Physics and Astronomy Articulation Minutes – May 6 2022 - DRAFT

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Physics and Astronomy Articulation Minutes 2022

May 6 2022

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

This was a Hybrid meeting via Zoom and in person at the University of Victoria, Clearihue Building, Room B017.

	9:30 Am start	We began this meeting by respectfully recognizing we are gathered today on First Nation's traditional unceded territory. Everyone paused to think about whose lands they were currently occupying.
#1	9:35	Welcome and Introductions. People were invited to show us your pet or your favourite hot beverage mug. Bobo the beagle won the before break cuteness award. Second prize went to a mug from the Unemployed Philosopher's Guild that was covered with equations.. The after break cuteness award went to Robert Stutz from Okanagan College who presented his report while holding his baby on his lap.
#2	9:40	Approval of the Agenda (Moved: Mark Laidlaw/Seconded: Morteza Ghadirian) Passed by consensus.
#3	9:42 am	Approval of the Minutes (Moved: Jennifer Kirkey /Seconded: Mark Laidlaw/ passed by consensus. Visit the BCCAT web page to view these https://www.bccat.ca/articulation/committees/phys-astr

#4	9:45 am	Review of courses in the system that are still waiting transfer. The list was reviewed and the following comments were made. The chair urged everyone to please do what they need to do to get the transfer completed. A call or email to your Registrar might prove useful. CAPU ASTR300 is a "Life in the Universe" course that is co-taught with biology faculty. No math. None, so CAPU is not expecting a third year transfer, if any. A general SCIE ?XXX might be appropriate depending on your institutions. CAPU PHYS 300 Environmental Thermodynamics CAPU PHYS 310 Environmental Physics Lab where the labs are relevant to the Clean Technology and Environmental Science, CNC PHYS105 and 106 – just a minor update - same as the previous course. The outlines had not been updated in about ten years and had to go through the CNC system, but there were no changes so institutions should give them the same transfer credit as they had before.

Course	Pending	Submitted	Expires
CCC PHYS 119 (1)	20: CAPU, COLU, COQU, COTR, NIC, NLC, NVIT, CMTN, SFU, TWU, UBCV, UNBC, UVIC, VCC, UBCO, OC, YVU, FDU, QU, FIC	22 April 2022	Apr 22 2023
COTR PHYS 202 (3)	1: VIU	08 February 2022	Feb 8 2023
COTR PHYS 201 (3)	1: VIU	08 February 2022	Feb 8 2023
COTR PHYS 103 (3)	2: VIU, TWU	08 February 2022	Feb 8 2023
CNC PHYS 106 (3)	12: CAPU, COQU, KPU, LANG, VIU, NIC, CMTN, SELK, SFU, TWU, ALEX, QU	19 January 2022	Jan 19 2023
CNC PHYS 105 (3)	13: CAPU, KPU, LANG, VIU, NIC, CMTN, SELK, SFU, TWU, VCC, UBCO, ALEX, QU	19 January 2022	Jan 19 2023
ALEX PHYS 143 (3)	7: CAMO, CAPU, CNC, LANG, NVIT, CMTN, TWU	07 October 2021	Oct 7 2022
COTR PHYS 104 (3)	4: CAPU, LANG, NVIT, SELK	13 July 2021	Jul 13 2022
COTR PHYS 103 (3)	4: CAPU, LANG, NVIT, SELK	13 July 2021	Jul 13 2022
CAPU PHYS 310 (4)	6: EC, KPU, LANG, NVIT, SELK, QU	17 May 2021	May 17 2022
CAPU PHYS 300 (3)	5: EC, LANG, NVIT, SELK, QU	17 May 2021	May 17 2022

The chair noted that there were several transfers pending from NVIT = Nicola Valley Institute of Technology. We have not had an articulation representative from them in the past. There

		had not been a reply from recent inquiries about who might be the representative. James Brewer from BCIT said that as NVIT has a building on the Burnaby campus he will try to contact someone there. If anyone knows anyone from NVIT please contact the chair.
#5	9:50 Am	BCCAT SLP (System Liaison Person) report. Brian Chapell is Dean of Science and Tech at Douglas College and has been our SLP for one year. chapelld@douglascollege.ca/ He gave our committee a warm welcome. He has been Associate Dean and then Dean for 10 years in the system, but was the SLP for Sports Science before becoming the PHYS-ASTR SLP. He reported out on some system issues. 1) that domestic enrolments across the system have dropped a little bit. 2) Equity, Diversity and Inclusion (EDI) is increasingly important 3) New accessibility legislation is being rolled out. Lab sciences and field trip need to be aware of the new legislation. 4) Indigenization of the curriculum. Astronomy has developed some resources in this area. 5) Physics has been an OER leader. BC Deans of Arts and Science Programs (BCDASP) is a committee that meets twice a year to discuss system wide concerns. They issued a broad statement of support for Open Educational Resources (OER) The Dean are not trying to dictate what you use in your courses as that falls under academic freedom, but wanted to express their support for OER and that the Deans do not have any concern about the quality or transferability of OER. Here is the exact wording from the BCDASP *In supporting faculty choice in educational resources, the BC Deans of Arts and Science Programs also support and encourage the use, creation, and adaptation of Open Educational Resources (OERs) that contribute to the quality of the student experience in post-secondary arts and science courses.* *As a group, the BC Deans of Arts and Science recognize that teaching Open Educational Resources minimize the cost of learning for students, promoting equity in education and creating an opportunity to improve classroom preparedness.*

		Open Educational Resources also allow faculty to customize their classroom resources, present local examples, showcase their expertise, and collaborate with their peers.
#6	9:55 am	BCCAT update by Anna Tikina, atikina@bccat.ca. https://www.bccat.ca/articulation/resources is where you can find information about how Articulation Committees work and the Terms of Reference under which we operate. Please see the BCCAT Spring Update at https://www.bccat.ca/pubs/Resources/ACUpdate202204.pdf Anna showed off her coffee mug that had an inspirational saying about health and happiness. She reviewed the Spring update and pointed out the Indigenization and EDI initiatives that have been undertaken by BCCAT. The Provincial Government has launched a funding review of Post-Secondary Education, the first in many years, and we might want to keep an eye on this. The Transfer Guide has been updated and new technology makes it easier to use with more features. Her ending statement was an encouragement for us to consider hybrid meetings to accommodate members not being able or not being comfortable meeting in person due to the effects of the pandemic.
#7	10:00 - 10:45	Institutional reports. Highlights or additions to the written reports that have been circulated electronically before this meeting. 2 minutes per institution. See the attached reports.
#8	10:45	10:45 am – 11:00 am break time.
#9	11:00 - 12:00	Institutional reports (continued)
#10	12:05	WeBWorK questions for PHYSIII in the Common Core. PHYSIII = PHYS170 at UBC-V. Update on this project led by Agnes d'Entremont from UBC agnes.dentremont@mech.ubc.ca and Jennifer Kirkey from Douglas College. You are urged to check out the textbook at http://mechanicsmap.psu.edu/ and the

		1000+ open source images at https://commons.wikimedia.org/wiki/Category:OER_Mechanics_Images_by_UBC_Engineering_and_Douglas_College_Physics_and_Astronomy BCCampus blog on this project at https://bccampus.ca/2022/04/06/quality-through-collaboration-open-problems-and-images-for-physics/ Jennifer Kirkey used this textbook for Douglas PHYS1170 = UBC PHYS 170 = PHYSIII in the Common Core last semester. It is just fine. No students complained. The WeBWorK questions are very good. Mark Laidlaw from UVIC commented that they had switched to WeBWorK for their first year courses and it was well worth it. A bit of a steep learning curve but better than any commercial system. It used PERL and LaTeX. "It is a pickup truck" by what he meant that WeBWorK is not fancy but it gets you from point A to point B reliably at a fraction of the cost of a commercial system. Feel free to contact him for more information for this work.
#11	12:10 pm	Location for Friday May 5 2023 meeting. Regan Sibbald from Coast Mountain College will be very happy to host us and show off the new physics labs that will be finished by then. Action: Everyone: Regan, our 2023 host, urged us to purchase plane tickets more than three months before. In 2024 we will be back in the Lower Mainland. BCIT and Langara have been suggested but they need to contact their Deans. Action: Jennifer will confirm this and inform the committee in June about the 2024 options.
#12	12:13 pm	Chair election – No one else put their name forward so Jennifer Kirkey will do this for one more year.
#13	12:15	Articulation between BC institutions. Mark Paetkau from TRU keeps getting requests to review other BC courses from which have already been articulated into the data base and wondered if was common among other institutions. The short answer is no. A few other institutions said they get about one a year. There was some discussion that after 10 years without a transfer it might trigger an automatic review. Anna Tikina

		from BCCAT said many BC Transfer System institutions have policies which consider courses older than 10 years too old for transfer. Perhaps, courses were sent for re-articulation when they had "aged". However, it was not possible to say for sure without knowing the details of the situation.
#12	12:20 am	Indigenizing the physics curriculum. This request came from UFV but I am certain many of us have had this request from their institution. Any suggestions on how to indigenize upper year courses? UFV Administration is ***requiring*** this to be done in ***each course*** by the University. No one else had this strongly worded direction from their administration. Douglas College encourages it, but no edict. Brian Chapell our SLP said that there was nothing sector wide. Action: SLP Brian Chapell will contact the Council of BC Arts and Sciences Deans. Capilano has a new astronomy course which is an Introduction to Cosmology. Bruno Tomberli stated how the purpose of the course was to show how the scientific method used evidence to chance our cosmological view from geocentric to heliocentric specifically and in general away from traditional cosmological world views. Faculty need training in this – on how not to belittle beliefs while teaching the scientific method. Ben Tippett from COTR has been working on indigenizing his astronomy course which is a science course for non-science students, in which they study about the history of beliefs. Depending on the First Nations sometimes astronomical traditional knowledge is sacred information that is NOT to be shared. Due to the Colonial history of Canada we are not in any position to go out and demand that information. You are urged to check out BCCAT Report: Pathways Partnerships with Indigenous Post-Secondary Institutions at https://www.bccat.ca/intro/PathwaysPartnerships2021 and the BCcampus Indigenization Pulling Together Guides https://bccampus.ca/projects/indigenization/indigenization-guides/. The book, Blackfoot Physics: A Journey into the Native American Universe by David Peat, is particularly good for teaching about quantum mechanics. UFV brought the discussion back to the question of "Is anyone else being forced to do this for ***every*** course?" VCC Andy Sellwood has been doing this type of work for the last five years at the VCC

		Teaching and Learning Centre. VCC and Capilano U said this is "strongly encouraged" but not mandatory. BCcampus has many resource on indigenization. Can we set up a Community of Practice with the members of articulation. Action: Jennifer pledges to set this in the Moodle course shell. Action: Dean Brian Chapell our SLP said he would ask about this at the BC Council of Deans of Arts and Sciences.
#13	12:30 pm	Sharing of midterm exams. The PHYS-ASTR committee has a Moodle site thank to BCCAT. Action: Jennifer will start a folder on this to share some midterms. Midterms as most students are handed them back, unlike most final exams so they are already "out there". You can access this courser at Moodle.bcccat.ca/login/index.php. Anna Tikina from BCCAT asked us all to self-enrol in the course. BCCAT will help with tech support. Action: Jennifer will put the past minutes there as well and share with the email list-serve once there is content there. Dean Brian Chapell reminded everyone that all faculty should be explicit about if you are sharing the exam just for articulation review or are you also sharing the question. Be clear about licensing and copyright; Action: Jennifer will share resources on copyright. Mark Laidlaw form U VIC, our gracious hosts, asked for this to be put on the agenda. "What if we (institutions) made available to each other representative midterms from our 1st year courses? The context for this idea was a discussion between Physics and Engineering; in it the comment came out that "we don't know how much this is really covered even if the outline says it is". Actual (or near-actual) midterms would do the job of showing the level and content a lot faster than just talking."
#14	12:40	Enrollment over the last year. COTR had a big dip in enrollment in first year (calculus based) physics which has persisted into the 2021-2022 term. Furthermore, COTR saw a fairly large attrition rate in its first year calculus courses. Rumour in our local community has it that fewer high school students (during the pandemic) were willing to take more challenging math and

		physics courses; but other instructors attribute it to the changing high school math curriculum. Is this a provincial trend or just a regional thing? Enrolment was covered by each institution in its update. See the attached reports. Action: Dean Brian Chapell our SLP said he would get information from both his Institutional Research Office and the BC Deans of Arts and Sciences and will share the results with this group.
#15	12 50	Astronomy final project versus final exam discussion. Ben Tippet from COTR did a final project this last year where students had to show the connections they made in the topics. He feels it was better than a traditional exam for assessing the learning. He will make up and share a Rubric. There were 16 students in the course. He will work on a rubric to be shared. This was successful. The discussion was that it is likely to work better in small courses and those like astronomy which are for liberal arts majors.
#18	12:55	Adjournment

Attendance

Attending	Report			
Online	Yes	Kelly Cheung	Alexander College	Kellycheung5@gmail.com
Online	Yes	James Brewer	BCIT	James_Brewer@bcit.ca
In person	Yes	Stephanie Ingraham	Camosun College	ingrahams@camosun.bc.ca
		~~Lauren Moffatt~~	~~Capilano University~~	~~laurenmoffatt@capilanou.ca~~
In person	Yes	Bruno Tomberli	Capilano University	brunotomberli@capilanou.ca
online	Yes	Regan Sibbald	Coast Mountain College	rsibbald@coastmountaincollege.ca
Online	Yes	Barbara Rudecki	College of New Caledonia	rudecki@cnc.bc.ca
Online	Yes	Ben Tippett	College of the Rockies	Btippett@cotr.bc.ca

