performance under Outcome 3 is acceptable according to rubric-based direct evaluation of student work. At the completion of the course and other relevant courses with satisfactory grades in the curriculum assuring that surveying certificate graduates have the ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. The WKU Land Surveying Certificate will continue to prepare graduates with the same curriculum content, and monitor this student learning outcome with these measures. No need for programmatic adjustments has been found.			
Follow-Up (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.)			
The Land Surveying Certificate and Civil Engineering faculty will continue with program assessment on an annual basis. The accrediting agency, ABET, requires continual improvement through systematic assessment of student learning outcomes.			

Student Learning Outcome 3: Upon graduation, our students have the ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

	Capstone 4	Milestones		Benchmark 1
		3	2	
Independence (Foundations and Skills for Lifelong Learning VALUE Rubric)	Educational interests and pursuits exist and flourish outside classroom requirements. Knowledge and/or experiences are pursued independently.	Beyond classroom requirements, pursues substantial, additional knowledge and/or actively pursues independent educational experiences.	Beyond classroom requirements, pursues additional knowledge and/or shows interest in pursuing independent educational experiences.	Begins to look beyond classroom requirements, showing interest in pursuing knowledge independently.
Transfer (Foundations and Skills for Lifelong Learning VALUE Rubric)	Makes explicit references to previous learning and applies in an innovative (new and creative) way that knowledge and those skills to demonstrate comprehension and performance in novel situations.	Makes references to previous learning and shows evidence of applying that knowledge and those skills to demonstrate comprehension and performance in novel situations.	Makes references to previous learning and attempts to apply that knowledge and those skills to demonstrate comprehension and performance in novel situations.	Makes vague references to previous learning but does not apply knowledge and skills to demonstrate comprehension and performance in novel situations.
Initiative (Foundations and Skills for Lifelong Learning VALUE Rubric)	Completes required work, generates and pursues opportunities to expand knowledge, skills, and abilities.	Completes required work, identifies and pursues opportunities to expand knowledge, skills, and abilities.	Completes required work and identifies opportunities to expand knowledge, skills, and abilities.	Completes required work.