

**UNIVERSITY COUNCIL  
ACADEMIC PROGRAMS COMMITTEE  
REQUEST FOR DECISION**

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**PRESENTED BY:** Roy Dobson, Chair, Academic Programs Committee of Council

**DATE OF MEETING:** September 19, 2013

**SUBJECT:** College of Engineering enrolment targets

**DECISION REQUESTED:**

*It is recommended:*

That Council approve the College of Engineering enrolment target for admission of up to 700 first-year students, to be phased in from 2014 to 2017.

**UPDATE Sept 12: Following is the version of motion approved by Council:**

That Council encourage the College of Engineering to explore the resource implications of setting a target for admissions of up to 700 first-year students, to be phased in from 2014 to 2017.

**PURPOSE:**

Under the University of Saskatchewan Act 1995, decisions regarding enrolment quotas for university programs are to be approved by Council and confirmed by Senate. If approved by Council, the College of Engineering enrolment plan will be presented to the Fall, 2013 meeting of University Senate for confirmation.

**SUMMARY:**

This enrolment target represents a 30% increase in program capacity over current quotas, and an overall first year increase of around 70% over the current target. It is expected that the first year intake of nearly 700 will not happen until the 2017/2018 year. Such an increase will depend on whether upper-year retention rates remain as they are, whether the college is allowed sufficient resources in terms of faculty, technical staff, teaching assistants, markers and equipment to accommodate increased class and lab sections, and whether other colleges which also teach in the engineering program can also increase their faculty and staff commitments.

This increase moves to accommodate the forecasted demand for engineers in Canada and in the Saskatchewan labour market which has been identified in a number of industry reports and at an Engineering Summit held last spring between the College of Engineering and engineering companies from around the province.

**REVIEW:**

The Academic Programs Committee discussed this change with Associate Dean Aaron Phoenix at its meeting of September 4. It was noted during this discussion that year-to-year retention rates are also a component of Engineering enrolment. Reducing attrition and increasing retention could have a significant impact on overall college enrolment and would result in changing numbers of first-year admissions. The College will monitor the annual progress toward

achieving its overall enrolment and graduation goals and will report back to the Academic Programs Committee as necessary if the target needs to be revised after 2018.

**ATTACHMENTS:**

Proposal documentation



UNIVERSITY OF  
SASKATCHEWAN

## Proposal for Academic or Curricular Change

### 1. PROPOSAL IDENTIFICATION

**Title of proposal:** Increasing the annual admissions target for the Bachelor of Science in Engineering to 700 students

Degree(s): Bachelor of Science in Engineering

Field(s) of Specialization: Biological, Chemical, Civil, Computer, Electrical, Engineering Physics, Environmental, Geological, and Mechanical

Degree College: College of Engineering

Contact person(s) (name, telephone, fax, e-mail): Aaron Phoenix, Acting Associate Dean – Academic

Proposed date of implementation: Phased implementation through August 2014 – August 2018

### Proposal

It is proposed that the College of Engineering increase first year undergraduate enrolment to 700 students. When fully phased in, this will result in an anticipated headcount of 2,170 students in the undergraduate program.

In fall 2012, the College of Engineering admitted approximately 540 students into the first year of the program, with a total headcount for the program of 1,669. The proposed total enrolment for the Bachelors of Science in Engineering is 501 or 30 per cent more students than are currently enrolled.

The College anticipates an enrolment of 550 students for 2013/14, 625 for 2014/15, 675 in 2015/16 and 700 in 2016/17. The enrolment increases will be supported by targeted recruitment strategies and revised admissions policies, subject to Faculty Council approval.

It is proposed that the College of Engineering Faculty Council provide approval in principle of greater quotas for each discipline. This approval in principle will allow the enrolment plan to move to implementation with a clear sense of how students will move through the undergraduate program. Each fall, the Engineering Faculty Council would

consider specific quotas for each discipline for the following fall. This significant lead time would allow faculty council to consider actual first year head count and the college's actual capacity to deliver in each program, and would allow the College Executive to develop and share implementation plans (budget, faculty complement, staff complement, etc.) in support a specific sequencing of increases by program.

