Engineering Articulation Meeting
Thursday, May 6, 2021
10:00 am – 3:00 pm
Online - Microsoft Teams

Minutes

Voting PSI Attendees:

Institution	Name	E-mail
Camosun College	Susan Chen	chen@camosun.ca
Capilano University	Winton Li	wintonli@capilanou.ca
Coast Mountain College	Regan Sibbald	RSibbald@coastmountaincollege.ca
College of New Caledonia	Barbara Rudecki	rudecki@cnc.bc.ca
College of the Rockies	Trevor Beugeling	TBeugeling@cotr.bc.ca
Columbia College	Maryam Samiei	msamiei@columbiacollege.ca
Douglas College	Allan Majdanac	majdanaca@douglascollege.ca
Kwantlen Polytechnic	Michael Poon (Chair)	michael.poon@kpu.ca
Langara College	Csilla Tamas	ctamas@langara.ca
Northern Lights College	Lisa Verbisky	lverbisky@nlc.bc.ca
North Island College	Dennis Lightfoot	Dennis.Lightfoot@nic.bc.ca
Okanagan College	Allyson O'Neill	AONeill@okanagan.bc.ca
SFU	Jan Castro	fas_recruitment@sfu.ca
Selkirk College	Elroy Switlishoff	elroys@telus.net
Thompson Rivers University	Kammi Madsen	kmadsen@tru.ca
Trinity Western University	Herbert Tsang	herbert.tsang@twu.ca
UBC – Okanagan	Yang Cao	yang.cao@ubc.ca
UBC - Vancouver	Carol Jaeger	carolj@apsc.ubc.ca
University of Victoria	Jens Weber	jens@uvic.ca
University of the Fraser Valley	Peter Mulhern	Peter.Mulhern@ufv.ca
Vancouver Island University	Brian Dick	brian.dick@viu.ca

Non-Voting PSI Attendees

Institution	Name	E-mail
BCIT	Sirine Maalej	smaalej@bcit.ca
Camosun College	Peter Burrage	burrage@camosun.ca
Capilano University	Mark Wlodyka	markwlodyka@capilanou.ca
Capilano University	Lisa Lajeunesse	llajeune@capilanou.ca
Capilano University	Chi-Fu Wu	cwu@capilanou.ca
Columbia College	Taraneh Lajevardi	tlajevardi@columbiacollege.ca
Douglas College	Jennifer Kirkey	kirkeyj@douglascollege.ca
Northern Lights College	Morteza Ghadririan	mghadirian@nlc.bc.ca
Selkirk	Jonathan Brinias	j.brinias@gmail.com

Selkirk	Raoul Kemper	rkemper@selkirk.ca
UBC – Okanagan	Patti Ostrikoff	patti.ostrikoff@ubc.ca
UBC - Vancouver	Mary Murphy	murphy@apsc.ubc.ca
University of the Fraser Valley	Lin Long	Lin.Long@ufv.ca
University of the Fraser Valley	Norm Taylor	Norm.Taylor@ufv.ca

Non-PSI Guests (Non-Voting):

Institution	Name	E-mail
BCCAT	Rob Fleming	rfleming@bccat.ca
BCcampus	Brian Case	bcase@bccampus.ca
BCcampus	Melanie Meyers	mmeyers@bccampus.ca
EGBC	Caroline Westra	cwestra@egbc.ca
EGBC	Karen Leung	kleung@egbc.ca
Queen's University	Brian Frank	brian.frank@queensu.ca
University of Alberta	Jason Carey	jpcarey@ualberta.ca
University of Alberta	Nicole Dyck	nmdyck@ualberta.ca
UBC	Agnes d'Entremont	adentremont@mech.ubc.ca

Regrets:

- Aydan Bekirov, VCC, (abekirov@vcc.ca). Could not attend but submitted a report.
- Steve Helle (UNBC)
- Jaclyn Semple (Yukon University)
- Brent Dunn (BCIT)
- Ken Langedyk (Okanagan College). Allison O'Neill attended and voted on Mr. Langedyk's behalf.

1. MS Teams opened at 9:30 am.

2. Meeting procedures, agenda and introductions

- Greetings were extended by Michael Poon (KPU), Chair of this year's articulation meeting. Procedures of the meeting were reviewed. Each institution has 1 voting member.
- First Nations acknowledgements, of each location represented, were made.
- University of Victoria report to be sent separately to distribute with minutes.
- Slight change to the agenda to accommodate a report from BCIT in the afternoon.

MOTION: to adopt the May 6, 2021 Engineering Articulation Meeting agenda as revised.
Moved by Herbert Tsang, seconded by Jennifer Kirkey. Carried

MOTION: to adopt the April 30, 2020 Engineering Articulation Meeting minutes as revised, to note corrected email address.

Moved by Trevor Beugeling, seconded by Herbert Tsang. Carried

3. Reports and updates

BCCAT - Robert Fleming – Executive Director and Co-Chair

- Busy year in terms of research output. The following reports, the result of that research, were drawn to the group's attention - are also on the BCCAT website:
  - 'Who decides transfers' – how transfer decisions are made within institutional contexts. Compares practices and offers some suggestions for efficiencies
  - 'Environmental Scan of Micro-credentials in Canada and Beyond'. Provides a good overview and has helped to inform discussions. The Ministry will be conducting consultation with respect to a micro-credentials framework in the future.
- Block Transfer and Degree Partnership Programs. Encouraged review of this report in the context of an engineering bridge program to ensure established partnership practices are reflected in the practices contained in the report. https://www.bccat.ca/pubs/resources/BiggerBCTG2021.pdf
- Joint Annual Meeting (JAM) will be online again this year, early in November 2021. Invited all to attend. Last year's material is on the website.
- Majority of articulation committees met online last year and it worked well. Expect online meetings to continue for this year as well.
- Issues with Moodle have prompted BCCAT to work with BCNET to create their own instances, with more functionality, to better support that tool.
- Expansion of BC Transfer Guide to include national and international credit equivalencies. Goal is to include all BC transfer institutions over the next couple of years.
- Regarding transfer articulation, BCCAT is working to import adult basic education equivalencies into the transfer guide to support agreements across institutions that offer preparatory adult basic education programs.
- Will be conducting research, involving Registrars, on policy and practices involving ethnicity, diversity and inclusion data gathering.
- Will be working with the Northern institutions regarding rural and remote student experiences with the shift to online learning due to Covid.
- Working with Registrars to take a look at changes in admissions policies and practices and other registrar decisions, i.e. credit/no credit ratings and the impacts of that. What may be staying in practice for future years.
- Relaunching the Articulation Committee Project program which used to be the funding program that supported the Engineering Articulation Committee's work around the development of the Engineering program. There will be a call out soon to re-engage Articulation committees.
- https://www.bccat.ca/articulation/announcements/2021SpringUpdate

BCcampus - Brian Case, Project Manager IT Services and Melanie Meyers, Project Manager, Open Education

- Link to BCcampus Annual Review 2020-2021: https://annualreview.bccampus.ca/.
- The common first-year Engineering curriculum project was hindered by the inability to run the in-person events planned, however they were able to complete grants at Selkirk and Capilano University.

- Completed a gap analysis on science and technology and engineering math. Through this initiative a list was created of available OER and free resources faculty can use when teaching the common first-year engineering courses: https://pressbooks.bccampus.ca/engineeroer/ . Most have been adopted and had a fulsome review by faculty who have used the resource.
- Discovered there was a big gap in the first year Physics.

WeBwork – Agnes d'Entremont, Associate Professor of Teaching, Department of Mechanical Engineering, Faculty of Applied Science, UBC

- WeBwork projects undertaken to fill the gaps identified for first-year Physics in terms of the lack of OER resources. Spoke to the various open engineering mechanics practice problems that have been built through the project. Project is funded by BCcampus and UBC. Will continue through the summer to build additional problems and invited the group to send any they have created for possible inclusion and would welcome their collaboration as part of the team. BCcampus has some funding to allow institutions to set up their own WeBwork server. Problems are accessible by students so recommended that problems for exams be kept private by the instructor.
- Links to the above discussion:
  - http://mechanicsmap.psu.edu/websites/5_structures/method_of_joints/methodofjoints.html
  - https://github.com/ubc-mech2/OER-mechanics-webwork
  - https://www.dropbox.com/sh/427qbpt4jfra2v5/AAB1-tH9-d4uG32UuaVY6ynra?dl=0

4. Institutional reports – Receiving institutions

Queen's University - Brian Frank, Associate Dean, Engineering and Applied Science

- Has been attending some of the BCCAT meetings as, in Ontario, there is not a deliberate design for flexible pathways between technology and engineering programs. However, conversations are now taking place around flexible pathways for students, primarily from Ontario colleges, but also from other institutions that are interested. Students in the technology program don't necessarily have the math and science that would be taught in the first years of their engineering program. Therefore, they are creating a three phase pathway to: allow students to take a couple of extra courses in math and sciences, do a one term bridge program and then enter into the third year of some of their engineering degree programs. Planning to host a summer bridge program that will allow students from multiple technology programs and disciplines to enter into a flexible bridge (some online some face-2-face) and then enter into degree programs at multiple institutions.
- Hoping the above will provide a quality pathway for indigenous and Bipoc-identifying students who are under-represented and provide an opportunity to diversify the engineering programs in Ontario.
- Confirmed that the common core curriculum in BC aligns pretty closely with the first-year program at Queens with one course exception.

Simon Fraser University - Jan Castro, Student Affairs Officer

- Health and wellness has been a big focus for their Dean's office to the point that a Health and Wellness Officer was hired in the Dean's office to help embed a culture of well-being within their student community and in their curriculum.
- Increase in student enrollment and current students are registering for more classes as well.
- Have seen student success rates increase for first-year and transfer students due to the implementation of an elective grading system to accommodate the academic difficulty of virtual learning. Have seen a reduction in students on academic difficulty. Had a pass/fail system. Now have the elective grading system for final exams. Three different letter grades, pass, cr (credit meets prereqs), fail.
- New President has a focus on Electronic Data Interchange (EDI). There is a new scholarship, EULA Family Scholarship that offers students, who have socio/economic barriers, entering Applied Sciences, a full scholarship.
- Marked Increase in academic advising that reflects students' challenges during Covid.
- In response to a question regarding the grading system: at the beginning of the pandemic there was one grading system, pass/fail. Decision was made to offer the new Elective Grading system and determined that students would need to choose to be on this system for the final exams. Offers three different letter grades: 'Pass' for students obtaining a C- or higher, a 'CR' which is a credit suggesting a grade of ' (which doesn't satisfy prerequisites), and lastly a 'No-credit' which denotes a failing grade.
- More complete report will be forwarded to be included with minutes.

UBC Okanagan – Yang Cao, Professor of Teaching, School of Engineering, Mechanical and Patti Ostrikoff, Curriculum, Accreditation and Transfer Student Coordinator.

- Continued common, first-year block transfer agreements with 8 colleges which allows the latter's students full first-year credit. For students coming from an institution that did not sign the agreement, UBC Okanagan may be able to work with that institution on behalf of the student to receive the correct credit transfer.
- Still on the old transfer threshold at 2.7. Number of transfers constant over the last couple of years. Would like those to increase which will help to fill the attrition that happens in the second year.
- The bridge transfer is continuing with Okanagan College and Camosun
- Curriculum updates: have a new manufacturing engineering program which is actively being promoted. Hoping to work with Douglas College, which has a manufacturing program, to recruit students.
- The manufacturing program has received significant investment dollars for infrastructure, one million dollars-worth of equipment, which is currently used to offer the PLC certificates (in partnership with 'Festo'). Very hands-on certificate with broad career application. Will also be made available to industry for skill upgrading.
- New programs:
  - Hope to run the new Master of Design in September of next year and will be offered through the Faculty of Creative and Critical Studies. Students graduating from engineering are eligible to apply.
  - The Faculty of Management has designed a dual degree called Master of Management, available to new and transferring students. Designed so that students can finish within their

undergraduate. 25 months of part-time online study and three intensive in-residence sessions, held for two weeks each July.

- Looking at creating a computer engineering Bachelor degree, at the Okanagan campus. Very much in demand.
- Actively incorporating Indigenous curriculum in the program.
- Youtube videos have been created of first-year design projects, showcasing student work.
- Same application form is used to apply to either UBC Okanagan or Vancouver, noting their preference. Students going into second year must submit a placement form as well, prior to being admitted.

