

January 14, 2010

ITEM 146-2005-R0110 **Approval to Establish a Minor in Land Surveying;
Montana State University-Bozeman**

THAT: The Board of Regents of Higher Education authorizes Montana State University-Bozeman to establish a Minor in Land Surveying.

EXPLANATION: The objective of the requested Minor in Land Surveying is to streamline the application process at the Montana Board of Professional Engineers and Professional Land Surveyors level for the Fundamentals of Surveying (FS) Exam. Currently, if a student desires to start on the path of becoming a Professional Land Surveyor, they have to take a series of Montana Board of Professional Engineers and Professional Land Surveyors approved courses to become eligible to sit for the Fundamentals of Surveying Exam. As board members and class offerings change over time, it is difficult for students to become eligible 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 formalize this process for satisfying the requirement to become eligible to take the FS exam by tying it to a formally recognized curriculum. All elements of the curriculum are currently offered. Students who pursue this option will be served because they will have formal recognition of their educational path as well as an easier path to licensure because Montana and other states will look favorably upon a Bachelors of Science in Civil Engineering with a Land Surveying Minor.

Minor In Land Surveying

1. Overview

Provide a one paragraph description of the proposed program. Be specific about what degree, major, minor or option is sought.

The Department of Civil Engineering and the College of Engineering at Montana State University seek approval to offer a minor in land surveying. The objective is to streamline the application process at the Montana Board of Professional Engineers and Professional Land Surveyors level for the Fundamentals of Surveying (FS) Exam, and to make its graduates more attractive in the workforce marketplace. All elements of the curriculum are currently offered, but the existence of the minor (and accompanying certificate for students not pursuing an undergraduate major) will greatly simplify the process for students.

2. Need

a. To what specific need is the institution responding in developing the proposed program?

The need for the Surveying Minor at MSU in Bozeman is compelling and long overdue. MSU has strong programs in Civil Engineering, Construction Engineering Technology, and Bio-Resource Engineering. If a student desires to start on the path of becoming a Professional Land Surveyor also, they have to take a series of Montana Board of Professional Engineers and Professional Land Surveyors approved courses in conjunction with their degree to become eligible to sit for the Fundamentals of Surveying Exam. As board members and class offerings change over time, it is difficult for students to become eligible 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 formalize this process for satisfying the requirement to become eligible to take the FS exam by tying it to a formally recognized curriculum (as well as be able to formally recognize the extra effort in taking courses in the surveying related area). At the last in-state MARLS annual conference, a committee meeting was held regarding pursuing a Land Surveying Minor at MSU in Bozeman. It was unanimously well received by the committee.

b. How will students and any other affected constituencies be served by the proposed program?

This proposed minor will formalize what was already in place since the early 1990s. Students who pursue this option will be served because they will have formal recognition of their educational path as well as an easier path to licensure because Montana and other states will look favorably upon a Bachelors of Science in Civil Engineering with a Land Surveying Minor as an example.

In a regional analysis, Flathead Community College offers a two-year Associates Degree in Land Surveying. In discussions with David Dorsett, Department Head of the Surveying program at Flathead Community College, it was agreed that the proposed minor will not interfere or eliminate the need for their program. There were no other surveying related programs in the state of Montana that the Montana Board of Professional Engineers and Professional Land Surveyors recognize mainly due to the lack of a registered land surveyor on the faculty. The status quo is basically maintained by formalizing the minor in Land Surveying at MSU. The proposed MSU Land Surveying Minor fills both a geographical and strategic need.

c. What is the anticipated demand for the program? How was this determined?

No explicit analysis of possible increased demand has been conducted. The rationale makes sense if only to serve current demand. MSU has a substantial number of courses and presence in surveying and closely related disciplines. Mature and new faculty have an extensive background in surveying and surveying related instruction, and several courses are taught with an emphasis on surveying applications. Also, a Professional Land Surveyor licensed in Montana is part of the faculty at MSU. A common question during advising sessions of engineering undergraduates is: "When will the Land Surveying Minor be available?"

