



STUDENTS FOR ENGINEERING EDUCATION DEVELOPMENT

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# Areas Needing Improvements An Integrated Learning Proposal

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## **Introduction**

During the 2008/2009 school year, the SEED committee attempted to pursue the recommendations of the 2007/2008 SEED committee. This proved to be more demanding than the committee could handle, given the limited amount of resources that were available. In response to this lack of action, the committee decided to host a forum in February to find out what the general student body felt needed to be addressed. Many ideas that came up were already discussed during previous committee meetings. The following report outlines the areas where students feel some improvements can be made.

## **Teaching Assistants & Professor Teaching Style**

Students have recognized a need for better trained Teaching Assistants (TAs) and Professors, with regards to the quality of lectures and tutorials taught. As addressed in the SEED forum, there is a desire amongst students to have more involvement ensuring that they are receiving the quality of education that is expected at a University. Students are concerned more than ever about the future of the quality of instruction due to the recent budget cuts and spending limitations of the university.

Students and committee members discussed the possibility of being able to encourage and recommend the Center for Teaching and Learning here at Queen's for Professors or TAs that they believe would benefit from attending such sessions. It would be feasible to have evaluation sheets handed out to students within the first two weeks of class. These sheets would be returned with recommendations for the Professors or TAs. The recommendations could include encouraging the Professors or TAs to improve various aspects of their teaching technique. The techniques could include things such as creating integrative course notes, having lectures taught using PowerPoint, or improving the loudness of the lecturer's voice. Students willing to help such Professors or TAs could volunteer to have positive discussions with the Professors or TAs to explain the recommendations.

## **Selling Textbooks**

It is quite easily seen that textbooks required for courses do not vary considerably year to year. Even though there are new editions, often old textbooks can continue to be used. As students move from year to year, it can be quite hard to find upper year students who are willing to sell their textbooks to students in the year below them. Many students simply buy all brand new books at a great expense and environmental waste. This comes as a result of an inability to acquire used text books due to lack of communication. Organizing upper year engineering students to sell their old books as a set, rather than selling them to the Used Bookstore or not at all, would be useful. A site could be set up where upper years could sell a complete year's set of textbooks to a person who requires them. Students could log onto this site, through the Engineering Portal, and could either input or view information about the sale of textbooks. The

page could provide information such as discipline, the year in which books are used, books available for purchase, price and contact information. The site could work just like Kijiji.ca, where someone fills out all the information they want and the ad is posted for several weeks for free. Students could search by year and discipline to buy the textbooks they wanted as a set, as is done typically for students in first year. The price would be recommended to be a 40-60% markdown, from the cost of a new textbook, based upon the condition that the textbooks were kept in.

## **APSC 151**

In the fall semester of first year applied science students are required to take Earth Systems Engineering known as APSC 151. This course includes many practical engineering problems and provides a good introduction to university level geology. However, a significant portion of the course involves detailed learning of rocks and minerals. While this is certainly useful for the students who will be studying earth sciences in the future, it is not perhaps the best use of time for those who won't be. The members of the SEED committee, as well as several students who attended the SEED forum, agree that it would be useful to have a course in first year focused on environmental sustainability. This focus on environmental sustainability is important because students in many of the applied science disciplines are never required to take an environmental sustainability course. First year would be the best time for students to take a course of this nature, as it would be more difficult to coordinate such a course between disciplines in later years.

A replacement of part of the rock and mineral modulus of APSC 151 with an environmental sustainability modulus would not be a difficult change to make. What we propose is to send this recommendation to the coordinator of the APSC 151 course. Overall, it would be most beneficial to the students to have an appreciation of the importance of environmental sustainability early on in their studies so that they can see how it might apply to the other topics that they study.

## **Courseware**

Courseware is usually purchased from the bookstore in the format of a spiral bound set of notes with important pieces of information omitted. The student fills in the blanks and writes out their own examples during class time. Going through the courseware is an excellent way to study for midterms and exams.

Many of the applied science courses offer courseware in first year. Particularly the mathematics courses such as APSC 171, 172 and 174 do a good job of using courseware. However, many students find that beyond the first year courses some professor's notes can be quite unclear and disorganized. The SEED committee feels that it should be recommended to all engineering Professors that they provide their students with courseware. This allows them to keep all course

notes in the same place along side printed definitions and diagrams. Furthermore, since basic things such as definitions and formulas are already printed in the courseware, each class can move more smoothly through the material and focus on the difficult problems.

## Course Websites

A major source of annoyance for students of the Applied Science faculty is the inconsistency amongst course websites. Each course coordinator can choose whether they would like to use WebCT, the Engineering Portal or a department course website. Often times the information for a course is spread out over two of these three options.

For example, MECH 241 course information and news is posted on the Mechanical Engineering Department course website but, course notes, some assignments, assignment solutions and a few tutorial solutions are posted on the Engineering Portal. Though it appears to be rather nicely organized to the outside observer, the fact is that not all of this information was given to the students. Therefore, most students do not actually know that MECH 241 has resources on the Engineering Portal. Most students believe that the Mechanical Engineering Department course website is the only site for finding the information that can be obtained for this course.

It would be far more effective and efficient to have all of the course resources on only one website. This form of organization is true for all course websites. To form an analogy, think of the course websites as the assignment drop boxes for each course. The TAs and Professors would get very frustrated if there were multiple drop boxes scattered across campus. Having only one single drop box means that the TAs and Professors only need to look in one place for their students' assignments. If a student's assignment is not in the drop box this means one of two things; either a) the assignment is late or b) the student has no intention of handing in the assignment. Therefore, the TA or Professor does not have to look elsewhere for missing assignments because they can make the assumption that the assignment does not exist. This concept can be applied to course resources on a website. If students can not easily find what they are looking for, they assume that what they are looking for does not exist. But, because there are multiple places to search for course resources, it is an inefficient use of time to spend searching every possible website that may, or may not, contain the desired information. Therefore, it would be logical to have all the course resources on one single website.

Another issue with individual course websites is that they are all different. There is no set format for these sites. As a result, these sites are often difficult to navigate through because students have to learn each Professor's formatting style. The variation of names and placements of links for basic course information that each Professor uses can cause some confusion for students.

Another problem with the individual course websites is the fact that if the Department's server is down, which is a regular occurrence for the Mechanical Engineering Department, students are unable to access the desired course information for extended periods of time. Also, if the site is

working, links on the sites are often not working properly and the desired page will not display. It appears that the Engineering Portal is on a better server and rarely goes down.

WebCT is the preferred choice for most students. This preference is based on the fact that absolutely everything can be found in one place. All courses on WebCT are displayed as a list upon logging in. This list is very convenient in that for every course that a student is taking, the website can be found instantly. There is no time lost searching through Department websites or sifting through the Engineering Portal.

The Engineering Portal is the next best choice for a standard website for Professors to use. The most prominent advantage of the Portal is the RSS feed, which is very nice if the student knows how to use it properly. The RSS feed organizes all course announcements onto one page. The only problem with the Portal is the lack of online quizzes. However, this is not a major problem at all. In fact, this can be viewed as a positive feature because it requires that all quizzes must be administered in a more controlled environment.

Either WebCT or the Engineering Portal would be a suitable choice, by the Applied Science Faculty, as a standard for course websites. Students prefer WebCT because of the fact that all links are clearly visible on one page upon selecting the desired course. However, it all comes down to what the Faculty prefers. If a standard is to be decided upon, which is highly recommended, every Professor will have to know how to use the chosen format. This may take some time to teach all the Professors, but it will be time well spent.

## **Technical Communication Courses**

The technical communications courses could be modified to foster more effective learning. Many students feel that the current technical communications courses are not an efficient use of their time and do not provide relevant information. Additionally, many students do not understand the importance of technical communication skills in a professional environment.

In order to encourage students to take the course more seriously, the number of credits received for technical communications courses could be increased. It would provide an incentive for students to spend more personal time improving their communications skills through readings and assignments. Furthermore, an increase in the numerical academic value would help students to understand that communication skills are of equal necessity as the technical and application based skills learned in other classes.

Currently, some technical communications courses have become integrated with projects assigned in other courses. An example of this is the integration of MECH 290 with the manufacturing project in MECH 213. This is an effective way for students to practice technical writing without having to produce additional assignments. Should this continue in the future, it would be helpful for the coordinators of both courses to converse frequently. This

communication would ensure that they both have an understanding of what the integrated assignments or projects entail as well as the timeline in which students are expected to complete them. Presently, the miscommunication between the two coordinators causes the technical communication side of the project to be extremely disorganized and appears very unprofessional.

In terms of course material, students could be taught practical applications, such as resumé and business memo writing, as well as the use of technical grammar. Many students have not previously learned technical communication skills and are unaware of what the use of proper technical writing entails. The incorporation of basic technical grammar activities and assignments may help students familiarize themselves with this style of writing.

The technical communications courses should be thoroughly organized. Major projects and assignments should be developed before the course begins and students should be aware of the existence of such projects within the first few weeks of classes. Furthermore, the primary lecturer and Academic Assistants should be well-informed of course material to ensure that they address relevant and complementary topics.

Lastly, it would be helpful for Academic Assistants and lecturers to have a background in engineering. Some assigned projects require thorough technical research and must provide accurate information. Students may feel that their efforts are not being accurately assessed when given feedback merely on grammatical errors and sentence structure. If Academic Assistants were familiar with an engineering work environment, they may be able to provide additional technical feedback. Moreover, students would be more thoroughly convinced of the importance of communication skills if they are learning from someone with past engineering experience.

## **Maple and MatLab**

Maple is the current computer algebra system being used for first year engineering students in the APSC 141 course. Maple has in the past been used in Calculus courses such as APSC 171. While it does serve the purpose of helping to solve calculus problems many students find it difficult to use with respect to the benefits. Beyond first year studies Maple is seldom used. Upper year engineering mathematics courses use MatLab in lieu of Maple. MatLab has been found to be more user friendly, powerful, and incorporates the use of aspects of C++ which is already learned in first year with APSC 142. Therefore it is believed that the teaching of MatLab in APSC 141 would be a better use of the students time, it will provide them with a more valuable resource, and better integrate the learning in the APSC 141 and 142 courses. This was recommended by many upper year students at the SEED forum and the members of the SEED committee agree

## **The First Year Website**

It is very difficult for first year students to find the information they need on the current first year website. Students would benefit if there was a directory of where different information was posted. Also, under the “Calendar Information” on the first year website, the clock icon should be explained to make the website more comprehensible.

The SEED committee thoroughly examined the website and came up with numerous thoughts on how it could be easily improved and updated. The content was good however many changes could be easily made to improve its effectiveness and ease of use. The SEED committee would welcome an opportunity to work alongside the website organiser to implement these changes for the coming first year class of 2013.

Many first year students are overwhelmed with the number of courses they take and the amount of information that this results in. It would be helpful for the first year website to display all important information, such as course announcements and current assignments, on the main page. Having all of this information in one place would help to relieve the stress of search countless websites for course information that may not even exist. Additionally, it would be helpful for students to have access to an RSS feed for their course information. If this is possible, students should be informed on how to set up and use the RSS feed.

The Douglas Tutorials are a very useful to first year students. They allow students to receive academic aid in any of their courses in a friendly, helpful environment. Unfortunately, many students are unaware of how to make proper use of the Douglas Tutorials. They are often uninformed and do not understand the logistics or purpose of this tool. As a result, it would be helpful for the website to include information on what the Douglas Tutorials entail, as well as a schedule of all Douglas Tutorials that run during the week. Many students believe that they are restricted to attending only their own scheduled tutorial, however this is not the case. Students should have access to the time and locations of all Douglas Tutorials in case they need extra help or have a time conflict with their scheduled tutorial.