UBC Vancouver - Carol Jaeger, Assoc Dean Academic

- Enrolment was up this year, in fact the fall had the largest first year enrolment than ever before.
- Plan to have a lot of face to face courses in the fall but blended offerings may remain available. Students, in second year and up, should expect to be in the Vancouver area if they are attending in the fall 2021 and if not, they will have fewer options.
- Reviewed new initiatives:
  - Biomedical Engineering is going to be graduating its first few students this year. Just completed the accreditation site visit for that first cohort.
  - Manufacturing Engineering, which has instances on both Okanagan and Vancouver campus, will be next. First accreditation visit will take place during the winter 2021. Years two and three are already completed for manufacturing and the first instance of year four will be taking place.
  - This year a Vancouver only Environmental Engineering Program at the year 2 level was offered.
  - Have been able to offer a new program, each year, for the last three years. Choices for students is increasing and all programs are available to students transferring into their second year placement process. Biomedical Engineering may require additional coursework depending on what Chemistry students have as well as other considerations.
- Back to regular system for applying to second year in that students input their list to which program they want admittance and they speak about their fit or their interest in their top choice.
- Number of new programs provide an increase of choice for year 2 but the number of seats will not be increasing due to space limitations. Students are advised to think in terms of families of related programs (where there is overlap) when thinking about choosing a program, i.e. environmental is connected to civil, geological, mining, chemical and biological.
- Admission GPA is 3.3
- Discussion of the accommodation of pass/fail grades this academic year. Averages were calculated on data that had numbers or letter grades associated with them, not for courses awarded 'credit'. Skewed a student's i.e. GPA upwards but with so many students applying, really only the threshold was raised.

UNBC

- Presenter was not able to attend. No other representatives from this institution available at this meeting.

UVIC – Jens Weber, Acting Associate Dean, Undergraduate Programs.

- Reviewed enrollments: 552 students were admitted to first year BEng/BSEng and 82 transfer admissions from other BC institutions. There were also 39 international transfer admissions. Further data, and breakdown of admissions numbers, included in the attached report.
- Reviewed transfer agreements expired or expiring by the end of 2021. The intention/hope is to renew agreements with these institutions capturing the common curriculum and are streamlined as much as possible.
- New deadline for application is now January 31 rather than end of April.

Thompson Rivers University - Kammi Madsen.

- They are a sending institution by their transfer program and have been accepting second year transfers in to the software engineering program.
- In fall 2021 will be offering their 4th year courses for the software engineering program. June of 2022 will see the first cohort of graduates. With Covid recruitment for the program has been challenging. This past academic year saw 71 students and 34 for the transfer program.
- Changes to Physics courses - changing EPHY 1150 to EPHY 1170.
- Did not see an enrollment drop but saw course loads drop. Feedback from most students is that they have found online learning challenging.
- For this fall, for both programs, 130 students registered thus far and expecting more. Looking forward to the return to campus and debating if there will be blended delivery offered.
- The Software Engineering program has hired 5 new instructors so the program is growing.

5. Reports and Updates

BCIT – Sirine Maalej, Faculty, Mechanical Engineering

- Presentation on their project, 'Transferring to BCIT'. The Engineering common curriculum was developed to standardize the engineering transfer program throughout BC. BCIT was not part of the process because of the uniqueness of their degree programs and the first year courses as they are very specialized. BCIT has been approached by local colleges to create some clear pathways for engineering transfer program students to transfer to BCIT.
- Currently admission is handled on a case by case basis. The intention is to make the process automated in order that they can transfer courses or a block of courses directly to BCIT.
- At this time, pathways have been created with 8 sending institutions: Douglas, KPU, Langara UFV, VCC, VIU, Capilano and Camosun, to civil, mining, mineral, mechanical and electrical engineering programs.
- Have been seeking feedback from instructors, program heads and associate deans and collecting comments on any missing learning outcomes, lab components, team projects.
- Hope to have all required feedback by the end of the term and start discussion on: number of transfer courses allowed, will this impact the accreditation process, separate stream vs accommodations for transfer students, etc. Will then think about a bridging process that may

include adding summer or part-time courses. Will also require synchronizing the BCIT intake with the graduation from sending institutions.

- Looking at possibly a fall 2022 implementation.
- For those institutions interested in pursuing this pathway with BCIT, email Sirine: smaalej@bcit.ca .
- Confirmation that BCIT's programs will not reflect exactly the provincial common curriculum. Most transferring students will probably not go right into 2nd year at BCIT hence the creation of pathways.
- Pathway agreements will be unique for each of the four BCIT departments, no unified pathway.

Engineers and Geoscientists of British Columbia (EGBC) - Caroline Westra, P.Eng, Manager, Academic and Experience Assessment and Karen Leung, P.Eng

- Operating under a new act, the Professional Governance Act (PGA), as pf February 5, 2021. For details of the Act and how it is going to impact the registrants, various resources are available:
  - the website: www.egbc.ca/pga
  - webinar 'Professional Governance act: What You Need to Know'
  - the November/December issue of their magazine 'Innovation' contains a reference guide
- Two biggest items that could potentially impact today's group: Regulation of Firms and Mandatory Continuing Education.
  - Regulation of Firms: EGBC is currently researching whether or not universities will be considered firms under the new Act. Looking to see if the professional engineers employed at Universities are doing: research that involves the practice of professional engineering, facilities operations involving the practice of professional engineering, consulting engineering, spin-off startups from research activities that involves the practice of professional engineering or some combination of the above. Will be in touch with all of the academic institutions once that has been determined.
  - Continuing Education: As of July 2021 continuing education (CE) is mandatory for all EGBC registrants. Currently there are 40,000 registrants who will all be looking for courses. There is now a determined number of CE hours required every year along with the requirement to develop a CE plan. Therefore, institutions here today could potentially be a source of courses for technical or soft-skills. To consider - will institutions be interested opening the courses up to industry, particularly if they are online?
  - If an institution is already offering this kind of course(s) or if there is an interest in doing so, please contact Caroline Westra or Karen Leung, Will be placed on the CE webpage as an external resource.
- Reviewed the registrant application requirements as many institutions require engineering courses be taught by a registered professional. Applications are reviewed for: academic attainment, engineering experience, there is a law and ethics requirement and a good character requirement. For those whose entire career has been in academia EGBC has Professional Licensing Engineering (new name replacing Limited License).
- For detailed information regarding registrant application requirements, please visit: www.egbc.ca .
- Webinar recordings and the Powerpoint presentation are available on the Online Learning section of the website: https://www.egbc.ca/Events/Online-Learning . Webinars do need to be

paid for. Webinars include: Path to Professional Licensure and Tips on Improving Your Professional Engineer's Application.

- Nomenclature has changed from Eng.L (Engineering Licensee) to P.L.Eng (Professional Licensee Engineering).
- Responses to questions:
  - Clarification of instructor qualifications for a P.L.ENG: 10 years of experience six of which can be one's academic background including Bachelors through to a PhD. The more experience one has in teaching, the faster your application can be reviewed.
  - The P.L.Eng is exactly the same as the P.Eng but within a narrowly defined area of practice so they have to meet all the same requirements as the P.Eng, including the exam. The exam is generally not that difficult and questions come from the 2 required textbooks.
  - Limited scope, third and fourth year, for teaching engineering in terms of eligibility to apply. Historically third and fourth year had the design curriculum, when the standardized scope was developed. Now design is being offered in the first and second years and upon application one needs to make it clear that the lower level classes one is teaching has a design component. Therefore, a license is required.
  - In terms of CE reporting the requirement is 60 hours over a three-year period averaging 20 hours a year, one hour must be on regulatory matters and one hour on ethical matters. Other 18 hours can be self-study, online courses, attending seminars, writing papers for conferences, etc.
  - At this time there is no intention to create something equivalent to the EIT to go along with the new P.L.Eng as the reality in the field is there is not the demand (50% of applicants do not continue through to the end of the process). Causes difficulty during accreditation for instructors who need to demonstrate intention to pursue the P.L.Eng. This suggestion of developing a training program for the P.L.Engs will be brought to the EGBC Leadership team for consideration.

University of Alberta – Jason Carey, Vice Dean, Engineering, Nicole Dyck, Director Programs and Planning, Engineering

- Review of 2020/21 academic year:
  - Set up two agreements with two institutions: Vancouver Island University and Northern Lights College. Currently in discussion with Selkirk. Have had preexisting relationships with all three of these institutions. Plan is to try to facilitate agreements between U of A and any institution that offers the common first year.
- Here today to answer any questions and gauge interest of other institutions.
  - The University of Alberta offers nine programs and several specializations. Engineering programs are: Chemical, Materials, Electrical, Computer, Engineering Physics, Mechanical, Civil, Mining and Petroleum.
  - Have a common first year for all programs (and a qualifying year) so if it aligns with BC's common first year it should be a fairly straightforward process to bring students into the U of A programs.
  - Students are asked to rank the programs in terms of their preference and the current process for selection is GPA-based. Top students get their first choice. There is limited space in each program: Mechanical and Civil have roughly 260 to 300 seats. Rarely had issues

transferring students into programs as long as they have the right courses and their GPA is competitive.
- For second year entry the GPA cutoff is, according to agreements, 2.5 but will look at anyone 2.3 and above.

6. Institutional reports – Sending institutions

Attached, in alphabetical order, at the end of meeting minutes.

- Vancouver Community College: Aydan Bekirov was unable to attend but submitted a report
- Yukon University – Jaclyn Semple was unable to attend.

7. Dates and Location of 2022 & 2023 meetings

- **Thursday, May 5, 2022, Coast Mountain College, Terrace**, if travel is allowed.
- As backup, KPU Richmond campus will host if physical meeting is allowed but travel is discouraged.
- Head's up for 2023. Thursday, May 24th is the recommended date. Michael Poon and Jennifer Kirkey will start polling institutions for hosts, early next year.

8. Wrap-up and Adjournment

- Reminder of the 'First-year Engineering Community Resources and Design Workshop' taking place, Wednesday, May 12, 2021, 10:00 am – 3:00 pm. Will be looking at design projects and a design competition that could run across several different institutions. Focus is community building activities perhaps on the side of basic learning activities in the classroom. There will also be presentations related to: the mechanics project, the open resource project, use of professionalism and ethics. Brian Dick is the point of contact for any information needed and will be forwarding the zoom meeting link to the group.
- Trevor Buegeling, College of the Rockies, is looking for feedback, on the following questions in pursuit of building a design program. Would also welcome course outlines/syllabi.

Engineering Design Course Poll.

"Thinking about your Engineering Design course (ENGR I or ENGR II or both):

1. How many weeks of instruction does your institution deliver courses over (not counting holidays or final exam period)?
2. Will your answers apply to ENGR I, ENGR II, or both?
3. How many hours per week of lecture are scheduled?
4. How many hours per week of lab are scheduled?
5. How many hours per week of tutorial are scheduled?
6. How many hours per week of scheduled class time are devoted to group work and/or discussions?
7. Are students required to review course content (videos, reading, etc.) on their own time which are not covered in class?
8. If you answered 'yes' to Q6, how many hours per week are students expected to devote to reviewing that content?

9. How many hours per week, outside of scheduled class time, are students expected to devote to working on their course projects?

- Michael Poon, host, extended his thanks to all for attending.

ACTION: Michael Poon, KPU, to create a Moodle site to load the various institutions' ENGR l and ENGR ll course outlines/syllabi. Moodle site can also be used as a common repository resource(s) site for all institutions' use (engineering design, physics l – 3). Perhaps when the BCCAT site has a space on their site for this Articulation group, the information can be transferred there.

MOTION: to adjourn the May 6, 2021 Engineering Articulation meeting.
Moved by: Elroy Switlishof, Selkirk College / seconded by Peter Mulhern, UFV.

- Meeting concluded at 3:21 pm.

Institutional Reports

Received:

- Camosun College
- Capilano University
- Coast Mountain College
- College of New Caledonia
- College of the Rockies
- Columbia College
- Douglas College
- Kwantlen Polytechnic University
- Langara College
- North Island College
- Northern Lights College
- Okanagan College
- Selkirk College
- Simon Fraser University
- Thompson Rivers University
- Trinity Western University
- UBC Okanagan
- UBC Vancouver
- University of the Fraser Valley
- Vancouver Community College
- Vancouver Island University

Still to come:

- BCIT
- UNBC
- Yukon University

Camosun College - Engineering Transfer Program
Engineering Articulation Report 2020-2021
April 20, 2020

Camosun College's Engineering Transfer program is wrapping up its eighth year. Our program, supported by a transfer agreement between Camosun and UVic, provides students with a seamless transfer into second year engineering at UVic. Virtually all of our students intend to transfer to UVic, the campus of which is just blocks away from our Lansdowne campus.

Program updates

Starting Fall 2020 we changed the required chemistry and computer programming courses in our program from CHEM 120 to CHEM 150 and from COMP 132 to COMP 166, respectively. While new to the Engineering Transfer program, these courses were already part of the Engineering Bridge program, serving as transfers to UVic's CHEM 150 and CSC 111 courses. CHEM 150 and COMP 166 are designed for Engineers and align with the CHEM I and CSC I courses in the common engineering curriculum. Students with credit for the old courses (CHEM120 and COMP132) or students who choose to take the old courses instead of the new ones will still be allowed to do so, as UVic will still accept them.

Enrolment

We admitted 28 students – our usual cohort size – into our Engineering Transfer program for 2020 Fall. Similar to the previous two years, we had little to no waitlist in 2020 Fall, in contrast to very large waitlists we experienced several years before. Of the 28 students, 6 were international although the target number was 8. Our adjusted international student target is 7 for Fall 2021.

Applications to the program appear to be up for Fall 2021 compared to last year for both domestic and international students, but how many of the international students will be able to join us in person will remain to be seen.

Student achievement levels

The calibre of students this year appears to be stronger than that of last year. We expect 50% of this year's students to fully graduate from the program.

