

Western Canada's Electronics Engineering Technology Articulation Meeting

Minutes

**Camosun College,
Interurban Campus, 4461 Interurban Rd,
Victoria BC V9E 2C**

CBA 250, June 17-18, 2019

Monday, June 17th

9:15-9:45 Meet and Greet (Coffee, tea and muffins)

- 1. 9:45 Call to Order**
- 2. Introductions/welcome**
 - Guest: Eric Sehn, Dean TT Camosun
 - New Members: Joel Stadnick, SAIT; Amir Yousefi, Associate Dean BCIT
 - Regrets: Joe Carey, Red River; Tim Schneider, Saskpolytech
- 3. Approval of Agenda and Any Additional Items**
- 4. Approval of Previous Minutes of the Articulation Committee meeting of June 17/18th, 2018**
- 5. Business Arising from Previous Minutes**
- 6. 10:00 Presentation of Institutional Reports (½ hour each followed by 15min discussion)**

Institution/Name: **David Williams**, Okanagan College. Please see appendix

10.45-11.00 Break

- 7. 11:00 Institutional reports continued**

Institution/Name: **Mathew Tracy**, NAIT. Please see appendix

12:00-13:00 Lunch Classroom Resturant (Prepared by Trainee chefs)

Joyce and Godfried, Faculty in my department will be joining us for lunch.

- 8. 13:00 Institutional reports continued**

Institution/Name: **Amir Yousefi**, BCIT. Please see appendix

13:45-14:00 Refreshment Break and transportation to FTS

9. 14:30-16:00 Industry Tour: FTS. EXTREME ENVIRONMENTS/EXTREMELY RELIABLE.

From website: We've been designing reliable environmental monitoring solutions for extreme environments for over three decades. Get to know us and see why our products are trusted for mission-critical applications all over the world.

Phi Jones explained the company's history and growth. We went on a tour of the production area and saw a number of systems and sensors used by the company.

1065 Henry Eng Place Victoria, BC, CANADA V9B 6B2

<https://ftsinc.com/> Phil Jones c: 250.508.8859. t. 250.478.5561 ext. 203

Tuesday, June 18th

9:00 (Coffee, tea and muffins)

10. 9:15 Institutional reports continued

- a. Institution/Name: Joel Stadnick, SAIT. Please see appendix
- b. Institution/Name: Alan Duncan, Camosun College. Please see appendix

10:45-11:00 Break (refreshments)

11. 11:00 Tour Camosun Innovates, Sean McConkey

Sean gave us a tour of the facilities of Camosun innovates, emphasizing the equipment and capability of the equipment they have.

12. 11:45 Camosun Bridging programs Tim Ayres, Bridge Coordinator

Tim Ayers gave an overview of bridging program at Camosun, emphasizing that students should have at least one physics course prior to attending the bridge. The Electrical bridge has not filled to capacity in recent years so as long as the students meet the minimum GPA they should be accepted. Peter Burrage will be taking on the role of Bridge Coordinator and his contact details are as follows Burrage@camosun.bc.ca

12:00-13:00 Classroom restaurant Lunch

13. 13:00-14:00 Tour of Camosun's Electronic and Computer Engineering Department Labs

14. 14:00 Discussions topics

- a. Micro Controllers Mel Dundas
Mel Dundas gave a detailed presentation on the micro/ software streams with our program. Please see the appendix for a copy of his presentation.
- b. TAC accreditation
Joyce joined us for a discussion around TAC accreditation, in particular around findings as stated by TAC after the site visit. Emphasis on group projects, safety – eye protection where air lines were present, Size of signage, IPC Soldering standards, Invite ASTTBC to course that teaches Ethics, PAC industry makeup and length of service, ensure learning outcomes are being assessed appropriately.
- c. Faculty Recruitment

David led a discussion around difficulty in finding term faculty. Suggestion to include lower mainland in the advertising.

15. Next year's meeting host/location Possibly at SAIT. Joel will look into this.

16. 15:30 Review of action items and meeting adjournment.

None.

