

Receive a master's degree in surveying engineering on-line, no time on campus required!  
If accepted to the program by fall 2014 all students (not only Maine) will pay in-state graduate tuition for their entire curriculum! Note it can take up to six weeks to process an application so out-of-state residents please apply by July 2014 to ensure you receive the tuition discount.

20 students took the first class in this curriculum – SVT 532 – this semester spring 2014!

All lectures are Windows media or mp4 files that you play from the Internet at anytime. You can watch them as many times as you desire. All homework and exams are turned in via the internet. Questions and answers are handled through e-mail, Skype, or video chats.

Please read this and if questions email Raymond.hintz@umit.maine.edu

**Surveying Engineering Concentration**  
**Professional Science Masters (PSM) Degree in Engineering and Business**  
**University of Maine**  
**January 23, 2014**

**Background:** Professional Science Masters (PSM) degree in Engineering and Business consists of 15 credits of engineering courses, nine credits of business courses, and six credits of applied field experience. Business and economics classes can include (all on-line):

- BUA 605 Creating & Capturing Value in the Digital Economy (3 credits)
- BUA 651 Financial Management (3 credits)
- BUA 400 Introduction to Accounting (3 credits)
- ECO 410 Accelerated Introductory Economics (3 credits)

The on-line anchor course for the 15 credits of engineering courses is GEE 486 Advanced Project Management (3 cr. hr.). This is a required core competence as surveyors move into management positions. The remaining 12 credits of surveying courses would focus on the student's discipline. Advanced courses in surveying engineering will build on concepts provided in an undergraduate degree in that discipline. Students without an undergraduate degree in a surveying engineering discipline will be considered for the PSM degree but may require some prerequisite courses.

**Surveying Engineering Concentration of PSM Degree**

The concentration in Surveying Engineering is one of several options in the PSM degree. Students in the surveying engineering concentration will take four of the following five on-line core courses:

- SVT 501 Advanced Adjustment Computations (3 credits)
- SVT 511 Geodetic U.S. Public Land Survey Computations (3 credits)
- SVT 531 Advanced Digital Photogrammetry (3 credits)
- SVT 532 Survey Strategies in Use of Lidar (3 credits)
- SVT 541 Geodesy (3 credits)

With permission, other courses may be substituted for those listed for a track. Prior graduate courses that have been taken by students will be considered on a case by case basis.

**Tentative Schedule of Course Offerings of the Surveying Engineering Concentration**

Semester	Course number and title
Spring 2014	SVT 532 Survey Strategies in Use of Lidar
Fall 2014	SVT 501 Advanced Adjustment Computations
Fall 2014	SVT 511 Geodetic U.S. Public Land Survey Computations
Spring 2015	SVT 531 Advanced Digital Photogrammetry
	SVT 532 Survey Strategies in Use of Lidar
Spring 2015	SVT 541 Geodesy

In subsequent fall semesters SVT 501 and SVT 511 will be offered.

In subsequent spring semesters SVT 531, SVT 532, and SVT 541 will be offered.

**Faculty:**

Raymond J. Hintz is a professor of surveying engineering technology and is responsible for all SVT graduate courses. He has on-line teaching experience.

**Course Descriptions of Surveying Engineering Courses to be Included in the Program**

- SVT 501 Advanced Adjustment Computations (3 credits) - direct formation of reduced form of normal equations; Cholesky decomposition and back substitution; using Cholesky algorithms for computing select variance-covariance terms; optimization of solutions via banded and column profile minimization; recursive matrix partitioning; use of conjugate gradient procedures in solution efficiency; post-adjustment variance-covariance propagation for computed terms
- SVT 511 Geodetic U.S. Public Land Survey Computations (3 credits) - review of townships, sections, closing corners, parenthetical distance and acreage; section subdivision, fractional rules; major changes in the 2009 Manual; the USPLS datum; Mean bearing in geodesy; geodetic coordinate geometry; geodetic computations of single and double proportioning; geodetic one, two, and three point control; geodetic compass rule adjustment, grant boundary adjustment, irregular boundary adjustment, and meander line computations; Geographic coordinate data base issues in an updatable system; mega-adjustments and error propagation
- SVT 531 Advanced Digital Photogrammetry (3 credits) - airborne GPS-IMU processing techniques; conversion between local cartesian and conventional mapping coordinate systems; techniques in automated pixel matching; digital cameras and their calibration; optimization of automated photocoordinate measurement for aerotriangulation; recursive partitioning techniques for aerotriangulation solution optimization; techniques for automated feature extraction; synthesis of digital imagery and Lidar; image enhancements issues in orthophotos and mosaics; multi-ray considerations

- SVT 532 Survey Strategies in Use of Lidar (3 credits) - Lidar (Light Detection and Ranging) is an optical remote sensing technology that uses laser pulses to determine distance between the sensor and a surface or object. In the last 10 years, lidar has emerged as one of most important sources of data for topographic mapping, vegetation analysis, and 3D modeling of urban infrastructure. Course topics will include types of Lidar sensors and their applications; integration of GPS-IMU with Lidar; calibration; algorithms for elimination of non ground Lidar shots; automated break line extraction processes; ground based mobile Lidar survey issues; Integration of survey control into Lidar data sets; accuracy assessment of overlapping scanned data; understanding the industry standard .las format; integration with other types of survey information; Lidargrammetry; classifying Lidar data by return number and layer; procedures for accuracy assessment; corridor mapping
  - SVT 541 Geodesy (3 credits) - Types of coordinate systems and mathematical models; defining datums; defining transformation parameters between datums; Building of gravity models; Modeling continental drift; Conventional celestial and terrestrial references frames, precession, nutation, and polar motion; spherical trigonometry and spherical harmonic expansions; Geodesic line, geodesic curvature, differential equations of the geodesic, direct and inverse solutions; Conformal mapping of the ellipsoidal surface
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The PSM web site is

<http://engineering.umaine.edu/home/psm/>

You can apply to graduate school and the PSM surveying engineering degree at

<http://www.umaine.edu/graduate/admissions/application-information>

Note you do not have to take the Graduate Record Exam (GRE), its requirement will be waived!

If you want to take a course without becoming a graduate student you must fill out the non-degree graduate form at

<http://www.umaine.edu/graduate/system/files/files/nondegree.pdf>

FAQS

(1) I am from out of state, what tuition will I pay?

**THIS IS IMPORTANT!** If you apply for PSM surveying engr. and are accepted before fall 2014 courses start you will be in-state tuition no matter what state you live in!!! This will exist for the entire time during your PSM program.

This tuition break for out of state residents stops after this date and you will pay out-of-state rates if not accepted to the PSM before fall 2014.

(2) Is there a time frame in which I must complete the PSM surveying engr. degree?

The graduate school requires it is completed in six years. it is assumed since working concurrently you may desire a reduced credit load. It is assumed you will take at least one class each fall and spring semester unless you provide a reason why you need a leave of absence.

(3) I have taken accounting, business, and economics during my undergraduate degree, Do I still have to take those suggested classes?

No, you will work with your major advisor to take alternatives which enhance those previous courses.

(4) My bachelor's degree is not surveying engineering. Does this affect me?

Each student will be treated individually for potential required prerequisite courses.

(5) What are the tuition rates.

The present rate for all graduate students if admitted to the PSM program by start of fall 2014 is at

<http://umaine.edu/bursar/tuition-and-fees/fall-2013-spring-2014-maine-resident-in-state-tuition-and-fees/>

Out-of-state students admitted after fall 2014 will pay out-of-state graduate tuition which is presently

<http://umaine.edu/bursar/tuition-and-fees/fall-2013-spring-2014-non-resident-out-of-state-tuition-and-fees/>

Out-of-state students taking a course as a non-degree graduate student will pay out-of-state tuition.

- (6) Ray had previously mentioned the Univ. of Maine could legally not offer on-line instruction to most other states.

Yeah! This problem has been solved. The University of Maine can offer on-line education to anyone anywhere.