May 4 2018 Douglas College, New Westminster Campus, Aboriginal Gathering Place

Physics and Astronomy Articulation Representatives

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N	Nicole Arklie	Ministry of Education	Nicole.Arklie@gov.bc.ca

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Physics and Astronomy Articulation Agenda 2018

May 4 2018 May the Force be with you.

Location: Douglas College, 700 Royal Avenue, New Westminster
Room S4650 Aboriginal Gathering Place
South Building, River Side, Fourth Floor

"We recognize and acknowledge the QayQayt (Ki-Kite) First Nation, as well as all Coast Salish Peoples, on whose traditional and unceded territories we live, we learn, we play, and we do our work."

Host and Chair: Jennifer Kirkey Cell phone: 604-868-4105

8:30 am Coffee and Carbohydrates
Textbook and equipment representatives are down the hallway in the boardroom, room S4920.

Item #1	9:00 am	Welcome by Dr. Brian Chapell, Dean of Science and Technology at Douglas College
#2	9:10 am	Approval of the Agenda
#3	9:15 am	Approval of the Minutes See attached and/or visit the BCCAT web page http://www.bccat.ca/articulation/arts/phys-astr
#4	9:30 am	BCCAT update by Dr. Anna Tikana "Provide the BCCAT I will… " is how her report started, as she showed off her own Yoda. Please visit http://www.bccat.ca/companion for information about how Articulation Committee work and the Terms of Reference under which we operate. Numeracy assessment ministry of education 2019-2020 essential for graduation and literacy assessment Starting in grade 10 and can take it more than one time https://curriculum.gov.bc.ca/ https://curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/pdf/Graduation_Numeracy_Brochure.pdf

		This item deals with something was discussed in the 2017 physiccs articulaton around the issue of graduation exams in physics and math. In 2017 there was a motion on the floor to instead request standardized summative assessment for post-secondary Physics entry. Discussion around pushing for Mathematics assessment rather than Physics assessment. More research needed on this motion as well. Motion was not carried to a vote. Jennifer Kirkey encouraged the discussion to continue, communication around this can continue via Google group STP = student transitions project https://www2.gov.bc.ca/gov/content/education-training/post-secondary-education/data-research/student-transitions-project
#5	10:00 am	Review of courses in the system that are still waiting transfer. Please see the attached TCES report. If your institution is on this list and you require more information, please make a point of talking with the relevant institution.
#6	10:15 am	SLP = BCCAT System Liaison. A dean or associate dean who has physics as part of their faculty. Any suggestions? This committee is currently without a SLP.
#7	10:30	Break Visit the textbook and equipment representatives
#8	11:00	Report highlights. Maximum of 5 minutes per institution. Please see the attached written reports.
#9	12:00 pm	Lunch Visit the textbook and equipment representatives
#10	1:00 pm	Reports continued, if needed.
#11	1:30 pm	Discussion on relevant issues. Here are three suggestions. 1. What is the current structure of the Physics Honours and/or Double Majors degrees amongst the group? To be specific, how many credits for the programs, and how many can be in common for a double major? We are getting pressure from Administration to reduce the number of required credits to be more in line with other Honours programs at UFV (from the current 132 down to 120). And they also do not like our current credit reduction for

		double majors (we require two less upper level Physics courses if they want to add on a second major in Science). 2. What is the structure of lab courses at the 2nd year level? How many, and are they optional or required? We currently have labs associated with our Intermediate Mechanics course, as well as our Waves and Optics course. We also have one stand-alone lab course. Only the Mechanics course is currently required by our programs. 3. What sort of lab technician support do other institutions have? That is, is this done by faculty, or are there specific technicians who do this? We currently have a 2.5 section release for our two Lab Instructors as compensation for performing lab tech duties. 4. What are departments doing about online homework solution websites? In particular, relating to Open textbooks.
#12	2:30 pm	Discussion of location for 2019 meeting
#13	2:40 pm	Break – visit the textbook and equipment representatives
#14	3:00 pm	Tour of the new facilities
#15	3:30 pm	Physics Education. Nelson Publishing has sponsored a presentation of their second edition of Robert Hawkes, et al. Physics for Scientists and Engineers, 2nd Edition Dr. Marina Milner-Bolotin is one of the authors. She is from UBC, and will be presenting on this book and the associated resources. Dr. Milner-Bolotin is a science educator within the Department of Curriculum and Pedagogy. marina.milner-bolotin@ubc.ca She will be accompanied by Valery Milner (Due to a scheduling conflict this presentation must happen late in the afternoon._.
#16	430 pm	Adjournment

Dinner reservations have been made at the Old Spaghetti Factory, 50 8th St, New Westminster. It is one block downhill from Douglas College. Starting at 500 pm. Hope to see you there.

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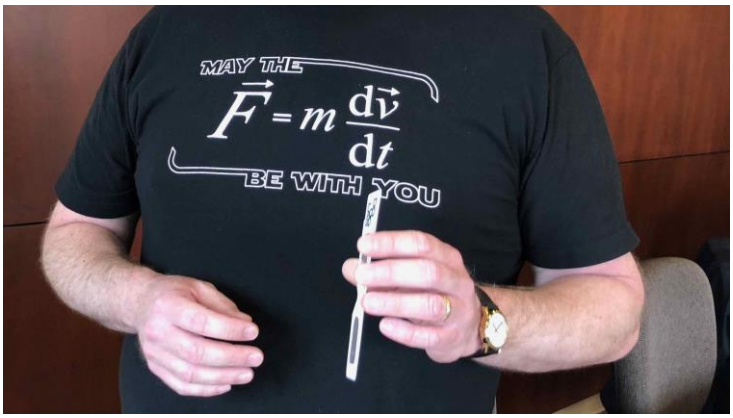
May 4 2018 "May the Force be with you" Day

This is a picture of the BCCAT representative, Anna Tikiana who brought her own Yoda and started off with the statement "BCCAT update I will report."

Special thanks to Kevin Staley of the Math Upgrading Department at Douglas College for lending us the Star Wars figurines. The Darth Vader gum dispenser was particularly popular.



Physics and Astronomy Articulation Minutes

Item #1	The meeting began with a welcome by Dr. Brian Chapell, Dean of Science and Technology at Douglas College. Dave Seaweed from the Aboriginal Student Services Centre gave the territorial acknowledgement as well a brief history of the room and the new rooftop balcony garden, specializing in native plants, which is visible from the meeting room. Douglas college policy is that to show respect to First Nations in the Aboriginal Gathering Place when holding an event, we make the giving of a territorial acknowledgement the first item on the agenda: *"We recognize and acknowledge the QayQayt (Ki-Kite) First Nation, as well as all Coast Salish Peoples, on whose traditional and unceded territories we live, we learn, we play, and we do our work."*
#2	Round table of introductions followed.
#3	Agenda was approved. Moved by Jennifer Kirkey of Douglas College and seconded by Tara Todoruk of Columbia College.
#4	Minutes were approved without changes. Moved by Takeshi Sato of KPU and seconded by Dennis Lightfoot of North Island College.
#5	BCCAT update by Dr. Anna Tikana She brought her own Yoda to the meeting and began her report with the statement "Provide the BCCAT update I will." Congratulations were offered for the award of excellence for the Physics and Astronomy minutes from the 2017 articulation meeting. It was noted that this should place no pressure on the 2018 minute taker, Will Gunton of Douglas College. A huge thank you to Chris Avis of Camosun College for last year's minutes. 

Please visit http://www.bccat.ca/companion for information about how Articulation Committee work and the Terms of Reference under which we operate.

The Joint Articulation Meeting (JAM) is coming in November. Last year, this meeting was a success, bringing together articulation chairs and system liaison persons (SLPs) from all articulation committees for discussion on many topical issues. Congratulations to Brian Dick for winning the Community Leadership award in 2018.

BCCAT Your guide through post-secondary education.

Spring Update 2018

Elder Margaret George of the Tsleil-Waututh Nationprovides a welcoming prayer at the 2017 JAM

TRANSFER & ARTICULATION

JAM 2017!

BCCAT welcomed over 150 Articulation Committee Chairs, System Liaison Persons, Institutional representatives and Ministry personnel to the Joint Annual Meeting held at the Westin Wall Centre Airport Hotel in Richmond. Dr. Thomas Carey was keynote speaker on the subject of Teaching and Learning for the Modern Student and we were pleased to have a panel discussion on Indigenization in the BC Post-Secondary System. Details of presentations can be found on the JAM webpage.

NEW DOWNTOWN VENUE FOR JAM 2018!

SAVE the date - November 16, 2018 for this year's Joint Annual Meeting to be held at the **Pinnacle Harbourfront Hotel,** downtown Vancouver. Further details will be available in the summer.

CONGRATULATIONS TO COUNCIL AWARD WINNERS 2017

Awards were presented at the JAM in recognition of outstanding leadership and support of the BC Transfer System to the following individuals:

Brian Dick, Professor & Chair, Department of Physics, Engineering & Astronomy at Vancouver Island University: **Transfer & Articulation Community Leadership Award**

Brian Dick receives his award at the 2017 JAM

Tanis Sawkins, Associate Director, Partnership Development Office, Vancouver Community College: **Leadership Award** and **Steven Earle,** Instructor, Earth Sciences, Thompson Rivers University - Open Learning: **Transfer & Articulation Community Leadership Award.** For more information and for this year's nomination form, visit BCCAT Awards.

NEW AND IMPROVED TCS!

BCCAT launched a new version of the its Transfer Credit System (TCS) in February. This represents a total modernization of the technologies in support of transfer. The new TCS introduces new automations, data tools, and greater consistency between course agreements. The new TCS also, for the first time ever, allows institutions to manage articulations from outside of BC.

WELCOME TO MEG STAINSBY

BCCAT is pleased to welcome Meg Stainsby to the team in the role of Director, Transfer & Articulation. Meg has been Dean of the Faculty of Language, Literature and Performing Arts at Douglas College for the past seven years, and previously she served as chair of the English department. She has extensive experience with curriculum development and review, articulation and transfer, and with educational governance, policy development and administration.

SECONDARY TO POST-SECONDARY TRANSITIONS

A symposium entitled "Developing Minds - Critical Thinking in Curriculum Transfer" was held at Simon Fraser University on Friday, February 9th. This event provided an opportunity for dialogue between educational professionals and the public about the teaching of critical thinking as a core competency in the revised K-12 curriculum in BC. MoE representatives will be attendng many of the articulation committee meetings this spring.

	There is a list of courses that are pending articulation from the previous year. Institutions should deal with these requests so they are completed before they go dead, which happens after a year of sitting on the transfer credit system. Institutions can now upload courses that are articulated to other provinces or internationally and are no longer restricted to the BC transfer system. There is a hope that this new system can facilitate greater student mobility, by allowing students to be aware of established out of province pathways. There is a hope that UBC can upload their courses soon. A brief update on the high school graduation requirements was given. The requirements for grade 10 have been finalized, and grade 11 and 12 will be finalized and launched in 2019/20. There are two new assessments: numeracy (completed and offered in 2018/19) and literacy (which will be required for graduation starting in 2019/20). Passing these assessments are essential for graduation. Starting in grade 10 and the students can take it more than one time. Here are the links. https://curriculum.gov.bc.ca/ https://curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/pdf/Graduation_Numeracy_Brochure.pdf STP = student transitions project. There is also a project underway to study student transitions from K-12 to post-secondary institutions. This is a collaboration between the Ministry of Education and the Ministry of Advanced Education, Skills, and Training. There is data on when students enroll in post-secondary institutions (and how many do so immediately from high school), and how students move between institutions. Here is the link for more information. https://www2.gov.bc.ca/gov/content/education-training/post-secondary-education/data-research/student-transitions-project An overview of recent research projects was provided.

	Indigenization is a topic of great interest. Phase one of a project detailing practices that institutions have in place to help indigenous students with their education pathways has been completed. This report focuses on the institutions perspective. The second phase will focus on the student's perspective. The chair encourages you to visit the BC government web page on aboriginal education. https://www2.gov.bc.ca/gov/content/education-training/ways-to-learn/aboriginal-education The report from BCCAT about Indigenous Pathways Access, Mobility, and Persistence in the BC Post-Secondary System http://www.bccat.ca/pubs/Indigenous_Pathways.pdf "Across Canada, systemic barriers have created an environment where Indigenous learners encounter various obstacles to accessing and persisting through postsecondary education, resulting in an educational gap between Indigenous and non-Indigenous populations. The federal government has recognized the importance of and made it a priority to address this gap. Although the proportion of Indigenous high school graduates and the count of Indigenous students entering the post-secondary system have been increasing, the Indigenous postsecondary attainment rate remains significantly lower than that of non-Indigenous learners. " The BCcampus Indigenization Project http://www.bccat.ca/Media/Default/pubs/BCcampus%20Indigenization%20Nov.%202017.pdf?t=636473921344179880
#6	Review of courses in the system that are still waiting transfer. Please see the attached TCES report. If your institution is on this list and you require more information, please make a point of talking with the relevant institution. Some additional details provided by specific institutions:

- KPU: Some 4th year courses were sent out in error. There is no expectation that there are similar courses at other institutions. It was recommended to just let these requests expire. Some courses were intended to only be sent to particular institutions. For example, PHYS 1141 is intended as a transfer to only UVIC PHYS 141 and UBC PHYS 170.