Appendix

BCIT

Enrolment

- First year enrolment continues to be very strong. The diploma and degree programs share a common first year and both the September 2018 (capacity 96) and January 2019 (capacity 64) intakes were full, including healthy numbers on the waitlists. Our ECET program pre-requisites are currently English 12 (C+), Math 12 (B), Physics 12 (C+) and Chemistry 11 (C+). International student enrolment is a maximum of 20% of capacity.
- Enrolment in each of the diploma options were as follows: Electrical Power was 53 students (11 with modified or partial schedules, the remaining full-time), Automation & Instrumentation was 36 (with 12 modified) and Telecom was 16 (with 1 modified). These numbers reflect approximate enrolment in the third term of each option over the past academic year.
- Although not a part of the articulation, our BEng degree continues with an intake of 32 students each September. These students are selected after completing the common ECET first year and must have a minimum GPA of 75%, although entry is competitive and the minimum GPA trends higher than this figure. Diploma graduates from the ECET program, biomedical technology, mechatronics and robotics program can also apply to enter the ECET degree path with a reduced GPA requirement and some common course exemptions. Demand for the degree program continues to grow and expansion is being considered.

Coop

- Enrolment in the optional diploma coop program continues at its typical levels. There were 16 placements last fall, winter numbers are pending

Curriculum

- The new 15 – 15 – 4 term structure continues to run with the curriculum adapted for the new term durations.
- The diploma curriculum committee has completed their work on standardizing language and describing depth of coverage for learning outcomes of the first-year common courses. Instructors are starting to adapt this language standardization as well as depth of coverage specification in preparation/updates to their course outlines for later years of the diploma and degree programs
- Updates have been approved and implemented to the first year Electronic Circuits course (ELEX 2120), which include a project component in the final part of the term, removal of JFETs from course, deemphasis of BJT content, and more emphasis on circuit 3dB bandwidth
- A more rigid structure has been implemented for the part-time studies courses (evenings/weekends during the term and full-time four week courses during June) to increase flexibility for students and support student retention.

Accreditation

- For the time being BCIT technology programs continue to remain unaccredited. The Institute's preference is to join when there is a single National accreditation.
- Though not part of this articulation meeting, the degree program is preparing for a CEAB accreditation visit for this fall after a previous successful 6Y visit. All engineering degree programs (Mechanical, Civil, Mining, Electrical) are being organized by a recently hired accreditation lead that has been working towards harmonizing the processes for data collection and structuring the continuous improvement process, i.e., how that data will be used. The electrical degree program accreditation follows visits to the mining, mechanical and civil programs in fall 2018 where much was learned
- As part of the preparation for degree accreditation two laboratory safety audits (both internal and external) have been conducted. Since these laboratories are common to all programs within ECET, it is of relevance to technology articulation. This effort has been led by faculty member Glenn Pellegrin along with the department safety committee. The following initiatives have been made as part of this process:

- **Conducted an internal walk-through** early in the year to identify potential safety issues. We had been doing this in the past but this time involved BCIT's OH&S (Occupational Health and Safety) staff. From this walk thru we created a deficiency list or "gap analysis".
- **Hired an outside consultant to perform an independent safety consultation.** This ensured we had done things properly and thoroughly. Apart from a couple of things the outside consultant found much the same as our internal review.
- **Established our department as its "own" safety committee** that will have a member of the institute's OH&S office as a committee representative and liaison.

Addressed or are in the process of addressing safety issues that were identified in the gap analysis.

- **Drafted a Terms of Reference for our Safety Committee** consistent with other BCIT Safety Committees.
- In the process of **preparation of Safe Work Practices (SWPs)** for specific activities (soldering, rotating machinery, 120 V / 208 V electrical work, etc.) and Standard Operating Procedures (SOPs) for equipment for both the use of students and instructors.
- In the process of **drafting a Safety Manual** intended for first year students and supplementary option-specific Safety Manuals for second year students and B.Eng. students.
- Arrangement **for inspection and certification** of several pieces of equipment developed in-house including load banks, AC transformer panels, VFD panels, and other assorted instrumentation panels.
- Preparation of **a safety dossier**, outlining what steps have been taken to improve the safety of equipment and ensure SWPs / SOPs are in place for all situations, and a plan for continuous improvement of safety in the department.

