

## BCCAT Engineering Articulation Committee Meeting

04-May-2017, University of Victoria, Victoria BC

### Members Present

Committee Member	Institution	E-mail
Renata Wood	BCIT	rwood76@bcit.ca
Chris Avis Tim Ayers George Ballinger	Camosun College	avisc@camosun.bc.ca ayers@camosun.bc.ca ballinger@camosun.bc.ca
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Margaret Gwyn LillAnne Jackson (SLP)	UVic	mgwyn@uvic.ca lillanne@uvic.ca
Costa Karavas	Vancouver Community College	ckaravas@vcc.ca
Brian Dick (Chair)	Vancouver Island University	brian.dick@viu.ca

## Guests

Guest	Institution	E-mail
Mike Winsemann	BCCAT	mwinsemann@bccat.ca
Torrey Dance	University of Alberta / ACAT	torrey.dance@ualberta.ca
Bryan Rowsell Wei Zhao	Red Deer College	bryan.rowsell@rdc.ab.ca wei.zhao@rdc.ab.ca
Carolyn Westra	APEGBC	cwestra@apeg.bc.ca

1. Call to Order: 10:00am
2. Welcome from the Faculty of Science (Dr. Hicks) and Faculty of Engineering (Dr. Tiedje)
3. Agenda/minutes approved

The Chair expressed the appreciation of the BCCAT Engineering Committee to the University of Victoria for hosting today's event, and particularly to Mimi Lin (and team) for the planning of the day, and to Valerie Cross for taking notes of the proceedings.

4. Updates  
*ACAT -*

- Working with University of Calgary and University of Alberta and sending institutions, GRP, MEU, Kianu, MEH, RDC, University of Lethbridge , etc. to establish standard 1<sup>st</sup> year/GPA requirements.

### *BCCAT:*

- New system effective Spring or Summer which will replace existing triangulation tools. All public schools will be required to use the Education Planner BC system by September 2018 as mandated by the Education Ministry.
- Work on electronic transfer involving high school transcripts, etc. by the end of this year.
- Work on updating transfer programs to BCCAT from anywhere in Canada, not just BC.
- Working with UBC to store all that institution's transfer credit including international articulation.

### *BC Open Textbook:*

- open textbook. Operates on grant money and cross partnerships.

### *APEGBC:*

- Limited licenses available which will allow instructors to have a "Eng.L" label for accreditation purposes.

- Upgrading available for international engineers.
- Most arduous task is defining the scope of practice for limited license and the interview.
- Confirmed that PEng designation is becoming a larger issue for 1<sup>st</sup> year courses.

5. Reports by Sending Institutions (Summary, full reports attached as an Appendix):

- Concerns dealing with different admission requirements of the receiving institutions. Different course and GPA requirements.
- Some changes being made (upgrades) at some institutions re: high school course/GPA admission requirements.
- Resolving internal scheduling so preparatory courses are taken sequentially.
- Adding new engineering certificate programs.
- Issues applying and sending transcripts.
- Working on transfer programs with receiving institutions.
- Want more defined articulation agreements.
- New 4 year TRU engineering program being considered, funding dependent.
- Concern re: K – 12 curriculum changes impacting high school success in tackling 1<sup>st</sup> year engineering courses.
- Concerns about English and physics at the high school level.
- Expanding student experience and flexibility for engineering students.

6. Reports by Receiving Institutions (Summary, full reports attached as an Appendix)

- Managing changes to admission requirements to ensure a better fit for engineering.
- Reviewing GPA requirements specifically for international applicants with transfer credit issues.
- Possible new programs in Biomedical, Software, mathematical engineering, design and manufacturing engineering and environmental engineering.
- Working to grow transfer programs with sending institutions.
- 1,000 new engineering seats promised by current Provincial government but budget unconfirmed.
- Recent accreditations for UBCO and UVic successfully completed.

7. Discussion: Feasibility of Implementing a Common 1st year Curriculum in BC

*Motion: The BCCAT Engineering Articulation supports an application to the BCCAT TIP program to support the implementation phase of the Engineering Pathways project.*

Chair discussed consultation process behind feasibility study submitted to BCCAT under the previous TIP grant. This study resulted in two requirements, three recommendations, and a suggested common curriculum for first-year engineering.

The study is available on-line at:

[www.bccat.ca/pubs/Engineering Final Report - v121.pdf](http://www.bccat.ca/pubs/Engineering%20Final%20Report%20-%20v121.pdf)

Motion approved.

The committee agreed that the following members would sit on the steering committee that will put together the application to TIP, and subsequently move forward with work to implement the feasibility study outcomes:

Brian Dick (Chair)	Vancouver Island University
Barbara Rudecki	College of New Caledonia
Elroy Switlishoff	Selkirk College
Tara Todoruk	Columbia College
Jennifer Kirkey	Douglas College
Bruno Tomberli	Capilano University
Margaret Gwyn	University of Victoria
Yang Cao	University of British Columbia (Okanagan)

8. Discussion referred as a component of the common curriculum Implementation activities.
9. Location for the 2018 Meeting: Douglas College  
Proposed location for the 2019 Meeting: UBC-O / Okanagan College
10. Meeting Adjourned: 16:00

## Report from Camosun College Engineering Bridge Programs

Submitted by: Tim Ayers, Engineering Bridge Coordinator [ayers@camosun.ca](mailto:ayers@camosun.ca)

Camosun College has four engineering technology programs: Engineering Transfer, Civil Engineering Technology, Electronics & Computer Engineering Technology – Renewable Energy, and Mechanical Engineering Technology. Pathways to university degrees are described in the table below.

The Engineering Bridge programs at Camosun have converted to the semester system. All of them include a new optional Internship Work Term.

A new Civil Engineering Bridge program to UVic's new Civil Engineering program may also be developed in the near future.

DIPLOMA PROGRAM	JANUARY TO DECEMBER UVIC BRIDGE	JANUARY THIRD YEAR ENGINEERING	ENROLMENT
Mechanical (or related) Technology	<a href="#">Mechanical Engineering Bridge</a>	Mechanical Engineering at UVic	35
Electronics (or related) Technology	<a href="#">Electrical Engineering Bridge</a>	Electrical Engineering at UVic	20

DIPLOMA PROGRAM	SEPTEMBER TO AUGUST UBC BRIDGE	SEPTEMBER THIRD YEAR ENGINEERING	
Civil (or related) Technology	<a href="#">Civil Engineering Bridge</a>	Civil Engineering at UBC V and UBC O	20
Mechanical (or related) Technology	<a href="#">Mechanical Engineering Bridge</a>	Mechanical Engineering at UBC V and UBC O	20
Mining (or related) Technology	<a href="#">Mining Engineering Bridge</a>	Mining Engineering at UBC V	0

A large majority of Camosun engineering technology students polled at the start of their programs express the intention to progress towards a bridge program and a degree. In practice about one fifth of the technology students eventually enrol in a bridge program. Several dozen colleges feed the bridge programs, with the most participants coming from Camosun, SAIT, and NAIT.

In the UVic bridge, 40 Electrical & Computer Engineering and 20 Mechanical Engineering students are accepted and 95% progress to UVic. Students who are unsuccessful in one or more courses the first time must clear these deficiencies in a second intake. In the UBC bridge, 20 Civil Engineering and 20 Mechanical Engineering students are accepted, with similar retention.

The bridge programs to UBC and UVic have been running successfully for a couple of decades. Graduates from a combined technology diploma and bridge program are highly regarded by the universities due to their strong hands-on skills. They are also in demand amongst employers.

## **Camosun College - Engineering Transfer Program Articulation Report 2016-2017**

Camosun College's Engineering Transfer program (not to be confused with its long-running Bridge program) is now in its fourth year. It is designed for transfer into second year engineering at UVic, with which we have a transfer agreement. Students going elsewhere, of which there tend to be very few, apply for course-to-course transfer. We take in 28 students each year. Students who do not complete the program in the normal 10 months (September - June) may return on a part-time basis for a second year to finish it. We had 3 or 4 such returning students this year of which 1 or 2 will graduate.

Students are admitted to the program on a "first qualified, first served" basis instead of by competitive entry. They are required to meet minimum admission requirements in English, math, physics and chemistry. The program is popular and is always waitlisted. There were close to 200 applicants this year although many students withdrew their applications, submitted incomplete applications or did not meet the requirements. About two thirds of the qualified applicants who were invited to join the program eventually declined the invitation. Approximately 100 students have so far applied for our September 2017 intake.

Unfortunately, success in the program seems to be elusive for most students. Typically between 25% and 40% of students successfully complete the program.

Of the 28 new students who started in September 2016, about 5 or 6 dropped out of the program during the first semester and many others failed or withdrew from one or more courses, such that by the end of December only 13 students were still on track to graduating by June. That number dropped to 10 as the second semester progressed. Of those, 4 are struggling with at least one course and are at risk of failing. Final exams are just getting underway; results will be known by the end of April. Although only 10 of the 28 students are still on track to graduating this year if they pass their second term courses, many others are continuing with the program on a part-time basis and may return next year to finish it. Indeed, fully 19 of the 28 students are registered to take our summer courses in mechanics and engineering design.

Besides students formally in our transfer program, there are others who "shadow" the program. These non-program students are eligible to receive our certificate and transfer to UVic the same as program students if they can satisfactorily complete all the necessary coursework. Naturally they do not benefit from having guaranteed seats, a conflict-free timetable or being part of a cohort. These students are understandably difficult to track or count. This year there are about 7 or 8 known "shadow" students and there are likely others who are unknown. Two of the known "shadow" students are on track to completing the program requirements by June and a few others are intent on returning next year to finish the coursework.