### **3. RATIONALE**

The College of Engineering has been considering increasing the size of its undergraduate enrolment for several years. As the third integrated plan was developed, the College identified its defining features as relevance to industry, quality programs and innovation. In reflecting on the current economic environment and expectations of the college from our community: student and parents, the university, the engineering profession, employers and industry in Saskatchewan and western Canada, the College determined that it would be appropriate to significantly increase its undergraduate enrolment during the third integrated planning period. The College is committed to enrolment growth that is implemented in a logical, planned way: ensuring resources and supports are in place to ensure the admission of high quality students, supports so students are well positioned to succeed, and resources to ensure the college is able to continue to deliver a high quality program.

The college's ambitions were for 15 per cent growth by 2016; however, the Provost's Committee on Integrated Planning (PCIP) provided planning parameters that provide for a 30 per cent increase by 2016. In light of the University's request to more substantially increase enrolment, the College of Engineering is developing an enrolment plan that provides a path for increasing total enrolment to 2,170 students over the coming years.

The College is undertaking a multifaceted enrolment planning project to assess undergraduate enrolment growth. The project includes the following components.

- assessing demand for graduates of the bachelor of science in engineering
- assessing demand from prospective students
- developing a program enrolment model
- assessing the costs to deliver a larger program
- investigating program quality – how it is defined and measured, and how it can be maintained or improved in a larger program
- improving admissions policies and procedures
- developing and implementing a recruitment plan
- investigating and improving student retention rates
- developing diversity strategies and goals

Each of these items is discussed in greater detail below.

Many of the projects remain underway, and will continue through the 2013/14 and 2014/15 academic years. Despite more work to be done to flesh out the details of implementation, the College believes that there is sufficient evidence of a) the demand

for engineering graduates; b) the college's capacity to deliver the program, with the additional resources predicted by the TABBS model, and c) the supply of quality students to begin to phase in larger enrolment starting in fall 2014.

## **A. Demand for Graduates of the Bachelors of Engineering (Appendix A)**

A Summit will be held on June 26, 2013 to will provide greater context for enrolment increases being considered at each of Saskatchewan's universities. The College of Engineering, University of Saskatchewan is partnering with the University of Regina, College of Engineering to bring together industry, government and the post-secondary sector to interpret the various forecasts and provide critical insight into enrolment planning choices that need to be made at the two faculties of engineering in Saskatchewan.

Appendix A includes a report that outlines the demand for engineering graduates that will serve as the foundation for the Summit. The report summarizes Engineers Canada's October 2012 report - *The Engineering Labour Market in Canada: Projections to 2020*, which projected an overall average surplus of 41% more engineering positions per year than the current graduating capacity of Canadian universities. Saskatchewan is projected to experience demand 40% in excess of current training capacity. Complicating this is the forecast that Alberta will have an average of 87% more engineering positions available than their current capacity to graduate engineers. Immigration and mobility may offer some solution but strong demand in other jurisdictions in Canada, similar shortages in the United States and increased activity in Asia and the Pacific Rim may limit the availability from these sources.

It seems critical that the province, universities and engineering profession take a proactive role in developing strategies to ensure labour shortages in the engineering profession do not impede economic performance in Saskatchewan. This summit will work to achieve consensus of the demand, potential solutions and strategies to meet the demand and some indication of the relative demand in the various disciplines of engineering.

## **B. Demand from Prospective Students (Appendix B)**

A review of local, provincial, national and international secondary school enrolment trends reveals strong pools of prospective students for the College of Engineering among local Saskatoon, Saskatchewan, out-of-province Canadian and international markets. Numbers of applicants, admitted and registered students continue to rise substantially for the College of Engineering, despite the higher admission average set to control enrolment. It is expected that the demand for engineering from prospective direct entry and prospective transfer students will continue to rise, and that the College of Engineering can be increasingly selective in choosing the best qualified students from the applicant pool.

### **C. Program Enrolment Model (Appendix C) & Program Quotas (Appendix D)**

The program enrolment model, developed by College of Engineering faculty, uses data from the cohort of students who entered the college in the 2007/2008 academic year to determine average attrition rates and the movement of students from first to second year, from second to third year, and from third year to fourth year on to graduation.

Using this sample cohort, the model shows a 25%+ attrition rate from first to second year, a 1.3+% attrition rate between second and third year in program, and a 7.3% overall attrition rate between third and fourth year. Using these average attrition rates, the model enables us to predict the numbers of students who will graduate after 4 or 5 years (given a first year enrolment of 687 students) and also models backwards using the number of desired graduates as input to determine the numbers to admit first year and into the various programs.