Faculty

- The department has 29 instructors, 6 assistant instructors and two support staff to deliver the three diploma programs, the full time BEng program and the part time B.Tech program.
- This year there is one vacancy in the department and two temporary vacancies. Formation of selection committees for these roles is underway
- In the previous year, a lab technician, William Han, was hired to oversee the maintenance, inventory and safety of all 26 department laboratory spaces after several years without a dedicated lab technician.
- After 24 years at BCIT, Kelly Voros, the long-standing program coordinator for the ECET program has retired, replaced by Gundi Minato. Retirement festivities were had to see Kelly off and welcome Gundi to the department.
- Amir Yousefi, faculty member in the ECET department started his role in the Associate Dean position and has kept things running smoothly throughout the academic year while breaking ground on several new initiatives
- David Romalo and Ed Casas have now been serving as program head of the B.Eng. electrical and telecom programs, respectively for the last academic year
- Ali Palizban stepped down as program head of the ECET Electrical Power & Industrial Control option and Kathy Manson was acclaimed the new program head of this option
- Rich Beketa stepped down as program head of the ECET First Year and Mahda Jahromi was acclaimed the new first-year program head
- Jeff Bloemink stepped down from his role as PTS coordinator for the ECET department, and Ali Palizban was acclaimed as the new coordinator for part-time studies operations within ECET

Facilities

- Upgrades to the Smart Grid Laboratory space continue this summer. The laboratory was used last term to deliver courses in protection, power electronics and to support several student projects. For the upcoming academic year, its utilization will be increased to support additional courses
- The power electronics equipment purchased in 2017 was built over summer 2018 by our department and successfully put into use in the 2018-2019 term. This equipment has been used as a platform to teach

students about several aspects of motion control and grid connected inverter applications; such as, power conversion for electric vehicles, energy storage, and other renewable energy systems.

- The Industrial Data Communications and PLC lab being worked on last year is now complete and functional. In this lab, student are introduced to new methods of PLC programming and modern industrial control systems as well as industrial data communications.
- Five students from degree and diploma programs have been hired by the department this summer to help with upgrades to facilities and equipment, laboratory maintenance, and safety improvements
- New laboratory bench furniture and upgraded equipment were installed in the primary first year electronic laboratories (updated Oscilloscopes TBS-1064, power supplies, and instructors have reported that it is a welcome and long overdue change
- The telecommunications project lab which is currently leased to Urthecast will be returned to teaching use in August. A portion of the income from the lease was used to purchase new equipment and furniture for this lab including a 3D printer and surface-mount soldering equipment.

Equipment

- In addition to the facility funding above the department used operating funds to purchase various pieces of test equipment to a total of approximately \$317K in the previous academic year
- Non-capital item amounts have increased to \$10k for this fiscal year and a budget of approximately \$100k has been freed for the department, for which all options have portions allocated to carry out planned upgrades
- The Institute is releasing some capital funding for the purchase of items that are considered as small capital (any individual item costing above \$10K).

Activities

- Four students, along with Chris Goetz, attended the SAIT/ISA Student Games this year in Calgary. The competition this year included 15 schools from around the world including Spain, Ireland and India. The students compete in teams of 4, each from different schools. The BCIT teams fared well and the students learned a lot about leveraging the strengths of team members with different backgrounds to their teams' best advantage. It was a good learning opportunity on many different fronts.
- For the first time, BEng Electrical is involved in the BCIT Mentorship program administered by the Student Association. After a lengthy process of soliciting and interviewing prospective mentors from industry and prospective mentees (students from BEng), seven electrical engineering mentor-mentee pairs were formed for the Feb-Jul 2019 session.

Automation & Instrumentation Diploma Graduates: Job opportunities seem strong at this time. There are several placements into ESC Automation again this term and last. Argus Controls has hired three students to help with their rapid expansion, partly due to marijuana greenhouse expansion in the Lower Mainland. Altec Integrated Solutions, AutoPro, Progressive Automation, and Spartan Controls have all hired this year as well as some smaller companies. Other companies who have been communicating with the students include Houle Electric, TetraTech, Andritz Automation, WSP, Magna IV, Voxel, and BBA. At least four A&I grads are expected to start into Level 2 of the BEng in September 2019. Spartan Controls continues to support students at BCIT. They have revised the Spartan Achievement Award, which was directed to students entering the BEng from A&I, to include a scholarship to support students in the A&I diploma program also.

- **Electrical Power & Industrial Control Diploma Graduates:** Job market for power grads is strong and growing due to growth and modernization of power industry. Companies such as BC Hydro, Wood, Delta Controls and many smaller consulting engineering and contracting firms are hiring power grads this year

Camosun College Report

Department Update June 2019 Alan Duncan



Enrollment for September 2019

ELECENG: Our enrollment numbers are again strong as has been the trend of the last few years. Our Electronics and Computer Engineering technology – renewable Energy program is not quite full for fall but and has a healthy number of applicants at various stages of the process. In addition we have twelve students selecting to enter the program in 2020F. Our capacity for this program is set at 40 students of which seven are targeted to be international students. We have five qualified applicants at this point. We have about 15 students on the waitlist at this point.

EMETENG: We launch our new Electrical technology –Marine & Industrial program this September. The program was approved by ICC and then EDCO on Feb 20th of this year. The website went live at the beginning of March and we are planning on a first intake of 20 students. This will translate to one lab size probably after the first semester due to attrition. I did not feel that it was feasible to try for 30-36 as an intake since we have a limited amount of time to market this new program. Since this new program shares our first-year courses, means that we are dealing with 60 students in the first year in two lecture four lab groups, which is quite the logistical challenge! The new program already has seven students invited with 5 having paid their deposits and others at various stages of the application process. The college marketing department will be attempting to market this new program with the following strategies:

- featured in the May High School Counsellor email newsletter
- featured on the Post-Secondary BC website as a new and exciting program
- Facebook/Instagram promotion campaign to the Greater Victoria area (cost associated)
- Promotion of the May Technologies info session on the Camosun social media channels

ELECAACC: Our Technology access program last year had a poor enrollment but already this year we are full.

COMPNET: Our Computer Network Electronics Technician program has very strong enrollment demand. We take in twenty-two students and have already invited 18 students and have 26 qualified applicants on a waitlist and 50 others at various stages of the application process. We have been approved to expand this program from its current 2 to 3 semester technician program to a 2 + 2 Technology program with a first year exist as a technician. I just received permission to hire someone in order that we can release faculty to development work. Posting closed and we have 6 applicants but none that can teach in this program. I am looking to set up a PAC meeting just for this program.

CETACC: The technician access program looks like it will fill for this year as we have 9 out of the 15 seats filled with 15 applicants at various stages in the process. This program feeds our COMPNET, Comp Sci and Eng. Graphics technician programs (this program is managed by Comp Sci)

DND Programs: We currently deliver three programs to DND Naval students. We can have up to 50 students trained here at Camosun in a given year. There have been a lot of changes in this area but it would seem that for at least 2019 and 2020, it will be business as usual.

Events

Feb 20th Women in trades and technology

The *Women in Trades & Technology (WITT)* program provides an opportunity for all students that identify as female to explore a variety of trades and technology areas through hands-on activities. Students, in grades 9 – 12 and from school districts 61, 62, 63, 64 or 79, will explore four career pathways throughout the day, participating in two trade activities and two technology activities. Ran four workshops with resistors and LED's

March 8th Skills Canada

Hosted and ran the regional Electronics skills competition. We had only two students compete with four from one school dropping out at the last minute. The winner of this competition won silver at the provincial competition! We also assisted with the Mini sumo competition and an electronics showcase in the atrium.

May 16th Oak Bay High School

We are hosting the entire G10 year from Oak Bay high all 280 kids on Thursday, May 15th at the college and we will have an opportunity to run an activity with 5 groups of about 18 students. It's going to be a busy day!

Equipment

We recently received 10 new RF generators that were ordered just before Year-end that completes our upgrade of RF communication lab equipment. Prior to this we received 86 RIGOL 4 channel colour Scopes MSO 1104Z, and a couple of Fusion Splicers.

Accreditation

We have submitted all of our documents and reports for TAC accreditation. We had hoped to have the site visit carried out during May-June period but TAC had difficulty organising auditors. This has now been postponed to fall.

Staffing

We have posted for permanent faculty positions recently. I am pleased to say that we have hired two new faculty who are both women and are teaching with us this term. I still need to hire a term faculty member for fall but am hoping that a recent retiree of ours, will step up to the plate! This will bring mean that we will have 19 faculty working with us in the fall.

I am hiring a student to help us out over the summer but have also requested another lab tech to support all of our new programs.

Office space

With DND dropping the requirement for office space, we are repurposing this office into a three-person office which will assist us with increased staffing needs.

Lab Space

With the "Big Move" there will be opportunities to acquire new lab space. With the increase in programming that we are offering, I have identified that we need three new lab spaces.

- 1) Capstone Project Lab: This space will be used both in fall and Winter to house our capstone project students. The project course takes up a lot of space and with projected intakes for the first year rising to 80 in subsequent years, we will need dedicated lab space.
- 2) Shop skills Lab space: All student current receive instruction in basic hand skills in both mechanical and Electronics. This is accomplished in ECET 190, a 5 hour in the lab course in CBA 119. Dedicated lab space for this activity is also required.
- 3) Power Lab: With our increasing use of Electrical gear including LABvolt and Speed drives etc., we need a dedicated space to house this kind of equipment. This space will be used by DND students, ELECENG and EMETENG and free up space in TECH 227 to be used for regular programming.

Okanagan College**1. Faculty and Staff:**

The Electronic Engineering Department (ELEN) consists of:

- Five continuing faculty members
- One lab tech.

Faculty members teach 19 out of the 24 program courses. The department also provides 2 service courses for the Mechanical Engineering Technology program and 3 service courses for the Trades and Technology Teacher Education program.

2. Student Enrolment:Year 1 group (Fall 2018 intake)

- 24 students – lower enrollment than expected
- Six spots reserved for international students. Two spots used
- ~19 students moving on to second year

Year 2 group

- 20 graduates (largest group in last 18 years)

ELEN-UBCO Bridge

- 2 ELEN graduates enrolled in ELEN-UBCO bridge program in Fall 2018. They are both currently enrolled in UBCO Electrical Engineering Program.

Applications for Sept. 2019 are about the same as last year, but conversion from applications to admitted has improved – expecting 27-30 students in September

Program capacity is 34 students with two lab sections of 17 students each (Fabrication course has maximum of 12 students per lab section)

3. Graduates Employment:

2019 graduating class was 20 students. The job market (at least in the central Okanagan) is stronger than last year and 13 out of 20 students are planning to bridge to UBC-O or UVic engineering. Employers that have been actively recruiting this semester include:

- Innovation, Science and Economic Development Canada
- NAVCanada
- WSTechnologies
- VO2Max
- BC Ministry of Transportation
- USNR

4. Program Promotion:

The ELEN department is active in many promotional activities. Over the past year, we have organized and/or participated in: Robocup, OC Career Fair, Experience OC sessions in Kelowna and Vernon, and numerous Science and Technology hand-on sessions for middle and high school students.

Western Canada RoboCup Jr:

The 13th Western Canada RoboCup Jr. was held on December 6th 2018, 41 teams represented by over 150 students participated in this annual competition. Two or three teams are planning to travel to Montreal in June to represent Canada at the international RoboCup Jr. games.

Skills BC regional competition (secondary):

The department ran the 2019 regional Skills Canada competition in electronics.

Awards and Scholarships:

A variety of scholarships and bursaries are available to Okanagan College students which are administered through Okanagan College Financial Aid & Awards. The Okanagan College foundations develops funding with donors for students through awards, program support and funds for capital projects.

There are seven awards specific to 2nd year Electronic Engineering Technology and the total monetary value of these awards is about \$5000.

5. 2018-2019 capital

Capital allocation of \$7000 was used to purchase:

- 2 Prusa i3 MK3 3D printers
- 1 Ultimaker 2+ 3D printer
- Dobot Magician robot arm

2019-2020 capital will be used to purchase more 3-D printers. An increasing number of student projects are requiring custom pieces and/or enclosures plus we will be adding 3D modeling and 3D printing to our fabrication course.

6. Laboratory Equipment and CAD software

Three rooms are used for instruction of laboratory sessions C304, C310 and C314.

C314 has 17 benches equipped with identical equipment consisting of:

- 25MHz function generator
- triple output power supply
- DMM
- 100MHz oscilloscope
- PC with an NI DAQcard and LabVIEW.