We have made two recent changes to our program. The first involves chemistry. Our admission requirements have increased from C in Chemistry 11 to C in Chemistry 12. All students will now take CHEM 120 (College Chemistry 1), which transfers to UVic's CHEM 101 course, in the fall semester. Previously, students who lacked Chemistry 12 could take the equivalent course at Camosun during the fall semester and then CHEM 120 the following term.

The second change is that, in the second semester, students now have a choice of taking statistics or a second computer programming course, the latter being necessary for software engineering at UVic. Neither of these changes affects articulation or our transfer agreement with UVic.

George Ballinger  
Engineering Transfer Program Leader  
Camosun College, Victoria BC

## **Capilano University Report:**

### **B.C. Engineering Articulation Meeting**

**Thursday, May 4<sup>th</sup>, 2017, University of Victoria**

Capilano University has two engineering transfer programs, both of which transfer to second year engineering at UBC and fulfill most or all of the prerequisites for second year engineering at other B.C. universities.

#### **First-Year Engineering Transfer Program**

This program is modeled after first year engineering at UBC and is geared towards strong high school graduates. Statistics for the 2016/2017 year are as follows:

- 341 applications were received (42 international)
- 113 admission offers were made (14 international)
- 36 students registered
- Due to late end of term cannot check how many made the UBC grade cutoff

This year, so far (as of April 24th), we have received 201 applications (30 international) for the 2016/2017 year.

#### **Engineering Transition Program**

This is a two-year program for mature students who have been out of school for a number of years and for high-school students who do not have the prerequisites to begin first year engineering. The cohort who are finishing this year began in the fall of 2015. Statistics for this group are as follows:

- 117 applications were received (8 international)
- 73 admission offers were made (4 international), plus an additional 66 offers (3 international) to applicants of the First-Year program
- 63 students registered

The cohort that began in the Fall of 2016 are finishing their first year of the program. Statistics for this group are as follows:

- 122 applications were received (12 international)
- 84 admission offers were made (4 international), plus an additional 53 offers (9 international) to applicants of the First-Year program
- 71 students registered

This year, so far (as of April 30th) we have received 59 applications (4 international) for the 2016/2017 year. Note that we have changed our practice so that students applying for the First Year Program are automatically considered for transition and this has reduced the number of explicit Transition applications

## Other News

- We have had approved a certificate associated with our First Year Transfer Program.
- Changes have been made to the Transition Program which disallow taking preparatory courses in the second year and expand the list of second year electives.
- We are in the final stages of Approval for a second two-year credential: the Diploma in Applied Science. This credential is intended for students with all the pre-requisites for First-Year Transfer but with grades too low for selection into that program. In the first year, these students will be expected to take a similar course load to those in the Transfer Program. In the second year they have a course load similar to second year Transition students but with more second year course required.
- Administrative duties for our Engineering programs were shared in the 2016-17 academic year between Chris Morgan and Bruno Tomberli.
- Bruno Tomberli has completed a 3 year stint as program convenor and is handing duties off to Tony Cusanelli for 2017-18.
- This year has seen a further expansion of 4 lecture sections proposed for the 2016-17 academic year. Two of the sections were devoted to second year transferable offerings in Computer Science (COMP 220) and Chemistry (CHEM 252).
- Our enrolment capacity remains capped at 35 for the Transfer program this year (hard limit of 40). Last year we filled up at the end of June. In Fall 2015 the limit for the Transition Program was raised to 70 from 35 students.
- We have further developed our maker-space for our design courses. This development has been well-received by students.

Respectfully submitted

Bruno Tomberli and Chris Morgan  
Engineering Convenors – School of STEM  
Capilano University

## **College of New Caledonia 2017 Engineering Articulation Report**

CNC continues to offer an engineering transfer program. Upon completion of the program, students are eligible for an Applied Science (Engineering) Certificate. The program consists of the following classes: Introduction to Engineering, Engineering Drawing, Fundamentals of Chemistry I and II, Computing Science I, Composition and Style, Calculus I and II, Linear Algebra, Introductory Physics I and II (calculus based), Mechanics I and an elective.

In 2016/2017, the overall enrollment in engineering classes was similar to last year. The enrollments in APSC 100 (Introduction to Engineering) and APSC 120 (Engineering Drawing) were: 48 and 27 students this year, comparing to 40 and 35 last year. The enrollments in PHYS 101, PHYS 102 and PHYS 204 were: 52, 29 and 28 students this year comparing to 42, 32 and 20 last year. Some students completed the program in one year and are currently applying for transfer to other institutions, mainly to UBC, UBCO and UVic. The remaining students chose to do the program over two years. We had a cohort of Mexican engineering students auditing classes in the fall semester and we are expecting another group in September 2017.

Barbara Rudecki, P.Eng.  
Department of Physics & Applied Science  
College of New Caledonia

# **Columbia College**

## **2017 Engineering Articulation Report**

**May 4, 2016 – University of Victoria**

Columbia College is completing our fourth year at our new campus and enrollment is still on the rise for the entire college, currently at a record high. Enrollment in the engineering transfer program has been holding steady and has not increased substantially.

We currently offer 2 Applied Science courses regularly, along with physics, chemistry, and math courses needed for the transfer program. The 2 courses are Applied Science 151 (Fundamentals of Graphics Communication for Engineers) and Applied Science 160 (Fundamentals of Computer Programming for Engineers). We still have Applied Science 122 in the calendar but the demand for this course is not high and it has only been offered one time.

Our engineering transfer program has continuous applications, and our application process is general, so we do not have clear statistics on the numbers in the program. APSC 160 and 151 are offered in alternating semesters, with enrollment each semester between 16 and 25 over the past year. Our engineering mechanics course is the only other course offered dedicated to engineers, and the enrollment in this course has been small.

We have recently started regularly offering Physics 130 (Waves, optics, and thermal physics), which transfers to both UBC and UVic. This has increased the number of UVic bound students, although there are still plenty UBC- and SFU-bound. As our students need to take different physics courses for differing institutions, we are looking forward to reaching an agreement regarding common First-Year Core Engineering Curricula for the BC Post-Secondary Sector, to easier facilitate transfer of our students.

Tara Todoruk

Columbia College  
Vancouver, BC

## **College of the Rockies**

### **2017 Engineering Articulation Report**

College of the Rockies continues to offer our first-year engineering transfer program (Engineering Certificate) with a block transfer available for students intending to enter UVic. Numbers have held steady with 15 students registered in our Intro to Engineering course in the fall semester (up from 12 in fall 2015), and 7 students registered in our spring semester Engineering Design course (down from 9 in spring 2016).

Starting in fall 2017, the scheduling of our engineering courses will undergo some changes:

Currently, our engineering students take ENGL 100 (English Composition) in the fall semester (Sept - Dec) and COMC 102 (Advanced Professional Communication) in the winter semester (Jan - Apr). They then take COMP 105 (Intro to C/C++) and APSC 123 (Engineering Design) in the spring semester (May - June).

Starting in fall 2017, COMP 105 will be offered in the fall semester and APSC 123 will be offered in the winter semester. ENGL 100 and COMC 102 will be offered in the spring semester, both as online courses.

Our hope is that these changes will give our students more freedom to work summer jobs (online courses can be done on their own time), and allow them to send preliminary transcripts that include all of their core engineering courses much sooner to receiving institutions, all while avoiding the increased workload that would result from trying to squeeze all courses into the fall and winter semesters alone.

## UVIC Required Courses

Course Acronym	Course Name	Credits
<b>Fall Semester</b>		
APSC 122	Introduction to Engineering	1
APSC 151	Engineering Graphics	3
CHEM 101	Fundamentals of Chemistry 1	3
ENGL 100	English Composition	3
MATH 103	Differential Calculus	3
PHYS 103	Introduction to Physics 1	3
<b>Winter Semester</b>		
COMC 102	Advanced Professional Communications	3
MATH 104	Integral Calculus	3
MATH 221	Elementary Linear Algebra	3
PHYS 104	Introduction to Physics 2	3
PHYS 141	Engineering Statics	3
<b>Spring Semester</b>		
APSC 123	Engineering Design	3
COMP 105	Introduction to Programming in the C and C++ Language	3

## UBC Required Courses

Course Acronym	Course Name	Credits
<b>Fall Semester</b>		
APSC 122	Introduction to Engineering	1
APSC 151	Engineering Graphics	3
CHEM 101	Fundamentals of Chemistry 1	3
ENGL 100	English Composition	3
MATH 103	Differential Calculus	3
PHYS 103	Introduction to Physics 1	3
<b>Winter Semester</b>		
CHEM 102	Fundamentals of Chemistry 2	3
MATH 104	Integral Calculus	3
MATH 221	Elementary Linear Algebra	3
PHYS 104	Introduction to Physics 2	3
PHYS 170	Engineering Statics and Dynamics	3
<b>Spring Semester</b>		
APSC 123	Engineering Design	3
COMP 105	Introduction to Programming in the C and C++ Language	3

## **Douglas College Engineering – Articulation Report – 2016/17**

The 2016-17 academic year saw the official launch of two new engineering credentials at Douglas College - the **Engineering Foundations Certificate** and the **Engineering Essentials Diploma**.

The Engineering Foundations Certificate (EFC) is a three-semester, 10-course credential designed to satisfy first-year course requirements for a university engineering degree program. The majority of these courses are the standard suite of first-year science courses. The EFC also has a writing course requirement and an arts elective requirement. Although not part of the EFC, there are additional “bridging courses” students take to fulfill the remainder of first-year engineering program course requirements which, at most universities, consists of 12 courses. A key feature of the EFC is a degree of flexibility that allows students to tailor their arts, writing and bridging courses based on their desired destination institution. This allows the EFC to be robust enough to accommodate the course requirements of any university program in BC.