While this model provides a predictive scenario (and echoes previous studies in the College of Engineering - including a 10 year longitudinal study of students moving through program), it is expected that inputting current data each year will enable us to track movement over the long term and observe changes in attrition rates, distribution to program and time to completion. This ongoing refinement of the model as the College increases enrolment will enable more accurate prediction of enrolment and graduation numbers and will further enhance enrolment planning and management.

### **D. Program Quality (Appendix E – Literature Review: Program Quality; Appendix F, Draft Terms of Reference, Quality Task Force)**

Ensuring a quality undergraduate program is a defining feature of the College of Engineering at the University of Saskatchewan; the college strives to be known for its high quality undergraduate and graduate programs that prepare students for professional and academic careers, graduate studies and leadership roles. To ensure this vision becomes and remains a reality, work is underway to define, measure and enhance program quality.

The first step has been to undertake a literature review to better understand definitions and measurements of quality in engineering programs. Work by the Gwenna Moss Centre for Teaching Effectiveness reveals a substantial body of research in this field. The literature on quality in engineering education bears closer examination and it is expected that this review will form the basis of future work on quality of education and experience within the college.

The college is in the process of establishing a task force to investigate, define, and propose metrics to track quality of education in the College of Engineering from a student perspective. Denard Lynch, Rick Retzlaff, Peter Park, Li Chen, and Corey Owen have committed to participate in a task force and the draft terms of reference are attached.

The college's Strategic Plan commits us to ensuring a quality student experience while optimizing enrolment. Growth is not at the expense of quality; it will be done in a way that maintains or enhances the student experience while responding to society's needs for more engineering graduates.

#### **E. Admissions Policies and Procedures (Appendix G)**

The current policy on average calculation and the process of setting an admission average and admitting all who meet it by the deadline are no longer meeting the needs of the College of Engineering to effectively predict and manage enrolment. Proposed changes to both policy and process (for 2014/2015) are anticipated to lead to better enrolment prediction and management, in time for the College to plan for and adjust sections of first year classes to accommodate growth.

#### **F. Recruitment Planning (Appendix H)**

In order to attract, enrol and retain highly qualified and academically prepared students, work must be done to clarify, package and promote the advantages and benefits of the disciplines within the College of Engineering. Attracting the best and brightest students requires competition with other programs at both colleges and universities. Students will be attracted to clear, consistent and engaging messaging, as well as responsiveness and timeliness of information during the recruitment cycle. Efforts to attract and engage the best and brightest students must be collaborative - faculty, current students, recruiters, alumni, school counselors, academic advisors and community leaders all have a role to play. Recruitment must be targeted and segmented to ensure that the right numbers of students are enrolled to meet second year program targets and that the College diversity goals are met. More work at the front end will provide clear information to prospective students to enable them to make the right choice and will result in stronger enrolment and retention of these well-qualified students. Transfer credit agreements with colleges, technical institutes and universities can be a predictable source of students and will be undertaken with key institutions.

#### **G. Improving Retention (Appendix I – Presentation on Retention)**

A retention and attrition study undertaken by the College of Engineering Student Centre reveals a greater than 25% attrition rate before the second year. The study shows that while some students leave the college due to poor academic performance, the majority are leaving with solid sessional averages – some moving to other colleges at the U of S, but many leaving the university entirely. Further, the majority of these students entered the colleges with strong high school or transfer averages (80%+ for direct entry and 70%+ for transfer). Retention rates vary among programs and these rates should be examined more carefully to determine the reasons for the variance. Improving the rate of retention from first year into programs would enable the College to admit fewer first year students, but graduate more within a four to five year timeframe. A retention task force will be established within the 2013/2014 academic year to research and address retention and persistence to completion rates.

## **H. Diversity Strategy**

One of the compelling reasons to increase enrolment is to make room for some learner populations that are currently underrepresented – a societal responsibility. The College of Engineering is committed to increasing enrolment of two underrepresented groups:

- Aboriginal students, who make up just 2 per cent of our undergraduate student body; and
- female students, who currently make up just 20 per cent of our undergraduate student body.

With particular regards to Aboriginal enrolment, the College of Engineering has not met the goals we set for ourselves. While increased Aboriginal enrolment remains a priority, we have struggled to find a way to make meaningful changes that will lead to the results we seek. In the third integrated planning period, the college is renewing this commitment and is determined to do more to ensure that Aboriginal students enroll in and are successful in engineering programs, and to ensure that people in the college better understand, respect and embrace Aboriginal culture.

As one component of the enrolment planning work that remains outstanding, the college must commit to placing particular emphasis on understanding and working to increase the presence of underrepresented populations in the college.