C304 has 17 benches each with:

- 15MHz or 20MHz function generator
- triple output power supply

- DMM
- 60MHz or 100MHz oscilloscope
- PC

C310 is a workshop room used primarily for fabrication courses and capstone project course. It has 12 benches each consisting of:

- soldering station
- microscope
- fume extractors (in 2015 we replaced the fume absorbers with a centralized fume extractor)

C310 also has sheet metal equipment including:

- drill presses
- bandsaws
- bending brakes

PCB fabrication capabilities include

- Printed Circuit Milling Machine capable of producing double-sided PCBs with solder mask and silkscreen
- reflow oven

Important software packages used in the program include

- Quartus II digital design software from Altera
- Matlab
- Microchip MPLABX IDE V2.04
- Altium PCB Design Software

7. Program/Course Update

In Fall 2018, the department performed a significant redesign of the program with several goals in mind

- Keep program current to the needs of industry locally, regionally, provincially and beyond
- Improve topic coverage efficiency to bring all 4 semesters back to regular 16 week (including final exams) semesters
- Maintain TAC accreditation

The new curriculum has been approved at all levels and it will begin in September.

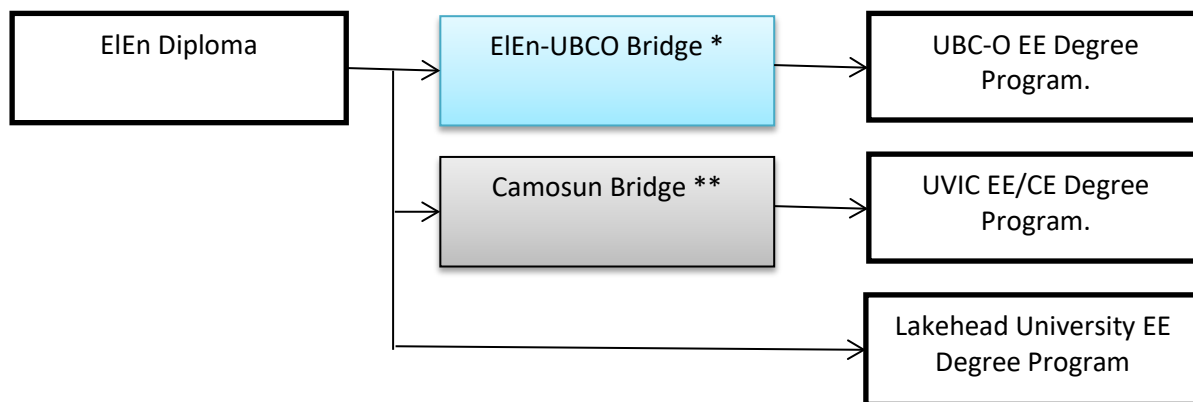
8. Program Accreditation

1. The ELEN program was accredited in 2016 by CTAB for three years.
2. The ELEN program went through the accreditation and on-site audit process with TAC in May 2018 and received accreditation in July 2018.
3. The ELEN Program is currently accredited for the following careers with the Canadian Forces:
 - a. Naval Electronics Technician (Communications)
 - b. Naval Electronics Technician (Radar)
 - c. Naval Electronics Technician (Sonar)
 - d. Naval Weapons Technician
 - e. Aerospace Telecommunication & Information Systems Technician

However, the Canadian Forces Non-Commissioned Member Subsidized Education Plan (NCM SEP) has been suspended. There are still non-subsidized opportunities available.

4. The ELEN Program's one-semester bridge program to the University of British Columbia – Okanagan (UBCO) is in place. ELEN graduates take six courses at Okanagan College in September and bridge into second semester, second year at UBCO in January. ELEN graduates are also given credit for some third year courses. The bridge program is administered by the ELEN Department. This is in addition to the University of Victoria bridge program currently in place, and administered and run by Camosun College.

Bridge to Degree Programs



**A one semester program, offered at Okanagan College in September.*

*** Offered at Camosun College (Victoria), starts in January.*

9. Other Developments:

- A. Ongoing NSERC Grant for research and development of sustainable agriculture in Salmon Arm, BC.
- B. Construction of a new health building is underway. This had significant impact on labs during the semester due to noise – the pass-through between buildings is adjacent to one of the ELEN labs.