The Engineering Essentials Diploma (EED) is a five-semester, 20-course credential designed to provide students with a balance of academic coursework and experiential learning prior to transferring to a university engineering program. The EED consists of the 10 courses in the EFC plus an additional set of 10 “second-year” courses. The second-year courses encapsulate the spirit of the EED program: to give students hands-on experiential learning in engineering design, fabrication and prototyping. Some of the second year course topics include mechanical fabrication, electronics design and a capstone project course. Note that all students are required to register in the EED for administrative purposes, but can choose to exit with the EFC after one year.

From our point of view, the interest in these programs was high. There were nearly one-hundred applicants to the program and, in total, 35 students were admitted over two intakes (27 in the fall semester and 8 in the winter semester). The majority of the students in the program are interested in the one-year EFC option, with roughly half of these intending to transfer to SFU and the other half to UBC. There are 7 students registered for EED-specific courses this coming summer, which gives an indication of the enrolment for the second year of the program. We hope to increase this number for the fall 2017 semester, after the universities have made their admission decisions.

Going forward, we plan to continue advertising and promoting the program with industry partners and the local community. In addition, we hope to establish transfer agreements with other BC university engineering programs. For instance, we have established a guaranteed transfer agreement with the UBC Wood Products Processing program for students in the EFC program. We hope to increase the number of such agreements as a way to further attract students to our program.



# Kwantlen Polytechnic University

## Engineering Articulation Report

May 2017

### **Program Review**

The summer of 2016 was definitely a low point for KPU's Engineering transfer program. With dwindling enrolment (only 43 of 70 seats filled), and discovering that UBC was removing the "guarantee" from its Engineering Transfer agreement, members within our Dean's office were calling for the Engineering program to be cancelled after the 2016-2017 academic year. It was strangely fortunate that KPU was in the midst of conducting a program review of the Engineering program (the first program review in the 27-year history of the Engineering program), and I was able to convince our Dean to suspend the idea of cancelling the program, pending the results of the program review. After submitting the completed self-study report to the Dean, we were extremely happy to find that the Dean's report (based on data from the self-study) was supportive of continuing the Engineering program and finding ways to return the program to full enrolment levels. Also complete is the report from the external review team – we were fortunate to have LillAnne Jackson (UVIC) and Agnes d'Entremont (UBC) on the external review. We are currently developing the quality assurance plan – a strategic framework to guide KPU's engineering program into the future.

### **Enrolment**

Enrolment numbers in the KPU engineering courses continue to be in decline since the implementation of a new admissions model that eliminated the open intake option into the KPU engineering transfer program.

Table – Enrolment in KPU Fall APSC courses. Full enrolment is 70 students.

<b>Student Program</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Engineering – Limited intake	34	36	37	30
Engineering – Open intake	36	34	0*	0*
Non-engineering	0	0	1	13

\*Engineering – Open intake option discontinued.

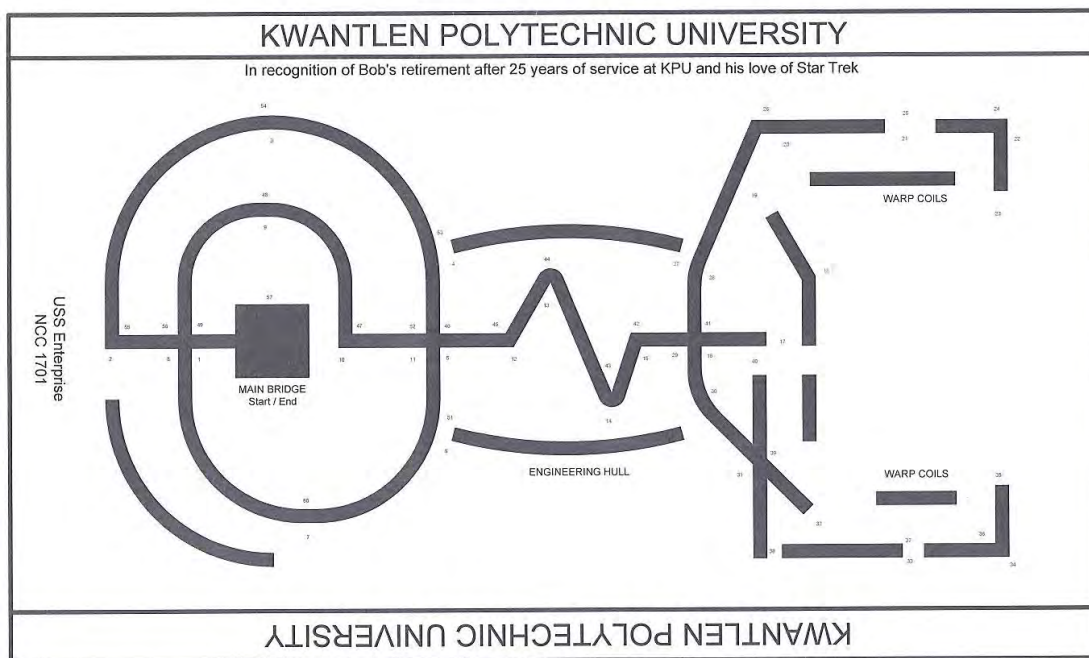
Enrolment was particularly poor in on the KPU Richmond campus this year with only 15 out of 35 seats filling. The main challenge these past couple years has been encouraging new students to attend KPU and take the engineering transfer courses without being formally admitted to the KPU engineering transfer program (previously, these students would have been admitted through the open admissions option). The Registrar's office has finally admitted that the low enrolment in engineering is a real issue and are now actively taking steps to help develop a sustainable solution. We have also been communicating with Advising and the Future Students Office to develop a comprehensive strategy on how to reverse this low enrolment trend.

## Transfer Agreements

KPU has developed a second mechanics course, PHYS 1141, that will explicitly transfer to UVIC's ENGR 141. Establishing transfer credit for ENGR 141 was the only item blocking a transfer agreement between KPU and UVIC. Having cleared this final hurdle, KPU and UVIC are in the process of establishing a formal transfer agreement that will provide guaranteed and seamless transfer for KPU engineering students into UVIC's 2<sup>nd</sup> year engineering program. It is hoped that establishing this transfer agreement will make KPU more attractive to students and help increase enrolment.

## Personnel

The Department of Physics and Engineering would like to thank our lab technician, Bob Chin, who will be retiring after 25 years of service supporting our engineering program. This year's challenge track for the APSC 1299 line-following-robot project was dedicated to Bob and his love of Star Trek.



The Dean of Science and Horticulture supports the creation of an official "Engineering program coordinator" position with time release (up to now, the KPU engineering program has been managed on a voluntary basis). I have also taken over as Chair of the Department of Physics and Engineering. However starting September 2017, I will be taking four-months parental-leave to spend with my daughter, Diana.

Michael Poon  
Chair, Department of Physics and Engineering  
Kwantlen Polytechnic University

## Engineering Articulation Report (2016-2017)

This year's Engineering Transfer Certificate program started with 54 students enrolled in September, registered from among hundreds of applicants. Of these, 12 withdrew from the program during the first semester, and another 4 were unable to complete all of the 40 credits/12 courses due to family and health issues. Of the 38 who did complete the program, 31 achieved a GPA above 2.8, and 4 more students who achieved a GPA between 2.5 and 2.8. (As per Brian's request here is also the information from last year: 30 students enrolled in September 2015, 13 of those achieved 2.8 or higher, with 4 more in the 2.5-2.8 range.) The majority of the students would like to transfer to UBC, although we had this year a student admitted into the joint UBC-UNBC Environmental Engineering program.

We have had now two intakes of our new "Applied Science for Engineering" transition diploma program. The "soft launch" of the program happened in Spring 2016, with about 20 students registered. While several (mainly international) students continue to work towards completion of the Diploma at their own pace, 5 students switched over to the 2016-2017 Engineering Transfer Certificate program and 3 of them completed it with a GPA above 3.0.

We had about 55 students register for the Fall 2017 intake for the Applied Science for Engineering Diploma. I expect about 15-20 of them to be interested (and qualify) for switching over to the Engineering Transfer Certificate program for 2017-2018.

Demand for both the Engineering Transfer and the Applied Science for Engineering is big; last year we had over 400 applicants for each program (with some overlap); this year we are again approaching those numbers.

As always at Langara, we also have a large number of students who will apply to university engineering directly from our college science programs, without having registered in the Certificate program. Some simply chose to pursue a lighter schedule, and some others were missing Certificate pre-requisites, most notably the native English speaking level of language proficiency required for the two literature courses in the Langara program.

It is hoped eventually that the "Applied Science for Engineering" program will include most of those students at the college who are in pursuit of engineering transfer, while still allowing those who wish to, to take the current Certificate format of courses. It includes new 100-level "Engineering in Society" and "Engineering Communications" courses, has instruction from a Professional Engineer, and does not include 2nd year courses.

As noted before, for the past two years both our "Engineering Graphics" and "Micro-controller Projects" courses were taught by engineers registered with APEG-BC. It is our intention to develop the content of both courses to meet any and all freshman engineering-science and engineering-design requirements of our CEAB accredited receivers. We are also working with our Physics Department to more closely align the content of our Physics courses with the curriculum recommended by the Engineering Pathways Report.

Csilla Tamás

Engineering Coordinator  
Langara College

# **Engineering Articulation Report 2017**

## **Northern Lights College**

April 24, 2017

- Prepared by Lisa Verbisky -

## **1.0 Enrolment in NLC's Engineering Certificate**

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### **1.1 Current and Historic Enrolment**

Northern Lights College (NLC) has a one year engineering certificate (Figure 1) designed for transfer to receiving institutions. It has been approximately five years since NLC has offered all the course required to complete this program due to low enrolment. At this time, there is zero enrolment in the program.

Having been a Chair for six years prior to my current position, I can remember less than ten students interested in taking the engineering certificate program with NLC. That said, this could be an iceberg effect as potential students might find out for themselves that NLC is not offering the courses within the program and therefore pursue engineering elsewhere from year one. For those students interested in pursuing engineering with NLC, we advised them to stay with us for a maximum of one semester knowing that NLC could provide only three courses that would seamlessly transfer to most engineering degrees.