## **4. DESCRIPTION OF PROGRAM CHARACTERISTICS**

No changes to the program are proposed.

## **5. RESOURCES (Appendix J)**

To obtain resource estimates required to deliver each program, Department Heads within the College of Engineering were each asked to consider the total resources required to deliver their programs, measured by number of instructor hours, number of teaching assistant/marker hours, number of lab technician hours, space requirements/constraints for classes and labs, and estimated equipment costs. Department Heads were invited to consider the optimum size of classes and labs, as well as the constraints on section and lab sizes. Additionally, in light of workforce planning and staff and faculty complement planning, both existing and anticipated resources were considered.

Each Department Head, in conjunction with program chairs and faculty, considered the resource estimates in the context of the individual programs, and different scenarios were considered based on program quotas (current, proposed modest growth, proposed substantial growth).

Based on these overall estimates of required resources, a model was constructed to provide cost estimates of the different scenarios. Proposed program quotas are based



on the cost modeling and are reflected in the TABBS model revenue projections. **See Appendix I for the tables outlining the additional costs and additional revenue projected to flow to the College of Engineering. In summary, the increased enrolment can be fully funded with the resources anticipated by the TABBS model. The surplus of resources will be allocated by the Dean to best advance the college's mission of teaching, research and outreach, including addressing any unanticipated costs associated with growth.**

The work undertaken by department heads provides the solid foundation on which implementation plans can be built. It is expected that in all cases as implementation takes place over the next several years, changes in the university environment, natural evolutions in the faculty and staff complements, changes in the College's space, etc. will necessitate further consideration. The resource estimates are not seen as definitive for either the department or the college, but should be seen as providing information for all parties about the feasibility and viability of growth given the increased resources that will come to the university and the college.

## **6. RELATIONSHIPS AND IMPACT OF IMPLEMENTATION**

A significant portion of the Bachelor of Science in Engineering is delivered by the Division of Science in the College of Arts and Science, and the Edwards School of Business supports the delivery of the Engineering Entrepreneurship Option. Prior to send this proposal to University Council, the college will work closely with the College of Arts and Science to secure its support for this specific level of enrolment increase.

The proposed enrolment increase is aligned with the PCIP-approved planning parameters for the third integrated plan. It is expected that administrative units on campus are aware of the increase and will be re-focusing their activity to align with student demand. If the undergraduate enrolment numbers from the Planning Parameters are implemented across campus, some program enrolments would decline while engineering's enrolment is increasing, allowing resources to be shifted to support engineering undergraduate programs and students.

## **7. BUDGET**

Delivering a significantly larger program requires additional funding for the College of Engineering. Working in collaboration with the Office of Institutional Planning and Assessment and with the Provost's Office, the college has been assured that additional resources will be provided to the college using the Transparent, Activity Based Budget model (TABBS). See appendix J for additional detail.

TABBS is intended to help align college and unit budgets with activities in a more transparent, comprehensive, and systematic way and to ensure resources are put behind strategic priorities. In short, the TABBS model makes it possible for the University to understand and predict the increased revenues and expenditures resulting from a change in enrolment, and to provide predictable funding to the units involved so

that Engineering, Art and Science and other units can develop and implement a plan to address additional cost pressures resulting from growth.

Using the resource estimates and resulting cost estimates per program for delivery of increased program size, the TABBS model illustrates a scenario in which incremental tuition revenue is proportionally higher than anticipated incremental costs, providing assurance that enrolment growth is financially viable and would provide excess tuition revenue that could be invested in research, enhanced support for faculty and students and other targeted initiatives. While the TABBS model provides a planning scenario and not a guaranteed or approved budget for growth, it does enable the College to plan for enrolment growth with the understanding that increased tuition would flow to the college to ensure that new faculty could be hired to accommodate increased numbers of students.

#### **Attachments**

- A. Demand for Engineers
- B. Prospective Student Demand
- C. Enrolment Model
- D. Program Quotas
- E. Literature Review – What is Program Quality? - *To Be Distributed*
- F. Draft Terms of Reference, Quality Task Force
- G. Admissions Plan: Achieving Enrolment Targets
- H. Discussion Paper for Future Recruitment Planning
- I. Presentation: Retention
- J. Resources: TABBS Modeling

#### **Related Documentation**

Review the following documents for additional context:

- The College of Engineering 2012-2016 Strategic Plan:
- The College of Engineering PCIP Planning Parameters, Third Integrated Plan: