1. Context

Created in 1979, the Department of Geomatics Engineering in the Schulich School of Engineering at the University of Calgary is the only Geomatics engineering department in Western Canada.
and is internationally recognized as a leader in undergraduate and graduate education as well as research. With 19 faculty members and more than 300 undergraduate and graduate students, it is the largest department of its kind in Canada. Our undergraduate degree program is accredited by two national bodies: the Canadian Engineering Accreditation Board (CEAB); and the Canadian Board of Examiners for Professional Surveyors (CBEPS).

The department has strong ties to both the engineering and land surveying professions that is formalized by the Geomatics Engineering Advisory Committee (GEAC), which meets twice per year to provide advice about the Department’s teaching and research programs, and the Geomatics Engineering Liaison Committee (GELC), which meets once per year to discuss matters of common interest to the department and to the professional land surveyors associations.

The department’s undergraduate program was originally modelled after similar leading programs worldwide has been developed through a continual process of review and improvement that has always included consultation with our students, faculty, alumni, the two accreditation agencies, and our two industry advisory committees.
3. Guiding Questions

The curriculum review team met with students and faculty members and drew upon the past experiences of these groups to identify several areas for possible improvement within the curriculum. Many of these were deemed to be covered by the following questions, which were used to focus the curriculum review process:

1. Are students getting opportunities to acquire fundamental knowledge in the field?
2. How are the content and theories in the core courses built upon in subsequent courses? How are we scaffolding student learning throughout the program?
3. Where are the bottlenecks in the program and how do we resolve them?
4. Do we have the right prerequisite courses for courses in our program?
5. How do we attract and retain students in our program?

The last question above is not related to curriculum per se, but is critical to the success of our curriculum because having students that are engaged and interested in the program/material makes for a richer learning environment that benefits everyone.
8. Action Plan

In light of the findings and recommendations in the previous section, the table on the following pages presents the action plan that spans the next five years. Note that our department’s priority for the next six months is successful completion of two professional accreditation processes. Accordingly, most of the items in the action plan labelled “1 year” will begin in November/December 2017.
<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Action Item</th>
<th>Timeline for Implementation</th>
<th>Lead Responsibility</th>
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<tbody>
<tr>
<td>Rec-A</td>
<td>Identify the key topics graduates of the program are expected to master</td>
<td>1 year</td>
<td>Department Undergraduate Committee</td>
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<td>Draft initial list of key topics</td>
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<td></td>
<td>Seek input from industry liaison committees and alumni, and update list accordingly</td>
<td>1 year</td>
<td>Head and Associate Head Undergraduate Committee</td>
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<td>Rec-B</td>
<td>Determine what students perceive as the major challenges to understanding key topics in the program</td>
<td>1 month</td>
<td>Department Undergraduate Committee</td>
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<td>Meet with a selection of undergraduate students to get their feedback on major challenges</td>
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<td>Develop questionnaires to allow for ongoing data collection; this could be done per year or per course, as appropriate</td>
<td>1 year</td>
<td>Support from admin staff</td>
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<td>Rec-C</td>
<td>Perform a “critical path” analysis to determine where the key topics are currently introduced, developed and used</td>
<td>2 years</td>
<td>Department Undergraduate Committee</td>
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<td>Identify where key topics are introduced, developed and used throughout the program</td>
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<td>Identify deficiencies in progression of material along the critical path and implement curriculum changes as appropriate</td>
<td>3 years</td>
<td>Department Undergraduate Committee</td>
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<td>Rec-D</td>
<td>Identify what students perceive as the main stumbling blocks in the bottleneck courses, especially ENGO 333, 343, 361 and 431. (concurrent with Recommendation B)</td>
<td>Meet with a selection of undergraduate students to get their feedback on major challenges If possible, also determine why these are problematic, which may include specific topics from prerequisite courses, being too far removed from prerequisite courses, or the manner in which new material is introduced.</td>
<td>1 year</td>
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<td>As appropriate, modify bottleneck courses to improve student success, for example, by reinforcing key prerequisite material of changing lab assignments.</td>
<td>3 years</td>
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<td>Review critical path analysis (see Rec-C) and consider whether a new ENGO course could be used to replace a common core course in order to better prepare students for the program</td>
<td>1 years</td>
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<td>Rec-E</td>
<td>Assess student performance on different aspects of bottleneck course (e.g., labs vs. exams) to determine if the evaluation methods may be impacting DFW rates</td>
<td>Compile statistics on how students perform on different aspects of bottleneck courses</td>
<td>2 years</td>
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<td>Analyze statistics to determine if there are problem areas; seek feedback from undergraduate students if appropriate</td>
<td>3 years</td>
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<td>Rec-F</td>
<td>Identify options for facilitating student success, especially in bottleneck courses but also within the program as a whole</td>
<td>Implement methods to improve student success over the period of 1–2 years</td>
<td>2 years</td>
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<td>Develop a mechanism for tracking the impact of each methods within a given course and in follow-on courses</td>
<td>3 years</td>
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<td>Analyze data to determine which methods are most beneficial and adjust accordingly</td>
<td>4-5 years</td>
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<td>Rec-G</td>
<td>Identify short-term methods of allowing student to continue progressing within their program, for example, by allowing them to take a supplemental exam or removing some prerequisite courses</td>
<td>1 year</td>
<td>Associate Head - Undergraduate</td>
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<td>Consider longer-term solutions that may require changing/moving course content to remove some prerequisite requirements</td>
<td>3 years</td>
<td>Department Undergraduate Committee</td>
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<td>Rec-H</td>
<td>Reassess whether listed prerequisites are truly necessary and not “nice to have”.</td>
<td>2 years</td>
<td>Department Undergraduate Committee</td>
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<td>Consider whether a grade of C- or better is required for prerequisite courses and, if necessary, update PeopleSoft to allow for lower grades</td>
<td>3 years</td>
<td>Department Undergraduate Committee and SSE Undergraduate Studies Committee through calendar revision process</td>
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<td>Repeat the above reassessment following completion of the critical path analysis (see Rec-C)</td>
<td>4–5 years</td>
<td>Department Undergraduate Committee</td>
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<td>Work to attract more 1\textsuperscript{st}-year students to our program and reduce 2\textsuperscript{nd}-year attrition</td>
<td>Provide information sessions to better inform 1\textsuperscript{st}-year students about our program and to dispel any negative perceptions</td>
<td>Ongoing</td>
<td>Department Undergraduate Committee with buy-in from all Faculty members</td>
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<td>Work with industry to promote the application of Geomatics Engineering to a wide range of industries</td>
<td>Ongoing</td>
<td>Head with GEAC and GELC Industry committee members</td>
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<td>Work with SSE Communications to create and maintain an up-to-date website as well as brochures that can be used to advertise the department</td>
<td>1 year</td>
<td>Head and Associate Head - Undergraduate</td>
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<td>Work with Dean’s office and the SEE undergraduate studies committee to provide 1\textsuperscript{st}-year students with a more comprehensive, self-driven understanding of each department</td>
<td>3 years</td>
<td>Head and Associate Head – Undergraduate</td>
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<td>Work with EUSC to develop a proposal for a web-based tool to link students’ strengths and interests to the different departments within the School. Deploy/use the tool as part of the SSE admissions process, within the 1st-year curriculum and/or to high school guidance counselors</td>
<td>4-5 years</td>
<td>Head and Associate Head Undergraduate</td>
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