Questions for BCCAT: Is it normal practice to do articulation for upper level courses? There are no official guidelines, but it may overwhelm the system if all 3rd and 4th year courses are sent out. Best practice would be to not submit upper level courses to institutions that are not willing to articulate upper level courses. There is a list of institutions that have said they will **not** do this.

- VCC: Offers PHYS 11/12 in adult upgrading. There is a push to create a cross listed version of the courses for University transfer. They are on the books but may not be offered.

Pending Transfer Requests Agenda Item #5

Outline	Send	Course	Cr	Pending	Su
PHYS 115 Fall17.pdf	CAPU	PHYS 115	4	COLU, TRU, TRU-OL, TWU, UVIC	Jun 3:5
PHYS 114 Fall17.pdf	CAPU	PHYS 114	4	COLU, TRU, TRU-OL, TWU, UVIC	Jun 3:5
KPU-PHYS-4199-20170901.pdf	KPU	PHYS 4199	3	LANG, TRU, UFV, UVIC	Aug 11:
KPU-PHYS-4010-20170901.pdf	KPU	PHYS 4010	3	LANG, TRU, UVIC	Aug 11:
KWN PHYS 4700 201709.pdf	KPU	PHYS 4700	3	CAPU, TRU, TRU-OL, TWU	Ma 11:
KWN PHYS 4600 201709.pdf	KPU	PHYS 4600	3	CAPU, TRU, TRU-OL, TWU	Ma 10:
KWN PHYS 1141 201709.pdf	KPU	PHYS 1141	3	CAPU, TRU, TRU-OL, TWU, UBCO, VCC	Ma 10:
PHYS-202-w13-PJ.pdf	SELK	PHYS 202	3	KPU	Sep 2:5
PHYSICS 1093-Principles of Physics Part 2_Jan 2018.pdf	VCC	PHYS 1093	3	ALEX, CAPU, CNC, COQU, COTR, DOUG, LANG, LCV, NIC, NVIT, NWCC, OC, TRU, TRU-OL, TWU, UBCO, UCW, UFV, VIU	Nov 11:
PHYSICS 1083-Principles of Physics Part 1_Jan 2018.pdf	VCC	PHYS 1083	3	ALEX, CAPU, CNC, COQU, COTR, DOUG, LANG, LCV, NIC, NVIT, NWCC,	Nov 11:

					TRU, TRU- OL, TWU, UBCO, UCW, UFV, VIU		
	PHYSICS 1071-Introductory Physics Part 2_Jan 2018.pdf	VCC	PHYS 1071	3	ALEX, CAPU, CNC, COQU, COTR, DOUG, KPU, LANG, LCV, NVIT, NWCC, OC, TRU, TRU-OL, TWU, UBCO, UCW, UFV	Nov 21 17 11:56AM	
	PHYSICS 1061-Introductory Physics Part 1_Jan 2018.pdf	VCC	PHYS 1061	3	ALEX, CAPU, CNC, COQU, COTR, DOUG, KPU, LANG, LCV, NVIT, NWCC, OC, TRU, TRU-OL, TWU, UCW, UFV, VIU	Nov 21 17 11:55AM	

#7	SLP = BCCAT System Liaison. This is a dean or associate dean who has physics as part of their faculty. Any suggestions? This committee is currently without a SLP. The role is suited for a person within the discipline, but with more connections to the system. The articulation chair will continue to push for recommendations. Douglas College Dean of Science and Associate-Dean are already SLPs for other committees and are thus not available.
#8	Break. There was time to talk with colleagues, and visit the textbook and equipment representatives who were just down the hallway. There was also a table for Open textbooks and other similar resources staffed by members of the Open Douglas committee. This unstructured time is a very important part of articulation.
#9	Report highlights. Maximum of 5 minutes per institution. Please see the attached written reports. Any additional comments have been added to the start of the institution report which you can read later in this package.
#10	Lunch. Thanks to the Dean of Science and Technology at Douglas College for hosting a hot lunch.
#11	11.1 Discussion on relevant issues What is the current structure of the Physics Honours and/or Double Majors degrees amongst the group? To be specific, how many credits for the programs, and how many can be in common for a double major? University of the Fraser Valley UFV is getting pressure from their Administration to reduce the number of required credits to be more in line with other Honours programs at UFV (from the current 132 down to 120). And they also do not like our current credit reduction for double majors (we require two less upper level Physics courses if they want to add on a second major in Science). Some require specialized courses,

	others require more courses. Some institutions also have an honors thesis requirement. • UVic: Differentiation is more intensive courses, and 4th year courses in quantum, EM, and Stat Mech. Students also do honors lab courses and an honors thesis. Honors physics is 60 credits (5 courses a term). Combined honors are above 60 credits. • SFU: Similar to UVic. Need to take advanced courses that are necessary for graduate school, and students need to complete an honors thesis. Had to reduce the number of credits, so there is not a lot of room for electives. • UBC: In science honors are 132 credits, Majors are 120 credits. In physics, an honors degree requires a thesis and more courses. There used to be different courses for majors and honors. This is not the case currently, but some courses may be separated again. • KPU: No honors options, and there are no consistent criteria for honors. There is no institutional appetite for more required credits, as there is worry about scaring off students. • UBCO: No distinct courses for honors students (for courses also taken by major students), but there are new required courses for only honors students (EM and Quantum). There is a GPA requirement of 75% by the end of 3rd year (and on exit). 120 credits, with a 6 credit honors thesis that comes out the credits for general electives. • TWU: Science majors (biology and chemistry) require four extra courses than majors students, for a total of 134 credits. There is also a required thesis as part of those four extra courses.
#11	11.2 Discussion on relevant issues What is the structure of lab courses at the 2nd year level? How many, and are they optional or required? We currently have labs associated with our Intermediate Mechanics course, as well as our Waves and Optics course. We also have one stand-alone lab course. Only the Mechanics course is currently required by our programs.

	• Langara and SFU: There are two second year lab courses that are not tied directly to any lecture. Students register directly in the lab course. • UNBC: There are four second year courses, two of which lab a lab component (EM and Modern Physics). Each course has 7 or 8 labs a semester. • UBCO: Two second year lab courses that also have a lecture component. First semester focuses on electronics, and second semester is more project oriented with modern physics experiments. • KPU: Almost all courses spend some time in the lab. There is one designated experimental physics course that runs 6 hours a week (and has a lecture component). • UBCV: Only PHYS 101 has a lab component. In all other courses the labs have been made a stand-alone course. In Second year: lab course not tied to any course content. 3rd year students have a choice of two different lab courses. • UVic: There are two courses with associated lab (Modern Physics and EM). There is a new introduction to experimental physics course (with a lecture section associated with it). Also has a computational physics course which is 2/3 lecture, 1/3 instructor walking around helping students.
#11	Discussion on relevant topics 11.3 What sort of lab technician support do other institutions have? That is, is this done by faculty, or are there specific technicians who do this? We currently have a 2.5 section release for our two Lab Instructors as compensation for performing lab tech duties. • A follow up discussion on tech support for the labs followed. There is a distinction at many institutions between faculty (teaching courses) and lab staff (who teach the labs), often under different unions. At others, the labs are set up and taught by faculty. Some have lab techs to help with set up and maintenance, but faculty teach the labs.
#11	Discussion on relevant topics

	11.4 Many institutions are having issues with websites that provide solutions for homework. How are institutions dealing with this issue, and how do they incorporate homework into courses (and grading)? • One solution is to create own internal sets (for example, Douglas College does this using Blackboard). Most problems assigned from textbook or homework system provided by publishers have solutions online. This was done due to students complaining about having to use two online systems (Blackboard and then Mastering Physics for example) and the lack of quality / poor fit of the packaged system as opposed to questions by the college faculty. • Some institutions are moving away from Mastering Physics (or similar software) and are moving towards optional homework. The homework is not marked, but there is a short quiz at the beginning of class on the relevant material. • Many have no marks assigned for work outside of class, or a large reduction in weighting for homework. The downside is that some have seen optional homework lead to lower exam scores. At what point do students stop doing the homework? • UBC commented that they often feel guilty making students pay $80 for the online homework systems (like Mastering Physics) and it is only worth 5% of the overall grade.
#11	Discussion on relevant topics 11.5 Open textbooks and ZED CRED BCCampus provides a list of open textbooks. You can review a book and get paid $250. If you are interested, the call for proposals can be found at https://open.bccampus.ca/call-for-proposals/call-for-reviewers-2/ As well, BCcampus is making grants available for a ZED CRED, which is a diploma or degree where there is zero cost for textbooks. https://open.bccampus.ca/zed-cred-z-degree-programs/
#12	Discussion of location for 2019 meeting and 2020 meering The 2019 meeting is being hosted by Okanagan College on Friday May 3, 2019. The 2020 meeting will be held in the Lower Mainland following

	the usual rotation. Typically, the engineering and physics articulation run on the first Thursday and Friday of May. In 2019, the first Friday is May 1st, so the engineering articulation meeting may be April 30th or Physics might need to meet on the second Friday. Institutions are asked to check final exam dates/grade submission deadline for 2020 before arriving at the 2019 meeting. Possible locations for the physics meeting include: KPU, Capilano and UBC. The date and location of the 2020 meeting will be determined later though most likely KPU.
#13	Break – visit the textbook and equipment representatives and time to continue the discussions. This unstructured time is an essential part of articulation.
#14	Tour of the new facilities. Articulation members were given a tour of the new engineering facilities at Douglas College.
#15	Physics Education. Nelson Publishing has sponsored a presentation based on their newly released second edition of Robert Hawkes, et al. Physics for Scientists and Engineers, 2nd Edition. Due to a scheduling conflict this presentation had to happen late in the afternoon. Dr. Marina Milner-Bolotin from UBC is one of the authors. Dr. Milner-Bolotin is a science educator within the Department of Curriculum and Pedagogy at UBC. marina.milner-bolotin@ubc.ca She will be accompanied by Valery Milner Dr. Milner-Bolotin (UBC). Dr. Milner-Bolotin discussed the motivation for the layout of the textbook, and the enhanced features that connect students with online technology. Dr. Valery Milner (UBC) gave a follow up presentation on how he incorporated the technology (videos, simulations, interactive elements) into the classroom teaching first year physics. The articulation committee would like to thank Dr. Miler-Bolotin and Dr. Milner for their presentation and Nelson Publishing for sponsoring part of the meeting and providing refreshments during the break.

	 The afternoon speakers. Britt Morrow from Nelson Publishing, Dr Marina Milton-Bolton and Dr. Valery Milton both from UBC
#16	Adjournment at 445 pm.

14 people enjoyed dinner at the Old Spaghetti Factory which is located one block downhill. Lively conversation at and after the meeting. Smart phone levels were used to confirm that “The Hill” is “only” 8 degrees.

Reports from the Institutions

Alexander College

Kelly Cheung	Alexander College	Kellycheung5@gmail.com

Additional information provided at the meeting:

Alexander College

- Many students are international students, and it is hard to determine who should be taking the Grade 12 equivalent or first year physics. Wide variety of students, and level of knowledge.
- Previously only allowed science students in physics courses but are now seeing an increased number of students outside of science that are interested.
- Should calculus for commerce be accepted for the math prerequisite?

A discussion followed regarding the placement of students, and accepted math background. Some institutions have placements tests or diagnostic tests to help place students in the appropriate course. Regarding math courses, many institutions allows different math courses to be used as pre-req but make it clear to students what the expectations on math standards are for each physics courses.

Alexander College Physics Articulation Report: May 2018

Alexander College is a small private college that focuses primarily on foreign students who cannot get into the regular Provincial universities due to a lack of language and cultural skills. We offer about 100 different courses on two campuses, one in Burnaby near Metrotown and the other in Downtown Vancouver opposite SFU Harbour Centre. We have continued to experience

growth in student numbers setting institutional records for Spring 2017 (1593), Fall 2017 (1942), and Winter 2018 (2004).

Our general aim is to offer students a palette of first- and second-year courses along with intensive language training and small classes, where a large amount of personal attention is possible. The courses are designed to be at the academic standards of the corresponding introductory courses at SFU, UBC and UVic and, thus, to provide transferable credits to students who wish to gain entry to those institutions. We presently offer two-year "Associate" programs in Arts, Science, and Business, all of which include laboratory science requirements.

All Physics courses are offered at the Downtown campus limited to a class size of 20 students. Smaller classes allow students to more easily examine concepts in groups and share their results with the class. In addition, students are given the opportunity to work with concepts as they are being presented through active learning techniques and laboratory exercises. The past year, ~55% of the students registered in physics courses received A or B grades.

Physics courses presently approved are:

Physics 100: Introduction to Physics (53 students over the last 3 terms)
A one-semester preparatory course for students lacking physics background at the BC 12 level.
(Text: Knight, Jones, and Field, *College Physics*)

Physics 101-102: Physics for the Life Sciences I and II
Two sequential one-semester algebra-based introductory physics courses for students concentrating in Biology and Chemistry.
(Text: Giancoli, *Physics: Principles with Applications*)
Note: Has not been offered since 2011.

Physics 141-142: Engineering Physics I and II
I: Mechanics and Modern Physics (11 students over 2 terms)
II: Electricity and Magnetism, Optics (4 students over 1 term)
Two sequential one-semester calculus-based introductory physics courses designed for science and engineering students.
(Text: *Knight, Physics for Scientists and Engineers*)

Physics 151-152-153: Our 3-course Engineering sequence
151: Mechanics for Engineers (23 students over 2 terms)
(Text: Hibbeler, *Engineering Mechanics: Static and Dynamics*)
152: Oscillations and Waves, Fluids, Heat, and Thermodynamics (20 students over 2 terms)
153: Electricity and Magnetism, Circuits, and Radiation (12 students over 1 term)
(Text: *Knight, Physics for Scientists and Engineers*)

Physics 191: Introduction to Astronomy (18 students over 1 term)
(Text: Backman, *ASTRO*)

BCIT British Columbia Institute of Technology

James Brewer	BCIT	James_Brewer@bcit.ca

BCIT Physics Department

Additional information the written report provided during the meeting:

James Brewer was not present at the Articulation meeting. Jennifer Kirkey provided the extra information that he is looking into using an open textbook for the astronomy course. He will be working with Jennifer Kirkey to facilitate that.

Articulation Report, May 2018

The BCIT Physics Department has 11 full time faculty members, 3 technicians, and teaches around 1000 students in 17 different technologies.

This coming term our department will, for the first time, offer an astronomy course as a general education elective.

With the elimination of ABE fees, our part-time studies Grade 11 and 12 equivalency courses have been full.

James Brewer (jbrewer@bcit.ca)

Camosun College

Ed Nelson	Camosun College	nelson@camosun.ca

Additional to the written report provided during the meeting:

- Enrollment is steady, with help from international students. Summer physics offering (PHYS 105) may be cancelled.
- Looking into creating a tuition free course based on the high school grade 11 model due to provincial funding.
- Tried to offer a course in a high school, but enrollment was low, and it did not work.

Camosun College Department of Physics and Astronomy
Articulation Report - May 2018

At our Lansdowne campus, we offer college prep PHYS 101 as well as first year courses: PHYS 104/105 (algebra-based) and PHYS 140/141 (calculus-based) and enrollment in these courses has remained fairly steady. Very low enrollment in our condensed summer offerings of PHYS 105 and 141 may lead to cancellation of these sections for the first time in several years. We are noticing increased interest in Physics 104, which can be used as an entry requirement to college programs such as Medical Radiography and our 1st year Engineering Transfer.

Astronomy courses (ASTR 101/102) continue to attract students in large numbers and we have continued to maintain increased offerings with 3 sections per semester. The second-year courses at our Lansdowne Campus (PHYS 200, 210, 214 and 215) remain closed since 2010.

The department also delivers service courses that are restricted to students in certain career programs. We offer MRAD 165, a Radiology Physics and PHYS 160 (Biomechanics) as a service course for PISE (Pacific Institute for Sport Excellence).

Our remaining service courses are for various engineering programs offered at the Interurban campus and include engineering-restricted sections of PHYS 101 and 104 as well as courses focussing on mechanics, electricity and magnetism (PHYS 157), 2nd year electricity and magnetism (PHYS 210), renewable energy (PHYS 272) and waves, optics and E&M (PHYS 295). Additional sections of PHYS 140 and 141 planned for 2019 for students in the Civil Engineering Bridge to UVic have been put on indefinite hold along with the rest of that program.

We have recently been asked by the Dean of Arts and Science to develop a new, tuition-free 0-Level Physics 11-equivalent course. This course will serve as an alternate pre-requisite to PHYS 101 for entry to PHYS 104 and is being designed with the intent of being transferable on the ABE transfer grid. We anticipate that it will be a more rigorous course than the existing PHYS 101 owing to the need to cover additional topics for Physics 11 equivalency and we plan to continue to run 101 while the new course is piloted and student enrollment and success is gauged. It is anticipated that this new course will not lead to any overall growth in the department unless there is unexpectedly strong student demand as sections of the 0-level course will be added at the loss of sections of 101.

We have been attempting to find ways to better advertise and grow our department in recent years. Last Fall, we opened a section of PHYS 101 at the college's satellite campus in a wing of Belmont high school, but the course was cancelled (along with other science and math courses) due to dismal enrollment (the same as some other science and math courses). We are repeating the same experiment this Fall with a section of our non-majors ASTR 101 course, which appeals to a broader demographic. We are limited in our ability to develop new courses as there is little support for any new courses that are not university-transferable to other institutions (particularly UVic).

The demographic of the college is gradually changing. Over the past few years, Camosun has made a major effort to recruit international students to the college. The main issues that are observed here amongst science instructors are weak language skills and occasionally poor transfer credit assessment, with the result that some of these students are placed in courses that are too advanced for their abilities. There is a continuing trend of domestic students seeming to be more and more ill-prepared for the rigours of a full college workload and suffering from more mental health problems. Anecdotally, it seems that this is due, to a large

extent, to students having to work more than ever to afford to attend school as well decreasing standards in high school courses. Many students report heightened anxiety surrounding testing and faculty have been encouraged to find alternative means of evaluating students. Finally, some faculty have reported increased use of online webpages (e.g. Chegg.com, Slader.com) that offer completed solutions to homework, with the result that many students are simply passively copying from homework websites.

Looking beyond our department, the School of Arts and Science has a new dean, Debbie Hlady, coming from a background as Chair of the English department. As well, we have a new Associate Dean of Arts and Science, a position filled by Nasr Khalifa from the Chemistry Department.

Chris Avis and Ed Nelson
Department of Physics & Astronomy
Camosun College

Enrollment Numbers 2017 Fall – 2018 Summer

Fall	**Winter**	**Summer (As of April 5th)**
ASTR 101 – 54	ASTR 101 – 34	PHYS 101 – 28
ASTR 102 – 23	ASTR 102 – 61	PHYS 104 – 28
	PHYS 105 – 22	
PHYS 101 – 102	PHYS 101 – 51	PHYS 141 – 10
PHYS 104 – 94	PHYS 104 -104	
PHYS 140 – 64	PHYS 105 – 50	
	PHYS 140 – 23	
PHYS 210 – 47	PHYS 141 – 50	
	PHYS 157 – 36	
	PHYS 160 – 31	
	PHYS 272 – 53	
	PHYS 295 – 35	

Enrollment Numbers 2016 Fall – 2017 Summer

Fall	**Winter**	**Summer**
ASTR 101 – 50	ASTR 101 – 32	PHYS 101 – 28
ASTR 102 – 28	ASTR 102 – 49	PHYS 104 – 28
	PHYS 105 – 22	
PHYS 101 -120	PHYS 101 – 76	PHYS 141 – 10
PHYS 104 – 90	PHYS 104 -108	
PHYS 140 – 57	PHYS 105 – 53	
	PHYS 140 – 25	
PHYS 210 – 50	PHYS 141 – 38	
	PHYS 157 – 32	
	PHYS 160 – 33	
	PHYS 272 – 29	
	PHYS 295 – 39	

Capilano University

Lauren Moffatt	Capilano University	laurenmoffatt@capilanou.ca
Bruno Tomberli	Capilano University	brunotomberli@capilanou.ca

Addition to the written report provided during the meeting:

- Enrollment is stable.
- Labs have been changed from 2 hours to 3 hours. A new lab instructor was hired and is working out well. No new material added to labs, just additional time given to better reflect the time that students take to finish the labs.
- In the process of creating some new degrees (Heath, General Science, Data Science)
- A new course on "Physics of Fluids" is in development. This was a second-year course targeted at engineers that was developed in expectation of another program being approved.

CAPILANO UNIVERSITY

Capilano University Articulation Report - May 2018

This year we offered: Introductory Physics (PHYS 104 x3), "calculus-based" (PHYS 114 x5, 115 x3), Physics for Engineers (PHYS 116 x2), and our astronomy course ASTR (106 x2). Compared to 2016-2017 we are down one section of PHYS 110 and up one section of PHYS 114. The additional offering of PHYS 114 is to capture all the students who would have normally taken PHYS 110. The switch from PHYS 110 to PHYS 114 was due to low enrolment. The underlying cause of the PHYS 110 low enrolment is unknown.

For 2018-2019, we will be able to offer a similar course offering as 2017-2018 with a few modifications due to some changes in the Engineering Transition Program profile. The changes from 2017-2018 to 2017-2018 are summarized in the table below. The net result is an increase in PHYS 104 by one section.

	2017	2018		2018	2019
	Fall	Spring		Fall	Spring
Astr 106	1	1		1	1
Phys 104	2	1		3	1
Phys 114	3	2		2	3
Phys 115	1	2		1	2
Phys 116	1	1		1	1

We had changed the length of our Phys 114 and Phys 115 labs from two contact hours per week to three contact hours per week. This change was implemented in Fall 2017 and was successful and appreciated by lab faculty and students.

Total enrollments for PHYS courses remains consistent with 2016/2017. There was no change in textbooks used from 2016/2017.

Additionally, Capilano University is currently in the process of developing new degrees and I am attaching a prepared statement that we have been requested to present at all Articulation Meetings:

> "Capilano University is developing a Bachelor of Science – General degree. The Stage 1 proposal is currently under internal review and will be submitted to DQAB in late May or early June.
> The development of a B.Sc. is part of a strategy to increase the number of baccalaureate degrees offered by Capilano University. The university currently offers 12 undergraduate degrees, including a B.A. with a major in Liberal Studies, but we have no B.Sc. options for our students. As a special purpose teaching university serving the North Shore, Sunshine Coast, and Howe Sound region, the lack of such a fundamental degree is a significant gap in the university's ability to fulfil its mandate.
>
> Primary responsibility for developing the B.Sc. lies with the School of Science, Technology, Engineering and Mathematics (STEM). The proposed B.Sc. – General will establish a foundation and general framework for the development of specific majors, minors, and concentrations in the near

future. Proposals for majors in Biomedical Science, Data Science, and Environmental Technology have also received preliminary approval and are currently under development.

The proposed B.Sc. – General will be a standard 120 credit program, including a minimum of 30 upper-level credits in STEM disciplines. This flexible program can be tailored to a student's individual interests. The School of STEM currently offers first- and second-year courses in Applied Science, Biology, Chemistry, Computing and Data Science, Mathematics and Statistics, and Physics and Astronomy. We have the capacity to offer the first two years of a B.Sc. with enough flexibility to accommodate a variety of potential majors. Expanding to a full four-year program will require the development of upper-level courses across the STEM disciplines."

College of New Caledonia

Barbara Rudecki	College of New Caledonia	rudecki@cnc.bc.ca

Addition to the report provided during the meeting:

College of New Caledonia

- No changes to offerings, enrollment numbers are slightly lower.
- New developments should bring up numbers: there is a new sonographic program, and a civil engineering technology degree starting in 2020.

2018 Physics Articulation Report

CNC offers calculus-based (PHYS 101/102, PHYS 204) and algebra-based physics courses (PHYS 105/106) to accommodate first year engineering transfer and general science transfer programs.

Comparing to last year, we observed a decrease in enrolment in calculus based-physics and an increase in algebra-based physics.

PHYS 101 - Introductory Physics I - 33 students
PHYS 102 - Introductory Physics II - 18 students
PHYS 105 - General Physics I – 12 students
PHYS 106 - General Physics II - 7 students
PHYS 204 - Mechanics I Statics - 13 students

This year, algebra-based PHYS 105/106 courses were delivered via video

conference, with the lectures broadcasted from Quesnel to Prince George and the labs delivered locally in Quesnel and Prince George. We are continuing delivery of calculus-based PHYS 101/102 and the mechanics course PHYS 204 in both fall and spring semesters.

Physics Department also offers two physics courses for the Medical Radiography Program: PHYS 115 - Medical Radiography 1 and PHYS 225 - Medical Radiography 2. The delivery pattern was modified and starting with 2016 cohort both courses are 15 weeks long comparing to the previous 15 weeks for PHYS 115 and 20 weeks for PHYS 225. The maximum enrolment in these courses is based on the cohort admission, currently 18 students.

Two new programs are being currently developed at CNC: Sonography Program and Civil Engineering Technology Program. Sonography Program is scheduled to start in January 2019 and it will contain 3 physics courses in its curriculum, while Civil Engineering Technology Program is planned to start in September 2020 and it will have 2 physics courses.

Barbara Rudecki
Department of Physics & Applied Science
College of New Caledonia

College of the Rockies

Trevor Beugeling	College of the Rockies	TBeugeling@cotr.bc.ca

Addition to the report provided during the meeting:
Jim Bailey is retiring. Retirement project is learning the local first nations language and working with Jennifer Kirkey on some first nations material for Canadian edition of OpenStax astronomy textbook.

College of the Rockies Physics Articulation Report May 2018

Enrollment:
We had 30 students registered in our PHYS 103 course at the start of the fall semester. This number dropped to 22 by the end of the semester, with 19 of those passing the course.
PHYS 104 in the winter semester started with 15 students and dropped to 12 by the end of the semester (number who passed not yet determined).
We did not have any students this year registered in our second-year physics classes.

Changes to Faculty
We are currently in the process of hiring two new Math instructors (one full-time, one part-time), so there will be some new instructors for our math (and likely some physics) courses in the coming year.

Fun news:
Our annual spaghetti bridge contest this year had an entry that was able to support 145 pounds before breaking ("exploding" may be a better word…). The bridge itself, constructed using pasta noodles and epoxy, weighed in at just under 750 grams. Unfortunately, no video of the explosion.

Columbia College

Tara Todoruk	Columbia College	ttodoruk@columbiacollege.bc.ca

Addition to the report provided during the meeting:

- No major changes. 2nd year enrollment has declined but first year is stable.
- Hiring a new head of school.

Columbia College
Vancouver, Canada

2018 Physics & Astronomy Articulation Report

Columbia College is completing our fifth year at our new campus and enrollment is at a record high for the college. We have expanded our facility and have moved our English Language Center and our Secondary program into a building nearby. We have also expanded our secondary offerings to include Grade 10. Although the physics department has grown substantially over the past six years, over the past 3 or so, enrollment in physics has stabilized.
In 2017/18 Columbia College ran seven Physics courses, with six of them at the UT level and 1 at the secondary level:

- Physics 110 (Calculus based Newtonian Mechanics)
- Physics 120 (Calculus based Electricity and Magnetism)
- Physics 130 (Calculus based Optics and Thermodynamics)
- Physics 118 (Engineering Mechanics)
- Physics 205 (Thermal Physics)
- Physics 11
- Physics 12

The enrollment is fairly stable in our UT program. Throughout the 2017-2018 academic year, there has been a total of 3 sections of Physics 110 (approximately 15 students each), 3 sections of Physics 120 (approximately 10 students each), 3 sections of Physics 130 (approximately 16 students each), and 1 sections of Physics 118 (only 6 students). Our second-year enrollment is low, and Physics 205 was only offered one time, as a

directed study course. Physics 200 was not offered two times, but will be on the summer 2018 timetable. Typically Physics 200 and 205 are offered in alternating semesters.
Enrollment in Physics 11 is continuing to stay fairly low (11 students the last semester), and the enrollment in Physics 12 is still healthy with 24 students enrolled in the fall. Throughout the year, Physics 11 and 12 courses are offered in alternating semesters. We have started to look at ways to incorporate aspects of the new curriculum into teaching these courses.
We have prepared a second-year Electromagnetics course that we hope to offer in the 2018-2019 academic year and are preparing a basic physics for non-science students to be articulated.

Tara Todoruk Columbia College Vancouver, BC

Coquitlam College

Janusz Chrzanowski	Coquitlam College	janusz@coquitlamcollege.com

No representative was present at the meeting.

Coquitlam College 2017/18.

No changes in the Physics Curriculum at Coquitlam College. We continue to offer 1st year calculus-based Physics courses. Physics 101 (mechanics with an introduction to thermal Physics) is offered in the summer and the fall semesters, Physics 102 (electricity, magnetism and optics) is offered only once a year in the spring semester. At present, there are no plans for the second-year courses.

However, there have been significant changes in student demographics at Coquitlam College. During the past academic year, we observed a substantially increased influx of Indian students, with a rather stable number of Chinese and other international students. The overall enrolment of students at Coquitlam College has recently increased to almost 2700 students so that the administration of the College plans to open new pilot-campuses in Richmond and in Surrey.
The enrolment in Physics courses so far has been stable and good. As a rule, the classes of Physics 101 are full (40 students = 2 lab sections), and the number of students enrolled in Physics 102 ranges from 16 – 20.

Corpus Christi College

Alain Prat	Corpus Christi College	aprat@corpuschristi.ca

Additional information provided during the meeting

First time that Corpus Christi has attended articulation. Alain Prat received a warm welcome.

Background: Corpus Christi is a small two-year liberal arts catholic college on the UBC campus. It was founded in 1990 and has offered physics courses since 2010.

- Offers physics courses and introduction to astronomy course. About 10 students in each.

Report

Founded in 1990, Corpus Christi College is a Catholic two-year liberal arts college located on UBC's campus. The college offers over eighty courses in a variety of subjects, including one physics course and one astronomy course. Approximately 20% of the students at the college are international students.

Since 2010, Corpus Christi College has been offering a single physics course (PHYS 101: Energy and Waves). Enrolment in this course over the last three years has been steady with 11 students per offering. Since the Fall of 2015, the college has been able to offer the course on campus after purchasing permanent lab equipment for this course. There is currently no required textbook for PHYS 101.

In the summer of 2016, Corpus Christi College offered an introductory astronomy course for the first time, with 10 students enrolled in the course. This course will be offered again in the summer of 2018.
The course title is ASTR 210: Exploring the universe – The Solar System, and the textbook for the course is The Cosmic Perspective: The Solar System with Mastering Astronomy (8th edition) by Jeffrey O. Bennett, Megan O. Donahue, Nicholas Schneider and Mark Voit.

From their web page http://corpuschristi.ca/ A Brief History
1996: Corpus Christi is created as an undergraduate Catholic College, offering a two-year undergraduate program. The College is associated with Saint Mark's College, a Roman Catholic theological college affiliated to the University of British Columbia and founded in 1956 by the Congregation of St. Basil.
1999: 14 students enroll and start classes at the Corpus Christi campus, located at Saint Mark's College, just steps from UBC.
2000: Corpus Christi College receives program approval from the University Presidents' Council, thereby becoming an institutional member of the BC Transfer System.
MAY 2011: The province's Minister of Advanced Education confers on Corpus Christi the ability to grant a two-year Associate of Arts degree.

Douglas College

Jennifer Kirkey	Douglas College	kirkeyj@douglascollege.ca
Yulia Kvasnikova	Douglas College	kvasnikovai@douglascollege.ca
Will Gunton	Douglas College	guntonw@douglascollege.ca
Nakul Verma	Douglas College	verman@douglascollege.ca
Farhang Fana	Douglas College	fanaf@douglascollege.ca
Jim Scott	Douglas College	scottj@douglascollege.ca
Jared Cloutier	Douglas College	jclouti4@douglascollege.ca

Additional information provided at the meeting

We are glad to be your hosts this year

- Physics department is growing slowly, thanks to new engineering program. Also, seeing a better quality of students.
- Offering new course in modern physics as a guided study in the fall. Transfer to UBC has been approved, still waiting to hear from SFU.
- Some discussion about the new engineering program: What does education look like in a maker space? Want to approach teaching technical knowledge so students can apply this knowledge after they leave, rather than just replicating information.
- Looking for help with first Canadian edition of the astronomy book. Please talk to Jennifer Kirkey if you are interested in helping with this.

Number of Students and Faculty

We are bigger than we ever have been, with three full time faculty and two contract sections this summer. Due to modest expansion thanks to the new Engineering Program we will have four faculty members as of Fall 2018. We have two full time lab instructors who work during the day, and several contract lab instructors to help with the night time astronomy labs.

Course	Number of students	Change	Textbook
PHYS1104	108	Increase of 33% as one new section added Winter 2018	Open Stax College Physics - modified
PHYS1107 (algebra) (life science stream)	140	Same	Open Stax College Physics - modified
PHYS 1207 (algebra) (life science stream)	27	Same	Open Stax College Physics - modified
PHYS1110 (Calculus)	90	Increase of 2%	Halliday, Resnick and Walker
PHYS1210 (Calculus)	60	increase of 2%	Halliday, Resnick and Walker
PHYS 1170 Mechanics for Engineers	29	Same	Hibbeler
ASTR1105 (liberal arts majors)	120	Increase of 2%	OpenStax Astronomy - modified

We are using custom editions of the open source OpenStax textbooks.
We are focusing on a Canadian Edition of OpenStax Astronomy.
You can view it at https://pressbooks.bccampus.ca/astronomy2/
Please contact me if you would like to help with this project, or to modify it for your institutions. The publishing program is PressBooks. Relatively easy to learn and I will gladly help you with it, or just do some small edits for you. For example, I put the Course Outline directly into the book.

Second Year Courses

We have articulated two new second year courses – Classical Mechanics and Modern Physics. They will be run on a one by one "guided study" basis as we do not yet have enough demand. Every year we have two or three students who have completed our first-year physics courses but have stayed to do their second and third year math and chemistry courses, so they are looking for a second-year physics course.

Outreach and Elementary Schools

I do active outreach with Science World and the Scientist and Innovators in the Schools program. I visit an elementary school to do hands on science workshops about once a month. https://www.scienceworld.ca/sis
Douglas also offers MSTE, a Post-Graduate program for Elementary School teachers to help them with Math and Physics. Jennifer co-teaches one of the six courses in that program. This program runs as a cohort every two years, with about 20 people per cohort.
https://www.douglascollege.ca/programs-courses/catalogue/courses/MSTE

Evergreen Skytrain

The Evergreen Skytrain to Coquitlam stops across the street from our campus. It began running in December of 2016 but there has been no noticeable increase in our students. Enrolment in general Arts and Sciences has held steady – smaller than we would like. The Coquitlam campus is full as many Programs are held there, such as Nursing. A ride on the new Skytrain line and through the tunnel is quite an experience. If you attend the BCAPT meeting on Saturday, you can hear a presentation about Skytrain and geology. Once the Skytrain line opened we stopped offering courses via video-conference as a student can get easily between the campuses in less than one hour via public transit.

Expansion

Do stay around for the tour of the new expanded New Westminster campus and the new engineering prototyping labs. Jared Cloutier is our lab instructor for the ENGR program.

The college as a whole has increasing numbers. We are full. The College has rented space in the Anvil Centre just downhill from the main campus in New Westminster. It will house primarily Commerce and Business classes. The College owns land across 8th Street and while discussions of a new building are beginning, it will be many more years before that happens.

Kwantlen Polytechnic University

Takashi Sato	Kwantlen Polytechnic University	Takashi.Sato@kpu.ca
Michael Poon	Kwantlen Polytechnic University	Michael.poon@kpu.ca

Additional information provided at the meeting

- Update on new degree: Physics of Modern Technology. It has been rolled out in stages. Running fourth year courses this year. Third year students on work term last summer, was successful for students (some almost did not come back). First graduation in four weeks (with one student). Hoping will reach steady state after a few years.
- Have had success with running an online offering of PHYS 1110 labs. Students can take any permutation of online and in person and can attend lecture from any campus.
- Renovations to Surrey campus are ongoing.
- A discussion of the online lab followed. The course uses IO Labs, where the kits are borrowed from the library. The lab for the following week is posted on Sunday. A prelab quiz must be submitted by Wednesday night, and then the system releases the main part of the lab, to be completed by the following Sunday night. There are online office hours and some in campus drop in office hours. KPU would be willing to share their lab manual. Curriculum material is already posted on the internet as this information was presented at the July 2017 AAPT meeting. http://www.kpu.ca/physics/sato/AAPTCincinnati

Physics Articulation Committee – Institutional Report
Kwantlen Polytechnic University **April 2018**

Kwantlen Polytechnic University has campuses in Richmond, Surrey, Cloverdale and Langley and the Physics Department operates on three of them. At Langley Campus, PHYS 1400 & 1401 run as part of the long standing Environmental Protection Technology program. At Surrey and Richmond Campuses, we run our complement of first year courses in physics and engineering, as well as our various courses in astronomy for non-majors. In addition, Richmond Campus is home to the 2nd, 3rd and 4th year courses for the *B.Sc. Physics for Modern Technology*, as well as the upper level lab opened in September 2016.

Since my last report, the 3rd year students went on a work term (Summer 2017) and returned with positive reviews from employers. This spring, the *Physics for Modern Technology* program completed its initial roll-out with all courses through 4th year having run at least once and is now graduating our first 4th year student. The first year of this degree curriculum is a familiar mix of science courses but due to the very applied nature of this program, courses become specific for our degree from second year onwards. We see students transferring into our degree after (and during) first year fairly seamlessly but those arriving with some second and third year credits are seeing some glitches, as one normally would when changing majors mid-stream.

Last year, I also reported that an online lab section of PHYS 1100 was offered on a pilot basis. [Students perform experiments using home kits built around the IOLab (http://www.iolab.science/) and remotely operated equipment of the Remote Web-based Science Lab (RWSL) located at North Island College. The experiments generally paralleled those in the on-campus lab sections.] Building on this success, we have since then run two more online lab sections, one hybrid lecture section, and one online lecture section. While the hybrid may have been a one-time anomaly, the other offerings are being continued for 2018/2019.

Takashi Sato (for Jana Kolac)

Langara College

Bradley Hughes	Langara College	bhughes@langara.ca
Terrence (Terry) Coates	Langara College	tcoates@langara.ca

Additional information provided at the meeting

- Enrollment is high, sections have increased by 30% to 40% in the last two years. Dealing with some issues related to the growth of the international student population.
- Second year courses are still running, but enrollment is lower than hoped for.

Langara.
THE COLLEGE OF HIGHER LEARNING.

Langara College Physics and Astronomy
Articulation Report 2018
Submitted by Bradley Hughes: bhughes@langara.ca

Similar to other institutions, senior administrators at Langara College remain dedicated to defending successive governments' policy of minimal funding for public services in order to provide low taxes for the rich. Of course, they themselves benefit from the numerous tax cuts we have seen over the last couple of decades. The current implementation of this policy is the extortion of the funds necessary to run the institution from countries that are much poorer than Canada. For example, in Fall 2017, around one third of Langara students were international students, who were required to pay more than three quarters of the tuition fees that were collected. 71% of international students at Langara come from India and China; both countries are in the bottom half of countries when ranked by GDP per person. There is not yet any organized opposition on campus to this policy of extracting wealth from the poorer countries of the world in order to fund tax cuts to the richest members of the richest countries.

As a consequence of this policy, enrolments are up dramatically at Langara. The physics department has also increased the number of sections that we offer. This has resulted in hiring several new department members who are on temporary, and frequently, part time contracts. They are forced to work on as many campuses as will hire them, so we are constantly in danger of losing members of our department to full time work on

other campuses. Our newest colleagues are quite talented and contribute a lot to the department and to the college. The risk of losing them could be averted if they were hired for permanent, full-time positions the way the college hires into the seemingly endless stream of new administrative position that they create.

We had extremely strong first-year enrolments in the 2017-2018 academic year. We ran 46 sections of physics and astronomy courses; 8 in summer 2017, 19 in fall 2017 and 19 in spring 2018. This is two more than the previous year. We still had wait lists for some of the sections. We have 50% of each section (either 15 or 16 spaces per section) held for IE students. As we get closer to the semester starting date any unfilled IE spaces are opened up to domestic students on the wait list.

Astronomy Courses
We ran ASTR 1101/3310 (one half-section of 1101 (for Science students) and one-half section of 3310 (for Arts students)) in the fall with the similarly organized ASTR 1102/3311 course in the spring. Continuing the trend from previous years we are seeing a decline in enrolment for the 3310/3311 sections which may be due to the competition from a growing number of elective arts courses being offered at the college.

Introductory Courses
We ran 3 sections of PHYS 1114 (Grade 11 equivalent) in the fall and another 2 sections in the spring. Registration has held consistent in these courses although we are starting to have waitlists develop.
We ran 17 sections of PHYS 1118 (Grade 12 equivalent) which is our most popular course. We are seeing a huge increase in demand for this course as we have added multiple sections and still the wait lists are growing. This is primarily due to international students wanting to take the course. For this course, we use the OpenStax College Physics textbook, which is free to all students.

1st -Year Courses
We ran 10 sections of PHYS 1125 (Physics I with Calculus) and 3 sections of PHYS 1101 (Physics I for Life Sciences). PHYS 1125 is very popular and we have had wait lists for this course. For 1125 we ran 5 sections in the fall and 3 sections in the spring as well as 2 sections in the summer. For 1101 we run one section every semester. We are seeing declining interest in this course and we rarely have wait lists for it.
We ran 5 sections of PHYS 1225 (Physics II with Calculus). We are getting increasing enrolment in the spring semester (3 sections) as we have expanded our ENGT/ENGD programs and those students take the course in the spring semester. Demand for the course is much lighter in the other semesters.

2nd -Year Courses

We ran our 2nd -Year physics program again this year. In the fall semester, we had 12 students start in PHYS 2424 (Relativity and Quanta) and 5 students in PHYS 2309 (Intermediate Physics Lab I). In the spring semester, we had 8 students in PHYS 2323 (Newtonian Mechanics) and 4 students in PHYS 2409 (Intermediate Physics Lab II). This is a decline of around 20% or 30% from the previous years' enrolment.

Other Courses

We ran 2 sections of PHYS 1219 (Engineering Mechanics). We stopped offering it in the summer semester and fall semesters, so this is one less section than last year.

North Island College

Dennis Lightfoot	North Island College	Dennis.Lightfoot@nic.bc.ca

Additional information provided at the meeting

- Space science and astronomy course is running again, using OpenStax textbook.
- All of physics will be using OpenStax in the fall.
- Funding received through international department to develop a few second-year physics courses (EM and Quantum). This is due to demand from international students who want a two-year associate of science degree in math and/or physics.

NORTH ISLAND COLLEGE

NIC Physics Articulation Notes 2018

We have had no change in our physics offerings since last year. Our transfer courses in physics and astronomy are:

- PHY 100/101 – Algebra based physics, for life sciences
- PHY 120/121 – Calculus based physics, for engineers, physicists, and most chemists
- PHY 141/170 – Engineering Mechanics (PHY 141 transfers to UVic Engineering, and PHY 170 transfers to UBC Engineering).
- SSA 100/101 – Space Science and Astronomy for non-science majors

Enrollment in both streams of first year physics continue to be strong at our Courtenay Campus, and are modest but steady at Campbell River and Port Alberni campuses, where the courses are typically delivered by ITV (teleconference), with labs delivered face to face at each campus.

We will be switching to the Open STAX textbooks for both streams of first year physics for 2018/19 ("College Physics" for PHY 100/101, and "University Physics" for PHY 120/121).

Our Space Science and Astronomy courses were revived last year, and are going to be offered again this year. The course will be offered by ITV into our Port Alberni and Campbell River campuses, and will also be offered as dual credit to some high schools in our region. We are using the Open STAX astronomy textbook.

Northwest Community College soon to be Coast Mountain College

Regan Sibbald	North West Community College	rsibbald@nwcc.bc.ca

Additional information received at the meeting

- Name is changing to Coast Mountain College. Coast Mountain (singular – one mountain) not Coast Mountains as in the original report.
- Enrollment is small, and they will be offering a combined algebra / calculus-based section for the first half of semester. There is some concern about running a combined section. Any advice on ideas of tips and tricks to make this work would be appreciated.
- A discussion followed about teaching algebra and calculus-based physics at the same time. Many just teach the calculus version and tell the algebra students they don't need to know certain information. Retention of algebra student increased when courses where split up. Another suggestion was to have calculus-based students attend an additional hour long focused tutorial for the calculus specific part of the course.

Northwest Community College Physics and Astronomy Articulation Report 2018

Northwest Community College (NWCC) serves the rich and diverse communities and learners of BC's beautiful northwest region including Haida Gwaii and the Great Bear Rain Forest. We are undergoing a name change to Coast Mountain College this year.

We continue to run one section of algebra based physics 101/102at the Prince Rupert Campus and one section of calculus based physics 121/122 (advanced physics) and one section of physics 101/102 at the campus in Terrace. At the Terrace campus, the students for 101/102 and 121/122 share the same lab time. At both campuses, the class sizes are maxed out at 18 which is the maximum permitted in our lab. Both courses have 3 hours of lecture and 3 hours of lab each

week for fourteen weeks and then one week for final exams in each term (Fall and Winter). Most of our advanced physics students continue in an engineering program at another institution.

Due to low enrolment, the first half (7 weeks) of physics 101 and 121 will be combined and they will separate into two classes at that time. There will be no change in curriculum, and we will be using OpenStax textbooks this year for both courses again. We are currently re-writing our course outlines due to a new format required by our Dean and will submit them later this year.

Regan Sibbald
College Professor - Physics and Mathematics
NWCC Terrace
rsibbald@nwcc.bc.ca (250) 635-6511 ext. 5253

Northern Light College

Lisa Verbisky	Northern Lights College	lverbisky@nlc.bc.ca

No one was present at articulation because last year no one was teaching physics. They will be hiring a physics instructor this year. As of April 2018, the NLC web site was advertising a Certificate in Engineering, including a physics course.

Here is an email from the Associate Dean sent on May 1 2018
NLC will be posting a job soon. When we post, we will be posting for delivery in Sept of Physics 103, development of Physics 104, and for anyone who also has programming skills, delivery of CPSC 122. This would be followed by delivery of Physics 104 in January along with delivery of NCIT 212. It would approach full time temporary employment in fall and would be about half time in winter.
We should have postings out shortly and course outlines can be found on this webpage:
http://www.nlc.bc.ca/Programs/All-Programs-Alphabetical/UAS-Certificate-in-Engineering-Studies

Lisa Verbisky, M.Sc., Inst. Dip.
Northern Lights College
Associate Dean, Academic and Vocational Programs
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Okanagan College

Ryan Ransom	Okanagan College	RRansom@okanagan.bc.ca

Additional information provided at the meeting:

- Ryan Ransom and Robert Statz from Okanagan joined us.
- Harlow Shapley speaker. You pay $300 US to get a great speaker. Details at this URL:
- https://aas.org/content/harlow-shapley-visiting-lectureships-astronomy
- Labs with a high number of international students have some challenges regarding plagiarism, and attrition rate has risen.
- Some second-year course offerings (thermal physics in fall, modern physics in winter). There is a hope to offer a full set of second year courses.
- Offering Astrobiology in the fall, and "History of the Universe" in the winter.
- Held a special winter lecture with UBCO. Looking to do this more often. Open invitation to other institutions for tours.
- Seeing significant January intake, and are offering many first semester courses in the second semester to deal with these students.

Okanagan College – 2017/18 Physics & Astronomy Articulation Report

Okanagan College has four campuses: Kelowna, Penticton, Vernon, and Salmon Arm. Kelowna is our largest campus, making up ~65% of Arts & Science students.

A quick look at OC's recent enrollment history:

Associate of Science Applications: All terms, all campuses					
	2013-14	2014-15	2015-16	2016-17	2017-18
Applied	663	629	742	773	993
Enrolled	284	273	294	319	395

Enrollment notes:

- An influx of International students from India to our Kelowna campus accounts for most of the ~24% increase in Associate of Science enrollments between 2016/17 and 2017/18. (We see a similar increase in Associate of Arts enrollments.)
- First-year Physics numbers were up 23% overall. Our calculus-based courses (OC PHYS 111/121) were up 19%, while our algebra-based courses (OC PHYS 112/122) were up 27%. In Kelowna, our calculus-based sections were at 93% capacity in the fall semester (50 students, 54 available seats), while our algebra-based sections were at 90% capacity (65 students, 72 available seats). Attrition between the first and second semester was 29% in PHYS 111/121 and 24% in PHYS 112/122, which is a little higher than normal. The success rate for our International students is a concern.
- We offered three second-year Physics courses on our Kelowna campus again this year: Modern Physics (OC PHYS 200), with 6 students compared to last year's 4; Thermodynamics (OC PHYS 215), with 18 students compared to last year's 15; and Engineering Mechanics (OC PHYS 202), with 8 students compared to last year's 5. The Thermodynamics course is part of the ELEN and CIEN "Bridge" programs into UBC-O Engineering. The Engineering Mechanics course is part of the Engineering stream in Applied Science.
- First-year Astronomy numbers were up 9% overall. Our Astronomy courses (OC ASTR 11X/12X) draw both Arts and Science students.
- We offered two second-year Astronomy courses on our Kelowna campus again this year: Astrobiology (OC ASTR 220), with 14 students matching last year's 14; and History of Cosmology (OC ASTR 230), with 23 students compared to last year's 25. These courses draw Arts, Science, and Business students.

A quick look at applications:

- Applications in Science are up 31% (!) for Fall 2018 compared to Fall 2017 (for the same April 4 reporting date).

- Applications in Arts are up 9% for Fall 2018 compared to Fall 2017 (for the same April 4 reporting date).

Activities that enhance student learning:

- Our department participates in the CAP Lecture Series and the AAS-sponsored Harlow Shapley Lecture Series. The speakers usually visit one or more classrooms and give one or more public presentations. Our CAP speaker this winter was Ken Clark from Queen's University. Our Harlow Shapley speaker this past fall was Alessondra "Sondy" Springmann from the University of Arizona.
- Our department co-hosted (with UBC-O's Physics & Astronomy department) a free public lecture to celebrate the opening of the Canadian Hydrogen Intensity Mapping Experiment (CHIME) at the Dominion Radio Astrophysical Observatory (DRAO). The event drew 160 guests.
- Our department conducts tours each semester of DRAO. This winter, we opened the tour to UBC-O students and to senior high school students. We had 75 students/guests.

News related to student success:

- One of our 2nd-year physics students will be featured in the 2018/19 OC Viewbook. He is passionate about all things physics, and, despite significant physical challenges, has a GPA in his 2nd year of 95%.

Personnel changes:

- We have ongoing part-time to full-time term work on the Kelowna campus. The posting for the 2018/19 term work closes on April 22. We are looking for applicants with strong teaching skills who would enjoy teaching both lectures and laboratories.

Sincerely, Ryan Ransom

Selkirk College

Elroy Switlishloff	Selkirk College	elroys@telus.net
Jason Nickel	Selkirk College	jnickel@selkirk.ca

Selkirk College

Physics and Astronomy Articulation Report May 2018

Selkirk College serves the West Kootenay region of BC and continues to offer the same physics courses in 2017-2018 as in the previous five years. Our physics courses serve students in the first-year engineering transfer program, the rural pre-medicine program, as well as students enrolled in general arts and science. No major changes occurred to the physics courses this year.

The courses offered include:

- PHYS 102/103 – Algebra-based.
- PHYS 104/105 – Calculus-based.
- PHYS 200 – Engineering Mechanics - Statics.
- Astronomy 102 (not offered since 2013).

Textbooks remain the same for the past five years:

- *Physics* (9th ed.) by Cutnell & Johnson, for 102/103.
- *Fundamentals of Physics* (10th ed.) by Walker et al., for 104/105.
- *Statics and Dynamics* (13th ed.) by Hibbler, R.C., for 200.

Enrollment in physics courses at the Castlegar campus is steady, at approx. 55 students completing both the fall and winter semesters. We ran a near-full engineering program for the third year in a row. We expect similar enrollment for the upcoming year.

- Would like to redesign physics lab environment. Looking for advice on what is working or not working at different institutions.

Simon Fraser University

Barbara Frisken	Simon Fraser University	frisken@sfu.ca

Additional information provided at the meeting:

- Hosting the CAP Canadian Association of Physics conference from June 4-8 2019
- Have started using "Flip-It Physics", which is a type of just in time teaching. The package is bought from the publisher (about $80/semester) which includes pre-lecture material, homework assignment and an electronic text.

SFU Departmental Report 2018

There have been no major curriculum changes in the past year. We are using the need to develop educational goals (learning outcomes) to review curriculum in our programs. We will concentrate on our course sequences in quantum mechanics, electricity and magnetism, etc. Our current focus is on our sequence of laboratory courses.

First-year Textbook Summary:
Physics 100 (physics 12): OpenStax College Physics
Physics 101/102 (life sciences): Giancoli - Physics: Principles with applications
Physics 120/121 (calculus): Flipit Physics + Tipler (optional)
Physics 125/126 (enriched): Halliday, Resnick and Krane
Physics 140/141 (studio, calculus): Flipit Physics + Tipler (optional)

Enrolment is steady at all levels, with strong numbers particularly in second year

courses.

Barbara Frisken, Undergraduate Chair, Dept. of Physics, SFU

List of Textbooks

Course		Title	Edition/Year	Author
PHYS 100	Introduction to Physics	OpenStax College Physics	SFU	OpenStax
PHYS 101/102	Physics for the Life Sciences I & II	Physics: Principles with Applications	7th/2015	Giancoli
PHYS 120	Mechanics and Modern Physics	FLIPIT PHYSICS	1st/2016	
PHYS 140	Studio Physics-Mechanics			
PHYS 121	Optics E+M	Tipler (recommended)	1st/2012	
PHYS 140	Studio Physics - E+M			
PHYS 125	Mechanics and Relativity	Physics	5th/2001	Halliday, Resnick and Krane
PHYS 126	Electricity, Magnetism and Light			
PHYS 132/133	Physics Laboratory I & II	Measurements and their uncertainties: a practical guide to modern error analysis	1st/2010	Hughes and Hase
PHYS 190	Intro to Astronomy	Astronomy	2nd/2015	Ghose
PHYS 201	Undergraduate Seminar	No textbook		
PHYS 211	Intermediate Mechanics	Classical Mechanics	1st/2014	Taylor
PHYS 231/233	Physics Laboratory III & IV	Measurements and their uncertainties: a practical guide to modern error analysis	1st/2009	Hughes and Hase
PHYS 255	Vibrations and Waves	Vibrations and Waves	1/1971	French
PHYS 285	Relativity/Quantum Mechanics	Modern Physics	6/2012	Tipler
PHYS 321	Intermediate Electricity Magnetism	Introduction to Electrodynamics	4/2013	Griffiths
PHYS 326	Electronics/Instrumentation	Electronic Principles	8/2015	Malvino
PHYS 332W	Optics Lab	Statistics: A Guide to the Use of Statistical Methods in the Physical Sciences	1/1993	Barlow
PHYS344	Thermal Physics	An Introduction to Thermal Physics	1/1994	Schroeder
PHYS 347	Intro. To Biological Physics	Physical Biology of the Cell	2/2012	Phillips
PHYS 365	Semiconductor Device	Semiconductor Physics and Devices	4/2011	Neamen
PHYS 384	Methods of Theoretical Physics	Mathematical Physics	1/2016	Butkov
PHYS 385	Quantum Mechanics I	Modern Approach to Quantum Mechanics	Feb-12	Townsend
PHYS 390	Introduction to Astrophysics	Introduction to Cosmology	1/2002	Ryden
		Extragalactic Astronomy & Cosmology	2/2015	Schneider/Springer
PHYS 395	Computational Physics	Numerical Recipes		Press et al.
PHYS 413	Advanced Mechanics	Mechanics (V1)	3/1976	Landau
		Classical Mechanics	3/2002	Goldstein
PHYS 415	Quantum Mechanics II	Modern Approach to Quantum Mechanics	2/2012	Townsend
PHYS 421	Electromagnetic Waves	Introduction to Electrodynamics	4/2013	Griffiths
PHYS 431	Advanced Physics Lab	No textbook		
PHYS 433/833	Biological Physics Laboratory	Statistics: A Guide to the Use of Statistical Methods in the Physical Sciences	1/1993	Malvino
PHYS 445	Statistical Physics	Statistics and Thermal Physics	1/2010	Gould
PHYS 455/855	Modern Physics	Optical Physics	4/2010	Lipson
PHYS 465	Solid State Physics	The Oxford Solid State Basics	1/2013	Simon
PHYS 485/871	Particle Physics	Modern Particle Physics	1/2013	Thomson

		Introduction to Elementary Particles	2/2008	Griffiths
PHYS490/881	Relativity and Gravitation	Spacetime and Geometry: An Introduction to General Relativity	1/2003	Carroll
		Gravity: An Introduction to Einstein's General Relativity	1/2002	Hartle
PHYS 492/881	HEP Techniques	Particle Detectors	2/2008	Grupen
		Introduction to Experimental Particle Physics	1/1989	Fernow

Thompson Rivers University

George Weremczuk	Thompson Rivers University	Gweremczuk@tru.ca

Additional information provided at the meeting:

- Stable enrollments. Calculus based course back up to historical levels. In previous years, students were advised to take algebra-based physics unless they required calculus based. Students were also recommended (from high school) to put of first year physics to later years. These recommendations from high school appear to have now changed.
- Commitment to redevelop first year labs, away from confirmation experiments to focusing on experimental techniques.
- Are now offering a software engineering program, which will likely result in an increase in enrollment in service courses.

Physics Articulation Report 2018

Enrollments

Enrollments have been relatively stable except for a notable change: enrollment in the calculus-based Physics 1150 and 1250 doubled. After departmental consultation, academic advisors are advising students who have completed Physics 12 in high school to take the calculus-based courses. Previously, they were advising students to take the “easier” algebra-based courses if they weren’t planning to go into physics, probably to increase student success.

Enrollment numbers are listed in the following tables. Numbers in parentheses are enrollment numbers for 2016-17. Upper-level course run on a two-year cycle.

Fall Semester	
ASTR 1140 – The Solar System	61 (63)
EPHY 1150 – Physics for Engineers 1	52 (57)
PHYS 1010 – Physics for Future Leaders	44 (32)
PHYS 1100 – Fundamentals of Physics 1	105 (99)
PHYS 1150 – Mechanics and Waves	55 (28)
PHYS 1510 – Applied Physics 1	34 (23)
PHYS 1580 – Physics for Respiratory Therapists	48 (48)
PHYS 2000 – Relativity and Quanta	16 (10)
PHYS 2150 – Circuit Analysis*	19 (15)
PHYS 3090 – Analogue Electronics	9
PHYS 3140 – Fluids	13
PHYS 3160– Classical and Statistical Thermodynamics	12

Winter Semester	
ASTR 1150 – Stars and Galaxies	75 (57)
EPHY 1250 – Physics for Engineers 2	47 (50)
EPHY 1700 –Engineering Mechanics	45 (47)
EPHY 1990 – Introduction to Engineering Measurements	43 (52)
PHYS 1200 – Fundamentals of Physics 2	67 (74)
PHYS 1250 – Thermodynamics, Electricity and Magnetism	35 (16)
PHYS 1610 – Applied Physics 2	33 (23)
PHYS 2200 – Mechanics	11 (7)
PHYS 2250 – Intermediate Electromagnetism*	12 (13)
PHYS 3100 – Digital Electronics*	15 (12)
PHYS 3150 – Physics of Materials	10
PHYS 3200 – Advanced Mechanics	9

* Courses that are also part of the 2nd-year engineering transfer program.

This year about 40 % of the algebra-based Physics 1100 and 1200 enrollment consisted of second-year and higher students. Students are deferring the B.Sc.-required physics courses to later years. This trend does not occur in the calculus-based courses. Enrollment in first-year physics is considerably lower than enrollments in first-year chemistry and biology.

We will be graduating three physics major students this year.

News

Thompson Rivers University now has an engineering degree program. The initial field will be software engineering but it is hoped to eventually add computer and electrical engineering. TRU should be considered a destination university for engineering.

Plans

A faculty member has been granted a sabbatical leave to revamp the first-year physics laboratories. In line with current physics education research there would be a move away from confirmation-type experiments toward quantitative

inquiry. The labs will be designed to first present students with basic tools (statistics, uncertainties, scientific methodology). Subsequent labs will be designed such that students employ those tools and learn to make decisions and conclusions based on measurements, in essence apply scientific methodology. One significant change in the lab pedagogy is to provide students with straightforward measurements to allow students time to review and reflect on their results and, most importantly, allow students time to re-take measurements. We will be looking at UBC's first-year labs as an example.

Texts used:

PHYS 1100 - OpenStax College Physics and OpenStax College Physics for AP Courses. Next year, may include Schaum's Outline of College Physics, 11th Edition by Bueche and Hecht

PHYS 1150 - Physics for Scientists and Engineers, R.A. Serway and J.W. Jewett, 8^{th} edition

PHYS 1200 - OpenStax College Physics

PHYS 1250 - Physics for Scientists and Engineers, R.A. Serway and J.W. Jewett, 8^{th} edition

PHYS 1580 - College Physics, P.P. Urone, R. Hinrichs, K. Dirks and M. Sharma, OpenStax,

PHYS 2000 - Modern Physics, Randy Harris, Pearson/Addison-Wesley, 2nd ed.

PHYS 2150 – Electric Circuits, Richard C. Dorf, James A. Svoboda, Wiley, any edition

PHYS 2200 - Analytical Mechanics, G.R. Fowles and G.L. Cassiday, Thomson Learning Inc., 7th edition

PHYS 3080 – Hecht's Optics and Pedrotti's Optics

PHYS 3090 – Electronic Devices and Circuits, Theodore F. Bogart, Jeffrey S. Beasley, Guillermo Rico, Prentice Hall

PHYS 3100 - Digital Design, M. Morris Mano, Michael D. Ciletti, Pearson

PHYS 3200 - Classical Mechanics, John R. Taylor 2005, University Science Books

PHYS 3250 – Introductions to Electrodynamics, David J. Griffiths, Prentice Hall

PHYS 4140 - Dunlap's An Introduction to the Physics of Nuclei and Particles, and Krane's Introduction to Nuclear Physics

ASTR 1140/1150 - OpensStax Astronomy text.

Trinity Western University

Additional information provided at the meeting:

- No student failed either fall or spring. Lab marks and assignment marks were good.
- Offered an astronomy class and a conceptual modern physics for non-science students.
- Arnold Sikkema is on sabbatical next year. Rick Sutcliffe will be the acting chair.

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Physics at Trinity Western University

Report for the BC Articulation Committee Meeting

by Dr. Arnold E. Sikkema, Professor of Physics
Chair of the Mathematical Sciences Department, Trinity Western University

- TWU Physics mainly serves our B.Sc. programmes in Biology and Chemistry, as well as our pre-engineering options.
- Physics is part of our Department of Mathematical Sciences, which includes math, computing science, physics, pre-engineering.
- Enrolment in our first-year calculus-based physics sequence (with lab) was again a little below normal for the fall (47) & spring (27), with 0 (!) & *x* failing (the value of *x* TBD but likely non-zero). We are using Mazur, *Principles & Practice of Physics*, and have continued to use *MasteringPhysics* for these courses.
- All our other courses are offered on an alternate year basis, to allow students to complete a minor or concentration, with zero to three graduating per year with these options (zero this year).

- Enrolments in 2017-18 were:
  - 111: Fundamentals of Physics I: 47
  - 112: Fundamentals of Physics II: 27
  - 360: Optics (with lab): 2
- Courses planned for Fall 2018 are:
  - 111: Fundamentals of Physics I
  - 341: Advanced Physical Chemistry (with lab, and cross-listed with Chemistry)
- Courses planned for Spring 2019 are:
  - 112: Fundamentals of Physics II
  - 310: Topics in Modern Physics (possibly)
- Arnold Sikkema will be on sabbatical during 2018-19; Prof. Rick Sutcliffe rsutc@twu.ca (Professor of Mathematics & Computing Science) will be acting Chair of the Mathematical Sciences Department and acting Coordinator of Physics. Please contact him for any articulation-related matters.

- Along with the Canadian Scientific & Christian Affiliation, TWU is hosting a conference on science & Christianity (May 11-14, 2018) www.csca.ca/may2018 including physics speaker from Perimeter Institute, TRIUMF, and McMaster. There is also a special separate opportunity for the public (including you!) to hear physics-inspired music of the cosmos by the Isotone Ensemble from Oak Ridge, TN (composed by Janet Danielson of SFU) plus a lecture by Canadian climate scientist Katharine Hayhoe on May 12 www.SkyGala.com. (Ticket sales end May 6.)

University of British Columbia – Okanagan

Murray Neuman	University of British Columbia-Okanagan	Murray.neuman@ubc.ca

Additional information provided at the meeting

- First year course offerings have been reorganized. Switched from traditional algebra and calculus-based organization to life science and physical science-based organization.
- Both steams include tutorials for students who have not taken Physics 12 (and are optional for those that do have Physics 12). Student satisfaction scores have increased.
- Students with a grade of over 80% in Physics 12 and Math 12 are no longer forced to take the calculus-based physics. They can now choose which offering they want to take.

During the past academic year, first-year Physics enrolments have increased by about 9% over 2016-17. In the fall term, combined enrolments in the life-science and physical-science streams amounted to 694 (vs 632 last year), and in the spring term the combined total was 535 (vs 493 last year). The attrition between first and second term is about the same as last year, at about 23%. There were 97 enrolments in first-year Astronomy in the fall semester, and 66 in the spring semester.

Second-year enrolments in Physics are up sharply, but upper-year numbers are down somewhat, in comparison to 2016-17. Second-year class sizes ranged from 23 to 66, averaging to 39 (versus 29 last year), showing a robust recovery from a dip experienced last year. Upper-level class sizes ranged from 7 to 32, averaging

to 15 (versus 19 last year), the decrease echoing the previous year's dip in 2nd-year numbers. Another reason for this apparent decrease is that two sparsely populated upper-level courses, which were previously offered on a biennial rotation, are now being given annually, as they have newly been made mandatory for Honours students. The number of students graduating in Physics this year is 14 in total (3 in Honours, 10 in the Major, none in the Minor, and one in the Combined Math/Physics Major). This is down considerably from last year's total of 24 graduates, which was however anomalously high.

A major curriculum and organizational change took effect this past year in our first-year Physics program. The division into algebra-based and calculus-based streams has been replaced by a division into life-science and physical-science streams, both at least nominally calculus-based. Previously, students with better than 80% in both Physics 12 and Math 12 had been forced to take the calculus-based courses; now this rule has been removed and students are permitted to choose courses based just on personal preference. Both streams are henceforth treated on an equal footing as prerequisites for further Physics courses. Weekly one-hour tutorials were previously required in the algebra-based courses, and not in the calculus-based courses. Now, tutorials are required for students in either stream who did not take Physics 12, and optional for students who did. (About 60% of all students took the tutorials this year.) By at least some measures, we have seen an improvement in outcomes. For the past several years, we have been conducting Force Concept Inventory assessments in our first-year courses, both pre-course and post-course. This year, in our life-science-stream classes, we have seen significantly greater gains in FCI scores (post- versus pre-course) than in previous years' algebra-based classes. On the other hand, we have not found any change in the gains for the physical-science-based courses. This is perhaps not surprising, as the physical-science-stream courses are very little changed from their calculus-based predecessors.

Murray Neuman

Associate Professor Physics, UBC Okanagan

University of British Columbia – Vancouver

Tom Mattison	University of British Columbia-Vancouver	Mattison@physics.ubc.ca

Additional information provided at the meeting:

- 1500 students in main stream first year science with about 100 4th and 5th year Physics students.
- 3rd year courses are growing, with class sizes of about 150 students. They are large enough that they cannot be taught at an honors levels, and it would be better to split into a "majors" and "honors" stream, but this would require an increased teaching load.
- Construction updates: HEBB Tower is being gutted and redone. The main lecture hall in Henning's has been rebuilt. It is no longer a theater style, but now built in more of a studio style with different levels and monitors over the walls.

UBC-Vancouver Physics & Astronomy Articulation Committee Report

Tom Mattison May 2, 2018

There are currently 125 students in Physics or Astronomy degree programs in 4th year (or above), compared to 94 (2017), 92 (2016), 69 (2015), 93 (2014), 93 (2013), and 79 (2012). They are: 60 majors physics or astronomy, 16 honours biophysics, 20 combined-honours physics, 16 honours physics or astronomy, and 13 combined-major physics & computer science.

There are 67 students (21 of them female) who have applied to graduate this year (37 majors, 30 honours), compared to 56 (2017), 59 (2016), 46 (2015), 70 (2014), 57 (2013), and 49 (2012). We also graduate about 50 students in engineering-physics each year.

It is difficult to extract the average time students spend getting a degree from the registration system. If half of the students graduate in 4 years and the other half

in 5 years, the number of 4th year and above students would be 50% greater than the number graduating each year, which is about what we observe on average.

The second-year lab course PHYS 219, which is required for both majors and honours in both physics and astronomy, and is taken by very few other students, is a good measure of students intending to get a physics degree, and retention of them. Students in 4th year now took it in 2016. Enrollment this year was 106, vs 101 (2017), 131 (2016), 92 (2015), 99 (2014), and 76 (2013). Nearly all of the 2016 students are still in physics this year, although we should expect the cohort size to go down a bit in the next years.

We have about 800 engineering students in PHYS 170, 157, 158, and the lab course 159 each year.

PHYS 101 enrollment was 1423, compared to 1416 last year, 1353 in 2016 and 1671 (in 2015, before PHYS 117 was created). The vast majority of these are life-science students.

The enriched PHYS 107 enrollment was 88 this year, vs 98 (2017), 95 (2016), and 99 (2015). PHYS 108 enrollment was 83 this year, vs 94 (2017), 83 (2016), and 77 (2015).

PHYS 117 (mechanics for physical sciences) enrollment was 267, vs 291 (2017) and 229 (2016). PHYS 118 (E&M) enrollment was 315, vs 379 (2017), 427 (2016) and 532 (as PHYS 102 in 2015). PHYS 119 (lab) enrollment was 224, vs 236 (2017) and 228 (2016).

In the “Vantage College” program for foreign students needing extra help with English language, PHYS 117V enrollment was 96, vs 102 (2017), 83 (2016), 102 (as PHYS 107V in 2015). Enrollment in PHYS 119V was 41, compared to 62 (2017), 76 (2016), 86 (as PHYS 109V in 2015).

Enrollment in ASTR 310 for Arts students was 99 compared to 110 (2017), 143 (2016), 97 (2015), 106 (2014), 184 (2013). Enrollment in ASTR 311 was 63 compared to 70 (2017), 61 (2016), 55 (2015), 97 (2014), 146 (2013). We had 76 additional students in the distance-education version of ASTR 311, compared to 81 (2017) and 32 (2016).

University of the Fraser Valley

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Norm Taylor	University of the Fraser Valley	norm.taylor@ufv.ca
Peter Mulhern	University of the Fraser Valley	Peter.Mulhern@ufv.ca

Additional information provided at the meeting:

- New department head: Norm Taylor
- Marginal drop in first year enrollment (both in Physics and Engineering)
- Some departments have realized that many students end up in medicine and have started to lobby to remove physics as a requirement.

University of the Fraser Valley Articulation Report - May 2018

- UFV continues to offer Honours, Major, and Minor degrees in Physics, and also a diploma in Engineering Physics (Mechatronics). We have a faculty of 5 permanent lecturers, and two permanent lab instructors. This past year we were again allotted two Limited Term Appointments (LTA) which covered lecture sections, while another 3 sessionals covered primarily lab sections. We have been granted only a single LTA for the coming year, and with no new hire on the horizon, we will be relying heavily on sessionals for the next year (at least 7 lecture sections and an even larger number of lab sections).
- The first-year algebra based Physics textbook we use is the free OpenStax College Physics, while our calculus based textbook is still University Physics with Modern Physics Technology Update w/Mastering Physics by Young and Freedman. As far as I am aware, we have had no problems with the OpenStax textbook, and we will continue to use it this coming year.
- The numbers in our first-year courses is down this past year: from 126 to 91 in Algebra based courses (two courses in 3 sections), and from 309 to 291 in

Calculus based courses (two courses with multiple sections). Our second-year numbers improved from 76 to 96 (4 single-section courses), and our upper level courses also increased from 130 to 173 (9 single-section courses).

- The numbers for the Diploma were dramatically down this year due to the low intake numbers in the Fall. In fact, we had to cancel the course for the second year of the program due to low intake numbers in Fall 2016 (we would have run 5 full courses for maybe 7 students). This was not really an issue, as all of the Diploma students also want a Physics major, so they took Physics courses this year rather than next. This next year we should have a full cohort of 18 students in their final year of the Diploma (the 7 from last year and another dozen or so from the 2017 intake). Thus, next year we expect a very large graduating class.
- This year we expect to have 12 Major graduates, 4 Minor graduates, and 3 Diploma graduates. This is comparable to last year, where we had 8 Majors, 3 Minors, and 14 Diploma graduates – with the lower number of Diploma graduates being the big difference. But as mentioned previously, we expect to make that up next year.
- Our Program Review was completed in May of 2017, and we have already begun implementing some of the suggestions made by the external review committee. Alas, the possibility of a new (and recommended) hire still eludes us. We have also begun looking into the possibility of offering a degree in Engineering Physics (another recommendation), and we may have news on that for the next Articulation meeting.

Some questions did arise from our Program Review, three of which we thought might be good discussion items for the meeting.

1. What is the current structure of the Physics Honours and/or Double Majors degrees amongst the group? To be specific, how many credits for the programs, and how many can be in common for a double major? We are getting pressure from Administration to reduce the number of required credits to be more in line with other Honours programs at UFV (from the current 132 down to 120). And they also do not like our current credit reduction for double majors (we require two less upper level Physics courses if they want to add on a second major in Science).

2. What is the structure of lab courses at the 2nd year level? How many, and are they optional or required? We currently have labs associated with our Intermediate Mechanics course, as well as our Waves and Optics course. We also have one stand-alone lab course. Only the Mechanics course is currently required by our programs.
3. What sort of lab technician support do other institutions have? That is, is this done by faculty, or are there specific technicians who do this? We currently have a 2.5 section release for our two Lab Instructors as compensation for performing lab tech duties.

- The renovations that were supposed to be finished by the end of Summer 2017 are still not quite done. There were issues with the contractors, and several things ended up being substandard which had to be fixed. We are almost there, but it took far longer than it had to. Overall the improvements are aesthetically nice, but not generally worth the cost, inconvenience, and hassle of packing/unpacking.
- Our Dean of Science was on leave this past year, so we had an interim Dean who was a member of the Math department. The Dean is due back in August from her leave, and there were no major issues in her absence. We did get some Capital funding, and managed to acquire a few new scopes, radioactivity counters, and other electronic items. This is in addition to the PCB machine and laser cutter we got at the end of last years' budget.
- My tenure as Department Head is up at the end of June, and Norm Taylor has been elected to serve out the next 3-year term as Head.

Respectfully submitted by Jeff Chizma

University of the Fraser Valley Physics department

University of Northern British Columbia

George Jones	University of Northern British Columbia	George.jones@unbc.ca

Additional information provided at the meeting:

- Grade 12 equivalent course is now using OpenStax. Astronomy also used OpenStax, with a review left on the BC Campus website. It is an okay book. Need some additional topics. Jennifer Kirkey commented that she is working on the 1st Canadian Edition for BCcampus and will be in touch with the UNBC instructor to see what is needed.
- UNBC will be offering a full engineering program, which means more physics courses and lab sections (35 seats for each program)

University of Northern British Columbia Physics Department

2018 Articulation Report

UNBC offers a full physics program, and no major curriculum changes were made during 2017/2018.

In January 2018, it was announced that the University of Northern British Columbia will get full programs in both civil and environmental engineering. Each program will have 35 seats in each year. This should increase enrollment in first-year calculus-based lectures and labs by 35 students, starting in Fall 2019.

In 2016/17, OpenStax was used for the first time in the physics 12 equivalency course, and in 2017/2018 OpenStax was used for the first time in Astronomy. Overall verdict: good, but not quite as polished as “traditional” texts. The UNBC Astronomy instructor, Erik Jensen, has a detailed review on the bccampus.ca

website, https://open.bccampus.ca/find-open-textbooks/?uuid=aa7e4991-20af-489b-8fb1-fdbe155b9702

Enrolment

	2015-2016	2016-2017	2017-2018	% change
Physics 115 (physics 12)	61	68	74	+11
Physics 110/111 (calculus-based)	149	131	134	+2
Physics 100/101 (algebra-based)	156	172	200	+16
ASTR 120/121 (Astronomy)	32	39	37	-5
Physics 150 (Physics for Future Leaders)	26	10	10	0
Second-Year (four-course total)	18	32	30	-6

Textbooks

	2016-2017	2017-2018
Physics 115 (physics 12)	*College Physics*: OpenStax	*College Physics*: OpenStax
Physics 110/111 (calculus-based)	*Physics for Scientists and Engineers*, Serway and Jewett	*Physics for Scientists and Engineers*, Serway and Jewett
Physics 100/101 (algebra-based)	*College Physics*, Serway and Vuille	*College Physics*, Serway and Vuille
ASTR 120/121 (Astronomy)	*Astronomy Today*, Chaisson and McMillan	*Astronomy*, OpenStax
Physics 150 (Physics for Future Leaders)	*Physics and Technology for Future Presidents*, Muller	*Physics and Technology for Future Presidents*, Muller

George Jones Department of Physics
University of Northern British Columbia

University of Victoria

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Additional information provided at the meeting

- First year two term algebra-based course was offered in two parts (first and second term). Enrollment in second term dropped by about 35%. Possible reasons: Some programs only require the first term, or students in past years could make up issues in the first term during the second term. First draft of learning outcomes was just a split of the original course
- Engineering faculty will not let students advance to 2nd year unless they receive above a C.
- New "Programming in Python" course co-taught by an astronomer and math professor.

A discussion followed on issues of physics department offering computer science courses. At some institutions, this is not possible. In a more general sense, there is a feeling from other departments that they can teach the required physics from within their own departments, and the physics course is not necessary. In some cases, new courses are considered "zero sum", potentially taking away students from other areas.

University of Victoria

UVic 1st and 2nd year PHYS and ASTR articulation report, April 2018

1st year PHYS:

There were no significant changes in our offerings this past year.
Our calculus-based survey offerings have stable enrolment, but there is continuing decline in the enrolment of in courses aimed at students intending to continue in Physics or Astronomy.
Investigation of registration patterns revealed that the decline is not due to less students intending to do PHYS or ASTR, but rather less students in other departments taking the "for physics" course.

Effective September 2017 we split PHYS 102 into PHYS 102A and 102B. There were no significant changes in content or scheduling. The transfer guide system was updated so

courses that combined to be PHYS 102 now, together, go to PHYS 102A and 102B. There was a significant decrease in number of students completing the two-term sequence after this split.

Effective September 2017 we stopped using Mastering Physics for assignments in PHYS 110 and 111. We used UVic's Moodle-based platform, and saw no significant change in assignment completion rates or course marks

Effective September 2017 we changed the textbook for PHYS 110 to one written from scratch by UVic faculty. We are working on a similar text for PHYS 111 and intend/hope to use it for the first time in January 2019.

Courses offered:

PHYS 102A (first term) and 102B (second term) – An algebra-based survey of physics.
Normally offered Sept-April. *Formerly a two-term course PHYS 102.*

Primary Audience: Biology students

Text: Serway (algebra based, latest edition) Enrolment:

Initially around 500.

Final enrolment PHYS 102A: Fall
2017: 473

Final enrolment PHYS 102B:
Spring 2018: 330 (!)

End of term PHYS 102 enrolments: '17- 410 '16- 413, '15- 446, '14- 399, '13- 436

Topics: Mechanics and energetics, oscillatory and wave motion, fluids, thermodynamics, electricity and magnetism, optics, modern physics

PHYS 110 (first term) and 111 (second term) – A calculus-based survey of physics
PHYS 110 offered Fall (Sept) and Spring (Jan)
PHYS 111 offered Spring (Jan) and Summer (May) Primary

Audience: Natural Science and Engineering students Text: UVic locally-written text and supplements.

Enrolment: Initial (fall) enrolment peaks at 750-800 Final enrolment PHYS 110:
Fall 2017: 556 ('16: 599, '15: 606, '14: 609, '13: 566)
Spring 2018: 156 ('17: 162, '16: 154, '15 159, '14: 134)

Final enrolment PHYS 111:
Spring 2018: 490 ('17: 448, '16: 460, '15: 473, '14: 435)
Summer 2018: 92 ('17: 71, '16: 84, '15: 87, '14: 73)

Topics: As for 102, with limited content on fluids and electromagnetism 110 – Mechanics, conservation laws, electric and magnetic forces

111 – Thermodynamics, oscillatory and wave motion, optics, modern physics

PHYS 120 (first term) and 130 (second term) – Physics for Physicists and Astronomers Normally offered Fall (120) and Spring (130)

Primary Audience: Prospective major/honours students
Text: Young and Freedman – University Physics with Modern Physics (latest edition)
Enrollment: Used to peak near 100
Final enrolment 120: 57 ('16: 74, '15: 88, '14: 104, '13: 106, '12: 116)
Final enrolment 130: 42 ('17: 49, '16: 58, '15: 68, '14: 72, '13: 66)
Topics: As for 102 omitting Electricity and Magnetism and Thermodynamics 120 – mechanics and special relativity
130 – rotational motion, oscillatory motion, waves, modern physics

2nd year PHYS:

The University of Victoria offers a number of second year Physics courses, four of which are common to all our undergraduate programs. Enrollment have been relatively stable for the past years.
Three significant changes came to our programs effective fall 2017:

Introduced an experimental physics course PHYS 229. The calendar description of the course is: *Principals and techniques of experiment design and measurement, systematic and statistical uncertainties, data acquisition, analysis and the dissemination of knowledge. Laboratory experiments focus on the use of electronics, instrumentation, and optical systems fundamental to experimental physics.* This course replaces a laboratory electronics course PHYS 214 in all programs.

Thermodynamics was moved to 3rd year and renumbered as PHYS 317 (from 217). Students who have credit (e.g. via transfer) for PHYS 217 are exempted from the named- course requirement for 317, but must satisfy UVic's rules about number of senior courses.

New 2nd year course numbered PHYS 248 offered in partnership with MATH. The course title is *Computer Assisted Mathematics and Physics.* The calendar description is *Use of a high-level computer language for mathematical and scientific experimentation, simulation, and calculation. Programming of mathematics using available functions and routines and also writing short programs for symbolic and numerical computations, visualization, graphical output, and data management. The goal is to become competent with a high-level mathematics language and to practice programming in such a language. Emphasis on hands-on coding for experimentation in a variety of mathematical and physical contexts.* This course will be required in essentially all programs.

Courses offered:

PHYS 210 (also EOS 210) – Geophysics
Normally offered in the fall.
Primary Audience: PHYS/EOS combined program students
Text: Selections from several books, including Lillie – Whole Earth Geophysics
Enrolment: About 60 (20 as PHYS, 40 as EOS).

Enrolment: 2016: 63 ('15: 51, '14: 54, '13: 46, '12: 46, '11: 41)

PHYS 215 – Introductory Quantum Physics
Normally offered in the spring.
Primary Audience: PHYS and ASTR major and honours students Text: Varies depending on instructor, usually Thornton and Rex
Enrolment-Spring: 2017: 49 (‘17: 42, ’16: 46, ‘15: 35, ‘14: 32, ‘13: 48, ‘12: 44)

PHYS 216 – Introductory Electricity and Magnetism
Normally offered in the fall – offered this summer in compressed form. Primary Audience: PHYS and ASTR major and honours students, and Engineers Text: Excerpts from Young and Freedman – we are looking for a better text.
Enrolment: 2017: 73 (’16: 64, ’15: 67, ’14: 53, ‘13: 54, ‘12: 61, ‘11: 53)

PHYS 248 – Computer Programming in Math and Physics
Normally offered in the spring. Offered as a “trial” in 2015 and 2016. Required in MATH effective 2016/17 year.
Required in PHYS effective 2017/18 year.
Primary Audience: PHYS, ASTR, and MATH major and honours students Text: None standardized
Enrolment-Spring: 2018: Math 24 Physics 32 (‘17: Math 22, Phys 5, ’16: 10, ’15: 7)

1st year ASTR:

The University of Victoria offers three 1st year Astronomy courses, two intended for non-majors and one that is the first course in our ASTR progression.
The number of sections of ASTR 101 and 102 offered has changed in response to the recent retirement of a long-serving staff member.

Courses offered:

ASTR 101 and 102 – Astronomy for non-specialists (101-Solar System, 102-

Cosmology/Stars) Primary Audience: General interest
Text: Varies depending on instructor
Enrolment: About 150-180/term in ASTR 101; About 100-120/term in ASTR 102. Summer offering about 60-80.

ASTR 150 – Concepts in Astronomy
Primary Audience: Astronomy major/honours students Text: Varies depending on instructor
Normally offered in the spring.
Enrollment: 2018: 50 (‘17: 61, ’16: 72, ‘15: 83, ‘14: 67, ‘13: 55, ‘12: 45)

2nd year ASTR:

The University of Victoria offers three second-year Astronomy courses, one intended for general interest, and two that form part of our ASTR program. ASTR 201 is a recently developed course.

Courses offered:

ASTR 201 – Search for Life in the Universe Primary Audience: General interest
Text: Readings
Enrolment: 50-70. Normally offered in the fall.

ASTR 250 – Introductory Astrophysics
Primary Audience: ASTR major/honours students Text: Freedman and Kaufman - Universe
Enrolment: 2017: 27 (‘16: 24, ’15: 33, ‘14: 24, ‘13: 30, ‘12: 21, ‘11: 20)
Normally offered in the fall.

ASTR 255 – Planetary Science
Primary Audience: ASTR major/honours students Text: Varies depending on instructor
Enrollment: 2018: 9 (‘17: 15, ’16: 11, ‘15: 10, ‘14: 11, ‘13: 16, ‘12: 10)
Normally offered in the spring.

Vancouver Community College

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Additional information presented at the meeting:

- Looking at starting an associate of science degree. Initial focus will be on biology but may lead to a physics option is enrollment is stable.

Report to UT Physics and Astronomy Articulation 2018
Vancouver Community College

As mentioned last year, Mechanics 1 (PHYS 1170) has been added to the engineering certificate at VCC. This course transfers to UBC as PHYS 170. We attempted to run a section of this course in May 2017 but it was cancelled due to low enrollment. We are offering it again in May 2018 in a 'double-block' format (condensed into 2 months). So far enrolment is good and it looks like it will run (students can continue to register right up until the start of May).

We ran one section of the first half of our calculus-based 1st year physics (PHYS 1100) in fall 2017 which had strong enrolment. In winter 2018 we ran one section of the second half (PHYS 1200) and one section of PHYS 1100.

Finally, we attempted to run a section of our new Introduction to Astronomy (PHYS 1110) course in fall 2017. Although there was some interest it was cancelled. This course is for non-science students.

Vancouver Island University

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Additional information provided at the meeting:

- Funding approved for an engineering program. This should impact the physics department positively
- Have found difficulty getting traction with interdisciplinary courses. Popular courses cancelled because it was not captured within a program. If you can't link a course to a program, it does not stick around.

VANCOUVER ISLAND
UNIVERSITY

Vancouver Island University report to the Physics Articulation Meeting

1. Student numbers were down about 15% in our 1st year: Life sciences courses (P111/P112) numbered 74/42 this year and 86/57 last year. Calculus-based courses (P121/P122) numbered 63/48 this year and 71/54 last year. The calculus- based physics enrolment is strongly dependent on engineering enrolment, which was down this past year compared to the year before.

2. Astronomy continues to run two 1st year (solar system, stars & galaxies) & two 3rd year (cosmology, history). The 3rd year courses continue to remain well subscribed, and first-year enrolment have increased from last year correcting the decline we saw in 2016/17 (this year 103; last year 90).

3. SCIE 350 (Technologies for the Developing World) was run for the second year, and has seen numbers grow. This course has been generally under threat, as it lies outside any program's requirements. Indeed, we have recently been informed that this course has been cancelled for 2018/19. We are hopeful that this decision will be reversed in time for students to enroll (enrolment this year 16; last year 11).

Yukon College soon to be Yukon University

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Yukon College Articulation Report

There is a steady enrolment of about 8 students.

The Physics Department at Yukon College is comprised of one full-time faculty member and two first-year level courses with labs:
Physics 101 – Introductory Physics I (5 students)
Physics 102 – Introductory Physics II (3 students)

Other news:

- The college has received CAQC approval to become Yukon University as well as approval for our first made-in-Yukon degree in Indigenous Governance. University legislation is expected in 2020 or 2021.
- We're going to space! The college's own Yukon Research Centre was successful with our proposal to the Canadian Space Agency for a Yukon CubeSat project. We are currently building a team of Yukon College students to be able to launch our first satellite into orbit in 2021.

From their web page https://www.yukoncollege.yk.ca/
500 College Drive, PO Box 2799 Whitehorse, Yukon Y1A 5K4
(867) 668-8800 or 1-800-661-0504

http://yukonuniversity.ca/yukonu

At the request of the Government of Yukon, Yukon College is preparing to become Yukon University (YukonU). Several years ago, Yukon College Board of Governors and staff members spent 18 months researching, visiting and meeting

with leaders from more than 60 institutions and organizations around the world, and learned a number of valuable lessons. These lessons guide the institution as we move forward in our planning and development.

The Model: When Yukon College transitions, Yukon University will be what is referred to as a hybrid university – a flexible, post-secondary institution that includes a place and a pathway for every learner, including: adult basic education and upgrading, trades and vocational training certificates and diplomas or degree and post-graduate programs.

University of Alberta

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No representative at articulation this year.

Report from Engineering Articulation

University of Alberta Faculty of Engineering

Contacts:
Dr. Tim Joseph, Associate Dean Co-op and Student Services
Torrey Dance, Strategic Advisor to the Associate Dean Co-op and Student Services

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

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

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

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

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