Online	Yes	Vladan Jovovoic	Columbia College	vjovovic@columbiacollege.ca
Online	Yes	Janusz Chrzanowski	Coquitlam College	janusz@coquitlamcollege.com
Online	Yes	Saeed Faraji	Coquitlam College	sfaraji@coquitlamcollege.com
Online	Yes	Alain Prat	Corpus Christi College	aprat@corpuschristi.ca
In person	Yes	Jennifer Kirkey	Douglas College	kirkeyj@douglascollege.ca
Online	Yes	Will Gunton	Douglas College	guntonw@douglascollege.ca
Online	Yes	Peter Smith	Fraser International College	smip@learning.fraseric.ca
Online	Yes	Takashi Sato	Kwantlen Polytechnic University	Takashi.Sato@kpu.ca
Online	Yes	Tyron Tsui	Langara College	ttsui@langara.ca
Online	Yes	Charles Cue	LaSalle College	ccue@lasallecollegevancouver.com
			Nicola Valley Institute of Technology	
Online	Yes	Dennis Lightfoot	North Island College	Dennis.Lightfoot@nic.bc.ca
In person	Yes	Morteza Ghadirian	Northern Lights college	mghadirian@nlc.bc.ca
		~~Kevin Douglas~~	~~Okanagan College~~	~~kdouglas@okanagan.bc.ca~~
Online	Yes	Robert Stutz	Okanagan College	rstutz@okanagan.bc.ca
Online	Yes	Andrew Hamilton	Quest University	Andrew.hamilton@questu.ca
online	Yes	Jason Nickel	Selkirk College	jnickel@selkirk.ca
online	Yes	Eldon Emberly	Simon Fraser University	eemberly@sfu.ca
In person	Yes	Mark Paetkau	Thompson Rivers University	mpaetkau@tru.ca
online	Yes	Arnold Sikkema	Trinity Western University	Arnold.Sikkema@twu.ca

online	Yes	Christina Haston	University of British Columbia-Okanagan	Christina.haston@ubc.ca
online	Yes	Tom Mattison	University of British Columbia-Vancouver	Mattison@physics.ubc.ca
online	Yes	Erik Korolenko	University Canada West	erik.korolenko@ucanwest.ca
online	Yes	Peter Mulhern	University of the Fraser Valley	Peter.Mulhern@ufv.ca
In person	Yes	Lin Long	University of the Fraser Valley	Lin.long@ufv.ca
online	Yes	George Jones	University of Northern British Columbia	George.jones@unbc.ca
In person	Yes	Mark Laidlaw	University of Victoria	laidlaw@uvic.ca
online	Yes	Andy Sellwood	Vancouver Community College	asellwood@vcc.ca
In person	Yes	Brian Dick	Vancouver Island University	Brian.Dick@viu.ca
		~~Jaclyn Semple~~	~~Yukon University~~	~~jsemple@yukonu.ca~~

Attending online

Brian Chapell, Dean of Science and Technology, Douglas College
BCCAT System Liaison Person for PHYS-ASTR Articulation
bchapell@douglascollege.ca

Anna Tikina,
Director of Research and Admissions, BCCAT
atikina@bccat.ca (604) 412-7790

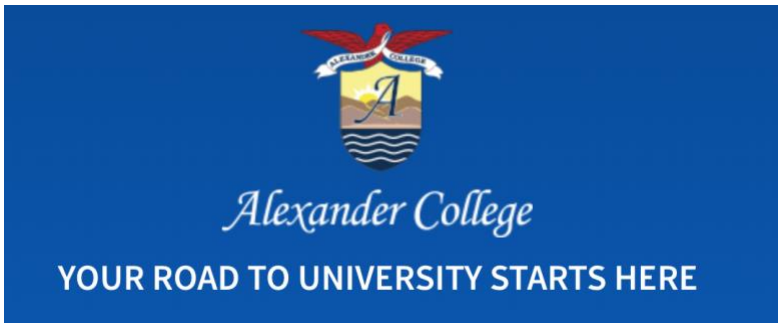
Reports

Alexander College

Kelly Cheung	Alexander College	Kellycheung5@gmail.com

Information added at the meeting:

- Enrolment has dipped a bit overall
- Did not run the E&M course this year as there was no interest.



Alexander College Physics Articulation Report: May 2022

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. The past year, approximately 2400 students enrolled at Alexander College. Currently, a large majority of new applicants are from India.

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 about 135 different courses with around 250 course sections. In addition, students can enroll in

two-year Associate degrees in Arts and Science, all of which include laboratory science requirements. In 2021, 611 Associate of Arts and 40 Associate of Arts degrees were conferred which is an increase of more than 30% from the previous year.
The past year, Alexander College transitioned from classes being taught online through Zoom or asynchronously to 50% of classes online and 50% of classes on-campus at our new Burnaby campus (4805 Kingsway, Burnaby). For the Spring term, all physics labs and exams are scheduled to be on-campus. This ensures our students get hands-on experience in the labs and prevents academic integrity issues arising from online exams.

The lecture components of our classes can have up to 35 students, and our on-campus physics labs hold a maximum of 18 students to give students the opportunity to work with the concepts actively in class through interactions with the instructor and students. Typically, around 40% of students registered in physics courses receive A or B grades.

We have developed and articulated PHYS 143: Engineering Physics III: Engineering Mechanics. Therefore, our PHYS 141/142/143 will closely resemble PHYS I/II/III in the Common First-Year Engineering Curriculum Agreement (BC CFYECA).

<u>Physics courses offered the past year and planning to offer the upcoming academic year:</u>

Physics 100: Introduction to Physics (95 students the past year)
(Text: Urone and Hinrichs, *College Physics*)

Physics 141-142-143: Engineering Physics I, II, III
I: Mechanics and Modern Physics (was not offered in 2021-2022 academic year, plan to be offered in 2022-2023)
II: Electricity and Magnetism, Optics (was not offered in 2021-2022 academic year, plan to be offered in 2022-2023)
III: Engineering Mechanics (was not offered in 2021-2022 academic year, plan to be offered in 2022-2023)
(Text: Knight, *Physics for Scientists and Engineers* and Hibbeler, *Engineering Mechanics: Static and Dynamics*)

Physics 151-152-153: Our 3-course Engineering sequence

151: Mechanics for Engineers (8 students the past year)
152: Oscillations and Waves, Fluids, Heat, and Thermodynamics (15 students the past year)
153: Electricity and Magnetism, Circuits, and Radiation (offered in the Spring term)
(Text: Knight, *Physics for Scientists and Engineers* and Hibbeler, *Engineering Mechanics: Static and Dynamics*)

Physics 191: Introduction to Astronomy (33 students the past year)
(Text: Franknoi, Morrison, and Wolff, *Astronomy*)

Kelly Cheung
Kellycheung5@gmail.com

BCIT British Columbia Institute of Technology

James Brewer	BCIT	James_Brewer@bcit.ca

Information added at the meeting

- James was Zooming in from England. Winner of the most distant participant award.
- Enrolment not too bad, but evening classes are down and part time students numbers are down.
- Physics classes reduced in the medial radiation program.
- Each of the courses have to break even on its own, not just an average of all courses. This has led to classes being cancelled and students are asking if classes are going to be cancelled.
- New Health Sciences Building under construction as well as student accommodations. Lots of building on the campus.

BCIT Physics Department Articulation Report, May 2022

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

Most classes started back in person September 2021, and now with the recent lifting of the mask mandate the institute is feeling more normal again. The medical radiography program underwent a major change, and our department lost some hours that were associated with that.

I am attaching our internal transfer guide and would appreciate it if readers would let me know of any errors or missing information regarding their institutes.

James Brewer (jbrewer@bcit.ca)

BCIT Physics, Course Credit Transfer Guide

- See Table 4 for Grade 11/12 equivalencies.
- For BCIT programs with a Physics 11 or Physics 12 prerequisite, an equal grade in any single post-secondary "general" physics course will be considered as equivalent (see: https://www.bcit.ca/admission/entrance-requirements/equivalencies/post-secondary/). A Physics 12/C is considered equivalent to Physics 11/C+.
- Only transfer credits for the current term will be considered.
- Find your BCIT physics course in Table 1, if in section B look in Table 2 for BC equivalents, if in section C, look in Table 3 for BC equivalents. Courses that are not listed in this guide will be considered on an individual basis.

Table 1: Physics Department's Courses.

A: Credit granted only with instructor consent		
Technology	Courses	
Biomedical Engineering	P11781	
Diagnostic Medical Sonography	1073, 2073, 3073	
Electro Neurophysiology	1280, 2280	
Food Technology	2112	
Nuclear Medicine	1274, 2274, 3274, 4274	
Radiation Therapy	5103	
Technology Entry	03112, 0312	
B: Credit granted with a "General" post-secondary (PS) course (see Table 2)[3]		
Technology	Term 1	Term 2
Architectural and Building Engineering	1140	21484
Chemical and Environmental Technology	1181	2181
Electrical and Computer Engineering	1143	2143
Geomatics	1151	2151
Mechanical Engineering	N/A	2149
Mining and Mineral Exploration	1147	2147
Occupational Health and Safety	1288	2288
Mechatronics and Robotics	1164	2164
C: Credit granted with a calculus-based post-secondary (PS) course (see Table 3)[3]		
Technology	Term 1	Term 2
Civil Engineering	1192	2192
D: Credit granted with a passing grade in a similar post-sec course within 10 years		

Astronomy	A3600	A7000
Modern Physics	8400	

Table 1 Footnotes:
1) Students must have covered optics and waves.
2) An exemption will be considered for students who have taken PHYS 0309.
3) Recency requirement: Course(s) taken within last 5 years (exceptions will be considered).
4) PHYS 2148 has insufficient course credits to be used in place of other Term 2 courses.

Table 2: BC Equivalents for Courses in Table 1, Section B.

Institute	Term 1 Equivalent General PS Course	Term 2 Equivalent General PS Course	Minimum Grade
BCIT	1301, Table 1: Term 1 Courses in B&C	2301, Table 1: Term 2 Courses in B&C, except 2148	P/50%
Alexander College	141	142	C+/67%
Athabasca University	200	201	C+/67%
Camosun College	104,114,140	105, 115, (140&141)	C+/67%
Capilano University	110, 114	111, 115	C+/67%
College of New Caledonia	101, 105	102, 106	C+/67%
College of the Rockies	103	104	C+/67%
Columbia College	110	120	C+/67%
Coquitlam College	101	102	C+/67%
Douglas College	1107, 1110	1207, 1210	C+/67%
Fraser Intl. College	See SFU	See SFU	
Kwantlen P. University	1101, 1120, 1170	1102, 1220	C+/67%
Langara College	1101, 1125, (1219&2309)	1225	C+/67%
North Island College	100, 120	101, 121	C+/67%

Northern Lights College	103	104	C+/67%
Coast Mtn. College	101, 121	102, 122	C+/67%
Okanagan College	111, 112	121, 122	C+/67%
Selkirk College	102, 104	103, 105	C+/67%
SFU (before 2016)	(101&130), (120&131), 140	(102&130), (121&131), 141	C+/67%
SFU (2016 onward)	(101&132), (120&132), (125&132), 140	(102&133), (121&133), (126&133), 141	C+/67%
Thompson Rivers Uni.	1100, 1150	1200, 1250	C+/67%
TRU: Open Learning	(1103&1105)	(1203&1205)	C+/67%
Trinity Western Uni.	111	112	C+/67%
UBC, Vancouver	(107&109), (117&119), (170&119)	(108&109), (118&119), (158&159)	C+/67%
UBC, Okanagan	111, 112	121,122	C+/67%
Uni. of Fraser Valley	101, 111	105, 112	C+/67%
Uni. of Northern BC	100, 110	101, 111	C+/67%
Uni. of Victoria	1021,102a, 110, 120	1021,102b, 216	C+/67%
Van. Comm. College	1100	1200	C+/67%
Van. Island University	111, 121	112, 122	C+/67%
Yukon College	101	102	C+/67%

Table 2 Notes:

- Students must apply for course credit and each application is subject to Institute approval.
- When both a letter grade and a % grade are given, the more favourable grade will be considered.
- Notation: (x&y) means courses x and y are both required, while x, y means either course x or course y is required.
- Grade 11/12 physics is insufficient for courses requiring a “general” post-secondary course.

Table 2 Footnotes:
(1) As of 2018, this course was split into 102a and 102b.

Table 3: BC Equivalents for Courses in Table 1, Section C.

Institute	PHYS 1192: Equivalent Calculus PS Course	PHYS 2192: Equivalent Calculus PS Course	Minimum Grade
Camosun College	140	(140&141)	C+/67%
Capilano University	114, See Footnote 1	(115&116), See Footnote 1	C+/67%
Douglas College	1110	(1110&1210)	C+/67%
Kwantlen P. University	1120	See Footnote 2	C+/67%
Langara College	1125	(1125&1225)	C+/67%
North Island College	120	(120&121)	C+/67%
Simon Fraser University	(120&Lab)3, 140	See Footnote 4	C+/67%
Thompson Rivers Uni.	PHYS 1150, EPHY 1150	See Footnote 5	C+/67%
UBC (Pre-2018)	(153&170)	(153&170)	C+/67%
UBC (2018 onward)	TBD	(157&158&159)	C+/67%
Uni. of Fraser Valley	111	(111&112)	C+/67%
Uni. of Northern BC	TBD	111, See Footnote 6	C+/67%
Uni. of Victoria (Pre-2019)	102	102	C+/67%
Uni. of Victoria (2019 onward)	110, 120	See Footnote 7	C+/67%
Van. Community College	1100	(1100&1200)	C+/67%
Van. Island University	121	(121&122)	C+/67%
Advanced Placement Physics	AP-C (Mechanics)	-	C+/67%

Table 3 Notes:

- Students must apply for course credit and each application is subject to Institute approval.
- When both a letter grade and a % grade are given, the more favourable grade will be considered.
- Notation: (x&y) means courses x and y are both required, while x, y

means either course x or course y is required.

- PHYS 1192 covers kinematics, dynamics, equilibrium, stress, strain, work and energy, conservation of energy, linear momentum and collisions, rotational motion, and simple machines.
- PHYS 2192 covers fluids at rest and in motion, viscosity, calorimetry, thermal expansion and stresses, simple and damped harmonic motion, standing waves, resonance, electric field and potential, DC circuits, magnetism, induction, and AC circuits.
- Fluids and heat are treated differently in chemistry courses, and these courses cannot be used for transfer credits.

Table 3 Footnotes:
1) Capilano PHYS 110 and PHYS 111 are insufficient.
2) Kwantlen PHYS 1220 has an insufficient overlap with PHYS 2192.
3) SFU Phys 120 has no lab, need 131 or 132, or other lab course.
4) SFU PHYS 121 has an insufficient overlap with PHYS 2192.
5) TRU PHYS 1250 and EPHY 1250 will be considered on a case-by-case basis (no fluid dynamics).
6) UNBC PHYS 111 covers fluids and heat (not stated on web description).
7) UVIC 111 and 130 have insufficient overlap with PHYS 2192.

Table 4: Physics 11/12: Acceptable Courses.

- For programs with a Physics 11 or Physics 12 prerequisite, BCIT may accept 3.0 credits of post-secondary education (100 or 1000 level course) with an equal grade from a recognized institute in the same subject. Note that the ERIC database contains only a list of anomalies.
- Recency and grade requirements: as given by program area.
- A Physics 12/C is considered equivalent to Physics 11/C+
- For provincial equivalencies, see: https://www.bctransferguide.ca/search/abe

Institute	Equivalent Grade 11 Course	Equivalent Grade 12 Course	Minimum Grade
BCIT	0309, 0311	0312	Check w/BCIT Program
Okanagan College			[as above]

New West Online Learning1			[as above]
Vancouver Learning Network1			[as above]

Table 4 Footnotes:

(1) Available via correspondence

Camosun College

Stephanie Ingraham	Camosun College	ingrahams@camosun.bc.ca

Information added at the meeting

- A new lab tech needs to be hired and the posting is open now.
- New course. PHYS 090 ABE so tuition free for domestic students.
- Enrolments slightly down with 1 or 2 courses cancelled
- Hybrid courses with labs and tests in person was the norm.
- Chris Avis will be Acting chair as of August 2022 as Stephanie going on a one-year leave
- There will be a sessional hiring coming up. Posting will be open soon.

Camosun College Department of Physics and Astronomy
Articulation Report - May 2022

The Department of Physics and Astronomy at Camosun College is located in Greater Victoria on the traditional territories of the Lekwungen and W̱SÁNEĆ people. Our department consists of 7 continuing faculty, 1 technician, and 4 sessional instructors. Between our two campuses, Lansdowne and Interurban, Physics courses are offered for academic upgrading, university transfer, and various diploma programs. Our courses include:

PHYS 070- a 0-level ABE Physics 11 course
PHYS 090- a 0-level ABE Physics 12 course
PHYS 101- a college prep Physics course which can also serve as a pre-requisite in lieu of Physics 11
PHYS 104/105- Parts 1 and 2 of first year algebra-based Physics
PHYS 140/141- Parts 1 and 2 of first year calculus-based Physics
ASTR 101- Astronomy- Night sky, solar system, and planets
ASTR 102- Astronomy- Stars and Galaxies

PHYS 090 is a new addition to Camosun's 0-level Science course offerings. It was approved through our EdCo process this year and will run for the first time in Fall 2022. PHYS 090 will offer students an opportunity to upgrade Physics 12 at Camosun and is tuition free for domestic students.

Along with reserved sections of PHYS 101 and 104, the following courses are restricted to students in Engineering programs at the Interurban campus:

PHYS 157- A first year Physics course focused on topics relevant to electronics and computer engineering students
PHYS 210- Electricity and Magnetism
PHYS 272- Energy and Sustainability
PHYS 295- A Physics course for Engineering Bridge students focused on Waves, Optics, Electricity and Magnetism

Service courses for other career programs include:

PHYS 160- Biomechanics- A service course for PISE (Pacific Institute for Sport Excellence)
AHLT 165- Physics of Medical Imaging and Radiation Therapy. This course services the Medical Radiography program.

The second-year courses at our Lansdowne campus (PHYS 200, 210, 214, and 215) remain closed since 2010, though we are interested in reopening the courses in the future.

In Fall of 2021, Camosun College returned to campus to resume primarily face to face instruction. All our Physics courses were offered completely face to face, except for PHYS 101 and PHYS 104, each of which piloted one blended section this year. Many instructors still opted to hold online office hours. The blended sections involved two hours each week in person for labs and tests, with the lecture portion of the course running asynchronously online. The number of incidents of academic misconduct was greatly reduced from the previous year with tests being conducted face to face. However, face-to face instruction during the pandemic has brought new issues surrounding attendance and missed labs and tests. We maintained face to face instruction throughout the Fall and Winter terms, and plan to continue in this format this

Summer and beyond. There has been interest from students in expanding our online or blended options, and we are open to considering this in the future.

Enrollment this year was steady compared to previous years. Though our domestic enrollment has been stable, the international student numbers have not yet returned to pre-pandemic levels. We have seen a decrease in the enrollment in Astronomy and lost two sections of PHYS 104. Our new blended courses proved the most popular with the longest waitlists. We have increased the blended offerings for our lower level and upgrading courses for Fall 2022 and Winter 2023. This was the third year that we have offered a dual credit PHYS 104 and Physics 12 in local high schools through the South Island Partnership program. This Summer we are running 3 courses: PHYS 101, PHYS 104, and PHYS 105.

For our first year Physics courses, we continue to use Physics- Principles with Applications by Giancoli for the algebra-based courses and Physics for Scientists and Engineers by Knight for calculus-based courses. Many instructors choose to list textbooks as optional, opposed to required, and to supplement with their own notes. Our Astronomy courses use the Astronomy OpenStax textbook, and we plan to use College Physics OpenStax for the first offerings of PHYS 090.

Stephanie Ingraham
Department of Physics & Astronomy
Camosun College

Capilano University

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

Information added at the meeting

- Enrolments down 15-20% or so as our engineering program did not recruit much in the previous summer..
- It looks like things are turning around as we come out of COVID
- Lauren not present so Bruno Tomberli gave the report
- Astro 300 course on life on other planets which is cotaught with biology – no math.
- Bachelor of general science soft launched in January so expecting to offer a number of upper year courses. 160-180 students have signed on already. Maybe a bioscience radiation type physics.
- Bachelor of science in "clean technology" got first approval by the ministry last year. PHYS300 thermodynamics with an environmental application are one of the courses being offered for this degree. Three concentrations one of which is clean energy, remote sensing and remediation, novel material science and clean process
- No new hires.

CAPILANO UNIVERSITY

Capilano University Articulation Report - May 2022

Covid-19 Modifications to Course Delivery for September to December:

- Classes returned to in-person delivery mode.
- One section of Astronomy 106 was held online as an option for international students who were unable to make it to Canada due to Covid19 travel restrictions

Covid-19 Modifications to Course Delivery for January to April:

- Class start date was delayed by ~ 0.5 weeks
- Classes were held online for the first three weeks of class (initially announced as two weeks)
    - Lab schedules were shifted and all labs were held in person with no interruptions.
- One section of Astronomy 142 was held online as an option for international students who were unable to make it to Canada due to Covid19 travel restrictions

Registration numbers were down for most courses, particularly for our engineering courses. Single offerings of courses that are required by programs have been maintained with low enrolment numbers (~10-15 students).

For 2021-2022, we will be able to offer a similar course offering as 2020-2021 with a few modifications. The changes are summarized in the table below:

	2021	2022			2022	2023
	Fall	Spring		Summer	Fall	Spring
Astr 106	1	0			1	1
Astr 142	1	1			1	0
Astr 300	0	1			0	1
Phys 104	2	2		1	2	2
Phys 112	1	0			1	0
Phys 113	0	1			0	1
Phys 114	2	1			1	1
Phys 115	1	1			1	1
Phys 116	1	1			1	1
Phys 203	0	0			0	1
Phys 300	0	0			0	1

With the successful introduction of both Phys 112 and Phys 113 (Life Sciences versions of first year physics courses) over the past two years, we will be directing almost all non-engineering students into Phys 112 and 113 going forward.

The first offering of Astronomy 300: The Search for Life in the Universe was very successful as an upper year elective for non-science majors. We will be offering this again in Spring 2023.

In Spring 2023 we will be offering Phys 300: Environmental Physics Lab I for the first time as an upper-level physics course for the Bachelor of Science General.

Capilano University is continuing the process of developing new degrees. The Bachelor of Science General was soft-launched in Fall 2021 and students are registering in the first year of the program starting Fall 2022. We are continuing development of courses for this program such as Phys 400: Environmental Physics Lab II and Phys 3XX: Diagnostic Imaging for the Life Sciences

The Bachelor of Science with a Major in Applied Clean Technology Stage I was approved by the ministry and Stage II is in development.

Lauren Moffatt

Coast Mountain College

Regan Sibbald	Coast Mountain College	rsibbald@coastmountaincollege.ca

Information added at the meeting

- Ran PHYS135 for the first time in a few decades = PHYSIII in the Common Core
- Slightly lower enrolment due to lack of international students, and the local domestic student down slightly.
- Last year all of the first year chemistry labs were online, but second year chemistry labs were face to face. Half of the physics labs were online and half face to face.
- Hyflex lectures next year will be in person, live streamed, and recorded, while all labs will be face to face, in person.

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Coast Mountain College Physics Articulation Report 2022

Coast Mountain College (CMTN) serves the rich and diverse communities and learners of BC's beautiful northwest region including Terrace, Kitimat, Smithers, Prince Rupert, and Haida Gwaii. Physics enrolments for 21/22 were as follows.

Physics 101: Enrolled: 11 (8 int'l and 2 locals, 1 dropped), 2 failed
Physics 102: Enrolled 10 (9 Int'l 1 local)
Phys 121: Enrolled 6 (all local), 5 passed, 1 dropped
Phys 122: Enrolled 5 (all local)

Phys 135: Enrolled 5 (all local)

We continue to run algebra-based physics 101/102 (introduction to physics) in Prince Rupert and in Terrace, and one section of calculus-based physics 121/122 (advanced physics) in Terrace which will have the lecture video-conferenced to Prince Rupert with face-to-face lab sections in both campuses. At both campuses the maximum permitted in our labs is 18. 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, however this year we also have students moving on to computer science degrees at other institutions, and our ACE (Applied Coastal Ecology) program in Prince Rupert.

We have adjusted Phys 135 – Engineering Mechanics I to align with the course description in the CFYEC. We will be using OpenStax textbooks this year for Phys 101/102/121/122, and Hibbeler, Statics and Dynamics, for Phys 135. Our newly designed Physical Sciences Program (one-year certificate) is now separate from the Engineering program and is outlined in the next page.

Our labs are being renovated (still) and a new dry lab is being created with normal physics instrumentation, a 3D printer, and tools. We have a CNC plasma cutter available for use in cooperation with our trades department, ALCAN has donated a robotic arm for our ENGR program, and we have a new 3d virtual learning environment.
I am interested in offering second year physics courses in partnership with another institution.

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

Term	Course #	Course Name	Intended Degree					Hrs	Credits
			Phys	Chem	Computer Science	Earth Science	Math		
Fall	CHEM 111	Fundamentals of Chemistry I	☐	☐		☐		90	3.0

Fall	CPSC 123	Computer Programming	☐		☐	☐	☐	90	3.0
Fall	ENGL 101	University Writing	☐	☐	☐	☐	☐	45	3.0
Fall	MATH 101	Calculus I: Differential Calculus	☐	☐	☐	☐	☐	67.5	3.0
Fall	PHYS 121	Advanced Physics I	☐	□ or PHYS 101	☐	☐	☐	90	3.0
Winter	CHEM 122	Principles of Chemistry II	☐	☐		☐		90	3.0
Winter	CPSC 124	Data Structures			☐		☐	90	3.0
Winter	ENGL 151	Technical Writing I	☐	☐	☐	☐	☐	45	3.0
Winter	MATH 102	Calculus II: Integral Calculus	☐	☐	☐	☐	☐	67.5	3.0
Winter	PHYS 122	Advanced Physics II	☐	□ or PHYS 102	☐	☐	☐	90	3.0
Winter	MATH 235	Linear Algebra	☐	□ or elective*	☐		☐	45	3.0
Any	Elective			☐	☐	☐**	☐	45 or more	3.0 or more
		Total Credits	30	30	30	30	30		
		Total Hours (depends on elective chosen)	720	675 - 720	675 – 720	675 - 720	675 - 720		

*Math 235 is highly recommended but not required for the first year of a Chemistry degree and students may take another elective instead. We recommend taking it during this course of study as it is required in the second year of a chemistry degree at most universities.

**It is recommended that the elective for a geoscience degree be either statistics (math 131) or a biology course.

College of New Caledonia

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

Information added at the meeting:

- Enrolment was lower , a trend through the pandemic.
- Next fall looks promising as number of application are already higher.
- One person retired so two positions available.
- Algebra and calculus and physics for medical technicians continue to be offered.
- All courses were hybrid, with all the labs face to face.
- OER Open Stax University Physics were used and still using Hibbeler for engineering mechanics but interested in the OER Mechanics Map that was mentioned at Engineering Articulation yesterday.
- Interesting dynamics in cohorts. They started online and then back to face to face, but they came back with many expectations of instructors to be available both online and in person, which is not possible.

College of New Caledonia
CNC

College of New Caledonia 2022 Physics Articulation Report

Due to the ongoing Covid-19 pandemic, physics courses at CNC were offered in a blended format over the past year. The lectures, tutorials and office hours were delivered in-person or online, and all labs were done in-person. Next year we are planning to continue this blended method of instruction.

CNC offers UT calculus-based (PHYS 101, PHYS 102, PHYS 204) and algebra-based physics (PHYS 105, PHYS 106). They are part of the curriculum of Applied Science (Engineering) transfer program and general science transfer programs. Enrollment in UT physics courses declined this year mainly due to the absence of international students.

Additionally, the Physics Department offers two physics courses for the Medical Radiography Program: PHYS 115 - Medical Radiography 1 and PHYS 225 - Medical Radiography 2. The maximum enrolment in these courses is based on cohort admission, which is currently 16 students.
Physics Department also delivers three physics courses for the Sonography Program: PHYS 170 – Physics for Sonography I, PHYS 173 – Physics for Sonography II and PHYS 175 – Physics for Sonography III. The maximum enrolment in these courses is based on the cohort admission, which is currently 16 students.

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

College of the Rockies

Ben Tippett	College of the Rockies	Btippett@cotr.bc.ca

Information added at the meeting

- Enrolment was low. Pre pandemic it would be 25 in the only offering of first year, which is calculus based physics. It dropped down to 14, and then 5 quickly left in the first two weeks of the term. Many complaints about the work load. Only 3 students taking physics in Grade 12 at their high school.
- Did two second year courses. Still looking for good textbooks for these second year mechanics course book so suggestions welcome.
- Astronomy no final exam is now a written report where they are asked to provide connections. Gives a better idea of what they have learned and would like to hear what people think. Andy Sellwood replied about alternative assessment. Asked for a rubric as soon as one is created. There was general interest from the group to this idea.

College of the Rockies Physics Articulation Report May 2022

In 2021-2022 College of the Rockies (COTR) ran the regular first year calculus-based physics (Phys 103,104) which served both our engineering program students and our university studies students. We also ran Astronomy 100, which satisfies a laboratory credit for students who are not science majors. For the first time in several years, we had sufficient enrollment to offer second year physics courses: Phys 201- Analytical Mechanics, and Phys 202 – Modern Physics. All of the above courses involve a weekly 3 hour lab.

COTR also runs high-school level physics courses: Phys 080, Phys 090 for upgrading students. Both of these courses also involve weekly labs.
September 2020

Phys 103 : 12 Students
Phys 201: 3 Students

Phys 080: 6 Students
January 2021
Phys 104: 10 Students
Phys 202: 3 Students

Astro 100: 12 Students

Phys 090: 4 students

Initial Enrollment in Phys 103-104 was lower than previous (pre-pandemic) years, Astro 100 was at capacity, and Enrollment in Phys 201 and 202 were the minimum for the college to offer these courses in a lecture-based format. Enrollment remained quite low in the high school upgrading Physics. Prior to the pandemic, It was usually around 12 in Phys 080 and 16 students in Phys 090.

Adaptions due to COVID-19 and reflections of effectiveness

In September 2021, COTR reopened for in-person classes. Physics 103/104, and 201/202 were run in the regular way; with 3hrs of in-person instruction per week and a weekly 3hr lab. Students were asked to space themselves out through the room and wear masks for any in-person activities. Deadlines were relaxed in order to encourage sick students to stay away from campus; and students who were absent were instructed to watch video lectures recorded last year. Having an archive of recorded class content proved to be helpful on a variety of occasions, and I anticipate continuing to use in the future.

Several changes were retained to the format of Astro 100. The labs we re-designed in 2021 (splitting the class in half, and requiring the students attend on alternating weeks, while the other half worked on different activities at home at their own pace.) were so enthusiastically received in 2021 that we repeated the experiment in 2022. The self-guided labs were, again, a mixed bag. I anticipate retaining a few of them for 2022. On the other hand, since the labs are run from 6pm-9pm for the students to get telescope time, I am pessimistic about the consequences which may come from the potential implementation of permanent daylight savings time.

The second change to Astro 100 we retained was replacing the final exam with a final project where students (during the last weeks of class) are instructed to choose an advanced topic, to research it on their own, and then to write a report on it. I emphasized to the students that they would be graded not only on the quality of their understanding but also (since this activity replaces the final exam) on how many connections they could draw between the topic of their research and the material we covered through the course. (For example, a student reporting on Saturn would lose marks if they did not explain how we used the EM spectrum to determine the chemical composition and temperature of the atmosphere.) Most students were successfully able to demonstrate mastery of the course content by linking their research topic to the course in a dozen ways, and I would like to hear from the articulation committee what they think of making this replacement permanent.

For Phys 080 and Phys 090, Labs and exams were delivered in the traditional way. The enrollment was extremely low. However, our instructor reports that the students displayed a notable amount of enthusiasm: they were "Interested, active, … it was great working with them."

Benjamin K. Tippett
Instructor Math, Physics, Astronomy

Columbia College

Vladan Jovovoic	Columbia College	vjovovic@columbiacollege.ca

Information added at the meeting

- New lab tech and instructor hired.
- Enrolment was high during the pandemic.
- Enrolment down now.
- Offering high school physics, PHYS100 , and enrolment is very high
- Second part of E&M, and second year physics, enrolment is down
- Working on offering the full common core engineering program courses.

Columbia College
Vancouver, Canada

Physics & Astronomy Articulation Report 2021

Physics at Columbia College

(Physics & Astronomy Articulation Committee Meeting Report, 2022)

The enrolment in Physics courses at Columbia College, for the 2021/2022 academic year, was like this:

Summer 2021

Physics 110 - 23
Physics 120 - 5
Physics 11 - 14

Fall 2021:

Physics 100 - 14

Physics 110	- 21
Physics 120	- 8
Physics 205	- 1
Physics 12	- 26

Winter 2022:

Physics 100	- 25
Physics 110	- 17
Physics 120	- 7
Physics 130	- 11
Physics 200	- 3
Physics 11	- 14
Physics 12	- 19

As usual, the enrollment was good in high school Physics courses (both in Physics 11 and Physics 12), as well as in Physics 100 and Physics 110. The

The enrollment was rather low in the rest of first year UT Physics courses for science and engineering majors (Physics 120 and Physics 130). The interest in our second year Physics courses was quite low.

Our high school courses have been taught in hybrid mode, and in Winter 2022 we decided to go back to the physical classroom for most of our UT courses as well.

Although the number of students enrolled in Physics classes was not high, we expect some improvements in the near future, especially when the College begins offering new UT Physics courses adapted to the First-Year Core Engineering Curriculum.

Vladan Jovovic, Ph.D.

Coquitlam College

Janusz Chrzanowski	Coquitlam College	janusz@coquitlamcollege.com

Information added at the meeting

- Nothing new at the college.
- Enrolment is very poor. Used to have 40 students on a regular basis, now 15 or 16. Very few in the second semester course. PHYS102 very low.
- Saeed teaching PHYS102 in the summer
- Number of the students in the college has grown a lot, but the interest in sciences is very low . Both physics and chemistry have low enrolments. Most of the students are interested in Finance and Business courses.

Coquitlam College Report to Articulation May 2022

There have been no changes in the Physics Curriculum at Coquitlam College during the academic year 2021/2022. Due to the current pandemic, in the academic year 2021/2022 the College Administration decided to offer some of the UT courses online (35%) and the rest (65%) to be taught in person. The lectures and the labs for Physics 101 have been offered online, while Physics 102 was taught in person at the College (lectures and the labs). Coquitlam College continues to offer 1st year calculus-based Physics courses. Physics 101 (mechanics with an introduction to thermal Physics) and Physics 102 (electromagnetism and optics) are currently offered in all semesters, which differs from the past, when Physics 102 was offered only once a year, in the spring semester.

The enrolment in Physics 101 and 102 has been steadily declining over the last few years. Recently, the enrolment in Physics 101 was relatively stable with ~15 students/semester. The number of students interested in Physics 102 (electromagnetism and optics) has dropped even more substantially to less than 10/semester. In spite of this tendency the Administration of the College has decided to offer both Physics courses in every semester.

There have been significant changes in the demographics of the international students at Coquitlam College. We observe a steady increase in the number of students from India, and a decline in the number of Chinese and other international students. The current enrolment at the College is about 3000 students. The College has currently one (main) campus in Coquitlam and a second one in Surrey.

There are no plans for the second-year Physics courses.

Janusz Chrzanowski, PhD
Coquitlam College

Corpus Christi College

Alain Prat	Corpus Christi College	aprat@corpuschristi.ca

Information provided at the meeting

- Enrolment is down. Highpoint was 28 students just before the pandemic and then 8 students last term.
- Astronomy course will be tried again next year.
- One new course PHYS119 = a 1 credit lab course to mirror UBC 191 . hope to offer it next winter.

Report from Corpus Christi College 2021

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 two physics courses and one astronomy course. Approximately 20% of the students at the college are international students. (https://corpuschristi.ca/). Since 2000, Corpus Christi college has been an institutional member of the BC transfer system.

The college offers over 90 university transfer courses in a variety of subjects, including two physics courses and one astronomy course. Enrolment at the college is between 250-450 students, and approximately 20% of the students at the college are international students. Many of our students transfer to UBC after one or two years at Corpus Christi college.

Since 2010, Corpus Christi College has been offering PHYS 101 (Energy and Waves). Enrolment in this course has fluctuated recently, with anywhere from 28 students (in 2020) to 8 students (last term). Since 2015, the college has been able to offer PHYS 101 course on campus after purchasing permanent

lab equipment for this course. There is currently no required textbook for PHYS 101.

Since 2016, Corpus Christi College has offered an introductory astronomy course (ASTR 210: Exploring the universe – The Solar System). Enrolment has been steady with between 5 to 15 students enrolled in the course each time. Since 2020, the textbook for the course is the free OpenStax astronomy textbook.

Since 2020, a second physics course has been offered (PHYS 100 - Introductory Physics: Mechanics and Heat). This course will again be offered in the upcoming term in Summer and Fall of 2022, with the OpenStax college physics book as the course textbook.

For Winter 2023 we are planning to offer a 1 credit physics lab course modelled after UBC's PHYS 119. The transfer agreement is still pending.

Alain Prat
Corpus Christi College
aprat@corpuschristi.ca

Douglas College

Jennifer Kirkey	Douglas College	kirkeyj@douglascollege.ca
Will Gunton	Douglas College	guntonw@douglascollege.ca

- Enrolments have dropped about 10 to 15% , which is the same as that as that across the college. That trend seems to be continuing into the summer. We are hopeful for next year.
- Articulation. Expect many of our first year courses coming up transfer. It was time by college policy for a review. The updates will include much more complete learning objectives and outcomes, but there is no major change to the courses so the same transfer should apply.

DOUGLAS COLLEGE

Physics and Astronomy Articulation 2022 Articular Meeting Report

Starting in the F2021 semester all our classes and labs returned to in-person delivery. Over the last two years during the semesters online we were able to maintain our full schedule of course offerings with strong enrollments. With the return to in-person delivery this year we have continued our full schedule of courses but have seen a decrease in enrollments starting in F2021 and continuing into W2022 (and S2022). Compared to the online fall and winter enrollments last academic year, our fall and winter enrollments this academic year are down about 13%. Overall, Douglas College has seen a decrease in international enrollment due to issues related to COVID-19. A small decrease in domestic enrollment, about 800 FTEs (full time equivalent students).

Although registration for S2021 is ongoing, our PHYS 1104 course has 33 students (in 1 section) registered and PHYS 1107 has 50 students (across 2 sections) registered. These enrollments (particularly in PHYS 1107) are down from last summer. Our PHYS 1210 section enrollment of 16 registered

students is comparable to the S2021 enrollment. Each course section has a capacity of 36 students.

Course	Sections S|F|W	Students S|F|W	Textbook
PHYS 1104	1|1|1	32|33|35	OpenStax College Physics – Custom Edition
PHYS 1107	2|2|1	70|65|34	OpenStax College Physics - Custom Edition
PHYS 1207	0|1|1	0|15|13	OpenStax College Physics - Custom Edition
PHYS 1110	0|2|1	0|71|28	OpenStax University Physics
PHYS 1210	1|0|2	14|0|38	OpenStax University Physics
PHYS 1170	0|0|1	0|0|26	Mechanics Map Open Digital Textbook
ASTR 1105	0|2|2	0|68|53	OpenStax Astronomy - Custom Edition

**S|F|W = Summer 2021 Semester (May-Aug) | Fall 2021 Semester (Sept-Dec) | Winter 2022 Semester (Jan-Apr)*
The capacity of one section is 36 students.

In the W2022 semester, our PHYS 1170 (Mechanics for Applied Science) course used the Mechanics Map Digital Textbook along with the selection of problems in WeBWorK that resulted from the work done by UBC and Jennifer Kirkey from Douglas College (supported by BCcampus). With the transition of this course to an OER, our regular Physics and Astronomy offerings are all using an OER.

In addition to our regular courses, we offered several courses as guided study sections in the past year including PHYS 2250 (Introduction to Modern Physics), PHYS 1108 (Physics for Life Sciences I) which is a lecture only course designed to match SFU PHYS 101, and PHYS 1208 (Physics for Life Sciences II).

Course	Sections (S|F|W)	Students (S|F|W)	Textbook
PHYS 2250	0|0|1	0|0|3	Modern Physics (Krane)
PHYS 1108	0|0|1	0|0|4	OpenStax University Physics
PHYS 1208	1|0|1	1|0|1	OpenStax University Physics

**S/F/W = Summer 2021 Semester (May-Aug) / Fall 2021 Semester (Sept-Dec) / Winter 2022 Semester (Jan-Apr)*

We were all excited for the return to in-person activities, and overall it was a smooth transition back in in-person labs and classes. Our experience creating online labs (which included new labs and a modification of existing labs) motivated some changes to our in-person labs which we made over the course the last two semesters. These changes include more emphasis on data analysis and a stronger focus on students creating and iterating procedures rather than following a set of "cookbook" steps. We have also transitioned our pre-lab quizzes from in-person at the start of the lab to online quizzes (using Blackboard) due the night before the lab.

All our courses currently use our LMS (Blackboard) for online homework assignments, but we are beginning to move over to using WeBWorK on a server provided by the college.

Our Engineering program has several guaranteed transfer pathways with UBC, SFU, and UVic, which we hope will continue to grow our enrollment in the courses related to this program (PHYS 1110, 1210, and 1170) in the coming year.

We are in the process of updating the curriculum guidelines of some of our algebra-based physics course (PHYS 1104 and PHYS 1107) to improve the clarity of the learning outcomes. We are also preparing for an update to our curriculum guidelines for our calculus based physical science stream (PHYS 1110 and PHYS 1210) to more closely match the common first-year engineering curriculum.

Will Gunton
Physics and Astronomy Department Chair

Fraser International College

Peter Smith	Fraser International College	smip@learning.fraseric.ca

- Peter said hello from Newfoundland – home of the Beothuk and many other First Nations.
- Enrolment has been fairly steady. PHYS100 was very successful last fall. Doing both in person and synchronous online courses. Doing relatively well.
- Enrolment has dipped in other areas of the college.

The following Physics courses were offered in the 2021/2022 academic year. FIC is not able to report Summer 2022 numbers until after enrolment is completed in mid-May. Summer 2021 numbers were included as they were not available for last year's report.

Course	Summer 2021	Fall 2021	Spring 2022
PHYS 100: Introduction to Physics	26	60	25
PHYS 140: Mechanics and Modern Physics	23	33	58
PHYS 141: Optics, Electricity and Magnetism	22	13	12
PHYS 1141: Optics, Electricity and Magnetism Lab	22	13	12
PHYS 1141: Soldering project (in-person required)	N/A	61	20

Overall, FIC saw similar numbers this academic year compared with previous year with a notable increase in enrolments for PHYS 100 of approximately 30%. FIC is expecting the trend to continue moving into the 2022/2023 academic year. The Physics Department has continued throughout the

2021/2022 academic year with one continuing instructor and one sessional instructor. No courses were cancelled this academic year.

Fall 2021 saw a return to in-person instruction, as was possible. Focusing on international students, FIC continued some online courses to accommodate students overseas who were unable to travel to Canada because of ongoing pandemic restrictions and delays in immigration procedures. In Spring 2022, greater than 50% of the courses were offered in-person with projections to reach 100% in-person in Fall 2022 as required by the Ministry of Advanced Education.

Course Offerings at FIC

PHYS 100: This course was first offered in Summer 2020 as part of the new Science Pathway at FIC, and enrollment has remained steady year-over-year. In Spring 2022, it was offered for the first time as an in-person section. By Fall 2022, this course will be taught using open educational resources only, so all course materials, content, and assessments will be available to students free of charge.

PHYS 140/141: These courses are based on the studio physics format, and similar in content and structure to PHYS 140 (Mechanics and Modern Physics) and PHYS 141 (Electromagnetism and Optics), which are currently offered at SFU Surrey. Starting in Fall 2021, we began offering both in-person and remote offerings for these courses.

PHYS 1141: This course, which is equivalent to ENSC 120 at SFU, is an engineering lab skills course that is offered concurrently with PHYS 141. Students take PHYS 1141 with PHYS 141 and are required to pass both courses in the same semester. Starting in Fall 2021, we began bringing back students from previous semesters who were not able to complete their soldering projects due to remote learning. By the end of summer 2022, we anticipate that all outstanding projects will be completed.

Kwantlen Polytechnic University

Takashi Sato	Kwantlen Polytechnic University	Takashi.Sato@kpu.ca

Information provided at the meeting

- Enrolments about the same
- Summer enrolments look good
- Physics for modern technology degree programs will be coming a program review – the external site visit will be in the fall

Kwantlen Polytechnic University 2022

Kwantlen Polytechnic University has campuses in Richmond, Surrey, Cloverdale, Surrey Civic Plaza and Langley. 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 (calculus-based physical science stream and calculus-based life science stream) and engineering transfer, as well as 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*.

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, even within the same university.

Since our last report (May 2021), we ran our usual offerings for Summer, Fall and Spring* semesters.

The University ran predominantly online, with the following notes/exceptions.

I. The Fall 2021 semester was planned to be a return to in-person learning but at the last minute (Aug 23), a sudden pivot in directives resulted in classes across the University to pivot to online (one by one, at the individual instructor's discretion).
II. On October 8, 2021, pre-pandemic milk was discovered in the first year lab refrigerator.
III. The Spring 2022 semester was planned to be a return to in-person learning but at the last minute (Dec. 30), the first week of the semester was cancelled and the two weeks that followed were designated as online learning. The bulk of the university stayed online for the remainder of the semester. At KPU the Spring Semester runs from January to April.
IV. Against this backdrop, the physics department was one of the more active departments on campus, especially for courses beyond first year. The first year labs largely operated in-person, except during Jan 10 – Feb 18, 2022.
V. In January, we were able to loan out IOLab-based kits to every student in PHYS 1100, 1101 and 1120. (This was not pre-planned.)
VI. Astronomy 1120, a survey course for science majors was run for the first time in the Spring 2022 semester. This was largely in response to student demand.

As of this writing, the Summer 2022 semester is set to begin May 9, predominantly in-person, without health mandates.

Takashi Sato

Langara College

Bradley Hughes	Langara College	bhughes@langara.ca
Tyron Tsui	Langara college	ttsui@langara.ca

Information provided at the meeting

- Enrolments looking up but down in relation to the pre pandemic numbers
- Two sections cancelled in the summer.
- Looking at reducing final exam of 25-30% from the current 40% and would like to know if that would be a problem for articulation.
- Tom Mattison from UBC does not think it a problem but he recommends checking out the University policy.
- SFU gut reaction is likely not good. Eldon Emberly urges Tyron to contact him directly.

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Langara College Physics and Astronomy Articulation Report 2021

Over this past year, we have transitioned back to our regular schedule of in-person course offerings with all but one or two sections per term being in online mode. Our offerings included first and second year university transfer physics, an engineering mechanics class, courses for students who do not have grade 11 or grade 12 physics, and two semesters of first year astronomy courses for science students and a set for non-science students. In total, we ran 45 sections with around 900 students enrolled. This is down from roughly 1200 in previous years. About a third of them are international students who contribute a disproportionately large fraction of the college's revenues.

This coming summer we still have one course offered online, but in the fall, we will be completely back to in-person classes and labs.

Our departmental Equity, Diversity and Inclusion Coordinator position is transitioning into a committee within the department. Langara College is

hiring a single coordinator to collaborate with individual departments through the college.

Tyron Tsui

Bradley Hughes
Chair, Department of Physics & Astronomy

snəẇeyəɬ leləm̓ - Langara College

LaSalle College

Charles Cue	LaSalle College	ccue@lasallecollegevancouver.com

Information added at the meeting

- Enrolment dipped from 25-30 students before the pandemic, and it is now down to 20-25
- The numbers for the diplomas dipped as well.

La Salle College Vancouver (LCV) has three physics classes offered to the students of our Bachelor of Science in Game Programming program.
- VGP248 (Physics of Light, Motion, and Sound) (offered every quarter)
- VGP246 (Calculus for Physics) (offered every two quarters)
- VGP256 (Math and Physics for Games) (offered every two quarters)

In addition, we have a Diploma in Video Game Programming, where VGP248 is offered to the students.

Due to the pandemic, classes had to be held online from 2020 until September 2021. Math and Physics classes have returned on campus starting the Fall quarter (October 2021) onwards. During the pandemic, classes were able to transition properly through the school's quick adoption of online learning tools such as Microsoft Teams.

Lectures were still valuable and students had been able to learn. A few assignments in VGP248 had to be modified to be taken by students remotely vs on paper. Most of the assignments offered in VGP246 and VGP256 were kept as project-based programming, so there wasn't very much interruption in those classes.

We had a total of 32 student enrollment for VGP248 (Physics of Light, Motion, and Sound), 25 for VGP246 (Calculus for Physics), and 21 for VGP256 (Math and Physics for Games) for the year. Our physics classes are offered to 2nd year students, and we are seeing the numbers slightly go down due to the

cohort of when the pandemic started sweep through the program progression.

Charles Cue

Nicola Valley Institute of Technology

No one was present at articulation, and I do not have a contact. If anyone knows anyone who teaches at NVIT, please contact the chair.

BC's Indigenous Public Post-Secondary Institution
https://www.nvit.ca/

Mission Statement

Empowering learners by strengthening voice and identity through education.

GUIDING PRINCIPLES
We are learner-centred.
We are grounded in Indigenous culture, tradition and Knowledge.
We are committed to the advancement of our learners, employees, communities and institute.
We seek to engage all learners and members of the NVIT community.
We will maintain a standard of academic excellence that ensures that our learners have the widest range of future choices possible.
We are committed to a high level of organizational discipline where all aspects of the Strategic Plan, governance and operations are guided by formalized policies, procedures, monitoring and review processes.

North Island College

Dennis Lightfoot	North Island College	Dennis.Lightfoot@nic.bc.ca
Jennifer Fallis-Starhunter	North Island College	Jennifer.FallisStarhunter@nic.bc.ca

Information provided at the meeting

- 35 First Nation's territories are covered by NIC.
- Numbers were up for calculus based physics, after a huge dip the previous year. So the two year average means it is still down over pre covid levels
- Space science and astronomy course is back with strong enrolment.
- No second year physics.
- Hylfex with labs in person. The administration has been pushing back on invigilation in person due to cost at the many remote campuses. They are wondering about how transfer would be affected if the invigilation was done online for tests. Final exams will be in person.

NIC Physics Articulation Notes 2022

Numbers

Our enrollments in physics were up this year over the previous two years, and Space Science and Astronomy courses were back this year after a one-year absence, with healthy numbers that surpassed enrollment from two years ago. Numbers in calculus-based physics may have been higher, but there was a long waitlist for the corequisite calculus course which did not get resolved in time, and some students either did not start post-secondary or went elsewhere.

The completion numbers for this year, last year and pre-pandemic and last are shown below. This does not include students who withdrew from the course before the deadline at the end of October or February.

Course	Course Code	19/20 Completions	20/21 Completions	21/22 Completions
First-year Algebra based Physics	PHY 100/101	15/8	17/9	17/10
First-year Calculus based Physics	PHY 120/121	17/9	10/4	22/11
Second-year E&M	PHY 216	3	Not offered	Not offered
Space Science & Astronomy	SSA 100/101	12/13	Not offered	13/14

Adaptation in year 2 of COVID-19 Crisis

All of our labs were back to in-person this year, and exams were also invigilated in-person. Lectures were delivered either digital synchronous or HyFlex (mix of digital and in-person) so that we could have one lecture section for three campuses (labs were offered at three campuses though). This was similar to our ITV delivery of lectures pre-pandemic, and will be the norm going forward.

Program Review

Our entire math, science and engineering department has been undergoing program reviews this past year (one for Engineering as our only certificate program, one for Math, Physics, Computer Science and Statistics, and one for Biology and Chemistry). We have appreciated the input from external reviewers, and are now starting the final report and action plan.

In-person Invigilated Midterm and Final Exams

One of the issues that we struggled with last year was exams that were not invigilated in person, and this year we are getting push-back from admin that in person exams for a digitally delivered course or HyFlex course (most of our physics, astronomy, and math courses) are not cost-effective when course instructors can only cover the exam at one of three campuses. Feedback we are seeking from the articulation committee, and in particular our receiving institutions, is clarification of whether the presence (or absence) of in-person invigilated exams would affect transferability of our courses.

Dennis Lightfoot

Northern Lights College

Morteza Ghadirian	Northern Lights College	mghadirian@nlc.bc.ca

Information added at the meetings

- Issues with lab reports as students struggle with the unfamiliar format and high level of analysis required. They improve a lot over the semester.
- Morteza was very happy to be here as it is his first articulation.

Northern Lights College
2022 Physics Articulation report

NLC offered two physics courses in the 2021/2022 academic year:

1) PHYS 103 Mechanics and Waves – calculus-based (10 students)
2) PHYS 104 Electricity and Magnetism and waves – calculus-based (6 students)

These courses primarily serve the following credentials at NLC:

1) Engineering Studies Certificate – common core first-year transfer to Engineering Degree-granting institutions in BC
2) Engineering Certificate – first-year transfer agreement with University of Alberta
3) Engineering Certificate – first-year transfer agreement with University of Victoria
4) Associate of Science degree

Required Text: Halliday, Resnick & Walker. 2018. Fundamentals of Physics, 11th ed., Wiley.

A hybrid of hands-on laboratory and PHET labs (still performed in-person at the lab) was tested this year and the results were phenomenal. Students benefited from the advantages of both worlds.

There has been a slight increase in the number of Physics students this year and we moved towards fully face-to-face instruction while following the PHO mandates. We are planning to promote our Physics-related programs on a broader spectrum to increase interest and registration.

The class average in Physics 103 was 73% and in Physics 104 was 68%. One of the challenges in Physics 103 was the students not being familiar with how to properly write a lab report for a university course (since it was their first official university course), and they had a hard time following the necessary steps in creating a sound report that included all the required components. A complete guide on how to write up a lab report was provided, and different examples were shown to provide the students with the necessary tools to learn. Satisfactory outcomes were witnessed after a few weeks.

Three of the students in the physics courses were in an engineering program. Currently, the one-year certificates in engineering offered by NLC do not meet the two-year duration desired by international students to obtain their post-graduate work permits. As such, most international students interested in engineering take the Associate of Science degree and subsequently contribute to the student numbers in PHYS 103 and PHYS 104. Different strategies are investigated to help international students contribute to this program as well.

Morteza Ghadirian

Okanagan College

Kevin Douglas	Okanagan College	kdouglas@okanagan.bc.ca
Robert Stutz	Okanagan College	rstutz@okanagan.bc.ca

Information added at the meeting

- Kevin Douglas could not attend, so Robert Stutz gave the report.
- Cuteness award for having their 1.5 year old baby on their lap.
- Enrolment down for the second year in a row.
- First year for Common Core Engineering Curriculum. 18 students started and 8 finished.
- Also have an Engineering Technologies Diplomas
- Also have a Life in the Universe astronomy course, at the second-year level – very popular with a wide cross-section of students.

Okanagan College – Physics & Astronomy Articulation Report – March 2022

Okanagan College has four main campuses: Salmon Arm, Vernon, Kelowna, and Penticton. Kelowna is our largest campus, accounting for ~65% of Arts & Science students. The Physics & Astronomy Department has 7 full-time faculty members, two of whom share appointments with the Mathematics & Statistics Department. One faculty member was on an Extended Study Leave this year. We had three full-time, term faculty teaching with us this academic year.
One of our second-year students was a successful applicant for the Canadian Astroparticle Physics Summer School, to be held in Kingston, ON from May 8-13 2022.

Our Science, Technology and Health portfolio was officially split into two separate portfolios, one specifically for Science and Technology, the other being Health and Social Development.

Recent enrollment history at OC for the Associate of Science across all OC Campuses:

	2015 – 16	2016 – 17	2017 – 18	2018 - 19	2019 – 20	2020-21	2021-22
Applied	772	773	1005	925	814	627	578
Enrolled	294	319	417	346	345	231	217

Enrolment notes:
Applications & enrollments were down significantly for a second straight year for Science. We still see steady second year registrations in PHYS & ASTR courses.

Course/Enrolment Updates:
Our courses offered at Okanagan College are the same as last year:

	2018-19	2019-20	2020-21	2021-22
PHYS112/122 – Algebra-based Physics I & II	250	229	179	132
PHYS111/121 – Calculus-based Physics I & II	128	95	80	75
PHYS126 – Physics for Electronic Engineering	22	22	21	16
PHYS200 – Relativity and Modern Physics	3	7	7	7
PHYS215 – Thermodynamics	12	38	27	26
PHYS202 – Engineering Mechanics I	7	13	9	8
PHYS240 – Biophysics	Not offered	Not offered	8	4
ASTR110/111/112/120/121/122 – Astro I & II	80	74	90	50
ASTR220 – Astrobiology	22	32	28	29
ASTR230 – History of the Universe	24	34	46	30

Comments on 2021/22 figures:
Addition of a second section of ASTR 230, and an out-of-sequence ASTR 11X stream, resulted in increased numbers for Astronomy courses in 2020/21. With the removal of these extra sections, the numbers decreased somewhat. We saw a significant number of first-year physics students dropping courses quite late into the semester, well beyond the usual "drop date." This was especially noticed with Algebra-based Physics I. We ran one online section of PHYS 112 in Fall 2022, which had up to 25 registrants, but ended with only 12.

Also offered online were ASTR 220, ASTR 230, and PHYS 240.

We had an intake of 18 CEC (Common Engineering Core) students at the start of the academic year. Of those, we expect 8 will complete the required course work. In our PHYS 126 service course for Electronics Engineering students, we had over 30 students begin the course but only 16 finished.
Prospects for 2022/2023: Application numbers are very strong for new Associate of Science students, with the exception of the Salmon Arm campus (down 50%). At Vernon and Penticton, numbers are up about 10%, and for Kelowna they are up around 35%.
Over 50 students have applied for the CEC program, up more than 40% from the previous (inaugural) year.
Despite these encouraging numbers, Science departments were asked to achieve reductions for 2022-23, in light of the previous two years' data. Our department cut approximately the equivalent of 1.25 term faculty workloads, mostly through the collapsing of lab sections that did not achieve sufficient enrolments, but also with some reductions to lectures (see point about HyFlex lectures below).

We will offer one section each of PHYS 111/112 in Fall 2022, and PHYS 121/122 in Winter 2023, in a HyFlex delivery mode. This scenario was seen as preferable to having no physics presence at all on some campuses, which was a real possibility in reference to the cuts mentioned above. All students will still complete physics labs in person.

We have proposed a combined PHYS/MATH Emphasis for the Associate of Science degree. This would be the first Emphasis at the College to include Physics.

Attrition: As mentioned above, attrition rates were significant, probably the highest in a decade. It is a concern that perhaps students impacted by COVID-19 were not prepared to undertake first-year post-secondary courses, for many possible reasons. Wondering if other institutions experienced similar trends.

Kevin Douglas
kdouglas@okanagan.bc.ca

Quest University

Andrew Hamilton	Quest University	Andrew.Hamilton@questu.ca

Information added at the meeting:

- First time Quest University has been at Articulation.
- Quest offers one degree, a Bachelor of arts and science.
- Courses are offered in a "block" model with one course per month.
- 700 students in 2019 but 100 students in 2021 .
- PHY 2108 Energy & Matter: Solar Power is taken by all students at Quest

Articulation Report

https://questu.ca/

2021-2022 Physics Course Offerings

Course Name	Enrollment (offerings)	Instructors
Foundation Level		
PHY 2108 Energy & Matter: Solar Power	12 (2)	Hamilton, Viswanathan
Concentration Level		
PHY 3101 Physics 1	5 (1)	Hamilton
PHY 3109 Entropy, Thermodynamics, & Chemical Kinetics	8 (1)	Hamilton, Viswanathan

NB: Course descriptions for the above can be found at Website Course List.

The 2021/22 academic year at Quest saw a relatively small incoming class of about 30 students and a total student population of approximately 150. The academic administration was re-structured with the addition of a Vice President Academic and Academic Dean, replacing what was a single position, the Chief Academic Officer. The current academic executive includes: the

University President George Iwama (PhD), the Vice President Academic Jeff Warren (PhD), and the Academic Dean Halia Valladares Montemayor (PhD). The Board of Governors consists of; Arthur Willms, Chief Dale Harry, Peter Webster, Anna Lippman, Sheila Biggers, and Rodney Bergen.
This was the first full academic year under the new partnership with Primacorp Ventures. While the partnership resulted in many changes to the non-academic structure of the University, the academic program and its structure has remained consistent as in previous years. The DQAB completed an organizational review of new partnership agreement.
Budgetary support for Lab Sciences (including life and physical science) has remained the same as previous years, with approximately $20k for operations, $30k for capital equipment, and 1 lab support person.

Continuing and Visiting Faculty in Physics

Name and credentials	email
Andrew Hamilton, PhD	andrew.hamilton@questu.ca
Balakrishnan Viswanathan, PhD	balakrishnan.viswanathan@questu.ca

Selkirk College

Jason Nickel	Selkirk College	jnickel@selkirk.ca

Information added at the meeting

- Enrolment is up about 10% over pre Covid times.
- About 60 students in total in September
- New physics lab nearing completion

Selkirk College May 2022

Selkirk College serves the West Kootenay region of BC. 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 course content this year. The same courses were offered as in previous years.

The courses offered:

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

Textbooks utilized:

- *OpenStax College Physics,* for PHYS 102/103.
- *OpenStax University Physics*, for PHYS 104/105.

- *Engineering Mechanics: Statics* (14th ed.) by Hibbeler, R., for PHYS 200.

Enrollment is up about 40% from last year. In comparison to the 5-year average, enrollment is up about 10%. This year, 60 students attended in the Fall, and 48 completed both semesters.

We are thrilled to announce a successful renovation of our Castlegar Campus physics laboratory. The original mid-sixties space now has a pod-style arrangement of workbenches that will foster interaction amongst pairs of students. The new space will be in operation this fall 2022. We use Vernier Go Direct® sensors with the Graphical Analysis App with great success and positive feedback from students.

Simon Fraser University

Eldon Emberly	Simon Fraser University	eemberly@sfu.ca

Additional Information shared at the meeting:

- Enrolment was good over the entire year
- Hiccups in student performance, likely due to poor time management as a result of the pandemic, and expectations on how health and resources would be delivered after the pandemic.
- Physics major enrolment trends over the last five years – the numbers are trending up. They plateaued over the pandemic. Drop in a completion of the upper labs and thesis during the pandemic.
- 50% Lecturer Position Starting September 1 2022. Deadline is May 24 2022. Applicants should apply electronically by sending a cover letter and CV, a statement of teaching experience and philosophy, and the names and email addresses of at least three individuals who will be able to comment on their teaching to experience to Barbara Frisken, Chair, Department of Physics, at physchr@sfu.ca by May 24, 2022

SFU

SFU Departmental Report 2022

SFU returned to in person teaching in Fall 2021. For the fall semester, large 1st year physics courses were still taught fully online. In spring 2022, all courses were back to F2F, though most faculty chose to live stream and record their lectures providing flexibility for students. The return to in-person exams was welcomed.

Here are several items worth noting in SFU Physics curriculum for this year:

1. We have offered our new course in special relativity for the first time this spring.

Special Relativity PHYS 313 (3)
A detailed presentation of Einstein's Special Theory of Relativity and how it revolutionized physics. Topics covered include: constancy of the speed of light, Lorentz transformations, time dilation, length contraction, relativistic paradoxes, space-time diagrams, relativistic particle kinematics and dynamics, electromagnetism as a relativistic phenomenon, and an introduction to general relativity.

2. We will be regularly teaching again our course PHYS 346 (3) Energy and the Environment

3. First-year Textbook Summary:
Physics 100 (physics 12): OpenStax College Physics
Physics 101/102 (life sciences): Flipit Physics + Freedman et al., College Physics 2nd Ed.
Physics 120/121 (calculus): Flipit Physics + Tipler (optional)
Physics 140/141 (studio, calculus): Flipit Physics + Tipler (optional)
Physics 125/126 (enriched): Halliday, Resnick and Krane (considering Chabay and Sherwood)

The complete textbook list is attached as a separate page.

Eldon Emberly, Chair, Physics Undergraduate Curriculum Committee, SFU
March 31, 2021

Course #	Course Name	Title	Author
PHYS 100	Introduction to Physics	SFU version of OPENSTAX COLLEGE PHYSICS	Openstax
PHYS 101	Physics for the Life Sciences I	College Physics + FlipIt Physics	Freedman
PHYS 102	Physics for the Life Sciences II	College Physics + FlipIt Physics	Freedman
PHYS 120/140	Mechanics and Modern Physics	FlipIt Physics	
	Studio Physics-Mechanics	Physics for Scientists and Engineers	Tipler
PHYS 121/141	Optics E+M	FlipIt Physics	
	Studio Physics - E+M	Physics for Scientists and Engineers	Tipler

PHYS 125	Mechanics and Relativity	Physics (V1)	HALLIDAY, RESNICK AND KRANE
PHYS 126	Electricity, Magnetism and Light	Matter and Interactions	Chabay and Sherwood
PHYS 132	Physics Laboratory I	MEASUREMENTS AND THEIR UNCERTAINTIES : A PRACTICAL GUIDE TO MODERN ERROR ANALYSIS	HUGHES/Oxford
PHYS 133	Physics Laboratory II	MEASUREMENTS AND THEIR UNCERTAINTIES : A PRACTICAL GUIDE TO MODERN ERROR ANALYSIS	HUGHES/Oxford
PHYS 190	Intro to Astronomy	OPENSTAX ASTRONOMY	Openstax
PHYS 211	Intermediate Mechanics	INTRODUCTION TO CLASSICAL MECHANICS	David Morin
PHYS 231	Physics Laboratory III	MEASUREMENTS AND THEIR UNCERTAINTIES : A PRACTICAL GUIDE TO MODERN ERROR ANALYSIS	HUGHES/Oxford
PHYS 233	Physics Laboratory IV	MEASUREMENTS AND THEIR UNCERTAINTIES : A PRACTICAL GUIDE TO MODERN ERROR ANALYSIS	HUGHES/Oxford
PHYS 255	Vibrations and Waves	Waves and Oscillations	Walter Fox Smith
PHYS 285	Quantum I	A first introduction to quantum physics	Kok
PHYS 313	Special Relativity	TBD	
PHYS 321	Intermediate Electricity Magnetism	INTRO TO ELECTRODYNAMICS	GRIFFITHS/Pearson
PHYS 326	Electronics/Instrumentation	ELECTRONIC PRINCIPLES	MALVINO/McGraw-Hill
PHYS 332W	Advanced Physics Lab I	MEASUREMENTS AND THEIR UNCERTAINTIES : A PRACTICAL GUIDE TO MODERN ERROR ANALYSIS	HUGHES/Oxford
PHYS 344	Thermal Physics	Basic Thermodynamics	Carrington, Gerald
PHYS 347	Intro. To Biological Physics	PHYSICAL BIOLOGY OF THE CELL	PHILLIPS/Taylor&Francis
PHYS 365	Semiconductor Device	SEMICONDUCTOR PHYSICS & DEVICES	NEAMEN/McGraw Hill
PHYS 384	Methods of Theoretical Physics	Mathematical Physics	BUTKOV/Pearson
PHYS 385	Quantum II	A Modern Approach to Quantum Mechanics	Townsend/USB

PHYS 390	Introduction to Astrophysics	Introduction to Cosmology	Ryden/Addison-Wesley
		Extragalactic Astronomy & Cosmology	Schneider/Springer
PHYS 391	Introduction to Observational Astrophysics	None	
PHYS 395	Computational Physics	None	
PHYS 413	Advanced Mechanics	MECHANICS (V1)	LANDAU/Butterworth-Heinmann
		CLASSICAL MECHANICS	GOLDSTEIN/Pearson
PHYS 415	Quantum III	MODERN APPROACH TO QUANTUM MECHANICS	TOWNSEND/USB
PHYS 421	Electromagnetic Waves	INTRO TO ELECTRODYNAMICS	GRIFFITHS/Cambridge
PHYS 431	Advanced Physics Lab II	No textbook	
PHYS 445	Statistical Physics	STATISTICAL AND THERMAL PHYSICS	Gould/Prinston University
PHYS 455/855	Modern Optics	OPTICAL PHYSICS	LIPSON/Cambridge
PHYS 465	Solid State Physics	The Oxford Solid State Basics	Simon/Oxford
PHYS 485/871	Particle Physics	MODERN PARTICLE PHYSICS	THOMSON/Cambridge
		INTRO TO ELEMENTARY PARTICLES	GRIFFITHS/Wiley
PHYS 490/881	Relativity and Gravitation	Spacetime and Geometry: An Introduction to General Relativity	Carroll/Pearson
		Gravity: An Introduction to Einstein's General Relativity	Hartle/Benjamin-Cummings
PHYS 492/881	HEP Techniques	Particle Detectors	Grupen, Claus/ Cambridge
		Introduction to Experimental Particle Physics	Fernow, Clinton, Cambridge

Thompson Rivers University

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Information added at the meeting

- Enrolment good at first year level. Running more than ever before. Ran one extra course in the winter and it was full.
- Second year is doing well.

THOMPSON RIVERS UNIVERSITY

Physics Articulation Report 2022

Department news

We will be hosting the APS – NW section meeting in June. June 3-5. It is planned to be in person. Here is the web site: https://www.tru.ca/science/programs/physics/APSNWS2022.html This meeting accepts CAP members!

We have two new faculty members, 1 Tenure Track and one LTC. We have completed a program review, and have subsequently been awarded 1 TT hire for next year. There are still faculty retirements on the horizon.

We expect to be graduating five physics major students this year.

TRU delivered its courses face to face, but had one section of first year physics (PHYS 1100) delivered remotely for students who were unable to travel to TRU. All students have arrived and are currently taking courses.

As something new, we offered PHYS 1100 in the winter term, and to our surprise, it was fully subscribed.

During the pandemic, we took the opportunity to redesign our first-year labs. For the pandemic, they were developed to be completed at home. This allowed us to deliver labs to students in quarantine this year.

We changed the pedagogy of the labs, removing the lab manual and requiring students to design their own experiments and analysis. Students were provided with the tools necessary for analysis (basic statistics, linear regression, etc.), then given simple experiments to plan and complete. Higher level topics such as variance propagation and linearization were scaffolded into the two lab terms. Each first- year lab consists of a lab exam, which is reduced to a single statement. For example, this term, students will need to create an experiment/analysis to test Newton's Law of cooling.

This pedagogy was delivered through the pandemic by keeping the physics simple and allowing students to create some experiments at home (pendulum and ramps). We continued to offer these labs remotely for students who were in quarantine through the fall and winter, with moderate success.

Enrolments:

Enrollments in physics courses was not significantly different than the previous year (although, as mentioned we offered a new section of 1100 in the winter. It is not clear if this will be sustainable). Physical and biological sciences enrolments do not depend upon international students.

Traditionally, the upper-level physics courses have a capacity of 12 but several courses saw significant capacity increases. Some of this was due to general science students planning to go into STEM education after completing their degrees; physics and mathematics courses are favoured due to the anticipated demand for teachers in those subjects.

New and revised courses

PHYS 3000 – Introduction to Quantum Computing was postponed was offered through the winter 2022. It had 28 students…many from Bachelor of Computing, but also mathematics students. It has been interesting balance the strengths of physics/math/comp students. Course evaluations may be telling on the success. We will look to develop an additional Open Learning delivery for this course.

EPHY 1170 – Physics for Engineering 1 and EPHY 1270 – Physics for Engineering 2 replaced EPHY 1150 and EPHY 1250 in the 2021-22 academic year. EPHY 1170 and EPHY 1270 were developed to meet the requirements of the First-year Engineering Common Curriculum courses, PHYS I and PHYS II. The EPHY 1170 course has a 3-hour weekly lab which its predecessor, EPHY 1150, did not.

We would be interested to know how other departments handled the Engineering "common-curriculum".

TRU recently underwent engineering accreditation. By all reports, the accreditation went well.

Texts (used or recommended)

ASTR 1140/1150 – *Astronomy*, OpenStax
PHYS 1100 - *College Physics*, Urone, Hinrichs, Dirks & Sharma, OpenStax
PHYS 1150 - *Physics for Scientists and Engineers*, R.A. Serway and J.W. Jewett, 8th or 9th edition
PHYS 1200 - *College Physics*, Urone, Hinrichs, Dirks & Sharma, OpenStax
PHYS 1250 - *Physics for Scientists and Engineers*, R.A. Serway and J.W. Jewett, 8th or 9th 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 – *Introduction to Electric Circuits*, Richard C. Dorf, James A. Svoboda, Wiley, 9th edition
PHYS 2200 - *Analytical Mechanics*, G.R. Fowles and G.L. Cassiday, Thomson Learning Inc., 7th edition
PHYS 2250 - *Introduction to Electrodynamics*, David J. Griffiths, Prentice Hall (any edition)

Trinity Western University

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Information added at the meeting

- Enrolment for the whole university down about 10%
- Lab instructor being hired next year, 2023
- Developing a Master's of science in Sustainability
- University has closed the physics minor – only had 1 minor in the past six years so will not have a big effect.
- What do we do with repeating students? How many times and what type of plan do they have? TWU has found that they tend to get the same poor grade.
- Mark Laidlaw from U VIC shared his study that found that for student with a F grade who repeated, 1/3 got F again, 1/3 got D and 1/3 improved.

TRINITY WESTERN UNIVERSITY

TWU is located on the traditional ancestral unceded territory of the Stó:lō people.

Report for the BC Articulation Committee Meeting 2022

Dr. Arnold E. Sikkema
Professor of Physics & Chair of the Mathematical Sciences Department

- TWU Physics mainly serves our B.Sc. programs in Biology, Chemistry, Mathematics, and Computing Science, as well as our pre-engineering options. Physics I also is one option among 16 for our required liberal-arts and -sciences core curriculum in our "scientific method & lab research" category.
- Physics is part of our Department of Mathematical Sciences, which includes math, computing science, physics, pre-engineering, and (soon) data science and statistics.

- TWU's administration decided after a program prioritization process undertaken during 2020-21 to close the physics minor and concentration (one among several program closures). For physics, this means that as of 1 January 2022, students can no longer declare a physics minor or concentration, but those who declared prior to that will be able to complete their program. (There is one such student, one who entered TWU in Fall 2021; she is the first such student in about six years.)
- 200+ level courses are scheduled on an alternate year basis.
- Two of the planned classes were canceled due to lack of enrolment (230: Electricity & Magnetism, with lab; 360: Optics, with lab) and one was moved to directed study (220: Mechanics, one student).
- Enrolments in 2021-22:
    - 111: Fundamentals of Physics I, with lab: 37 (with 2 failing)
    - 112: Fundamentals of Physics II, with lab: 26 (number failing TBD)
    - 240: Physical Chemistry, with lab; cross-listed with chemistry, and taught by chemistry faculty
- Courses planned for Fall 2022:
    - 111: Fundamentals of Physics I, with lab
- Courses planned for Spring 2023:
    - 112: Fundamentals of Physics II, with lab
    - 341: Advanced Physical Chemistry I "Quantum Chemistry," cross-listed with chemistry; lab taught by chemistry faculty
    - 321: Differential Equations; cross-listed with mathematics, taught by math faculty.
- For Physics 111/112, we used Randall D. Knight, *Physics for Scientists and Engineers: A strategic approach*, 5th edition (Pearson, 2022), with MasteringPhysics. I did a semi-flipped classroom, delivering many lectures via video before class and holding fully interactive class meetings for demonstrations, clicker-type questions, and solving problems.
- Labs for 111/112 were done using a combination of pre-pandemic "legacy" labs and some engaging more statistical understanding that I developed in collaboration with Mark Paetkau of TRU during the pandemic.
- We met in person throughout the year, with two exceptions:

- Campus was closed for three days in November due to the Fraser Valley floods, and while lectures were held online, one lab for Physics 111 had to be canceled.
- Our Spring semester was online in the first 2.5 weeks (January 6 to 21) due to Omicron. During this time, all scheduled lectures and labs for Physics 112 were held using our online-only approach of 2020-21.

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

University of British Columbia – Okanagan

Christina Haston	University of British Columbia-Okanagan	Christina.haston@ubc.ca

Information added at the meeting

- 700 in first term physics – usual number for the last five years
- 500 is the usual number in the second semester, but it was down to 381 likely due to a change in the biology program where only one semester of physics is required.
- About 20-30 in the usual physics majors program and has been stable for about five years.
- Second year numbers are a little lower than usual this year.

UBC OKANAGAN

At UBC Okanagan, we offer two streams of first-year physics. The PHYS 111/121 stream in for students interested in the physical sciences (40% of students) and the PHYS 112/122 stream is intended for students planning to enter programs within the life sciences (60% of students). Both streams are calculus-based. In both streams, students that have not completed grade 12 physics are required to enrol in a tutorial section.

The PHYS 111 and 121 stream used the OpenStax University Physics textbooks (volumes 1 and 2, respectively).
The PHYS 112 and 122 stream used a custom version of Knight's textbook, designed so that it is a life sciences-based book and uses calculus.

Over the past 6 years, the enrollment numbers in term 1 have been steady at ~700 students and in term 2, 2022 enrollment dropped to 381 from the more recent average of 500 students.
Changes to the Bachelor of Science degree requirements, beginning in 2020/21W, resulted in students only being required to complete "at least three credits of experimental science in any of BIO, CHEM, EESC, or PHYS courses with labs."

We offer MSc and PhD programs in Medical Physics and currently have 12 students, combined, in these programs.

At UBC Okanagan, physics is in the Department of Computer Science, Mathematics, Physics, and Statistics.

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University of British Columbia – Vancouver

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- Not a big drop in physics students
- University admitted more students than usual not expecting to have as many international students as usual, but the good news is that the international students showed up so classes are very full.
- Lab is now a separate course and thus renumbering required. This was done last year but wanted to comment on it again so sending institutions have time to change their courses.
- Yes this will cause a 1 credit increase and that was offset by decreasing the credits for electives.
- During Covid the labs courses were done at home and it worked well, but back in person now.
- Calculus streams (science, engineering, biology) will be merged into a single 2 hour lecture with a Friday 2 hour tutorial that will be more specialized to the streams. Many comments were made about this being a bad idea for the students. We all look forward to hearing next year how that works out.

UBC-Vancouver Physics & Astronomy Articulation Committee 2022

There are currently 112 students in Physics or Astronomy degree programs in 4th year (or above), compared to 125 (2021), 130 (2020), 137 (2019), 135 (2018), 96 (2017), 92 (2016), 69 (2015), 93 (2014), 93 (2013), and 79 (2012). They are: 42 majors physics, 5 majors astronomy, 16 combined-major physics & computer science, 15 combined-honours astronomy & physics, 14 honours

physics, 4 honours biophysics, and 16 other combined-honours or combined-majors physics.

There are 84 students who have applied to graduate this year, compared to 82 (2021), 80 (2020), 85 (2019), 73 (2018), 60 (2017), 57 (2016), 46 (2015), 70 (2014), 57 (2013), and 49 (2012).

We also graduate about 80 students in engineering-physics each year.

Due to Covid-19, a year ago the lab component of PHYS 101 (for non-physics students) was removed, and the lecture-only version was re-numbered to PHYS 131. The lab component of PHYS 107 (enriched mechanics) was removed, and the lecture-only version was re-numbered to PHYS 106. We no longer offer the combined lecture+lab courses 101 or 107.

Physics and astronomy degree students are required to take the 1-credit PHYS 119 lab (which existed before Covid-19). For other students, the lab is optional.

Many students applying to medical or veterinary school need 2 physics lab credits. To address this we created a 1-credit PHYS 129 lab, combining some content from the former honours lab PHYS 109 with some additional content. The PHYS 109 lab is no longer offered.

First year physics and astronomy students take PHYS 117 (mechanics), PHYS 118 (E&M), and PHYS 119 (1-credit lab). The enriched track is PHYS 106 (mechanics), PHYS 108 (E&M lecture), and PHYS 119 (1-credit lab). Physics and astronomy degree students are encouraged but not required to take the PHYS 129 lab. Other science students usually take PHYS 131 (a range of topics). Engineering students take PHYS 157 (thermal physics and waves), PHYS 158 (E&M), PHYS 159 (1-credit lab), and PHYS 170 (engineering statics and dynamics).

Mechanics courses should not normally be articulated to PHYS 131. Mechanics lecture courses with no lab component should articulate to PHYS 117. Articulating to PHYS 101 is deprecated, because it doesn't count toward a physics degree, and is discontinued (although it will remain in the Calendar for a number of years). E&M lecture courses should articulate to PHYS 118 (and not the long discontinued PHYS 102). If both terms of physics have a lab

component, that should map to PHYS 119. A separate lab course should map to PHYS 119.

The physics courses for engineering students already had separate lab components, so there were no changes, and no need to change articulation.

Tom Mattison April 29, 2022

University Canada West

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Information added at the meeting

- UCW has experienced continued growth throughout the pandemic.
- Some administration changes

We acknowledge that the territories on which UCW and its campuses are situated are the traditional, ancestral and unceded territories of the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish) and Sel̓íl̓witulh (Tsleil-Waututh) Nations. We thank them for having cared for this land since time immemorial, honour their graciousness to the students who seek knowledge here, and iterate our dedication to valuing the ongoing contributions of Indigenous peoples and communities.

General

UCW is pleased to be operating fully on campus with all services and facilities open to students and faculty both in person and virtually. There has been a return to on campus events for students, faculty, and staff, and UCW will be hosting a Grand Opening event for our Vancouver House campus later this year.

Students/Enrollment

- UCW has experienced continued growth throughout the pandemic.
- Our student body currently represents over 100 nationalities with the top percentage of students coming from India (44%), Mexico (6.4%), Sri Lanka (6%), Brazil (5%), Iran (4.4%), and Nigeria (4%).
- Other nationalities represented include Columbia, Philippines, Canada, China, Bangladesh, and Peru.
- We currently have over 8000 students enrolled with over 2400 who just joined us for the Spring 2022 term.