3. Institutional and System Fit

a. What is the connection between the proposed program and existing programs at the institution?

There is no counterpart of this Land Surveying Minor at MSU.

b. Will approval of the proposed program require changes to any existing programs at the institution? If so, please describe.

Implementing the new Land Surveying Minor will require no new course development.

c. Describe what differentiates this program from other, closely related programs at the institution (if appropriate).

n/a

d. How does the proposed program serve to advance the strategic goals of the institution?

Students are already engaged in internships and opportunities in surveying or a closely related field. This gives them a more publicized and formalized career path that as a profession needs an influx of members.

The Land Surveying Minor will enhance the undergraduate offerings at MSU in a career track with high need in the state. Representatives from Professional Land Surveyors in general are very supportive of this idea.

Among the needs met (explicitly and/or implicitly) for MSU Bozeman Five Year Vision (<http://www.montana.edu/upba/vision/visiondocfy06-fy11.pdf> implemented 2006) by the Land Surveying Minor (*impact of Land Surveying Minor described in italics*):

I. Student Body

- A. MSU Bozeman will enroll approximately 13,000 headcount students. The Fall 2005 enrollment was approximately 12,250. *Land Surveying Minor is a recruiting tool.*
- B. Approximately 27% of these students will be nonresidents, slightly higher than the current 25% nonresident rate (counting Western Undergraduate Exchange and international students). *Land Surveying Minor is a recruiting tool for undergraduate students.*

II. Faculty and Staff

- F. The University will increasingly attract a strong and diverse faculty. *Explicitly sanctions and enhances our ongoing and future activities in surveying.*

III. Curriculum

A. MSU Bozeman will be nationally recognized as a leader in the integration of learning and discovery at the undergraduate level. *Land Surveying Minor at MSU Bozeman fills a regional and national need.*

D. There will be increased opportunities for interdisciplinary courses and programs and encourage team teaching across all disciplinary boundaries. *Land Surveying Minor accessible for wide variety of majors at MSU Bozeman.*

e. Describe the relationship between the proposed program and any similar programs within the Montana University System. In cases of substantial duplication, explain the need for the proposed program at an additional institution. Describe any efforts that were made to collaborate with these similar programs; and if no efforts were made, explain why. If articulation or transfer agreements have been developed for the substantially duplicated programs, please include the agreement(s) as part of the documentation.

There is no similar program in the MUS system to the proposed MSU Land Surveying Minor. The closest is Flathead Community College's (FVCC) Associates Degree in Land Surveying. They do not offer BS degrees in engineering. The main correspondence with FVCC was to ensure that no harm would come to their program.

4. Program Details

a. Provide a detailed description of the proposed curriculum. Where possible, present the information in the form intended to appear in the catalog or other publications. NOTE: In the case of two-year degree programs and certificates of applied science, the curriculum should include enough detail to determine if the characteristics set out in Regents' Policy 301.12 have been met.

The Course of Study is uncomplicated, and all of the courses, facilities, and expertise are in place for the framework of a Land Surveying Minor. The Course of Study for the Land Surveying Minor is as follows:

Montana State University Land Surveying Minor

Total Credits Required – 29 Semester Credits

<u>REQUIRED COURSES</u>	<u>CREDITS</u>
• CE 201 SURVEYING ** #	3
• CET 202 CONSTRUCTION SURVEYING AND EARTHWORK **	3
OR	
• CE 350 TRANSPORTATION ENGINEERING #	3
• CE 363 ADVANCED SURVEYING COMPUTATIONS ^^	3
• CE 463 PHOTOGRAMMETRY ^^	2
• CE 361 LEGAL PRINCIPLES OF SURVEYING ^^	3
• CE 362 U.S. PUBLIC LAND SURVEY SYSTEM ^^	3
• CE 464 PROJECT DESIGN IN SURVEYING ^^	<u>3</u>
	TOTAL
	20