Of the 28 students who joined in Fall 2020, 14 students are on track to graduate in June, 5 dropped out of the program by the end of the first semester, and 9 switched to part-time status by the end of the second semester.

Students who do not complete our program in the normal 10 months (September - June) may return on a part-time basis for a second year to finish the program. We had about 10 such students return this year, 5 of whom are expected to graduate.

It is worth noting that several of the students who dropped out of the program or some courses did so due to worsening mental health conditions during the COVID pandemic.

Take-aways and lessons learned from the year of COVID

All of our program courses, including chemistry and physics labs, have been fully online this year. The only exception is a lab in ENGR 195 Intro to Engineering Design which is going to take place in Summer 2021 on campus with lab capacity reduced to half. Among the many methods that we implemented to keep courses running smoothly during the COVID pandemic, Online Office Hours in Collaborate/Zoom and Flipped Classrooms stood out as being welcomed by many students. We may therefore continue to use these methods post-COVID. While most faculty found it hard to get timely feedback on how students were doing on the receiving end of online delivery, there seemed to be consensus that online examination is something that both faculty and students would rather avoid in the future. However, we are pleased to report that we had almost no students use Chegg.com or other public websites to "get help" for examination problems in the second semester, which was a big improvement from the first semester. We took this as a signal that our students familiarized themselves with online exam guidelines and adhered to them as the year progressed.

Outlook for 2021/2022

Similar to most post secondary institutions, we are preparing to be fully back on campus this September while continuing to offer some online and blended classes. A recent poll of Camosun College students suggests that between 5-25% of students indicate a desire for exclusive online learning and about 25% of students indicate an interest in blended learning opportunities.

Susan Chen
Engineering Transfer Program Leader
Instructor in the Department of Mathematics and Statistics
Camosun College, Victoria BC

Capilano University Report:

B.C. Engineering Articulation Meeting

Thursday, April 30th, 2020, Online

Introduction

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

Engineering Certificate Program

This program is modeled after first year engineering at UBC Vancouver and is geared towards strong high school graduates and post-secondary science students.

Statistics for the 2019/2020 year are as follows:
• 188 applications were received (40 international)
• 27 students registered

Statistics for the 2020/2021 year are as follows:
• 129 applications were received (10 international)
• 24 students registered

Engineering Transition Diploma 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 and post-secondary science students who do not have the prerequisites to begin first year engineering.

Statistics for the 2019/2020 year are as follows:
• 222 applications were received (55 international)
• 26 students registered

Statistics for the 2020/2021 year are as follows:
• 111 applications were received (10 international)
• 14 students registered

Other News

- Administrative duties for our Engineering programs were shared in the 2020-21 academic year between Mark Wlodyka, and Winton Li.

- For 2021-22, we will again have a three-member team sharing Convenor duties, Chi-Fu Wu will be joining Mark Wlodyka and Winton Li.

- Due to internal issues and difficulties with the current pandemic, the implementation of Solidworks has been delayed to Fall 2021.
- The Engineering Lab is a fully capable MakerLab space with a multitude of different equipment for First Year students to complete their projects. These include CNC Router, Portable Mill, Laser Cutter, FDM and Resin 3D printers, drones, as well as various workshop power equipment for students to bring their ideas to life.

- Capilano University's 3-year memorandum of understanding with the University of Victoria regarding the transfer of Capilano students enrolled in the Engineering Certificate program and the Engineering Transition Diploma into second-year engineering at UVic has now ended. We will continue discussions with UVic to secure a new MOU.

- Negotiations with SFU for an Engineering transfer agreement for both programs are ongoing, but delayed due to the pandemic.

Description of your first-year design/capstone project

- The 2020-21 academic year supported two sections of APSC 140, the first year engineering design course.

- For the first section of APSC 140, one highlight of the design project this year was the RoomReader – A real time occupancy tracker for a post pandemic world. This project is currently running within the North Vancouver City Library, in collaboration with CityStudio North Vancouver. The following is the abstract from their report:

  The COVID-19 pandemic has brought about many challenges for businesses and society as a whole. In an effort to slow transmission, limited capacity in public buildings have been implemented. Limiting capacity requires a count of people coming i n and out of a building or space, and making sure occupancy does not tread over the instated limit. RoomReader counts the people coming i n and out of a building or space, and showcases the data in an easily readable and accessible database. RoomReader uses a sonar sensor to tell if people are walking into or out of a building/room, and is intended to be installed on a wall next to an entrance or exit point. The first prototype can read people coming into and out of a room, while sending data collected to a database where a time and occupancy count can be seen.

- The second section of the APSC 140 Engineering Design course, continued its focus on using drone platforms to support custom designed environmental sensors. The student teams designed various custom environmental sensors that were mounted on the school's drone fleet. Three of the 5 students teams completed their course work by a practical flight of their payloads on a drone. The course work was completed by submission of a formal design report.

One or two positive take-aways from the COVID year (i.e. something implemented specifically to address the COVID pandemic that you would continue to use post-COVID)

- Before COVID19 pandemic, class delivery mode has been mainly in-person. We did have opportunities and interests in offering our APSC courses to other colleges (geographically remote) but we lacked suitable equipment and software and were unable to deliver online courses. Now after one year of online course delivery during COVID19 pandemic, it is possible now for us to establish collaboration and offer courses at other institutions with online delivery.

One or two lessons learned (i.e. COVID adjustments that did not work)

- Engineering students work better and achieve higher results in a face-to-face, in person study group setting. For this past year, students were left alone in their homes studying, without seeing their fellow peers studying, hence their study habits cannot accommodate the high stress environment of first year engineering.

Outlook/plans for the 2021/2022 academic year

- In-person teaching has been mandated for 2021-2022. All faculty within the Engineering department have been instructed to prepare for in-person teaching for Fall 2021.
- Class capacity will not return to pre-pandemic levels.
- All COVID protocols will still be in place.
- Up to 20% of the classes will be available as online delivery format.

Respectfully submitted,
Chi-Fu Wu, Mark Wlodyka, and Winton Li
Engineering Convenors – School of STEM
Capilano University
April 30, 2021

Coast Mountain College
Engineering Articulation Report 2020

Coast Mountain College (CMTN) serves the rich and diverse communities and learners of BC's beautiful northwest region including Terrace, Kitimat, Smithers, Prince Rupert, and Haida Gwaii.

In the past we have had about 5-10 students per year performing excellently in our science courses and moving on to engineering or a physical sciences degree at one of the other institutions. In 2018-19 we increased our numbers in this area to 18, with 10 going on to engineering and others going on to physics, chemistry, mathematics, and computer science degrees. In 2019-20 we had 30 (18 international) physics students with 18 of them going on to engineering in the future. This year (2020-21) we had a huge drop in enrolment with only 6 students in the program, with only one going on to engineering at UBCO and one going on to computer science at SFU. Part of this is lack of international students, but some students that have gone elsewhere state that we were not "on the list" that UBC has published on their website and in the CFYEC document. It seems as though having the CFYEC has therefore hurt our enrolment.

We have a Professional engineer in the faculty now who is to teach the ENGR courses at CMTN. I will be reviving our PHYS 135 – Engineering Mechanics this Spring for offering next Winter term. Our institution has committed to running the program for 21-22 and 22-23, but will not continue unless we get sufficient numbers. Our program is outlined below.

COURSE #	COURSE NAME	CREDITS	HOURS	PREREQUISITES	CO-REQUISITES
CHEM 111	Fundamentals of Chemistry I	3.0	90	Chemistry 11 or Chemistry 12 and Math 11 or Pre-Calculus 11	None
CHEM 122	Principles of Chemistry II	3.0	90	Chem 111 or 121 and Math 101	Math 102
CPSC 123	Computer Programming	3.0	90	Pre-Calculus 12 or equivalent	None
ENGL 101	University Writing	3.0	45	English Studies 12, English First Peoples 12 or equivalent	None
ENGL 151	Technical Writing I	3.0	45	English Studies 12, English First Peoples 12 or equivalent	None
ENGR 121	Engineering Design and Drafting	2.0	60	Min. grade of "C+" in Physics 12; Min. grade of "C+" in Pre-Calculus12	PHYS 121 and MATH 101
ENGR 122	Engineering Design and Sustainability	2.0	60	Minimum grade of "C" in ENGR 121; Minimum grade of "C" in MATH 101, Minimum grade of "C" in CPSC 123	PHYS 122, MATH 102, ENGL 151
MATH 101	Calculus I: Differential Calculus	3.0	67.5	Pre-Calculus 12 or equivalent	None
MATH 102	Calculus II: Integral Calculus	3.0	67.5	A grade of C or better in MATH 101	None
MATH 235	Linear Algebra	3.0	45	Precalculus 12 or Equivalent	None
PHYS 121	Advanced Physics I	3.0	90	Physics 12 and Pre-Calculus 12	Math 101
PHYS 122	Advanced Physics II	3.0	90	Phys 121	Math 102
PHYS 135	Engineering Mechanics I	3.0	45	Physics 12 and Math 101	Math 102
	TOTAL	34	840		

Open Textbooks are used for all math, phys, chem, and cpsc courses.

Our labs are being renovated and a new project room (design lab) is being created with normal physics instrumentation, a 3D printer, a 3D imager, and tools. We have a CNC plasma cutter available for use in cooperation with our trades department, ALCAN has donated a robotic arm for our ENGR program, and we have a new 3d virtual environment where students can immerse themselves in their learning.

Regards,
Regan Sibbald
College Professor - Physics and Mathematics
CMTN Terrace
rsibbald@coastmountaincollege.ca
(250) 635-6511 ext. 5253

College of the Rockies

2021 Engineering Articulation Report

Program/Curricular changes

College of the Rockies is in the process of implementing the new common curriculum, to be ready for the Fall 2021 term.

Old courses: APSC 122 (Intro to Engineering), APSC 123 (Engineering Design), and APSC 151 (Engineering Graphics) will no longer be offered.

Two new courses: ENGR 101 and ENGR 102 (Engineering Design I & II) will replace the above courses.

APSC 141 (Statics and dynamics) is being renamed to ENGR 141. Course content unchanged.

Enrolment numbers

Course	# Enrolled	# Passes	# Fails	# Withdraws	Range of passing grades
APSC 122 (Fall)	10	7	0	3	Pass (pass/fail course)
APSC 151 (Fall)	9	7	0	2	B to A+ (A average)
APSC 123 (Winter)	12	10	0	2	B to A+ (A average)
APSC 141 (Winter)	10	9	1	0	C- to A+ (B+ average)

Positive takeaways

In an attempt to increase the clarity of exam expectations for midterms and finals that were forced to be online, I created a set of detailed rules/formats that were to be followed when writing out answers to problems. I found that this led to more consistent responses from students, which made the grading process easier. I will likely continue to use a similar procedure for future exams once we are back on campus.

Lessons learned

When we were forced to move all courses online for the Spring 2020 term (May-June), using Vex robotics kits for the APSC 123 labs became infeasible. In an attempt to provide students with relevant lab content for the course, I used VexCode VR activities which were made freely available online by the developers at the start of the pandemic. These activities allowed students to program virtual robots to solve various puzzles.

The software was easy to learn and use. However, I found that the activities were somewhat less challenging than I had hoped, and there was no ability to customize the robot designs that were used in the simulations.

Although they were enough to suffice for a semester where viable alternatives were lacking, I was very happy to go back to our traditional content delivery this year and hold the course on campus, once again making use of the Vex robotics kits for the labs.

Outlook for 2021/2022 year

As of Apr. 30, 2021: College of the Rockies plans to fully re-open campus for the Fall 2021 term, with all courses running on campus at full capacity (though likely still with face-mask and other safety precautions).

College of New Caledonia
CNC

College of New Caledonia
Engineering Articulation Report May 2021

Program and Curriculum

In order to align with the requirements of Common First-Year Engineering Curriculum (CFYEC), the existing CNC First Year Engineering (Applied Science) Transfer Program was modified in 2019/2020, and was offered in a new format in 2020/2021. Engineering design courses: APSC 101 and APSC 102 replaced previously offered APSC 100 (Introduction to Engineering) and APSC 120 (Engineering Drawing). While an Engineering Chemistry CHEM 150 was developed to meet the requirements of CFYEC, the existing CHEM 111 and CHEM 112 are optional. Please see below the outline of the program.

First-Year Engineering (Applied Science) Transfer Program			
No	Course	Lecture, Lab hours/week	Credits
1	APSC 101	(2, 2)	3
2	APSC 102	(2, 2)	3
3	CHEM 150 or CHEM 111 + CHEM 112	(4, 3) (3,3) + (3,3)	3 3 + 3
4	CSC 109	(3, 3)	3
5	ENGL 103	(3, 0)	3
6	ENGL 229	(3,0)	3
7	MATH 101	(4, 0)	3
8	MATH 102	(4, 0)	3
9	MATH 204	(4, 0)	3
10	PHYS 101	(4, 3)	3
11	PHYS 102	(4, 3)	3
12	PHYS 204	(4, 0)	3
Total			36 or 39

Enrollment

The enrollment in the program was lower this year (4 students), mainly due to the absence of international students.

Projects

The curriculum included three projects in its engineering design courses, APSC 101 and APSC 102. The first project was of a truss structure, the second was based on AutoCAD design including 3D printing, and the final was an Arduino electronic project. We installed upgrades to the existing lab equipment to include a 3D printer, a Pasco Advanced Structures set, and an Arduino kit.

For the truss structure project, initially, the Pasco Advanced Structure set with the universal interface, load cells, loads amplifiers and Pasco Capstone software were to be used for the collection and analysis of data. Due to Covid-19, the Pasco phase of the design was replaced by a graphic method to evaluate the compressional and tensional forces, and by building simplified prototypes and crash testing. However, next year a complete Pasco analysis is planned for building and pre-testing the prototypes. For the AutoCAD design project, students had a choice to a standard or customized design within the given criteria, and had the opportunity to use newly acquired 3D printer. For the final Arduino electronic project, students had a choice to design an alarm system, automatic temperature control device or a hand-wash timer. The project was preceded by introductory theory of sensors, actuator and microcontrollers, and series of applied electronics labs.

Covid-19

Due to the Covid-19 pandemic, the science courses at CNC were offered in a blended format over the past year. The lectures, tutorials and office hours were delivered online, but the labs were done predominantly in-person. Lab sections were reduced to 10 students in compliance with CNC Covid-19 safety protocols. Next year we are planning to return to on-campus instructions, but we are hoping to diversify the methods of instructions to include variety of blended models. All science labs are planned to be in-person, and for the lectures we are considering the following modalities: scheduled in-person, scheduled online, unscheduled online, hybrid online, hybrid classroom/online, and hylfex.

Barbara Rudecki, P.Eng.
Department of Physics & Applied Science
College of New Caledonia
Prince George, BC
email: rudecki@cnc.bc.ca

Columbia College

2021 Engineering Articulation Report

Below are the courses that we offer at Columbia College. Students who complete these courses qualify for a Columbia College First year Engineering Certificate.

Applied Science 151 (4): Engineering Graphics
Applied Science 160 (3): Fundamentals of Computer Programming for Engineers
Chemistry 121 (4): General Chemistry I
Chemistry 123 (4): General Chemistry II
English 100 (3): Language and Composition or English 101 (3)
Mathematics 113 (3): Calculus I
Mathematics 114 (3): Calculus II
Mathematics 252 (3): Linear Algebra and Differential Equations
Physics 118 (4): Engineering Mechanics
Physics 110 (4): Newtonian Mechanics
Physics 120 (4): Electricity and Magnetism
Physics 130 (4): Optics and Thermodynamics
Arts Elective (3): Any Arts course
TOTAL 42 credits

The enrollment in our APSC, Physics and Chemistry courses has been steady over the past year.

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. We continue regularly offering Physics 110 (Newtonian Mechanics), Physics 120 (Electricity and Magnetism), and Physics 130 (Waves, optics, and thermal physics), to facilitate transfer to SFU (110 & 120), UBC (130 & 120), and UVic (110 & 130).

Our goal is to establish block transfer agreements with other universities and research institutions. As our students need to take different courses for differing institutions, we would like to start offering the common curriculum and to begin articulation of the required courses for new transfer agreements.

Taraneh Lajevardi & Maryam Samiei

Columbia College
Vancouver, BC

Douglas College – Engineering Articulation Report – 2020/21

Program Summary: Douglas College Engineering consists of two programs:

- ***Engineering Foundations Certificate*** (EFC): A one-year university transfer program consisting of the required first-year courses of an engineering degree.
- ***Diploma in Engineering and Fabrication Technologies*** (DEFT): A two-year university transfer program designed to give students "hands-on" experience prior to transferring to an engineering degree program. The DEFT consists of the first-year, and some second-year, courses of an engineering degree, as well as additional courses in fabrication and prototyping.

Enrollment Information: Both the EFC and DEFT programs have the same entrance requirements. As such, past prospective students were permitted to apply only to the DEFT program, but could opt out after completing the EFC requirements. As of the September 2020 intake, prospective students are now able to apply directly to either of the EFC or DEFT programs. The inability to apply directly to the EFC was a source of confusion and dissuasion for many prospective students. Students are admitted on a "first-come, first-served" basis given they meet the requirements.

The program application, admission and registration numbers are given below. Note that our programs have two intakes per year: one in the Fall (F) semester and one in the Winter (W) semester.

Academic Year	Program	Applicants	Admitted	Registered
2018/19	DEFT*	203 (F,W combined)	45 (32 F, 13 W)	35 (23 F, 12 W)
2019/20	DEFT*	206 (F,W combined)	41 (34 F, 7 W)	34 (28 F, 6 W)
2020/21	EFC DEFT	190 (171 F, 19 W) 100 (86 F, 14 W)	35 (29 F, 6 W) 15 (12 F, 3 W)	22 (17 F, 5 W) 14 (11 F, 3 W)
2021/22 (to date)	EFC DEFT	135 (F) 95 (F)	12 (F) 3 (F)	- -

*: Denotes combined EFC and DEFT registration.

For 2020/21, there were 13 "no-show" students – students who were admitted to the programs but did not register for courses (even after paying a $350 non-refundable deposit). In addition, enrollments in our ENGR I course suggest there are about 15-20 "shadow" students; students that are not officially registered in the programs but take (most of) the required courses. Enrollments are healthy in first-year ENGR courses, but weaker in the second-year (non-transferrable) ENGR courses required for the DEFT program.

Transfer Destinations: Based on course enrollments, the main transfer destinations for our students were UBCV and SFU, followed by UVic. This was the first year we offered the full UBCV engineering transfer program pathway, which increased the number of students in our PHYS III course offering.

The majority of our students choose the EFC over the DEFT. For students remaining at Douglas for more than one year before transferring, most take only courses (i.e, MATH) with direct transfer credit at universities. That is, relatively few students take our second-year ENGR courses or complete the DEFT, due to a lack of transfer credit for these courses. However, enrollments in these courses are increasing due to the DEFT transfer pathway established with UBCV last year.

Updates:

1. BC Common First-Year Engineering Curriculum Alignment: We have updated our ENGR I/II equivalents to align them with the BC common first-year engineering curriculum. These courses have received transfer credit at receiving institutions. A "Chemistry for Engineers" course has also been created and is being

assessed for transfer credit at various institutions. These updates bring our programs fully in-line with the proposed common first-year engineering curriculum.

2. Guaranteed Transfer Pathway to SFU Sustainable Energy Engineering (SEE): Douglas College Engineering signed a transfer agreement with the SEE program at SFU Surrey. Douglas College students now have a guaranteed transfer pathway into all three engineering programs at SFU.

Capstone Project: The first-year design/capstone project occurs within our ENGR 1190 (ENGR II) course, and consists of student teams programming a robot to autonomously navigate through a maze. Throughout the semester, students learn programming aspects involved in the robot navigation, as well as designing and fabricating the maze within our labs. The final project/deliverable includes a written report, a presentation and a demonstration of the robot navigating the maze.

Due to COVID and online delivery, the course and project have been modified somewhat. Students now take home a robot kit, as well as pre-fabricated maze segments. They work remotely in teams on various programming exercises and assignments using the take-home materials. The final navigation project is modified so that students are presented with a navigation problem and constraints on their maze segments. They incorporate ideas from their previous assignments to achieve a suitable solution. They upload a video demonstration of the robot navigating the maze in addition to their report.

COVID Lessons and Take-Aways: Due to the online delivery model, we adopted a "Designed Locally, Manufactured Remotely" paradigm for our engineering graphics (ENGR I) classes. Students were tasked with designing widgets that would be laser cut and assembled by our lab facilitator (who acted as project "Manufacturing Engineer") during online sessions. The results were fantastic, and students were engaged and motivated to work in remote groups. We found this approach did an excellent job of teaching and reinforcing the fundamentals of stakeholder engagement and interaction. We intend to modify and use this approach when we return to in-person instruction. Students also preferred synchronous lecturing and interactivity via text and/or voice chat, rather than asynchronous activities.

However, no amount of creativity and "outside the box" thinking can replace in-person project work. While students commented that our courses were among their favourites, they also expressed a strong desire to return to campus and do the project work themselves.

Future Directions: In general, the outlook for the programs is positive. Enrolments are increasing due to the establishment of transfer pathways with receiving institutions. We look forward to a return to in-person instruction. In the coming 2021/22 academic year, we plan to:

- Continue promotion of the program and the new transfer pathways with prospective and incoming students, academic advisors, industry partners and the local community,
- Establish transfer agreements with any remaining receiving institutions,
- Revisit our entrance requirements to ensure they are competitive and consistent with those of other institutions offering similar programs,
- Update our second-year ENGR courses in an effort to increase and/or receive transfer credit at other institutions.

Allan Majdanac
Engineering Coordinator
Douglas College

Kwantlen Polytechnic University
Engineering Articulation Report

May 2021

Curriculum and Program

For the 2020/2021 academic year, all courses at KPU were defaulted to remote delivery. Courses and instructors wanting to hold some in-person instruction were required to complete a COVID Health and Safety plan and seek approval from their Dean, the Provost and the Health & Safety Manager. As such, only one (1) of the thirteen First-Year Engineering courses held any sort of in-person instruction. Only APSC 1299 Introduction to Microcontrollers (Spring) offered in-person instruction. Four (4) in-person APSC 1299 labs were included to provide access and instruction to use the oscilloscopes, and to provide some opportunities for teams to get together to trouble-shoot their line-following robot project.

With KPU anticipating deficits for the next couple years, the long sought-after time-release for the Engineering Coordinator was not approved in the KPU budget. However, the KPU Physics Department elected to internally fund on-going time-release for Engineering by converting two lecture sections into time-release. This internal-funding mechanism was allowed because it had a net-zero effect on the KPU budget. The Physics Department approved the Engineering release because it also had a net-zero effect on instructor workloads – two sections that would have been cancelled due to low enrolment were instead converted into the time-release.

Data

KPU's Institutional Analysis (IA) department offers a number of interactive dashboards to provide KPU members with a wide range of information, including applicant data, enrolment data and grades data. The data below has been obtained directly from the IA dashboards.

Table 1: Enrolment

Incoming Semester	Qualified Applicants	Offers	Acceptances	Students Enrolled[1]	Age, ≤ 18 years	Female students
Fall 2018	142	142	52	52	33	8
Fall 2019	159	146	55	60	28	8
Fall 2020	131	129	36	46	24	5
Fall 2021	151	88[2]	24[2]	---	---	---

Note 1: Includes students from previous years' cohorts

Note 2: Admissions process still ongoing

Comparing the Fall and Spring student numbers from Table 2 can be used to evaluate the amount of attrition due to the Fall semester. In the previous academic years, attrition was about 12%. In the current year, 24% fewer students were enrolled in the Spring compared to the Fall. It is believed that the 100% remote learning environment in the Fall 2021 semester attributed greatly towards the lack of success for the Engineering students.

In a KPU student satisfaction survey conducted in Oct-Nov 2020, students were asked their preference for online versus in-person classes when the COVID pandemic is over and physical distancing is no longer required. Of the cohort-based Science students (i.e. engineering), most students (65%) were okay with "Some, but not all, courses online". None of the cohort students selected "As many online as possible".

Table 2: Achievement

Semester	Students	GPA			
		Mean	Domestic	International	≥ 3.0
Fall 2018	52	2.75	2.75 (50)	2.76 (2)	46.2%
Spring 2019	45	2.69	2.68 (44)	---- (1)	44.5%
Fall 2019	60	2.74	2.75 (58)	2.29 (2)	46.7%
Spring 2020	53	3.24	3.21 (50)	3.66 (3)	77.3%
Fall 2020	46	2.56	2.53 (44)	3.35 (2)	52.1%
Spring 2021	35	---	---	---	---

GPA data for Spring 2021 not yet available.

Projects

KPU's First-year Engineering program has two 1-month group projects. In the Fall semester, students in APSC 1124 Introduction to Engineering work on a group design project, up to the design analysis phase (students are not asked nor expected to implement their designs). Student teams choose to solve one of four design problems. This year's design challenges were COVID-19 Bathroom Occupancy, CloudLab 3.0 Ballistic Pendulum, COVID-19 Physical Distancing, and Popsicle Bridge Testing Apparatus. Teams were required to submit a project schedule, meeting logs and a technical report, as well as give an investment-pitch presentation for their design to the cohort.

The second project was associated with the APSC 1299 Introduction to Microcontrollers in the Spring semester. Students are instructed on the basics of microcontroller operation – communications, logic and memory, input and output, timing, pulse-width modulation, and analog to digital conversion – then tasked with applying that knowledge to program a line-following robot. The robot project is evaluated on the robot performance on the challenge track, a technical report, and a group presentation that summarizes and reflects upon the groups efforts with the robot project.

COVID Reflections

While the rapid pivot to remote instruction was not a particularly pleasant experience, it did force many instructors to try something new. Without COVID, it is unlikely that I would have tried implementing any of the remote instruction resources on my own. The pandemic also brought forward a wealth of online teaching knowledge and shared experiences to instructors, though last summer it was a little bit of information overload.

The COVID requirements for remote instruction also created negative outcomes. I would deem the lack of student-student and student-instructor interactions and engagement as one of the more detrimental consequences of all-online instruction. Academic integrity, which has always been an issue, was exponentially more difficult to ensure with all assessments moving online.

Fall 2021

Current plans at KPU for Fall 2021 will see the majority of the engineering classes back in-person. One exception is APSC 1124, which will continue to be delivered remotely. APSC 1124 is a seminar course where invited speakers gave a single presentation to both the KPU Richmond and Surrey cohorts. In addition to the cost savings of going online (no need to charter a bus to transport the students), the students will also be saving on up to 2-hours of travel time. The team design project should be unaffected by the decision for APSC 1124 to remain online – engineering students will be on-campus for all their other courses so meeting to work on the project should not be an issue. Unused Physics labs may be opened to provide a space for the engineering students already on campus to attend the online seminars.

KPU administration will allow all final exams to be held in-person, regardless of the course delivery method (i.e. an online course can still have a physical final exam).

Sincerely,

Michael Poon
Coordinator, KPU Engineering First-Year Program

Langara College April 2021

Engineering Articulation Report (2020-2021)

Langara has two Engineering programs:

- **Engineering Transfer Certificate:** 1-year (2 semesters); equivalent to first year Engineering.

- **Applied Science for Engineering Diploma**: 2-year program; designed for students who don't yet meet the pre-requisites for the Engineering Transfer program, or who would like to take their courses at a slower pace. For many of our Diploma students, the program is a stepping stone towards getting admitted into the Engineering Transfer program.

Student data for the Engineering Transfer program:

> **2019-2020:** 372 applicants; 57 students accepted/registered; 47 registered for the second semester. In the two semesters of the program, 28 students achieved a GPA over 3.0, a further 2 students had GPA between 2.8-3.0.
>
> **2020-2021:** 341 applicants; 58 students accepted/registered; 42 registered for the second semester; 39 students completed the program successfully. In the Fall semester, 32 students had a GPA over 3.0, and a further 4 students had a GPA between 2.8-3.0. Spring semester GPA's are not available yet, but I estimate that about 30 of the 39 students completed the program with a combined GPA of 3.0 or more in the two semesters.
>
> **2021-2022:** 250 applicants to date (fairly close to the applicant numbers at the same time last year).

Student data for the Applied Science Diploma:

> **2019-2020:** 367 applicants; 48 students accepted/registered.
>
> **2020-2021:** 326 applicants; 43 students accepted/registered.
>
> **2020-2021:** 224 applicants to date. There is also a large overlap between the applications for the Diploma and Certificate programs (approximately 150 students last year).

For the 2020-2021 academic year, 14 Diploma students were admitted to the Transfer program (after finishing the first year of the Diploma), but only 9 completed the full Transfer program (the other five students partially or completely withdrew).

In the past few years, I have seen a decline in the number of students who accept the offer for the Diploma program.

Curriculum:

This is the first year we ran our new engineering courses (CPSC 1091, Engineering Design and Drafting, and CPSC 1491, Control Systems and Sustainable Engineering Design). The new courses align closely with the content of the ENGR I and II courses of the Common First Year Curriculum. Due to the COVID situation, both courses were offered remotely. We worked with the Langara Makerspace to output the CPSC 1091 student project prototypes (the Makerspace personnel produced the 3D printed designs using STL files submitted by the students). Diploma students in APSC 1010 (Engineering and Technology in Society) had a similar arrangement with the Makerspace. For CPSC 1491, students borrowed Arduino kits from the College to use in their projects, and presented their projects via short videos. Students were offered the opportunity to meet on campus when testing their prototypes.

The overall feedback from both the Certificate and Diploma students was that face-to-face delivery of the three engineering courses is preferred.

In response to UBC discontinuing ENGL 112, our English department has created a new course, ENGL 1123 (Introduction to Academic Writing), which replaced ENGL 1127 (Essay Writing and Short Prose Selections). This new course better aligns with the ENGL I course of the Common Curriculum.

Program review:

Langara's two Engineering Programs completed their first ever program review.

Plans for 2021-22:

In 2020-21, all courses within our two programs were delivered online, except for Chemistry labs for CHEM 1154, which ran face-to-face, with appropriate safety precautions.

Langara is planning on predominantly face-to-face instruction for the Fall semester (while also offering online courses to accommodate students who cannot be in Vancouver for the Fall semester). With this in mind, we are planning to offer our Engineering Transfer program face-to-face. In addition, the two engineering courses (APSC 1010 and APSC 1050) in the first year of the Diploma program will also be delivered face-to-face, as a majority of our Diploma students come from local high schools.

Csilla Tamás
Engineering Coordinator
Langara College

NORTH ISLAND COLLEGE

2021 Institutional Report for Provincial Articulation Meeting May 6

Numbers

The number of students coming to NIC for engineering transfer is steady but low. We had eight students in each of our Engineering Design courses. More students are choosing to stay for two years, so we actually had 11 students who took advantage of the EGBC student membership (NIC, like many of the other colleges, cover the cost of bulk membership for our students).

Changes

This was our second year offering the design courses as two separate courses in Fall and Winter term instead of the concentrated course in May/June. This turned out to very good timing, since teaching a project-based course this spring would have been very challenging.

Our two design courses are roughly equivalent to the two courses at UVic. The first course focusses on needs assessment, generating design alternatives, evaluating design alternatives, and concludes with a client-based design project. This year's projects were done for a group of new hazelnut producers on Vancouver Island. The project was to devise an appropriate technology for harvesting hazelnuts from local orchards, given the unique climatic, topographical, and scale of the industry on Vancouver Island. We are planning to have future classes devise drying and post-harvest processing equipment and processes for the local industry.

Our second design course focusses more on skills: CAD (Fusion 360), rapid prototyping using 3D printer and common fasteners and materials, using sensors and motors for automation (Arduino), and then a final project which is to design an Arduino controlled NIM game including design of the playing surface and pieces.

So far, UVic and UNBC and TRU are the only receiving institutions to give credit for the new design courses on BCCAT. UBCO, UBCV, and SFU are giving no credit.

We have also developed a new computer programming course for the engineering students based on C+ (our introduction to programming course currently uses Java, and it does transfer to most receiving schools, but to be compliant with the CFYEC document we are switching the engineering students to C+ starting in 2021.

Common First Year Curriculum

Our dean signed the common first-year curriculum agreement last year, and we are committed to meeting the objectives of this document.

Adaptation during COVID-19 Crisis

Like everyone else, we had mostly online classes this year. Some were asynchronous, and some were synchronous. Students were almost unanimous is their preference for scheduled synchronous courses, so many courses unofficially switched from asynchronous to synchronous delivery early on (or at least added some scheduled, structured tutorial time for students to attend). For our second design course, we had Arduino kits for the students to take home and use, and we did their 3D printing which they could them pick up at the Courtenay campus.

Going forward, I anticipate that we will keep some of our courses as synchronous online (matrix algebra, engineering mechanics are likely candidates). We have also become much more adept at doing group work over the internet, and will likely continue to use these tools in all of our courses (in addition to face-to-face group work, once we can resume normal operations).

Online course delivery has also resulted in more of our students electing to take a lighter course-load, taking two years to complete instead of one, as they struggled with not only the work-load but also the technology.

Engineering Articulation Report 2021

Northern Lights College

May 6, 2021

- Prepared by Lisa Verbisky -

1.0 Enrolment in NLC's Engineering Certificate

1.1 Current Enrolment

Northern Lights College's (NLC) current engineering certificates has four domestic students enrolled. However, student numbers in many of the courses are strong due to enrolment from students in other programs. This is the same number of enrolment as 2020 prior to the common first year agreement.

There is still an expectation that domestic student numbers will grow in future years to fill a cohort of 16 students with the common first year curriculum in place. Furthermore, it is expected that international students might also be attracted to the program with guaranteed transfer in place. Currently, the one year certificates offered by NLC does not meet the two year duration needed for international students to obtain their post-graduate work permit. As such, most international students interested in engineering take the Associate of Science degree.

2.0 The Common Core Curriculum

2.1 Course Development

As with other sending institutions, NLC developed gap courses for the common first year, ENGG 120 and ENGG 125. NLC also developed ENGG 130 to meet the transfer requirements with the UofA.

2.2 Challenges

One major challenge that NLC is experiencing as a small institution located as close to Alberta institutions as most BC institutions that grant Engineering degrees is attempting to provide a meaningful pathway for students within and across the Provincial border. It is very expensive for NLC to offer all the required specialized engineering courses in order to satisfy both in province and out of province transfer agreements.

That said, NLC is very thankful to be part of this development and very appreciative of all the work that has gone in to developing the common first year and securing funds for development. In a perfect world, we would have a single Alberta and BC common core first year.

2.3 Outlook

NLC will continue to support the Engineering Certificate and Engineering Studies Certificate to satisfy transfer agreements. However, if student numbers do not increase, it would not be surprising if a decision were made to suspend these program offerings in the next couple of years.

BCCAT Engineering Articulation Committee Meeting
May 6th, 2021
Okanagan College's Institutional Report

Okanagan College

The following Institutional Report is submitted by Okanagan College and outlines the main points requested by Michael Poon in his March 26, 2021 email.

Program / Curricular Updates

Common First-Year Engineering Certificate Program

The Common First-Year Engineering Certificate program was approved by the Board at Okanagan College in winter 2019/2020. The students taking this program were the students that would have taken the Applied Science (Engineering Program) and the Engineering Bridging programs at Okanagan College, as well as some new students.

New / Updated Transfer Agreements

The Common First Year Engineering Certificate program at Okanagan College has been approved for transfer to UBCO. We are currently working on a Memorandum of Understanding (MOU) agreement with UBCO. Once the MOU agreement is in place, we will work with other BC Universities to ensure a smooth transfer for our students to the various receiving institutions.

Enrolment Numbers

The Common First Year Engineering Certificate program at Okanagan College was first offered in September 2020. At that time, there was only six students that applied to the program so the program was cancelled for last year.

For the September 2021 start date, the program has 40 student applications as of March 26, 2021. We anticipate that this number will increase to about 60 applications by September 2021. Of those 60 students' applications, we anticipate about 15 students will be registered in the program for September 2021.

Student Achievement Levels

Since the Certificate program has not be completed by any students yet, we do not have any student achievement levels.

BCCAT Engineering Articulation Committee Meeting
May 6th, 2021
Okanagan College's Institutional Report

Description of our First Year Design/Capstone Project

The first-year design/capstone project is part of our ENGR 111 course. In this course, they will be working on their design project for two weeks in teams of 2 or 3 students. The project will be similar to designing a door hinge in ACAD and then making it on the 3D printer. Once complete, their project must meet certain criteria and be a working prototype.

Positives of the COVID Year

Some of the positives of the COVID year are: not having to drive to work, working in my pajamas, working on the ski hill, video/audio recording of examples and using more internet-based sharing platforms. We will continue to use the internet-based sharing platforms to ensure that students have easy access to all of the course materials. We will also continue to make and use of video/audio recordings of labs and data sheet/math examples so the students can watch/rewind/fast-forward and learn from them. The students really enjoyed having recorded examples as opposed to completing a demonstration or data sheet example during a lecture class.

Lessons Learned from the COVID Year

Where do I start? There are so many. One of the main lessons learned from the COVID year was to be really explicit with the instructions given for labs and midterms/final exams. Telling the students what to expect before-hand and giving them example tests on the same platform you are going to test them with was crucial.

One of the other main lessons learned was that the students do not always listen to reason or justification. For example, just telling the students they should be plugged into their modem/router instead of using WIFI for lectures and exams was a big deal. Some students learned the hard way that a $5 Ethernet cable is way less stressful then getting dropped out or having a frozen computer screen on a final exam.

Another positive is the online meetings. At first, they seemed excessive and annoying. But now, not having to drive to them or leave the house (or my pajamas) make them much more enjoyable and hopefully we will have some meetings in this format in the future.

BCCAT Engineering Articulation Committee Meeting
May 6th, 2021
Okanagan College's Institutional Report

Outlook/Plans for 2021/2022

Right now, as I write this with the new directive on in-person dining in restaurants being suspended for three weeks, my crystal ball says that we may still be in the pandemic at the start of the semester in September 2021. That means for at least the September to December semester, we will be teaching lectures on line and having some labs face to face. This will probably cause some students to withdraw from classes.

Right now, I am just looking forward to having some time off in the summer and laying on a sandy beach while drinking an ice-cold beer.

In conclusion, Okanagan College is doing very well during these pandemic times. The students and instructors are not only changing and adapting, but are growing and learning to work with various new platforms. Overall, life is great at Okanagan College!

Sincerely,
Allison O'Neill, P.Eng.

Selkirk College

School of University Arts and Sciences

File Note Memo

To: Michael Poon, EIT

From: Elroy Switlishoff, P.Eng., Engineering Instructor, Selkirk College

Date: 07 April 2021

Subject: Report and Issues List from Selkirk College for the Engineering Articulation Meeting

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1. Introduction

2020-2021 enrollment in the Selkirk College First Year Engineering Transfer program in September 2020 was 11 students. It looks like there will be eight students completing the program, and eligible to transfer into second year at receiving institutions.

Two new courses, ENGR 100 (Design and Communication I) and ENGR 101 (Design and Communication II) have been developed and adopted into the curriculum. These courses mirror the content of ENGR I and ENGR II of the provincial common-core first year engineering curriculum and bring Selkirk's program into full alignment the provincial common core.

The regular engineering instructor (me) will be retiring at the end of this academic year, and Selkirk College is actively recruiting for a replacement instructor.

2. Annual Summary

The notables of the 2020-2021 academic year are as follows:

1. Started the academic year with a cohort of 11 students. The demographic was skewed in that all students were male. It is believed that COVID-19 adversely impacted enrollment.
2. Three students did not continue into the second semester, and of the eight continuing students, two plan to remain at Selkirk to improve their grades.
3. Continued with the "bulk –buy" student enrollment with Engineers and Geoscientists BC (EGBC)
4. Close alignment of the first year curriculum with both UBCO and the provincial common core was achieved.

The Program Advisory Committee (PAC) did not meet in the academic year.

Selkirk College continued a "bulk-buy" student enrollment program with the Engineers and Geoscientists BC, which gives students access to scholarships, mentors, and discounted participation in Engineers and Geoscientists BC events.

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

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 at Mercer Celgar (pulp mill), the City of Nelson, and local consulting firms. The co-op program has been running for 15 years, and several employers have gone on to offer permanent positions to past co-op students upon graduation.

This was the last year for running the Engineering Graphic Communications course (APSC 100) using AutoCAD 2018. AutoCAD 2018 is overkill for the content of APSC 100, but the PAC has stated strongly 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

The biggest issue facing the Selkirk College First Year Engineering Transfer program is finding a replacement instructor for delivering the ENGR 100 and ENGR 101 courses. Both course require an instructor registered with EGBC to deliver the engineering-specific content.

The lab portions of both ENGR 100 and ENGR 101 as well as the capstone project need further development for delivery in September 2021.

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. A similar agreement with UVic is “signature ready” but there are a couple of gaps that require transferring Selkirk College students to complete a couple of extra courses at UVic somewhere along their programs.

4. Transfers

As previously mentioned, there are eight students remaining in the program at this time. Two are choosing to remain at Selkirk College for another year in order to improve their marks, three are planning to transfer to UBC-O, and one each to UBC-V, UVic and U of A.

SFU SIMON FRASER UNIVERSITY
ENGAGING THE WORLD

Simon Fraser University
Faculty of Applied Sciences - Dean's Office
Applied Science Building
8888 University Drive
Burnaby BC V5A 1S6
Canada

April 28, 2021
BCCAT Engineering Articulation Meeting
Faculty of Applied Sciences
Simon Fraser University

School of Engineering Science (ENSC)
School of Mechatronic Systems Engineering (MSE)
School of Sustainable Energy Engineering (SEE)

Simon Fraser University (SFU) has three engineering schools: the School of Engineering Science (Biomedical, Electronics, Computer, Systems, and Engineering Physics options) at the Burnaby campus, the School of Mechatronic Systems Engineering at the Surrey campus, and the new School of Sustainable Energy Engineering at the Surrey campus.

Health and Wellness Initiative

In collaboration with SFU's Health and Counselling team our Faculty is reinvigorating the ongoing commitment to student health and wellness. Since fall 2019, the we have been working to identify opportunities to embed mental health and wellness within policies and programs, enhance support options for students, and explore ways to better communicate supports and services available for student wellness. Continuing this commitment, we brought on a health and wellness coordinator to further work with the Faculty and each School to identify opportunities and develop resources to support student health and wellness.

Intake Numbers

The following table shows the number of new external students enrolled into ENSC/MSE/SEE in the 2020/21 Fiscal Year (Summer-Spring). The number of new external students enrolled into ENSC/MSE/SEE increased between the 2020/21 and 2019/20 Fiscal Years.

	ENSC	MSE	SEE	ENSC + MSE + SEE
Domestic	124	54	45	223
International	42	28	1	71
Total	166	82	46	294

Success Rates

The following table shows what percentage of students are on academic probation compared to students in good academic standing after their second term at SFU. These students entered ENSC/MSE/SEE in the 2019/20 Fiscal Year (Summer-Spring semesters). SFU did implement a Pass/Fail option for students during the 2020 Spring semester. This led to an increase in success rates for students compared to previous years.

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	ENSC		MSE		SEE		ENSC + MSE + SEE	
	BC Transfer	BC High School	BC Transfer	BC High School	BC Transfer	BC High School	BC Transfer	BC High School
Good Academic Standing after Term 2	88%	93%	91%	93%	100%	100%	90%	94%
Academic Probation or Required to Withdraw after Term 2	12%	7%	9%	7%	0%	0%	10%	6%

Transfer Agreements Updates

The School of Sustainable Energy Engineering and Douglas College established a new agreement by extending the current School of Engineering Science and School of Mechatronic Systems Engineering agreement.

First Year Design/Capstone Projects

- Engineering Science: For the design projects, groups of students are allowed to research and select any project that could be safely built at home. Instead of full system integration, a sub-system testing, validation, and a systems approach (i.e. modular) to design is emphasized. When building, students are allowed to demonstrate functionality for their respective sub-systems; this permitted the project to be built as separate components/modules and demonstrated separately (i.e. a live virtual demo). For system integration, logical explanations would explain how components would interact with each other. Poster presentations are replaced with virtual poster sessions. Project scopes are pre-approved by the course instructor, and generally, any scope too difficult/large/unsafe to complete at a household was modified to something manageable. For projects, dedicated virtual lab rooms are open 24hrs a day for teams to access.
- Mechatronic Systems Engineering: First year project course designed to provide students with a first exposure to the challenges of project organization. Students are responsible for designing and constructing a mechanical robot optimized to solve a particular chosen task. The engineering challenges of the project are expected to focus half on mechanical design and half on control algorithm design and implementation.
- Sustainable Energy Engineering: The project is to design and build an engineering device/product that can preferably contribute to sustainability. The topic is left to the students to choose. This is a team project, and the teams apply the engineering design techniques, that they learn in the lecture, to build their device of choice. Beside engineering design techniques, they will be introduced to life-cycle analysis, project management, and conflict management, that they are expected to apply to the project. The project deliverables consist of two technical report and the showcase.

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COVID Scheduling Takeaways:

- Changing modes of courses (remote or in-person) once announcements have been made makes things challenging. Example: for the last 3 terms we have been planning for 'in-person' course delivery and then get an announcement that courses will be 'remote' and have to repeat the work that goes into the scheduling process.
- Not all instructors taught the same way (synchronous/asynchronous, interactive etc.), so depending on the instructor the student could be at a disadvantage.
- Remote delivery for some courses is a successful method for all involved - faculty and students. A possible hybrid or fully remote (synchronous) delivery method of classes could continue to work post pandemic.
- Internally we implemented more online systems to collaborate with the relevant faculty and staff members to finalize schedules. Such as teams and online Microsoft excel worksheets. This is something we will continue to use going forward.

Thompson Rivers University
Department of Engineering
Engineering Articulation Meeting | Institutional Report
May 6th, 2021

➢ Program/Curricular updates

- Fall 2021 TRU offers final year academics (11 new courses, including technical elective) in BEng in Software Engineering Program
- Natural Science Elective added in BEng in SENG program in conjunction with the General Education Model.
- BEng in SENG Year One: EPHY 1150 (Physics 1 for Engineers): Fall 2021 will be EPHY 1170 and EPHY 1250 (Physics 2 for Engineers): Fall 2021 will be EPHY 1270 (Common Curriculum)
- BEng Software Engineering program will be going to the first Accreditation visit 2021-2022.

➢ New/updated transfer agreements

- Accepting transfer students based on First Year Common Curriculum

➢ Enrolment numbers

- Fall 2020 – Winter 2021
  - Total enrollments in all four year in BEng Software Engineering (71)
  - Total enrollments in Engineering Transfer Students (34)
- Fall 2021 Applications
  - Total Applications Engineering Transfer and BEng Software Engineering = 130

➢ Software Engineering Student achievement levels

- 4th Year Student, Lorelei Guidos:
  - Student COOP of the Year Award
  - Science Student Recognition Award
  - A number of students presented and co-authors research papers with faculty at international conferences
- 3rd Year Student: Abdul Jaiyeola
  - Fall 2021 TRU Career Ambassador

➢ Description of your first-year design/capstone project

- **ENGR 1100: Portable Ramp:**
  - **Objective**: The objective of this project is to design and build a portable ramp to make the buildings and vehicles handicapped accessible.
  - **Project Description:** One of the leading causes of disability in community-dwelling Canadians is mobility impairments, whether permanent or

temporary (e.g.,after getting some injury) [1]. Walking sticks, wheelchairs and mobile scooters help alleviate some of the difficulties people with mobile impairments face. In particular, these aids help the people commute from one place to another if there is provision for handicap accessibility. Although most newly built buildings have a provision for handicap accessibility, for example, in the form of a ramp, many old buildings do not have any. Making old buildings handicap accessible is not only expensive and is sometimes very challenging due to the location and architecture of the building.

- The purpose of this project is to make buildings and vehicles handicap accessible by designing a portable ramp. In particular, since the ramp will be used to reduce accessibility problems in different locations, it should be portable, and easy to carry.
- **Project Requirements and Constraints:** Teams are expected to design and implement a fully-functional portable ramp. The designed ramp should take into account all the aspects of an engineering design problem, such as evaluation of the impact of the ramp on the environment, professional ethics, calculation of risks, and evaluation of product limitations. The design process, in addition to meeting the product requirements, should also give proper attention to health and safety risks, applicable standards, and economic, environmental, and societal considerations. Every team is required to identify all the features that a ramp should have. On top of that, the ramp should be portable and versatile.

o **ENGR 1200: Smart Trash Bin**

- **Project Description:** The advancements in technology is reshaping our lives in almost every aspect. Today, our lives are much more convenient than it used to be in the past, thanks to the automation of tasks. Task automation collects data through different sensors and performs appropriate actions based on the collected data without requiring any human intervention. This not only makes our lives more convenient but also improves the reliability of the service. Throwing garbage in a trash bin is one of the most common tasks that we do in our daily lives, whether in our homes, school, offices, or on roads, etc. Unfortunately, trash bins host a lot of dirty and unhygienic stuff. As a consequence, we need to clean our hands after throwing garbage in a trash bin. However, cleaning our hands after using a trash bin is always not possible (for example, when using a trash bin outdoors), not to mention the inconvenience in cleaning the hands when they can be.
- One way to solve afore-mentioned problems is to automate the trash bin operations, i.e., by automatically opening and closing of trash-bin lid without needing to touch the bin. Automating the trash bin not only brings convenience at an individual scale but can also solve some of the problems related to garbage disposal at a large scale. Many cities face a variety of problems related to waste management, such as overflowing and stealing of garbage bins. Unfortunately, current manual waste-collection methods are not efficient in solving the large-scale garbage-disposal problems. As such, the governing bodies

and industries are working on sensors-based automated solutions to improve the waste management at a large scale.

- **Objective:** The purpose of this project to design a prototype of an automatic trash bin that not only makes our lives convenient but also helps at a larger scale in improving waste management.
- **Requirements and Constraints:** Students are expected to design and implement a prototype of a fully-functional smart trash bin using Arduino Mega 2560 board. In addition to meeting the product requirements and evaluating prototype limitations, the students should give appropriate attention to the health and safety risks, applicable standards, and economic, environmental and societal considerations.
- Students are required to work in groups of 4 students to develop a trash bin within the budget of $25 (excluding the provided microcontroller and sensor kit). Each design team should make sure that their developed product have all the features of a basic trash bin. Furthermore, the bin should allow touchless operation, and alert people whenever it's full or someone tries to steal it. Please be advised that the afore-mentioned features are only some of the desirable features. You are required to identify and implement all the desirable features of a smart trash bin (such as, light weight, safe to use, etc.). Your project will be evaluated based on your creativity in implementing the afore-mentioned features and also on implementing extra features using innovative ideas.

One or two positive take-away from the COVID year (i.e. something implemented specifically to address the COVID pandemic that you would continue to use post-COVID)

- The option for students to meet with faculty and Engineering Advisor either virtually or in-person. Meeting students virtually allowed students to have more flexibility in their schedule.
- Recording lectures. This function allowed students to go back and listen again to the lecture if they missed a particular topic or for some reason the entire class. Many students have expressed interest in recorded lectures (even a virtual option) and then conduct labs in-person.

One or two lessons learned (i.e. COVID adjustments that did not work)

- Online Exams. The inability for students to go back and correct and/or check answers provided an array of frustration from students and increased anxiety during exam time.
- Online labs

Outlook/plans for the 2021/2022 academic year

- Welcome students back to campus Fall 2021.
- Mentor first graduating BEng in Software Engineering Cohort in June 2022
- Prep and facilitate CEAB Accreditation visit in January 2022
- Hiring 5 new faculty members.

Pre-Engineering at Trinity Western University

Report for the BC Articulation Committee Meeting
April 2021

Coordinator:

- Herbert H. Tsang, Ph.D., P.Eng., Professor of Computing Science & Mathematics

Our engineering transfer options are administered by the above member 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, and 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, and computing science) plus English and humanities electives and apply to another university's engineering program.
- spend two years at TWU by adding linear algebra, computing science, physical chemistry (thermodynamics) before applying to transfer into the second year of an engineering program.

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

In fall 2020, we had about ten first-year students expressed an interest in engineering transfer. On October 28, we collaborated with the Fraser Valley Branch of the Engineers and Geoscientists BC to hold our annual "Engineers and Geoscientists Evening." We have invited five engineers from different engineering disciplines to come and present their work. This event was successful, and we had close to forty students attended this event virtually.

In the 2020-21 academic year, to support the first-year student, TWU has required all first-year students to take the cohort course bundle. Students are placed in a cohort of 15 students, and they will all be taking three courses together. The three courses in the bundle are FNDN 101, PHIL 105, and WRTG 100/101 or ENGL 103. The cohort has a guide, a TWU staff member who helps connect with the students. Each cohort has three TWU students who will offer peer support: a Peer Instructor for Foundations 101, a Writing Tutor for the Writing or English course, and a Peer Tutor for Philosophy 105. The pre-engineering student whose plan is to transfer to other institutions, it is unclear whether this requirement will affect their plan. For 2021-22, Pre-engineering students will be exempted from this cohort requirement.

As usual, we have some students switched to another major in TWU (for reasons of interest or ability) in the academic year. We have relaunched our BSc in computing science program in 2017, and we continued to see some students switched over to this program.

a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

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Faculty of Applied Science
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UBC Okanagan – School of Engineering
Receiving Institution Report
2020-2021

ENTRANTS

	Receiving Students 2020
Direct Entry – 1st year Applications	2773*
Direct Entry – 1st Year Enrollment	1741
Transfer – 2nd Year Applications	239
Transfer – 2nd Year Enrollment	58*

* 1st, 2nd and 3rd choices included in this number
** accepted offers

TRANSFER STUDENTS (excluding Bridge Program)

TOTAL Transfer Students	2020W	2019W	2018W	2017W
	58	59	56	60

Block Transfer Programs:
Eight post-secondary institutions around British Columbia offer transfer of first-year engineering course credits to UBCO. Students who successfully complete one of the following programs within one year (September to April) with a GPA of at least 2.8 are guaranteed admission into second-year the UBC School of Engineering. Students who are registered in an Engineering Transfer Program but who do not complete their program in one year (September to April) will be evaluated as transfer applicants.

	Sending Institution	Receiving Students			
		2020W	2019W	2018W	2017W
Block Transfer Programs	**Capilano**	2	0	4	5
	New Caledonia	1	1	0	2
	Kwantlen	2	3	2	4
	Langara	2	0	0	2
	Selkirk	10	2	7	5
	Thompson Rivers	9	7	3	10
	Fraser Valley	2	4	1	2
	Vancouver Island	1	3	2	0

University and College Transfers:
The UBC School of Engineering accepts students transferring from another UBC Faculty and other institutions. Admittance depends on the average of the last 30 credits of university-transferable courses that he or she has taken and on the average of the mathematics, chemistry and physics courses.

Students will be admitted into second-year engineering if they had successfully completed or has transfer credits for at least 27 credits of our first-year program. Students not meeting this criterion would be admitted into the first-year program.

	Sending Institution	2020W	2019W	2018W	2017W
Other Year 2 Transfers	College of Rockies	0	3	2	1
	Douglas	1	0	1	1
	Red Deer College	3	3	2	0
	UNBC	0	1	0	1
	Vancouver Community	1	0	1	3
	SFU	0	2	-	-
	Other	20	14	4	5

BRIDGE PROGRAM STUDENTS

TOTAL Bridge Students	2020W	2019W	2018W	2017W
	29	28	26	18

In general, few courses that are part of a technology diploma program are transferable to the School of Engineering, and there is a limit of no more than 30 transfer credits to the Okanagan campus of UBC from a technology diploma program. However, students who hold a technology diploma may consider applying to UBC through one of the established Bridge Programs.

	Sending Institution	2020W	2019W	2018W	2017W
Bridge Programs	Okanagan College	17	21	12	8
	Camosun College	12	17	14	10

Program/Curricular updates

1. **PLC Certification – in partnership with Festo – ran 3 weekend sessions – certified 66 people (current students, technicians, alumni)**

   This micro-credential is an introduction to Programmable Logic Controller (PLC) technology. The training will include lectures in PLC theory as well as lab (hands-on) components. Hands-on activities will involve participants using the Siemens TIA Portal programming environment to create PLC and HMI programs. PLCSIM Advanced and CIROS will be used to simulate industrial automation processes using a digital twin. This program offers participants a unique opportunity to use industry standard tools to learn about automated systems. Learners who successfully complete this program will receive a UBC Okanagan Non-credit Letter of Proficiency and are eligible to write the NC3/Festo Fundamentals of PLCs – Siemens Certification exam. The training is geared toward working professionals or post-secondary students looking to break into the world of industrial automation.

2. **Master of Design**

   Professional Master's Program – 30 credit (15 credits of core courses, 6 credits of studio /makerspace, 3 credits elective, 6 credits showcase/presentation). Together, the School

of Engineering (SoE) and Faculty of Critical and Creative Studies (FCCS) will offer a collaborative program in the field of design, innovation, creativity and entrepreneurship which will expand UBC Okanagan's professional level program offerings. This offering will enrich experiential learning opportunities for graduate students and expand opportunities for professional learning in a cohort based, collaborative, experiential learning environment.

3. **New Dual Degree – BASC and MGMT**
   This dual degree program option offers qualified students the opportunity to earn, in one program of study, an undergraduate B.A.Sc. degree from the School of Engineering and a MM degree from the Faculty of Management. This dual degree program option can be completed in four- and one-half years through intensive study and scheduling that includes one summer of study following the completion of their undergraduate program requirements.

4. **Program Course Additions**
   a. New MANF courses being created
   b. New Entrepreneurships-focused courses

5. **Computer Engineering Undergrad BASC Program – in progress**
6. **Indigenous perspectives within courses – in progress**

New/updated transfer agreements

Thompson Rivers – 3-year update process - in progress
Selkirk – completed 1st year transfer – work on 2nd year transfer 2021-22
Okanagan College – completed 1st year transfer
Douglas – 1st year transfer in progress

Description of your first-year design/capstone project

Great samples of first capstone projects – will attach assignment document when received.
https://www.youtube.com/watch?v=XoXGOZwsImo
https://www.youtube.com/watch?v=FTxUsPU7GPo
https://www.youtube.com/watch?v=xOxYHEjEqQA

One or two positive take-aways from the COVID year (i.e. something implemented specifically to address the COVID pandemic that you would continue to use post-COVID)

1. **UBC Learning Technology Rovers** – LTR are undergrad students working with the Center of Teaching and Learning to assist with learning technologies such as Canvas, Collaborate, Zoom, Kaltura etc.
2. **UBC Student Learning Hub** – free, flexible, online undergraduate learning supports & resources in
   - Math and Science Tutoring,
   - Writing Consultations
   - Learning Strategists

- Student Tech Support

3. Some **virtual labs** can continue to be used - Instructors are gaining skills developing online content on different platforms using simulation software – it is exciting to know that this can be integrated into the more traditional education and have a more blended environment.
4. Advising – ability to have online appointments with students – PD Portal for scheduling

One or two lessons learned (i.e. COVID adjustments that did not work)

1 Better **group project management** for online teaching. Many students are in different time zone. A more equitable mechanism is needed to better engage students for group project.

2 A better solution is need for **invigilation of online examinations** to address both of academic integrity and student privacy issues.

Outlook/plans for the 2021/2022 academic year

- UBC is currently planning for **in-person teaching in September 2021**.

BCCAT Engineering Articulation Meeting (virtual) – May 6, 2021

UBC-Vancouver Receiving Institution Report

April 23, 2021

Part 1: Facts and Figures

1. Total number of students enrolled in direct entry 1st year program:
    - 1039 (2020W – 719 domestic, 320 international)
    - 988 (2019W - 698 domestic, 290 international)
2. Total number of applications received for first year direct entry:
    - 5798 (2021W – 3026 domestic, 2772 international)
    - 6402 (2020W – 3017 domestic, 3385 international)
3. Total number of students admitted to year 2:
    - 220 (2020W – 89 via an engineering transfer program agreement, 131 from other sources)
    - 201 (2019W – 79 via an engineering transfer program agreement, 122 from other sources)
4. Engineering transfer students admitted from the following institutions with the following distribution:
    - 2020W (CAP – 16; CNC – 1; KWAN - 11; LANG – 39; SELK – 4; TRU – 10; UFV – 3; VIU – 5)
    - 2019W (CAP – 24; KWAN - 10; LANG – 18; SELK – 3; TRU – 11; UFV – 2; VIU – 11)
5. Total number of applications received for year 2 entry/transfer:
    - 461 (2021W)
    - 476 (2020W)

Part 2: News and Initiatives

The 2020 winter session was offered entirely online, and with the very small exceptions that a couple of practical courses could not be offered, we did manage to run full programs virtually. This included project and lab courses. Several programs made use of 'lab in a box' mail out kits to allow students to do physical design projects and labs, which turned out to be very successful. We may continue elements of this even when face-to-face instruction returns. Other initiatives that will have lasting value are pre-recorded screencasts for select topics, practice quizzes and question banks created in our LMS (Canvas) or on other platforms, and virtual office hours.

UBC is planning for a return to campus in September subject to public health orders. It is expected that a significant fraction of courses will be in-person, and we are messaging that students are expected to be in the lower mainland in September and able to attend in person classes. Where possible we will provide options for those that cannot be on campus, but these options will be limited and progression at a normal pace cannot be guaranteed.

New Programs Update

Biomedical Engineering. The first offering of the 4th year of this program is just wrapping up, and the program also underwent its first accreditation (virtual) site visit, with a decision to be expected in June. The visit went well and we are optimistic that we will be granted accredited status. Transfer students are welcome to apply for placement in the BMEG program, though additional courses may be required to complete the program.

Manufacturing Engineering. The first dual campus cohort of the Manufacturing Engineering (MANU) Program began 2nd year in the fall of 2019, and this year marked the first offering of the 3rd year of the program.. This program uses the common first year program at UBCV, and the common first year program at UBCO. Some courses will be co-taught using video-link. The two programs are equivalent, but not identical. The curriculum for MANU is co-developed between Materials, Mechanical, and Computer Engineering. Transfer students are welcome to apply. his program will receive an accreditation site visit (virtual) in January 2022 in time for the first graduating cohort to be included.

Environmental Engineering. The Vancouver-only Environmental Engineering program launched in September 2020 with its first cohort. The program uses the standard UBCV first year curriculum. The program is closely connected to both the Civil and Chemical & Biological Engineering departments. Transfer students are welcome to apply.

Admissions and Placement news

A*dmission GPA*. Current GPA requirement for the Engineering Transfer programs is 3.1. Interim GPAs of 3.3 are being offered admission, with 88 admits as of April 19. Every effort will be made to take into account the COVID-19 related modifications to transcripts (e.g. Pass/Fail grading systems in place of % or letter grades).

Academic concessions related to Covid-19. In both terms the Senate passed an amendment to the typical policies to allow students to elect to withdraw from courses until the last day of classes. Regular grading practices were preserved (percentage grades). We recognize that each institution implemented a variety of similar policy changes, but with less uniformity as compared to 2019W. We'll do our best to ensure students are treated fairly.

Second year placement – this year we returned to the standard format for second year placement requests. Students can write a personal statement that will be read by their number one choice only.

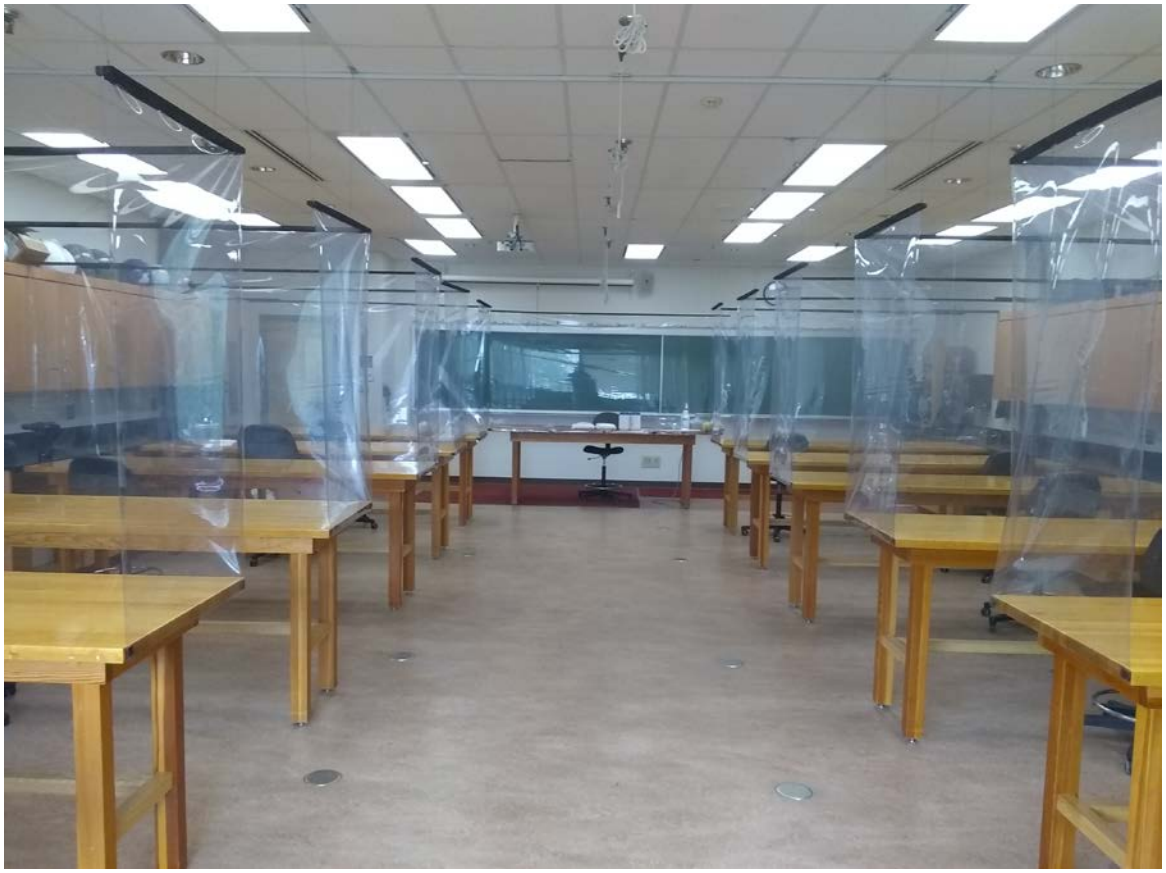
2021 Engineering & Physics/Astronomy Articulation Report

News:

- 1st calculus-based engineering & physics stream courses (PHYS 111/112) enrolments were down. A lot (from 311 to 243 on an annual basis). Which of course means that our calculus-based enrolments are now far below our historical high of around 400.
- Our algebra-based service course enrollments (ASTR 101/103/104, PHYS 100/101/105) were stable (247 to 235), which is good considering that we did not offer as many of them because running the labs was too onerous (extra set-up, extra cleaning, smaller lab sizes). The deferred courses were ASTR 103 & 104 and PHYS 100.
- 2nd year numbers were actually up quite a bit, from 60 to 80, but higher level course numbers (3rd year and up) were down. A LOT. They went from 178 to 126. Online learning has clearly induced students to wait until they can come back for F2F instruction. We just hope that they DO come back.
- Engineering Transfer enrolments are also down (from 94 to 75). Our Engineering Physics-Mechatronics Diploma enrolments also went 'way down (from 57 to 24). Our numbers were so low we changed many of our regularly-offered courses into directed study ones.
- Engineering Transfer completion is low - perhaps as small as half a dozen
- We have a total of 10 graduates so far this year (down from 16), all but one a Majors degree.
- We have four (down from 17!) Engineering Physics/Mechatronics Diploma graduates.
- Still not much progress on our Engineering program proposal. Our Dean was supposed to prepare a report on the way forward before he retired. No sign of it yet. We did manage to update our Engineering Transfer Program (ETP) offerings along the approved provincial guidelines. They will be in place for this Fall – expect many articulation requests soon (if not in the system already). In anticipation of their acceptance and in realization that the old courses were less suitable to on-line delivery than the new courses, much of the new course material was taught in the 2020/2021 year. Details of the materials covered are available to anyone who requests it.
- No change in regards to OpenStax texts - all of our first-year service courses still use them, but not our mainstream calculus-based courses. The user-friendly nature of Mastering Physics is very attractive to faculty, and (more importantly) student performance is adversely affected with an online text.
- Our administration has given us some guidance that we should try to have as much face-to-face (F2F) instruction as possible in the 1st and 2nd year courses as we try to build back those social networks. They would also like around 30% of UFV courses to be online. We don't plan on adding much to that total.

Other Notes:

- Our "lab-less" astronomy course (Astr 101) was a godsend in this pandemic, since we did not offer any other Astronomy courses (those with labs) at all.
- Learning outcomes relevant to indigenous people will be even more important going forward.
- Any changes as a result of COVID-19 are covered below.
    - Courses with labs required complicated lab equipment, and so could not be done at home. We either cancelled these courses, or had MUCH smaller lab sections to accommodate social distancing, and had students working on their own, each in their own plastic bubble (see picture below). The labs were also generally shorter, for data-taking only (and then doing the analysis at home and handing them in on Blackboard). The labs were cleaned between each class.
    - We noticed that while the labs were shorter, the marking took much longer.
    - Our first-year E&M course retained full-length 3 hour labs – we thought it would be just too difficult for students to learn how to set up circuits and use a DSO in a shorter length of time working on their own. We feel we were correct.
    - We almost got to have some F2F final exams this semester, but then the third wave hit so we went back to online exams.
    - We predict 2-3 years of remedial work to bring our students back to same pre-pandemic skill level.



VCC Report for Engineering Articulation

Program/Curricular updates

We revised our First-year University Transfer Engineering Certificate to include the CFYEC pathway for transfer to UBC, UVic, UNBC and TRU, effective Sept 2020. Our existing program for assured admission to SFU Engineering was not affected by this change.

New/updated transfer agreements

No updated transfer agreements: we are continuing to seek updated transfer agreements with all receiving institutions (UBC-V, UBC-O, UVic, UNBC and TRU) for our equivalents to ENGR I and II and ENGL II, and with UBC-O and UVic for our PHYS III equivalent.

Enrolment numbers

We have a bit of difficulty tracking actual enrolment numbers because our students can take all of the engineering courses without registering in the program; our ENGR I course had had approximately 25-35 students per year over the last three years, but it is also required for computing science students. Combined enrollment in our ENGR II course (SCIE 1151) and a course required for SFU assured admission (SCIE 1180) in Summer 2020 was 15 students, which may be a better estimate of our engineering contingent.

First-year design project

Students work in groups to create a proposal, a working prototype demonstrating engineering principles, and a final presentation. This term-long project is scaffolded with multiple opportunities for presentation and peer feedback. Normally students present to the campus community at an engineering fair; however, due to pandemic restrictions, this year's presentations all occurred via Zoom.

Positive take-aways from COVID

Prior to the pandemic, there was some reluctance around offering online classes. When we were forced to move to remote delivery in March 2020, we found that it worked relatively well for Physics. We plan to continue to offer a blended section (with on-campus labs) in addition to our in-person offering in the future. We purchased iOLab units from Macmillan to facilitate remote delivery of physics labs and will continue to use these for lab activities when we return to on-campus labs.

Lessons learned during COVID

We hosted a few online info sessions for current students, with the goal of introducing them to some of their transfer options besides UBCV and SFU. Unfortunately, these were quite poorly attended – we don't really know whether students were tired of being on Zoom, forgot about the sessions, too busy, or

are only interested in Vancouver schools, or some other reason. Student engagement in general has been a real challenge and we look forward to running in-person events once we're back on campus.

Assessment is another area of challenge: striking a balance between accountability and privacy has not been easy. Ongoing concerns include creating assignments and tests that discourage cheating, and invigilating tests in a way that is COVID-safe and respectful of student privacy.

Plans for 2021/22 academic year

We're working out the details of our full return to campus this fall, so at the moment it is not entirely clear what the 2021/22 academic year will hold. We will continue to offer the full complement of classes needed for SFU assured admission as well as CFYEC (there is significant, but not complete, overlap), and to raise awareness of these options among our ABE and UT students.

Vancouver Island University
report to the
Engineering Articulation Meeting (06-May/21)

Program / Curricular Updates

Integrated Engineering Technologist Diploma Update

- Two new instructors (one Civil, and one Mechanical) started in August to support the new Technologist diploma. One further search committee is underway now for a third instructor (Mechatronics/Electrical focus).
- The CAD courses within this credential were launched last year, with the full second year of the program starting in 2021/22. The courses run in 2020/21 include:
    - ENGR 210 (CAD I) – AutoCAD
    - ENGR 220 (CAD II) – SolidWorks
- As expected, enrolment numbers were soft, with less than six students enrolled. Neither course formally transfers to UBC or UVic, although it is hoped that one or both will do so in the future.
- Most of this past year has been focused on:
    - Re-aligning the building space provided to support the diploma needs.
    - Capital procurement to support labs and the instructional environment (including software). Purchases to date have included (as examples) a flume, machining equipment, white boards, structures kit, and a load testing system. These acquisitions are on-going.
    - Curriculum development related to the 2nd and 3rd year of the program, including building of labs and course content.

General Activities

- All engineering courses were offered synchronously and remotely, except for ENGE 250 (Linear Circuits I) which had a face-to-face lab.
- The Program Advisory Committee for both the Engineering and Technologist programs met virtually in both the Fall and Spring.
- A Lightboard was built to allow for more interactive lecture sessions (https://news.viu.ca/community-classroom/community-classroom-blog/bright-idea-boosting-student-engagement).
- An electronics PCB (including an Arduino, bread board, sensors, LEDs, 7-Segment display, and other component) was fabricated and provided (with a supplemental parts kit) to each student in the ENGR 121. The board is to be returned at the end of term.
- Four new awards ($1000 each) have been sponsored by VMAC Global Technologies to support students entering second year either the Engineering Transfer or Integrated Engineering Technologist Diploma

- Three new awards ($1500 each) have been created by a long-time endowment to support students entering to, or continuing within, either the Engineering Transfer or Integrated Engineering Technologist Diploma.
- Department / Program website has been re-vamped
- VIU continues to support the first-year of the EGBC student membership for its incoming class.
- EGBC provided a seminar on the student membership program, and the role of the association
- External speakers provided information to students related to their professional fields, and were available to answer questions that arose. In some respects, the virtual environment made arranging speakers to the class much easier.

New/Updated Transfer Agreements

- University of Alberta
- UNBC
- First-Year Common Engineering Curriculum.

The agreement with SFU-B will require updating, and discussions to date have been positive

Enrolment Numbers

Applications to the Engineering Transfer Diploma and Integrated Engineering Technologist program is steady at around 80-85, and is consistent with numbers in 2020 (82) and 2019 (80). Typically, approximately 50 – 60% of these students do transition into first-year. Offers have not yet been sent; application deadline has been extended.

Student Achievement Levels

Details are primarily anecdotal at this point in time:

- Grades were reasonably consistent with past years
- Diversity in success was more pronounced (attrition between Fall and Spring increased)

Description of First-Year Design/Capstone Project

In ENGR 121 (Spring term), students worked in teams to create a rolling ball structure. Each student was responsible for a module of that structure, and had to fulfil specific team requirements as well as individual requirements. Each student module was received at the VIU Nanaimo campus, with instructions on how it was to be assembled with the other team member's modules to allow for a ball to roll uninterrupted through the entire structure. Additionally, each team structure was to connect with another team structure – the goal was for a ball to continuously roll through all structures of the first-year class *(this did not happen, but we did observe as many as four teams enable 'mostly' continuous movement between them)*.

The design-build work was assessed by individual concept sketches, and a team proposal, progress report, final report, and 2-3 min 'sales' video. Each project was evaluated

individually (student-specific module), and as a team (team structure) based on the stated technical requirements, creative expression, and final cost.

The supply costs for all teams were supported by a grant from EGBC, Herold Engineering, and VMAC Global Technologies.

- *Students reported good communication with their peers and teammates, and overall a productive response to conflict.*
- *A majority of students did not, however, identify the team structure as a collective effort.*
- *A majority of students indicated more pride for their individual contribution, than the team structure as a whole.*
- *Observed increase in diversity in what students delivered: Generally, peer support was less constructive (being virtual not physical), technical strengths and weaknesses of individual students more apparent (e.g. those who had software skills, but not electronics etc…), and less 'pressure' for individual students to produce (e.g. each student typically only saw their individual structure, not the builds of their peers in the class) and apply more practical evaluation of the cost-benefit across all their courses.*

Lessons Learned

- The proposed first time offering of the second-year lab-based mechanics course (ENGR 214) was replaced by the first-year lecture-based course (ENGM 141) in the Fall term. Both courses are accepted by UVic as equivalent; the lab based course was not an essential offering given COVID.

  Exploring opportunity to provide an on-line variant of ENGM 141 (e.g. in partnership with other PSIs).

- ENGR 112 (Design I) and ENGR 121 (Design II) were re-structured into content modules, with lower impact assessments. A flipped classroom methodology was applied including use of video content, readings, and individual/team-based readiness assessments. All studio activities were modified to facilitate team-based, virtual learning.

  The flipped-classroom model will likely be maintained when we return to face-to-face.

  Low impact assessments proved difficult as many instructors moved to this structure, while also scheduling a final exam without the intent of having one (e.g. back-up plan). As a result, many low impact assessments in the last two weeks of classes resulted in a large overall impact on student stress.