

**Assessment Report  
Land Surveying Minor  
Montana State University  
2016 – 2017 Academic Year**

Department: Civil Engineering

Department Head: Jerry Stephens

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Date: Fall 2017, Reporting Period Academic Year 2016 – 2017

Program: Land Surveying Minor - offered in conjunction with  
BS Civil Engineering (CE)  
BS Civil Engineering, Bio-Resource (BREN) Option  
BS Construction Engineering Technology (CET)  
and open to all majors at MSU

**Program Objectives:**

The objective of the Civil Engineering Department's Minor in Land Surveying is to provide students with the education necessary to readily satisfy the academic requirements of the Montana Board of Professional Engineers and Professional Land Surveyors to sit for the Fundamentals of Surveying (FS) Exam. Currently, if a student desires to start on the path of becoming a Professional Land Surveyor, they must take a series of Montana Board of Professional Engineers and Professional Land Surveyors approved courses to become eligible to sit for this exam. As board members and class offerings change over time, it is difficult for students to be judged eligible by the Board to take the FS exam because of the need for a course-by-course assessment. The Montana Board of Professional Engineers and Professional Land Surveyors, the Montana Association of Registered Land Surveyors (MARLS), and the Department of Civil Engineering want to facilitate this approval process by tying it to a formal curriculum accepted by the Board as satisfying their requirements. This minor will facilitate the path to professional registration in Montana and other states, as students that successfully complete the associated coursework will have an institutionally established Surveying Minor recognized as satisfying the educational requirements to sit for the FS exam.

## Program Structure:

The Program of Study for the Land Surveying Minor developed to meet the surveying components of the requirements of the state licensing Board consists of 30 credit hours of coursework as follows:

### Survey Techniques – 12 credits

SRVY 230 SURVEYING **#	3 cr
SRVY 273 CONSTRUCTION SURVEYING AND EARTHWORK **	3
OR ECIV 350 TRANSPORTATION ENGINEERING#^^	
SRVY 375 PHOTOGRAMMETRY ^^	3
ECIV 456 HIGHWAY GEOMETRIC DESIGN ^^	3
OR GPHY 426 REMOTE SENSING	

### Principles and Practices of Land Surveying – 15 credits

SRVY 355 ADVANCED SURVEYING COMPUTATIONS ^^	3
SRVY 361 LEGAL PRINCIPLES OF SURVEYING^^	3
SRVY 362 U.S. PUBLIC LAND SURVEY SYSTEM^^	3
SRVY 474 PROJECT DESIGN IN SURVEYING^^	3
BGEN 361 PRINCIPLES OF BUSINESS LAW**	3
OR GPHY 357 GPS FUND/APP IN MAPPING	3
OR GPHY 384 ADV GIS AND SPATIAL ANALYSIS^^	
OR GPHY 484R APPLIED GIS & SPATIAL ANALYSIS	

### Electives – 3 credits

GPHY 284 INTRODUCTION TO GIS SCIENCE AND CARTOGRAPHY	3
GPHY 384 ADVANCED GIS AND SPATIAL ANALYSIS^^	3
GPHY 484R APPLIED GIS AND SPATIAL ANALYSIS	3

### Total – 30 credits

\*\* ALREADY IN CET CURRICULUM

# ALREADY IN CE or CE/BREN CURRICULUM

^^ PROFESSIONAL ELECTIVE IN CET, CE, or BREN

This is the second year this curriculum has been in place, as it had to be modified in 2015-2016 to reflect changes by the state licensing Board relative to curricula acceptable for students to sit for the FS exam.

## Outcomes Assessment:

The above revised Land Surveying Minor has been approved as a curricula that meets the revised requirements of the Montana Board of Professional Engineers and Land Surveyors preparatory for the FS exam. With this action, the primary and direct objective of this Minor continued to be achieved, i.e., providing a formal curriculum available to MSU students that is recognized by the state licensing board as satisfying their academic requirements to permit pursuit of professional registration in land surveying (more specifically, to sit for the FS exam).

From a program perspective, it is further desirable to assess the level of demand for this minor, and the degree of success realized by students that pursue it. Therefore, the Department annually assesses the number of students that graduate with a Land Surveying Minor. Further and as possible, the progress of these students following graduation is monitored specifically with respect to their surveying related activities. Metrics/information that are tracked as available include:

- student satisfaction with the minor, at and after graduation,
- percent of students with the minor that are employed in surveying related jobs,
- surveying employer satisfaction with students that obtained the minor,
- percent of students with the minor that take the FS exam,
- FS exam performance compared to national experience,
- percent of students with the minor that earn surveying intern status, and
- percent of students with the minor that earn professional surveying registration.

With the exception of the number of students that graduate with a Surveying Minor, the above metrics/information on student performance post-graduation are not automatically collected or necessarily available in university or other databases. Collection of this information relies significantly on the Civil Engineering Department's ability to maintain contact with this specific cohort of students after they graduate, and on their subsequent willingness to respond to this contact. The Department has had limited success in these regards.

In academic year 2016-2017, four students graduated with the Land Surveying Minor. Since the minor was adopted in 2011, 20 students have completed the program (see Table 1).

Table 1. Land Surveying Minors Awarded at MSU

Academic Year	Surveying Minors Awarded <sup>b</sup>
2010-2011 <sup>a</sup>	4
2011-2012	1
2012-2013	0
2013-2014	4
2014-2015	6
2015-2016	1
2016-2017	4

<sup>a</sup>Minor was approved in AY 2010 – 2011

<sup>b</sup>Table entries have been updated relative to the 2013-2014 assessment report to reflect better information now available on number of minors awarded. Total number of minors awarded through 2013-2014 did not change, simply the specific years when they were awarded.

The graduates from 2016-2017 were not interviewed regarding the program. After a considerable drop in the number of program graduates in 2015 -2016 (to a single graduate), the number of graduates rebounded to four in 2016-2017. With this rebound, the program appears to have stable enrollment, graduating on average three students per year. This program draws significantly on students enrolled in our Construction Engineering Technology (CET) program. Enrollment in the CET program has been relatively constant over the past several years, which is consistent with the relatively constant average number of graduates with a Land Surveying Minor.

The employment status of all 20 graduates of the program to-date is unknown. Based on information available on the Montana Board of Professional Engineers and Professional Land Surveyors website, none of the 2016-2017 program graduates have become Land Surveyor Interns (in Montana) as of Fall 2017. Since its inception, four of the total of 20 program graduates have achieved the status of Land Surveyor Intern (in Montana). Note that even if status as a Land Surveyor Intern was not pursued, a focus in land surveying as recognized by a Land Surveying Minor could well support job activities and advancement in many civil/construction engineering employment situations.

In light of the on-the-job experience required prior to being considered for Professional Land Surveyor registration (four years), it is possible that some of the early program graduates are eligible for professional registration. In reviewing licensing information available on the State of Montana professional registration website, one of the program graduates became a licensed Professional Land Surveyor in 2017.

Results for MSU alumni taking both the FS and PS (Principles and Practices of Surveying) exams were made available to the Department for the first time this year. Available results were for Spring 2014 forward to Spring 2017. Over this interval, two MSU alumni took and passed

the FS Exam, and two alumni took and passed the PS exam. This performance equals or exceeds the performance of our NCEES (National Council of Examiners for Engineering and Surveying) comparator cohort, indicating these alumni were relatively well prepared for these nationally standardized exams. It is important to note, however, that 1) it is unknown when these alumni graduated and whether they necessarily obtained a land surveying minor, and 2) this sample size is relatively small.