ELECTIVE COURSES

9 CREDITS REQUIRED

CE 456	HIGHWAY GEOMETRIC DESIGN ^^	3
AGEC 337	AGRICULTURAL LAW	3
LRES 357	GPS FUNDAMENTALS & APPLICATIONS IN MAPPING	3
LRES 426	REMOTE SENSING AND DIGITAL IMAGE PROCESSING	3
LRES 457	ADVANCED GPS MAPPING FOR GIS	3
GPHY 284	INTRODUCTION TO GIS SCIENCE AND CARTOGRAPHY	3
GPHY 384	ADVANCED GIS AND SPATIAL ANALYSIS	3
GPHY 484	APPLIED GIS AND SPATIAL ANALYSIS	<u>3</u>

TOTAL 29

- ** ALREADY IN CET CURRICULUM
- # ALREADY IN CE/BREN CURRICULUM
- ^^ PROFESSIONAL ELECTIVE IN CET, CE, or BREN

b. Describe the planned implementation of the proposed program, including estimates of numbers of students at each stage.

Implementation of the program will require little more than including the Land Surveying Minor in the MSU COURSE BULLETIN and will not require a phasing-in. It can be available immediately.

An estimate of students involved in the Land Surveying Minor would be about three to five students in the beginning.

Given that the Land Surveying Minor is applicable to any undergraduate program provided that prerequisites are satisfied, it is difficult to estimate the total number of students participating in the minor. However, since the Land Surveying Minor is working within the existing infrastructure, some metrics for its impact are provided in Table 4 below.

Table 4. Impact of Implementing the MSU Land Surveying Minor

• Break-even point?	0* FTE students
• Enrollments / year?	5 - 25
• Graduates / year?	5 - 25
• MT jobs / year?	5 - 25

*There is no start-up investment required, so the “break-even point” for number of students is irrelevant.

5. Resources

a. Will additional faculty resources be required to implement this program? If yes, please describe the need and indicate the plan for meeting this need.

No additional faculty resources are needed at this time to implement the Land Surveying Minor program.

b. Are other, additional resources required to ensure the success of the proposed program? If yes, please describe the need and indicate the plan for meeting this need.

There are no additional resources needed to implement the program.

6. Assessment

How will the success of the program be measured?

CE has had in place for a number of years a comprehensive and successful assessment plan for all of its programs (see <http://www.montana.edu/wwwprov/assessment/assessmentplans.htm>). We continually assess objectives and outcomes at the program and course levels. These assessments are mandatory for our national accreditation (ABET), an accreditation we have held for many years. Our current assessment plan and assessment methods will be consistently applied to the Land Surveying Minor.

However, we will provide specialized assessment that focuses on such issues as student, employer, and alumni satisfaction aimed specifically at the minor. Land Surveying Minor graduation rates and student placement will be monitored. We will continue to monitor the progress of our graduates, with the specific emphasis on surveying related activities. Since our students are already engaged in surveying related activities, and have a long track record of successful careers in surveying, the Land Surveying Minor has been needed for a long time to serve our students. This is a case where MSU has the responsibility to provide academic support for well-established demand.

7. Process Leading to Submission

Describe the process of developing and approving the proposed program. Indicate, where appropriate, involvement by faculty, students, community members, potential employers, accrediting agencies, etc.

The proposed curriculum was first presented to the CE Curriculum Committee and faculty for approval. Then the proposed curriculum was presented to the College of Engineering Curriculum for review and feedback. Lastly, the proposed Land Surveying Minor was reviewed by the MSU Undergraduate Studies Committee.

Civil Engineering and the College of Engineering at MSU each have Industrial Advisory Boards with members from engineering, construction, and surveying related companies. The implementation and progress of the program will be periodically reviewed by these boards. We will engage these members for specific guidance and support for the Land Surveying Minor.