### **1.2 Transfer Students**

Typically, students interested in NLC's engineering program are international students coming to us through the high school and they are interested in transferring to UBC or the University of Alberta. In general, students interested in a career in engineering and taking courses with NLC are doing so because they have not achieved the necessary marks in high school to be accepted into their institution of choice. NLC does not have formal data on where these students transfer.

## **2.0 New Initiatives**

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### **2.1 Background Information**

Below is some information that is likely relevant to the success of an engineering certificate at a small community college.

- A survey done by NLC of the north east region high schools indicates that engineering is the most common career of choice.
- Although NLC has a strong dual credit program with the high school and the students in dual credit programming tend to be high achievers intending to continue their post-

secondary education, it appears that the majority of dual credit students take one or two dual credit courses with NLC and then transfer to more southern regions to begin their first full year of programming. Few students with the academic standing required to get into an engineering degree program remain with NLC after high school graduation.

- Due to low enrolment across the sciences, it has been approximately five years since NLC has been able to offer introductory chemistries, physics, and computer programming; the majority of the core courses in the engineering certificate.

## **2.2 New Initiatives**

There have been recent discussions with local School District partners and a local engineer, Gary Remenyk, to revitalize an engineering certificate in the Peace Region. Building on the strong dual credit partnership, the School Districts are committed to promoting an engineering program that could start as early as the first semester of grade 12. By identifying keen students early and providing advice around course planning, students can begin taking dual credit courses for which the pre-requisites have been met in the first semester of grade 12, such as academic writing or calculus, and that would count toward the NLC engineering certificate.

Main concerns identified around such programming are listed below:

- NLC would need to have at least ten full time engineering students on each of our main campuses to feasibly run the courses making up an engineering program. If NLC does not have students now, what needs to change to see a cohort of ten students in the near future?
- If NLC and the School Districts create such a dual credit partnerships, will the fact that students have a lighter load in the first year of engineering at NLC negatively impact their chances of gaining entrance to the second year at a receiving institution?
- Is it possible to guarantee seats to those students transferring to a receiving institution for their second year of engineering?

Figure 1: NLC's Engineering Certificate Completion Guide

## NLC Engineering Certificate Planning Worksheet\*

Course Name		Description		Grade Or Enrolled
<b><u>ONE OF:</u></b>	<b>ENGL 100</b>	<i>Academic Writing</i>		
	<b>ENGL 110</b>	<i>Introduction to Workplace Communications</i>		
<b><u>ONE OF:</u></b>	<b>ENGL 100</b>	<i>Academic Writing</i>		
	<b>ENGL 105</b>	<i>Non-Fictional Prose</i>		
	<b>ENGL 110</b>	<i>Introduction to Workplace Communications</i>		
	<b>ENGL 111</b>	<i>Poetry and Drama</i>		
	<b>ENGL 112</b>	<i>Fiction</i>		
<b>CHEM 103</b>		<i>Fundamentals of Chemistry I</i>		
<b>CHEM 104</b>		<i>Fundamentals of Chemistry II</i>		
<b>PHYS 103</b>		<i>Mechanics (Calculus)</i>		
<b>PHYS 104</b>		<i>Electromagnetism and Waves (Calculus)</i>		
<b>MATH 101</b>		<i>Calculus I</i>		
<b>MATH 102</b>		<i>Calculus II</i>		
<b>MATH 152</b>		<i>Introduction to Linear Algebra</i>		
<b>CPSC 122</b>		<i>Introduction to Object Oriented Programming C++</i>		

# NIC Engineering Articulation Notes 2017

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Our big news is that we will have an “Engineering Foundations” certificate starting this fall. It is a 34 credit certificate consisting of 11 courses. For students transferring to UVic, the 11 courses are the same as we have been using for transfer for the past few years, and for students transferring to UBC, they would take their complementary studies elective instead of our technical writing course, and they would take PHY 170 (statics and dynamics) instead of PHY 141 (statics). We are hopeful that our students would also be able to transfer a full year of credit to SFU or UNBC, but we have not confirmed this yet.

The program requirements, completion requirements, and admission requirements for the Engineering Foundations certificate, as passed by Education Council, are shown on the following page.

Based on Matrix Algebra for Engineers (our only engineering-specific course in the fall), we started with about 25 students on three campuses. By the end of the winter term, our Engineering Mechanics course had only 13 students. Most of the attrition occurs in the first half of the fall term.

Last fall we offered Matrix Algebra for Engineers (MAT 133) as either face-to-face or online distance, and in the winter we offered Engineering Mechanics I (PHY 141) as either face-to-face or online distance. We had students complete the matrix algebra course online, but have not had any online students for engineering mechanics yet. Both courses will be offered in both formats again next year, and we would encourage any of the colleges who do not teach these courses to send their students our way to take the online-distance course (shameless plug).

## Engineering Foundations Certificate

### Program Requirements

- CPS 100 Computer Programming I
- CPS 101 Computer Programming II or CHE 152 Engineering Chemistry<sup>1,2,3</sup>
- ENG 115 Essay Writing and Critical Analysis
- ENR 110 Introduction to Engineering Design
- MAT 133 Matrix Algebra
- MAT 181 Calculus I
- MAT 182 Calculus II
- PHY 120 Principles of Physics I
- PHY 121 Principles of Physics II
- PHY 141 Engineering Mechanics I: Statics or PHY 170 Engineering Mechanics I: Statics and Dynamics<sup>2,3,4</sup>
- ENG 160 Effective Organizational Writing or University Transfer Elective<sup>2,3,4</sup>

#### Notes:

1. CHE 110 and CHE 111 may be taken in place of CHE 152.

2. Students transferring to UVic for software engineering should take CPS 100, CPS 101, ENG 115, ENG 160, ENR 110, MAT 133, MAT 181, MAT 182, PHY 120, PHY 121, and PHY 141. They may also take CHE 152, but this would normally be taken in second year at UVic.

3. Students transferring into all other engineering disciplines at UVic should take CHE 152, CPS 100, ENG 110, ENG 160, ENR 110, MAT 133, MAT 181, MAT 182, PHY 120, PHY 121, and PHY 141. They may also take CPS 101, but this would normally be taken in second year at UVic.

4. Students transferring to UBC should take CHE 152, CPS 100, ENG 115, ENR 110, MAT 133, MAT 181, MAT 182, PHY 120, PHY 121, PHY 170, and a complimentary studies elective (see UBC calendar and the BC Transfer Guide for options).

### Completion Requirements

Average Grade of C+ or better

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### Admission Requirements

- Grade 12 graduation or provincial equivalent
- C+ in Physics 12 or PHY 060
- C+ in Chemistry 12 or CHE 060
- B in Pre-Calculus 12 or MAT 060
- C+ in English 12 or First Peoples English 12, or one of ENG 060, ENG 096, ENG 098, or ESL 090

## Okanagan College – May 4, 2017 Engineering Articulation Report

Okanagan College has six technology programs (Civil Engineering Technology - CIEN, Sustainable Construction Management Technology – SCMT, Electronics Engineering Technology - ELEN, Mechanical Engineering Technology - MECH, Network Telecom Engineering Technology - NTEN, Water Engineering Technology - WET) and one computer technology program (Computer Information Systems with both a Diploma (CIS) and a Degree(BCIS)). The caps are 40 in CIEN, 24 in SCMT, 40 in ELEN, 40 in MECH, 36 in NTEN, and 40 in WET. There is no specific cap in CIS/BCIS which can handle about 60+ students in first year. Enrolment is strong in CIEN, MECH, and WET with a substantial waitlists and NTEN is full with a small waitlist as well. ELEN was full but not at the levels indicated above because of an error in timetabling and registration. The numbers were only about half (24). SCMT is a two-year program with in-takes every second year. The first enrolment was not full but had a very good start with 16 students. Twelve students are now completing their final year. The next in-take will be this year and applications for SCMT are good with 20+ expected and may even perhaps be full with 24 students. Applications for next year for the other Technology programs are all strong with waitlists in all programs expected again. We have about 20 – 30 students in third-year and fourth-year courses in the BCIS program (alternate year delivery for their courses at third and fourth years).

Okanagan College does not have an Engineering transfer program any longer (since 1992). Therefore, our Engineering-bound students take a modified first-year science load and as a result are very hard for us to track. I believe we had 11 Engineering-bound students at our Penticton campus, about 10 students at the Vernon campus, 5 students at our Salmon Arm campus, and about 12-18 students at Kelowna. We offered PHYS 202 (Engineering Statics and Dynamics) again last winter semester at Kelowna for the Engineering students. We had 5 students.

Our Science numbers overall were up significantly this year (+11.4%). Science at Kelowna (+14.1%), Penticton (+16.7%), and Salmon Arm (+45.5%) were up. Vernon (-6.82%) was down. Kelowna represents 65% of our Science students, Vernon 18%, Penticton 9%, and Salmon Arm 7%.

The numbers in Physics at Kelowna this year were up for the calculus-stream (+41.7%) and up (+5.66%) for the algebra-based (up +16.9% overall for first-year physics in Kelowna). Our Physics numbers in Penticton were up for the calculus-stream (+120%) but down (-40.0%) for the algebra-based (-8% overall for first-year physics in Penticton). Our Physics numbers in Vernon were up for the calculus-stream (+40%) but down (-26.7%) for the algebra-based (flat, 0%, overall for first-year physics in Vernon). Our Physics numbers in Salmon Arm were up for the calculus-stream (+66.7%) but flat (0%) for the algebra-based (+22.2% overall for first-year physics in Salmon Arm).

Applications in Science for next year are up slightly overall (+4.88%) with substantial growth in Vernon (+46.8%), slight growth in Penticton (+3.57%), a slight drop in Kelowna (-3.11%), and a fairly significant drop at Salmon Arm (-15.8%).

Attrition in first-year Physics was not a major problem this year, although most of the attrition still occurs in the first semester.

This year we offered three second-year Physics courses. They were Modern Physics (OC PHYS 200) with 4 students, Thermodynamics (OC PHYS 215) with 15 students, and Statics and Dynamics (OC PHYS 202) with 5 students. OC PHYS 215 part of the Engineering Bridges for both the ELEN and CIEN programs into UBC-O Engineering. We had 11 bridge students last year in Thermodynamics from the ELEN Bridge (4) and from the CIEN Bridge (7). This year we have 13 qualified students applying so far for the CIEN and ELEN Engineering bridges (same as last year).

We have one faculty member leaving this year which means we are looking for a Full-time Continuing faculty member for Vernon and a half-time term faculty at Kelowna. We are looking for applicants with strong teaching skills who would enjoy teaching both lectures and laboratories.

Yours sincerely, Richard Christie.

# File Note Memo

**To:** Brian Dick  
**From:** Elroy Switliffhoff, P.Eng., Engineering Instructor, Selkirk College  
**Date:** 14 April 2017  
**Subject:** Annual Report and Issues List from Selkirk College for Engineering Articulation Meeting

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## 1. Introduction

Selkirk College one-year engineering bridge program had record enrollment in 2016-2017 with 26 “core” students and another 3 students taking program components. It looks like there will be 22 students moving on, having successfully completed the program. 2017-2018 applications are strong, with 20 accepted and 20 more waiting on high school and other transcripts to meet entry pre-requisites.

## 2. Annual Summary

The highlights of the 2016-2017 academic year are:

1. Record enrollments
2. Program Advisory committee (PAC) up and running
3. Set up “bulk –buy” student enrollment with APEGBC
4. Reinforced working relationship with local APEGBC branch
5. Outreach to regional high schools

The PAC was established with representatives from local industry, UBCO and recent grads. The PAC is keen on shaping program content within the guidelines contained Engineering Pathways report. The PAC is very supportive of receiving institutions adopting the first year curriculum described in the Engineering Pathways report.

Working with Andrea Michaud of APEGBC, Selkirk successfully implemented a “bulk-buy” student enrollment in APEGBC, which gives students access to scholarships, mentors, and discounted participation in APEGBC events.

As with prior years, there is continued good participation and visibility with the West Kootenay Branch of the APEGBC. Some students have been participating in Branch field trips, and the Branch members have been helpful in presenting seminars in their respective fields of practice.

Selkirk has increased the number of high-school workshop days. These workshop days host one or two regional high schools' Grade 10, 11, and 12 students to come in, and engage a small course in the various programs Selkirk offers. I run a 2-hour workshop the focusses on engineering and geoscience as a career choice, a short blurb on how Selkirk can help achieve that goal, and conclude with 45 minute AutoCAD exercise. I believe this is a key reason for increased first year enrollments.

Selkirk College is continuing to offer a formal Co-op course in Engineering after the first year program. Local employer uptake has been very successful with student placements Zellstoff Celgar, and local consulting firms. The co-op program has been running for 12 years, and several employers have gone on to offer permanent positions to past co-op students upon graduation.

The Engineering Graphics course (ApSc 100) was using AutoCAD 2016. AutoCAD 2016 is overkill for the content of ApSc 100, but the PAC is adamant that the students should continue to have some curriculum in first year delivered using AutoCAD because it makes them much more useful during the co-op terms.

### **3. Issues**

- Selkirk College's "Introduction to Engineering" course (ApSc 120) does not have BCCAT transferability to similar courses at UBC, UVic, UBCO at UNBC. We're looking to the Engineering Pathways project to revise curriculum, and create BCCAT transferability.

Past Selkirk College students have found it frustrating to be mandated to repeat a very similar course to Selkirk College's "Introduction to Engineering" course (ApSc 120) during the second year at their destination institutions. There does not appear to be any "content" hurdle.

- Selkirk College has a formal "block transfer" program with UBC and UBCO that allows first year students entry into second year engineering programs at both institutions without having to have a course-by-course matching articulation. Selkirk is eager to advance the recommendations contained in the Phase 1 Engineering Pathways report.

## **Pre-Engineering at Trinity Western University**

Report for the BC Articulation Committee Meeting  
May 2017

Coordinators:

- Dr. Arnold E. Sikkema, Professor of Physics & Chair, Mathematical Sciences Department
- Dr. Herbert H. Tsang, P.Eng., Professor of Computing Science & Mathematics

Our engineering transfer options are administered by the above members of TWU's Department of Mathematical Sciences. At TWU we offer B.Sc. majors, concentrations, and minors in Mathematics, Mathematics with Computing Science, Computing Science, as well as a concentration and minor in Physics.

We provided our pre-engineering students with suggested schedule options and the competitive nature of the transfer. The options for our students are:

- take a pre-engineering year of some science courses (calculus, physics, chemistry) plus English and humanities electives and apply into another university's engineering program.
- prepare for admission into the second year of an engineering program by spending one or two years at TWU, by adding linear algebra, computing science, physical chemistry (thermodynamics), statics & dynamics at UFV or Langara, and engineering graphics at UFV or Kwantlen. Additional course options, particularly for a second year at TWU, include multivariable calculus, differential equations, mechanics, economics (macro & micro), statistics, technology & society. The two-year stay at TWU allows for more of these courses and/or valuable liberal arts courses while also reducing the second-year load in engineering itself.

Our information is posted at <http://www.twu.ca/academics/faculty-natural-applied-sciences/pre-engineering> .

In 2016, we had at least five successful transfers to UBC-O, University of Alberta, and SFU. Over the course of 2016-17, we had about 10 first-year students express an interest in engineering transfer. By the end of the year:

- of the first-year students:
  - about half are transferring to another institutions' engineering program.
  - a quarter dropped out of TWU entirely (largely due to failures in calculus and/or physics; some for lack of effort, some due to poor high school preparation, including a lack of awareness that engineering is challenging).
  - a quarter switched to a TWU major (for reasons of interest or ability).
- of the second-year students:
  - several are planning to go to other receiving institutions. They have good grades and we trust that they will do well.

## **TRU Engineering Transfer Program Articulation Report Spring 2017**

### **Engineering Transfer program – Year 1**

- Intake: 60 students
- Number of Applicants: 177
- Entrance requirements: PHYS 12, MATH 12, CHEM 11, ENGL 12, all with a minimum of a B (~73%).
- Full transfer to UBC-Vancouver and UVic.
- The vast majority of our students transfer to either UBC (Vancouver or Kelowna) or UVic.

### **Engineering Transfer program - Year 2**

- First cohort of 6 out of 8 students from 2015-2016 academic year are now transferred into third year at UVic.
- New courses that were offered for the first time: EPHY 2200 - Electrical Properties of Materials, EPHY 2950 - Engineering Fundamentals, EPHY 3600 - Continuous-Time Signals and Systems, EPHY 2990 - Introduction to ECE Design.
- At the moment students must have completed their first year at TRU to be eligible for admission to our second year. We are also considering partial or full completion of first year engineering transfer courses at any other institution to join 2<sup>nd</sup> year.
- 8 students this year.
- Appointed a new COOP coordinator for the engineering students.

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## **Engineering Articulation Report from the University of the Fraser Valley - 2017**

### **Enrollments and Related Issues**

UFV continues to have about 50 students in our first semester “Introduction to Engineering” course, and we completely fill our second semester “Statics and Dynamics” at 36. Our “Engineering Graphics” course is offered twice per year with a total enrollment of about 50, but that number includes students interested in our Mechatronics program.

The number of formal positions continues to be restricted to 24 and we admit that many, but we continue to see many “no-shows” at the enrollment date. As a result the official program has not filled for several years. Between non-enrollments in June and no-shows in September we may easily be down ten or more students.

Our number of high-school applicants remains high (we typically accept only 80 applicants for the program, and we get that number within three months of the program being opened for admissions), and our plan now is to try and get more of the students we accept to actually show up for the September courses.

UFV will be implementing a competitive entry system. For purely bureaucratic reasons we missed the deadline to have this implemented for the September 2017 intake, but the changes were approved in mid-April for the future. The new system is a gamble: will we get more dedicated students, or will we be offering more of our seats to students who are also applying to and will be accepted at other institutions? The prime motivation for the change was driven by our Office of the Registrar to streamline their operations, their reassurances that it will help our numbers is yet to be proven.

I expect we will have between about a dozen or slightly more students who will meet the ETP requirements, and about one third will choose Uvic and two thirds will choose UBC. Between students transferring after one year but missing a course or two, or students who spent two years at UFV before they tried to transfer, I suspect an additional two to three dozen are interested in going to one of the other schools. The numbers I have are only approximate - final exam grades are not yet posted and we have no tracking codes for non-ETP students.

### **Other Matters**

The biggest news in the program is moving from the “first come-first served” model to competitive entry.

Our Mechatronics diploma is still running, but there are issues with enrollments. Our budgeting assumes half of the students would be International, but the foreign students are not showing up in the expected numbers. We have enough domestic students to fill the majority of the spaces, but that is not long-term sustainable.

Peter Mulhern

**Vancouver Community College Report  
ENGINEERING ARTICULATION MEETING  
held at UVIC, May 4, 2017  
prepared by Costa Karavas (ckaravas@vcc.ca)**

Vancouver Community College offers a First-Year University Transfer Engineering program. Students gain transfer credits towards the second year of SFU Engineering science degree programs via assured or competitive admission. Also, transfer to the second year UBC Engineering program by competitive admission.

The program was launched in 2015 and 58 students have registered to date. Students can start during any semester and all credits must be obtained within sixteen months from the start of their first semester. In addition, for at least two of the semesters at VCC, students would need to meet a minimum course load of 12 credits, and an overall average GPA of 2.75. We anticipate first-year graduates by the end of the summer 2017 semester.

MATLAB software is gradually incorporated into MATH 1221-Applied Linear Algebra. MATH 1200-Calculus II emphasizes applications to electrical circuits. SCIE 1151-Engineering Graphics and Design (SolidWorks) is being offered for the first time during the summer 2017 semester.

Students can access MATLAB software via the internet through virtualization licenses.

**Vancouver Island University**  
report to the  
**Engineering Articulation Meeting (04-May/17)**

1. 2016/17 is the third year of the Fundamentals of Engineering Certificate and demand for the 42 domestic seats continues to be relatively strong although down from prior years:

- Applications received: 95 (in 2017) vs 119 (in 2016)

Of these,

- Completed files: 58 (in 2017) vs 76 (in 2016)
- GPA cut-off for incoming students: 3.36 (in 2017) vs 3.58 (in 2016)

2. UBC Faculty of Forestry, Bachelor of Science in Wood Products Processing transfer path agreement in place (effective for students starting in 2017/18). Requires students complete the Fundamentals of Engineering certificate with some course exceptions: 2nd term Chemistry instead of Engineering Mechanics and 2nd year Economics instead of 2nd term Physics.

The Fundamentals of Engineering certificate now has signed agreements for transfer to SFU-B, UBC-V (Engineering, Forestry), and UVic. The curriculum also provides the majority of the courses required for SFU-S, UNBC, and UBC-O, and discussions continue to align outcomes further.

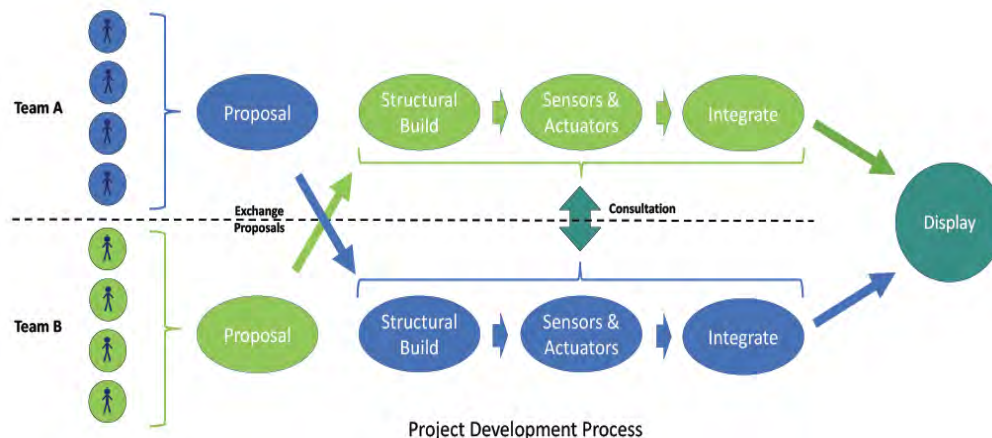
<b>FALL</b>	<b>SPRING</b>	
CHEM 150	ENGL 204	
CSCI 160	ENGR 121	
ENGL 115	MATH 101	
ENGR 112	MATH 141	
MATH 100	PHYS 122	All, but UBC-V (Forestry)
PHYS 121	ENGM 141	UBC-V (Engineering), UVic
	CHEM 142	UBC-V (Forestry)
	ENGR 110	SFU-B
	ECON 211	UBC-V (Forestry)

**VIU First-Year Curriculum Mapping**

3. Attrition between Fall and Spring terms was consistent with last year at around 30%. Using the design course as a proxy for enrolment, 60 students (up from 53 in 2015) were registered in the program as of mid-September (including Certificate students and transfer path students) while 45 were enrolled mid-March (up from 39 in 2016).
4. Ties between the first-year Engineering class and APEGBC (Vancouver Island Branch) continues. Students have participated in four chapter dinners and events, and APEGBC members have given a number of seminars to the students over the year as well as partially sponsored their capstone design competition.

Starting 2017/18, all students within the Fundamentals of Engineering certificate will be eligible for APEGBC student membership under a bulk-buy agreement. VIU will cover the cost of this membership for one year with students able to renew their membership after that point.

5. Six seminars were offered to students on engineering disciplines and topical areas (international development, career development, project management etc...) Taymez Raspin APEGBC gave a seminar on Engineering Ethics, UVic presented on their programs, and UBC provided links to a series of Youtube videos highlighting their offerings.
6. The capstone presentation of the 2<sup>nd</sup> term Engineering Design course (ENGR 121) continues to have a strong, positive response from both students and the public.
  - On-line voting at the competition (250 unique hits)
  - Student leadership award (voted on by the first-year cohort)
  - VIU Engineering lapel pins for the engineering cohort
  - 3D Printer lab used extensively (4 MakerBot printers now on-line)
  - Big change: Proposal swapping (see below)



VIU has three lab sections of students (approximately 16 students or 4 student teams in each). Two lab sections swapped design proposals, while the third swapped proposals with student teams in Tra Vinh University (Vietnam).

This event was sponsored by Herold Engineering (a local engineering firm), and APEGBC.

7. Similar to last year, we brought 20 students to visit the UVic campus as well as the Kinsol Trestle bridge near Shawnigan Lake on Vancouver Island. A further 12 students were brought for a tour of the UBC Vancouver campus as well as the TRIUMF lab.
8. Resourcing continues to be an issue in terms of personnel as the Fundamentals of Engineering program continues to have no technician support and only a half-course release for student advising and administering program activities.

During the past year, changes were made to the courses required for external transfer to SFU's Engineering Science and Mechatronic Systems Engineering programs. This was done in order to ensure students have sufficient preparation to enter the programs and have the prerequisites necessary to progress. Transfer students must now complete the following courses (in addition to the general SFU admission requirements):

### **Engineering Science Transfer Requirements**

A minimum of 24 units of transferable coursework including: at least one mathematics course chosen from: MATH 152, MATH 232 (or 240); at least one computing course chosen from: CMPT 128 (or 135; or (125 and 127)), and 225; at least one physics course chose from: PHYS 121 (or 141), PHYS 221, and PHYS 321.

### **Mechatronic Systems Engineering Requirements**

A minimum of 24 units of transferable coursework including: at least one mathematics course chosen from Math 152 and 232 (or 240); at least one computing course chosen from CMPT 130, 135 (or 128; or (125 and 127)) and 225; at least one physics course chosen from PHYS 140 (or 120) and 141 (or 121).

### **Enrolment Numbers:**

BC College and University transfers to SFU Engineering programs (ENSC + MSE):

TRANSFER INSTITUTION	2015/16
Alexander College	6
British Columbia Institute of Technology	3
Capilano University	1
College of New Caledonia	2
Columbia College	7
Coquitlam College	6
Douglas College	6
Fraser International College	70
Kwantlen Polytechnic University	11
Langara College	9
Thompson Rivers University	1
University of British Columbia Okanagan	2
University of Fraser Valley	6
University of Northern British Columbia	1
Vancouver Community College	1
Grand Total	132

Applicant/Registrant Numbers (All Bases of Admission - MSE/ENSC):

<b>Year</b>	<b>Applied</b>	<b>Registered</b>
2015-2016	1979	388
2016-2017	2095	349
<b>Grand Total</b>	<b>4074</b>	<b>737</b>

**Average GPA at 30 units for Secondary Admits (non-transfer students) to MSE/ENSC between 2009/10-2015/16 = 2.87**

**Average GPA at 60 units for Secondary Admits (non-transfer students) to MES/ENSC between 2009/10-2014/15 = 2.87** (grade data not yet available at 60 units for students entering 2015/16)

**Average GPA at 30 units for BCCOL/UNTR students to MSE/ENSC between 2009/10-2015/16 = 2.82**

**Average GPA at 60 units for BCCOL/UNTR students to MSE/ENSC between 2009/10-2014/15 = 2.84** (grade data not yet available at 60 units for students entering 2015/16)

## UBCO Transfer Report May 2017

UBCO continues to guarantee program of choice to its students. All students admitted to Applied Science on the Okanagan campus will get into their desired program of study and can switch at any point in their degree.

New for 2016W was the Computer Science Minor which is composed of 30 credits but can be completed in as few as 21 additional credits depending on the student's year level and program.

New for 2017W is the Management Minor which is composed of 21 credits but can be completed in as few as 18 additional credits depending on the students program.

Enrolment and Success of second year transfer students in 2016W:

	<b>Sending Institute</b>	<b>Number of Students Received</b>	<b>Average GPA (Term 1)</b>	<b>Average # of Courses (6 is full load)</b>
<b>UBC Okanagan Transfer Program</b>	TRU	4	76.0	5.8
	SELK	2	73.9	6
	CNC	3	74.8	6
	LANG	1	66.0	6
	VIU	1	65.2	6
	KWAN	2	70.8	5.5
	CAP	1	78.5	6
	UFV	3	83.3	5.3
<b>Other Transfers</b>	OKCO	4	79.6	5.5
	DOUG	1	93.8	4
	TWU	3	77.8	5
	OTHER	10	77.2	4.9
<b>Total</b>		<b>35</b>		

We continue to look for opportunities to strengthen transfer pathways and made visits to COTR, CNC, SELK, TRU, and TWU over the past year. If you are interested or think your students would benefit from more information about UBCO we are happy to accommodate.

UBCO will be hosting the first annual Graduate Attribute West Symposium on June 19<sup>th</sup>. Anyone interested in attending please connect with Megan Lochhead at [megan.lochhead@ubc.ca](mailto:megan.lochhead@ubc.ca). Feel free to extend this invite on to any colleagues who work in this area.

## BCCAT Engineering Articulation Meeting – May 4, 2017

### UBC-Vancouver Receiving Institution Report

#### Part 1: Facts and Figures

1. Total number of students enrolled in direct entry 1<sup>st</sup> year program: 715 (2016W - 516 domestic, 199 international)
2. Total number of applications received for first year direct entry: 6620 (2017W – 2966 domestic, 3654 international)
3. Total number of students admitted to year 2: 224 (2016W – 100 via an engineering transfer program agreement, 124 from other sources)
4. Engineering transfer students were received from the following institutions with the following distribution: (CAP – 30; CNC – 5; KWAN – 9; LANG – 11; SELK – 6; TRU – 19; UFV – 8; VIU – 12)
5. Total number of applications received for year 2 entry/transfer: 654 (2017W)

#### Part 2: News and Initiatives

1. **Admission GPA.** In the fall of 2016 UBC Vancouver made a commitment to continue to honour the transfer agreement at a GPA of 2.8 for transfer to UBCV in 2017 and 2018. The goal was to allow colleges to continue to be able to confirm the agreement for students commencing engineering transfer programs in the fall of 2017. Sending institutions should now be aware that this admission guarantee GPA may be subject to change effective for the 2017/18 recruiting cycle (i.e. for admission to UBC 2<sup>nd</sup> year programs commencing in the fall of 2019).
2. **Engineering Expansion.** The recent announcement of additional funded seats for engineering programs is an exciting opportunity for the engineering transfer programs. A detailed budget letter has not yet been received from the Ministry, but we do expect additional seats at UBC to be phased in beginning next year. Our intent is to promote the transfer program network as a desirable way to enhance engineering education opportunities across the province at the first year level. This would open opportunities for the development and/or formalization of additional transfer agreements. The UBC first year program will also grow to accommodate some of the new seats, but the majority of our growth will occur at years 2 and above.
3. **New Initiatives.** The new Biomedical Engineering Program has been approved by UBC Board and Senate, but has yet to receive Ministry approval. We hope to receive approval in the 2017/18 academic year with sufficient notice to be able to offer a 'bridging' opportunity such that incoming 1st year students could move into the 2<sup>nd</sup> year of the program admit students to the program in year 2. Note that this program has a modified 1<sup>st</sup> year timetable and some courses scheduled in the summer between years 1 and 2. A School of Biomedical Engineering has been proposed as a joint initiative between the Faculties of Applied Science and Medicine – it is currently being reviewed by the Senate Policy Committee.

Other programs being developed (each in varying stages of curriculum development) are: Environmental Engineering, Software Engineering (joint with Computer Science), Mathematical and Computational Engineering (joint with Mathematics), and Design and Manufacturing Engineering (joint with UBCO).

## UNBC Environmental Engineering Articulation Report 2016/17

As always, this past academic year has been both interesting and challenging. The program accepted over 54 students into first and second year at UNBC for Fall 2017. We are expecting 44 students to transit UBC this Fall. They will complete their third and fourth years there, taking mostly courses in Civil and Chemical/Biological Engineering. This year we have 32 students transferring back to UNBC to complete their degrees in the Fall 2017 term. We had our largest graduation class ever in 2016 (34 students) and anticipate we will have another 29 students graduating at the end of May 2017. The joint degree program between UNBC and UBC is finally reaching its steady-state with 40+ students transiting to the third year Environmental Engineering program at UBC and somewhere in the mid-30s returning for their final semester back at UNBC. It has taken a decade to get to this point but we are well on our way to servicing the industrial demands in rural British Columbia as many of our students are finding employment in the north.

This past year, we again hosted an accreditation visit by a CEAB Team. This was a short cycle due to issues raised during the 2014 accreditation process. While the CEAB has tried to cut down the size and extent of the documentation needed for accreditation, it is still several binders' worth of material and a significant amount of time and energy was put into preparing the report. Further, in an effort to streamline some of the process, they have restricted the answers to some of the questions to 12 lines – which is deeply problematic when trying to discuss two institutions. That said the visit appears to have been successful although we will not have the final letter until after the Accreditation Board meets.

The CEAB remains very interested in “Graduate Attributes”. Programs are required to have data on the attributes from first to final year. While we have worked out the intricacies of collecting data at both UNBC and UBC and from several departments, it does remain an issue with students transferring to the program from the Colleges. It was not raised in a formal sense but there are concerns about the extent to which Professional Engineers are engaged in education at sending institutions.

In response to the 2014 CEAB Team visit, the first two years of Environmental Engineering have undergone significant modification to include Design courses in both the first and second years (ENGR 117 & 217). We have also modified the Engineering Tools courses (ENGR 151 & 152), added a technical writing course (ENGR 110), an Engineering Chemistry course (ENGR 220), and removed the required organic and physical chemistry courses (CHEM 200 & 220). The result is the first two years are now:

First Term UNBC	Second Term UNBC	Third Term UNBC	Fourth Term UNBC
CHEM 100/120-4	CHEM 101/121-4	MATH 200-3	MATH 230-3
MATH 100-3	MATH 101-3	MATH 220-3	BIOL 110-3
PHYS 110-4	PHYS 111-4	STAT 371-3	ENSC 201-3
<b>ENGR 117-3</b>	CPSC 110-3	GEOG 210-3	<b>ENGR 217-3</b>
<b>ENGR 151-1</b>	<b>ENGR 110-3</b>	<b>ENGR 210-3</b>	<b>ENGR 350-3</b>
Elective	<b>ENGR 152-1</b>	<b>ENGR 220-3</b>	<b>ENGR 451-3</b>

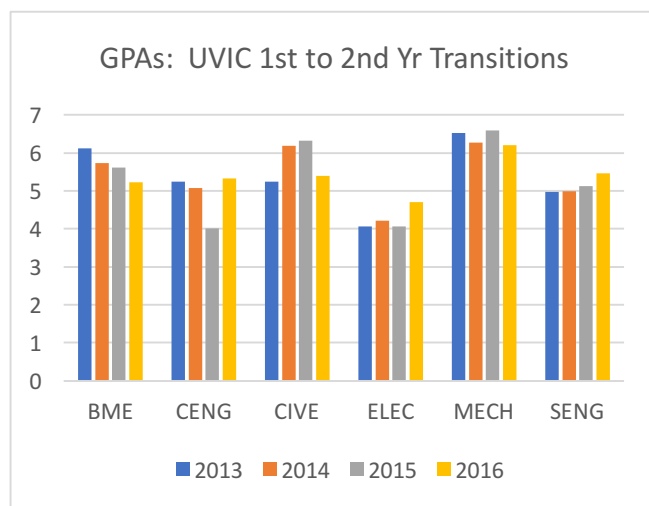
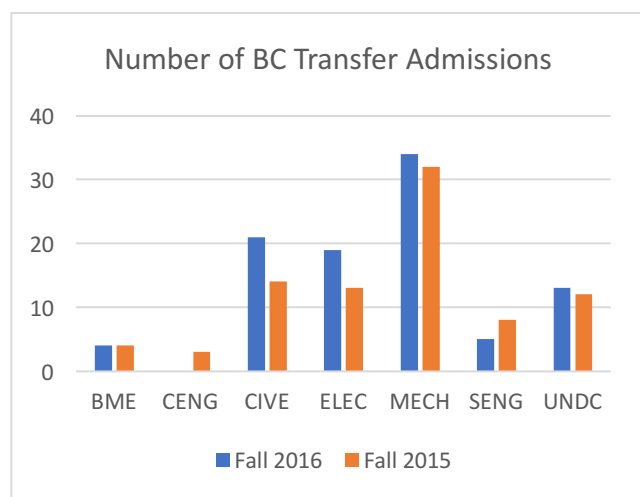
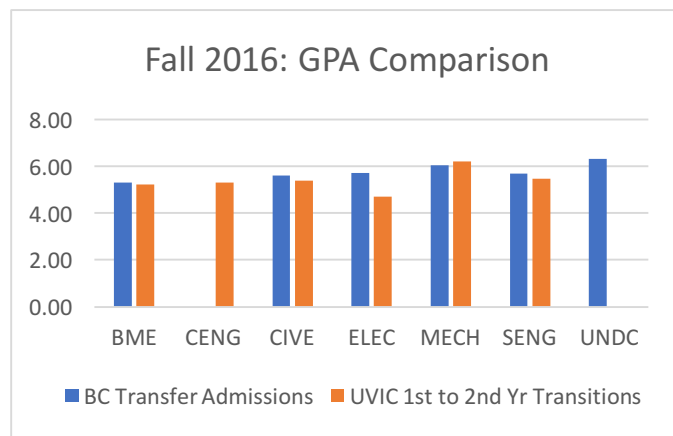
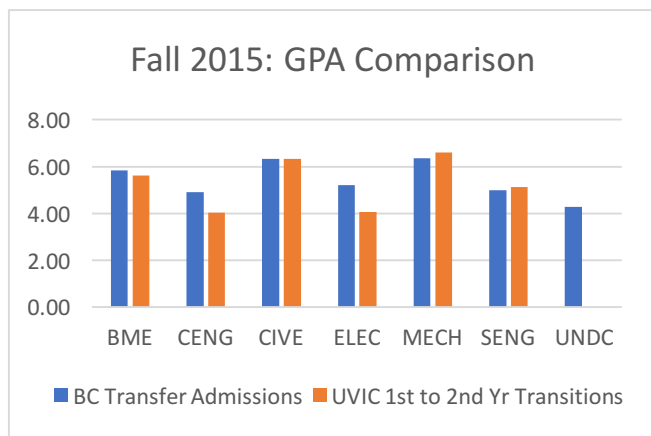
This new structure does have implications for students transferring into the program from other institutions but it is now more closely aligned, in first year, with the UBC Engineering curriculum as their APSC 100 and APSC 101 are reflected in the ENGR 110/117/151/152 courses. Further, we have adopted the designation ENGR to identify Engineering specific courses at UNBC. We will be renaming our fifth year course offerings in 2019 to accommodate the students transiting back from UBC.

BCCAT Engineering Articulation Meeting – May 4, 2017  
University of Victoria  
Receiving Institution Report

Data from the September 2016 Admissions:

- 406 Regular BEng/BSEng Admissions to 1<sup>st</sup> year
- 96 Transfer Admissions from BC Institutions (Alexander 1, Camosun 37, CNC 2, Columbia 1, COTR 3, Douglas 1, Kwantlen 6, Langara 3, NIC 4, Selkirk 1, SFU 3, TRU 7, UVBC-o 3, UFV 16, VIU 8)
- 67 Internal (UVic) Transfer Admissions
- 11 Transfer Admissions from other Institutions

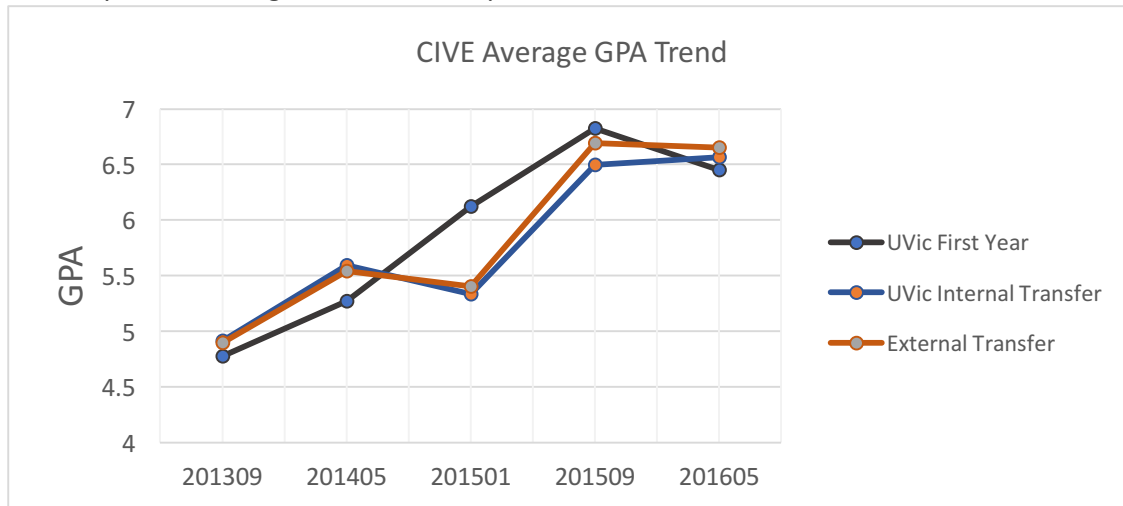
Some GPA Comparisons between BC Transfer Admissions and UVIC Regular:  
(Using UVIC's 0-9 GPAs)



BC Transfer Admissions:.. Uses student GPAs on admission..

UVIC 1<sup>st</sup> to 2<sup>nd</sup> Yr Transitions:.. Uses student 1<sup>st</sup> yr (end) GPA , before 2<sup>nd</sup> yr declaration.

One Data point on Long Term GPA Comparison:



Term (2A, 2B, 3A, 3B, 4A) GPAs of UVic's first Civil Engineering Class.

#### Accreditation News: In 2016

- UVIC received accreditation results for our new Biomedical Engineering program: 3 years, the maximum for a new program.
- UVIC received accreditation results for our Computer, Electrical, Mechanical and Software Engineering programs: 6 years.
- UVIC completed accreditation documents for our new Civil Engineering program. The site visit was completed in February 2017 and we await results.

## **University of Alberta Faculty of Engineering**

Report for the BC Articulation Committee Meeting

May 4, 2017

### **Contacts:**

Dr. Tim Joseph, Associate Dean Co-op and Student Services

Torrey Dance, Strategic Advisor to the Associate Dean Co-op and Student Services

The Faculty of Engineering at the University of Alberta is home to approximately 4600 undergraduate students and offers 35 different Engineering programs in various disciplines and routes (traditional or co-op), as well as with various options (i.e. Biomedical, Nanotechnology, Environmental, etc.). The first year class is composed of roughly 1050 students, and students “qualify” for second year disciplines depending on how well they do in the first year.

The Faculty of Engineering participates in the Alberta Council on Admissions and Transfer (ACAT) and accepts students from transfer programs around the province including:

- Macewan University (Edmonton, AB)
- Red Deer College (Red Deer, AB)
- Grande Prairie Regional College (Grande Prairie, AB)
- Medicine Hat College (Medicine Hat, AB)
- Keyano College (Fort McMurray, AB)
- Lethbridge University (Lethbridge, AB)

The standard first year course load offered at both the University of Alberta and at the transfer colleges is 37.5 units of graded engineering coursework. In order to successfully transfer from these programs, students must achieve a 2.5 GPA during the fall/winter terms, attempt at least 30.0 units of coursework in the fall/winter and transfer 30.0 units of coursework in the fall/winter/spring (a grade of C- or higher is required for a course to be considered transferable). Meeting the admission requirements set out at the beginning of the academic year guarantees admission into the faculty, but does not guarantee a student their chosen discipline.

The Faculty of Engineering currently accepts applications from students at other institutions and from other faculties at the University of Alberta. Admission through this route is competitive and GPA requirements may change year-to-year. For students applying to the 2017/2018 year, the competitive GPA is at least a 3.0 on 8 or more courses in the most recent fall/winter.

## **First Year Engineering – University of Alberta**

### Term 1

#### **CHEM 103 - Introductory University Chemistry I**

★4.3 (fi 6) (either term, 3-1s-3/2) Atoms and molecules, states of matter, chemistry of the elements.

Prerequisite: Chemistry 30, or equivalent.

#### **ENGG 100 - Orientation to the Engineering Profession I**

★1 (fi 3) (first term, 1-0-0) An introduction to the Faculty of Engineering and the engineering profession: the engineering disciplines; study skills; cooperative education; work opportunities; engineering and society including elements of ethics, equity, concepts of sustainable development and environmental stewardship, public and worker safety and health considerations including the context of the Alberta Occupational Health and Safety Act.

#### **ENGG 130 - Engineering Mechanics**

★4 (fi 8) (either term, 3-0-2) Equilibrium of planar systems. Analysis of statically determinate trusses and frames. Friction. Centroids and centres of gravity. Forces and moments in beams. Second moments of area. Corequisite: MATH 100.

#### **MATH 100 - Calculus I**

★3.5 (fi 6) (either term, 3-0-1) Review of numbers, inequalities, functions, analytic geometry; limits, continuity; derivatives and applications, Taylor polynomials; log, exp, and inverse trig functions.

Integration, fundamental theorem of calculus substitution, trapezoidal and Simpson's rules.

Prerequisites: Pure Mathematics 30 or Mathematics 30-1 or equivalent, and Mathematics 31.

#### **PHYS 130 - Wave Motion, Optics, and Sound**

★3.8 (fi 6) (either term, 3-0-3/2) Geometrical optics, optical instruments, oscillations, waves, sound, interference, diffraction. Prerequisites: Mathematics 30-1, Mathematics 31, Physics 30. Corequisite: MATH 100 or 113 or 114 or 117 or 134 or 144 or equivalent.

#### **Complementary Studies Elective (3-0-0)**

★3 Chosen from an approved list:

[http://calendar.ualberta.ca/preview\\_program.php?catoid=20&poid=18784](http://calendar.ualberta.ca/preview_program.php?catoid=20&poid=18784)

### Term 2

#### **CHEM 105 - Introductory University Chemistry II**

★3.8 (fi 6) (either term, 3-0-3/2) Rates of reactions, thermodynamics and equilibrium, electrochemistry, modern applications of chemistry. Prerequisite: CHEM 103.

#### **ENCMP 100 - Computer Programming for Engineers**

★3.8 (fi 8) (either term, 3-0-1.5) Fundamentals of computer programming with emphasis on solving engineering problems. Structure and syntax of computer programs, variables, data types, data structures, control structures, functions, input/output operations, debugging, software development process.

#### ENGG 101 - Orientation to the Engineering Profession II

★1 (fi 3) (second term, 1-0-0) An introduction to the engineering profession and its challenges: the engineering disciplines, career fields; professional responsibilities of the engineer including elements of ethics, equity, concepts of sustainable development and environmental stewardship, public and worker safety and health considerations including the context of the Alberta Occupational Health and Safety Act.

#### EN PH 131 - Mechanics

★4.3 (fi 6) (either term, 3-1s-3/2) Kinematics and dynamics of particles; gravitation; work and energy; linear momentum; angular momentum; systems of particles; introduction to dynamics of rigid bodies. Prerequisites: MATH 100 or 117, and ENGG 130. Corequisite: MATH 101 or 118.

#### MATH 101 - Calculus II

★3.5 (fi 6) (either term, 3-0-1) Area between curves, techniques of integration. Applications of integration to planar areas and lengths, volumes and masses. First order ordinary differential equations: separable, linear, direction fields, Euler's method, applications. Infinite series, power series, Taylor expansions with remainder terms. Polar coordinates. Rectangular, spherical and cylindrical coordinates in 3-dimensional space. Parametric curves in the plane and space: graphing, arc length, curvature; normal binormal, tangent plane in 3-dimensional space. Volumes and surface areas of rotation. Prerequisite: MATH 100.

#### MATH 102 - Applied Linear Algebra

★3.5 (fi 6) (either term, 3-0-1) Vectors and matrices, solution of linear equations, equations of lines and planes, determinants, matrix algebra, orthogonality and applications (Gram-Schmidt), eigenvalues and eigenvectors and applications, complex numbers. Prerequisite or corequisite MATH 100.