- Please see the student enrollment details in the Table 1 below (enrollment figures include new starters and continuing students).

Table 1: Student Enrollments

Programs	**2019**	**2020**	**2021**
MBA	2061	3339	6405
BCom	115	201	521
BABC	43	76	164
AA	298	732	1522
Total	**2517**	**4338**	**8612**

Staffing

- Dr. Sheldon Levy was appointed at the President and Vice Chancellor as of March 2022.
- Dr. Maureen Mancuso was appointed as Vice President Academic as of March 2022.
- Dr. Stephanie Chu was re-appointed as Executive Dean as of April 2022.
- Henrique Gea was appointed as Registrar as of January 2022.
- Adrian Mitescu was promoted to Director, Institutional Accountability as of March 2022 from being the Director, Information Services.
- Amy Hua was appointed as Director, Scheduling & Curriculum as of July 2021.
- Cassie Savoie was promoted to Director, Academic Operations and Support Services as of July 2021 from being the Department Chair for UAP.
- Kristeen McLellan was appointed as UAP Department Chair as of September 2021.
- George Drazenovic was appointed as Arts, Communication, and Social Sciences Department Chair as of April 2021.
- Please see the staffing growth in the Table 2 below.

Table 2: UCW Staff Growth

Department	**April 2021 Staff**	**April 2022 Staff**	**% Growth**
Academics	15	33	120%
Administration	4	10	150%
BD – Recruitment	8	10	25%

Finance	15	17	13%
Health & Safety	1	5	400%
Human Resources	4	10	150%
Library & Information Services	6	10	67%
Information Technology	13	17	31%
Marketing & Communications	8	13	63%
Office of President	3	5	67%
Registrar Office	33	45	36%
Student Affairs	11	27	145%
UAP Faculty	7	10	43%
Faculty	174	201	16%

Instruction/Open Education Resources

- UCW continues to update courses to use OER textbook and resource options wherever available.
- Our OER committee works with course developers, faculty, and Department Chairs to identify options to update our courses where appropriate.
- Funding is available to incentivize Faculty to update their course using OER options.

Program/Course Update

- UCW is currently working on new program development within our graduate area**.**
- Areas of interest for potential programs include
    - Entrepreneurship
    - Global Governance and Advocacy
    - Emerging Technologies

Curriculum Developments

- The Arts, Communication, and Social Sciences Department (Bachelor of Commerce, Bachelor of Arts in Business Communication) has been making updates to the core pathway of courses for students to ensure the degree is better aligned with industry requirements for the job market.

- New courses have been added to the degree pathway, and existing courses have been re-designed or refreshed.
- The Bachelor of Commerce degree is currently undergoing an in-depth review by CPA to ensure our Accounting courses align with the professional certification.
- UCW is currently going through the cyclical review process with the Degree Quality Assessment Board (DQAB) for all programs at the university. This involves program review self-study committees, Program Advisory Committee meetings, external review, and various other related activities.

Other Items of Interest

- Starting from the middle of the Winter 2022 semester, Physics lessons and labs have moved to face-to-face delivery model
- In lessons, main emphasis is on conceptual understanding of Physics
- Labs are based on PHET on-line simulations
- With the return to the face-to-face instruction, acquisition of equipment for Physics labs will become the next item to consider

University of the Fraser Valley

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Information added at the meeting:

- Massive hire – one tenure track – and it was challenging and the person chosen went someplace else so still looking for an instructor.
- 2 Limited Term Appointments (LTAs) – one in engineering and one more coming up soon.
- Enrolment numbers are down.
- Faculty and students are overwhelmed and stressed. Mental health of the students is very concerning.
- Quality of first year students is dropping

2022 Physics/Astronomy Articulation Report

The Physics Department at University of the Fraser Valley offers Physics Honours, Major, and Minor programs within the BSc.

Enrolments and graduates:

- 1st year calculus-based engineering & physics stream courses (PHYS 111/112) enrolments were slightly up (from 223 to 242) comparing 2020-2021 academic year but still lower than pre-pandemic.
- 1st year algebra-based service course enrolments (ASTR 101/103, PHYS 100/101/105) have been stable (from 226 to 234).
- 2nd year numbers were down a lot (from 80 to 63).
- 3rd/4th year were up a lot (from 117 to 168) comparing 2020-2021 academic year and almost reached the pre-pandemic level.
- Due to the shortage of qualified instructors, we have deferred ASTR 104, PHYS 100 once again.

- We have 11 graduates so far this year (10 Majors, 1 Minors).

1st year texts:

- OpenStax texts are used in all of our 1st year service courses (so all non-calculus based).
- Young and Freeman "University Physics" is still used in our mainstream calculus-based courses (PHYS 111/112), but probably won't be long. We have heard that the publisher won't be printing out hard-copy texts anymore, and instead is moving towards electronic only versions of their books. As a result (and to help offset the costs to students), the department has started to consider open-source alternatives for all first-year course offerings. Any suggestions are welcome.

Other notes:

- There were two retirements last year, however management has only authorized the hiring of one permanent replacement position for this coming academic year (the search ongoing). The department is currently in "survival mode" due to the shortage of faculty. Our reliance on sessional and limited term positions has increased as a result.
- The University is currently requiring Indigenization at the individual course level, which we are finding hard to address - especially for our upper-level offerings. We are open to any ideas/discussions on how we can possibly Indigenize each of our Physics courses.
- The University allowed departments to offer up to 30% of courses as online/hybrid for this past year. We offered all Physics courses face-to-face with the exception of two hybrid upper-level courses (as per the instructor's request). The hybrid courses had one online block per week, with the remaining two blocks being face-to-face.
- Due to the flood in Abbotsford/Chilliwack last fall, we had to cancel classes for a week before returning online for the remainder of the semester. We survived after all.

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University of Northern British Columbia

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

Information added at the meeting

- Biology no longer requires algebra based physics at the college level.
- Only grade 12 physics is required so that means lower numbers in the course.
- Successfully offered an upper level course.

University of Northern British Columbia Physics Department 2022

UNBC offers a full physics program. No major curriculum changes in first-year and second-year were made during 2021 - 2022.

Lectures in all physics and astronomy courses and labs returned to in-person delivery.

Upper-level labs, which were dropped more than ten years ago when the faculty was downsized, were delivered in 2021 – 2022. OpenStax texts were used for calculus-based first-year physics, and for one semester of astronomy.

Enrolment

	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	% change
Physics 115 (physics 12)	74	71	59	63	66	+5
Physics 110/111 (calculus-based)	134	122	141	111	105	-5

Physics 100/101 (algebra-based)	200	189	172	165	123	-25
ASTR 120/121 (Astronomy)	37	57	43	110	114	+4
Physics 150 (Physics for Future Leaders)	10	not offered	12	not offered	not offered	
Second-Year (four-course total)	30	40	15	36	25	-30

Textbooks

	2019-2020	2020-2021	2021-2022
Physics 115 (physics 12)	Physics, Cutnell and Johnson	Physics, Cutnell and Johnson	Physics, Cutnell and Johnson
Physics 110/111 (calculus-based)	Physics for Scientists and Engineers, Serway and Jewett	Physics for Scientists and Engineers, Serway and Jewett	OpenStax
Physics 100/101 (algebra-based)	College Physics, Serway and Vuille	College Physics, Serway and Vuille	College Physics, Serway and Vuille
ASTR 120/121 (Astronomy)	21st Century Astronomy, Kay, Palen, and Blumenthal	21st Century Astronomy, Kay, Palen, and Blumenthal	Universe, Geller, Freedman, Kaufmann (120); OpenStax (121)
Physics 150 (Physics for Future Leaders)	An Introduction to Physical Science, Shipman, Wilson, Higgins, Torre	not offered	not offered

George Jones

University of Victoria

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Information added at the meeting

- Algebra based course numbers are significantly up.
- Calculus based is down a bit as fewer students taking engineering.
- 50% or so are just not doing the homework in the "off term" sections
- One section will be partially online each semester, being offered due to help those with a strong time pressure due to complicated course schedules.

University of Victoria

UVic 1st and 2nd year PHYS and ASTR articulation report, May 2022

1st year PHYS:

We returned to primarily face-to-face instruction this year after a year of pandemic-based exclusively online teaching. Among our first-year courses we offered sections of PHYS 102A, 110, and 111 online in the fall, and 102B online in the spring.

Our overall enrolment continued to increase in the algebra-based stream and remained soft in the calculus-based streams. UVic's international enrolments have been lower over the past two years, and this means a smaller incoming cohort for Engineering. We had a high-than-normal drop rate in the calculus-based stream but ended up having about the same number of A & B students as usual going through the two-term sequence.

In the coming year we anticipate pilot offerings of single partially online section in PHYS 102A, 102B, 110, and 111 to complement the traditional face-to-face offerings. The model for these is that the lecture component will be online asynchronous, while the labs and exams will be in-person. The goal is to increase scheduling flexibility for first-years. We will also pilot a fully online offering of ASTR 101.

We are still claiming to be undertaking a comprehensive curriculum review. This review has been delayed by the pandemic. First-year offerings are not explicitly part of the review but our experience this past year means the idea of separating out a lab course is on the table. No changes for the upcoming year, but "watch this space".

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 2021: 645 ('20: 563, '19: 510, '18: 519, '17: 473)
Final enrolment PHYS 102B:
Spring 2022: 499 ('21: 465, '20: 403, '19: 377, '18: 330)
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 700-750
Final enrolment PHYS 110:
Fall 2021: 525 (20: 438, 19: 493,18: 498, 17: 556, 16: 599, 15: 606, 14: 609)
Spring 2022: 202 (21: 196, 20: 144, 19: 144, 18: 156, 17: 162, 16: 154, 15 159)
Summer 2021: 47 (unusual offering)
Final enrolment PHYS 111:
Spring 2022: 334 (21: 297, 20: 406, 19: 420, 18: 490, 17: 448, 16: 460, 15: 473)
Summer 2022: 104* (21: 87, 20: 68, 19: 61, '18: 77, '17: 71, '16: 84, '15: 87)

Fall 2021: 87 (unusual offering)
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: 66 (20: 76, 19: 67, 18: 62, 17: 57, 16: 74, 15: 88, 14: 104, 13: 106)
Final enrolment 130: 47 (21: 57, 20: 57. 19: 48, 18: 42, 17: 49, 16: 58, 15: 68, 14: 72)
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.
We are currently piloting two courses at the second year level

- Introduction to Medical Physics (2nd year offering)
- Introduction to Quantum Computing (1st year offering)

The change in instruction method in March means that it's hard to draw lessons about their success.

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: 2021: 43 (20: 47, 19: 65, 18: 56, 17: 62, 16: 32, 15: 51, 14: 54)

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 2022: 44 (21: 65, 20: 52, 19: 57, 18: 49, 17: 42, 16: 46, 15: 35, 14: 32)

PHYS 216 – Introductory Electricity and Magnetism

Normally offered in the fall – offered again 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 2021: 37 (20: 58, 19: 57, 18: 75, 17: 72, 16: 64, 15: 67, 14: 53, 13: 54)

PHYS 223 – Introductory Quantum Computing

Enrolment 2022: 9 (21: 10)

PHYS 232 – Introductory Biomedical Physics

Enrolment 2022: 9 (21: 11, 20: 9, 19: 15)

PHYS 248 – Computer Programming in Math and Physics

Normally offered in the spring.

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

This past year the course was offered twice, fall and spring. There are ongoing challenges associated with the cross-listing, and preliminary discussions of removing the cross-list.

Enrolment	Term	PHYS	MATH
	S2022	62	0
	F2021	0	32
	S2021	48	42
	F2020	n/a	48
	S2020	43	13
	F2019	16	26
	S2019	57	38
	S2018	32	24
	S2017	5	22

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 2017 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 2022: 52 (21: 60, 20: 57, 19: 62, 18: 50, 17: 61, 16: 72, 15: 83, 14: 67)

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.

Courses offered:

ASTR 201 – Search for Life in the Universe
Primary Audience: General interest
Text: Readings
Enrolment: 50-70.
Normally offered in the fall, not offered this past year.

ASTR 250 – Introductory Astrophysics
Primary Audience: ASTR major/honours students
Text: Freedman and Kaufman - Universe
Enrolment: 2021: 32 (20: 25, 19: 28, 18: 30, 17: 27, 16: 24, 15: 33, 14: 24, 13: 30)
Normally offered in the fall.

ASTR 255 – Planetary Science
Primary Audience: ASTR major/honours students
Text: Varies depending on instructor
Enrollment: 2022: 22 (21: 22, 20: 13, 19: 18, 18: 9, 17: 15, 16: 11, 15: 10, 14: 11)
Normally offered in the spring.
This course is now being taught by a new faculty member specializing in exoplanets; there may be changes to this course reflecting his research interest.

Vancouver Community College

Andy Sellwood	Vancouver Community College	asellwood@vcc.ca

Information provided at the meeting

- Welcomed Andy back into the classroom and this committee after starting this fall after five years in the Teaching and Learning Centre
- Program review is starting this year.
- Enrolment is small.

Report to UT Physics and Astronomy Articulation 2022

Enrolments have overall been down in university transfer. We ran one (online) section of the first half of our calculus-based 1st year physics (PHYS 1100) in fall 2021 with 11 students.

In winter 2022 we ran one blended section of the second half (PHYS 1200) with 13 students. We also ran a small online section of PHYS 1170, our Mechanics course for engineers.

For the first time we ran a section of Introduction to Astronomy (PHYS 1110), which is aimed at non-science students. This course was offered in a blended format.

Vancouver Island University

Brian Dick	Vancouver Island University	Brian.Dick@viu.ca

Information added at the meeting

- Overall numbers in first year physics courses continues to decline/remain low.
- Attrition from fall to spring in the life sciences was higher than normal
- Two unexpected retirements so there are two openings.

VANCOUVER ISLAND UNIVERSITY

Vancouver Island University Report 2022

General enrolment trends

Course	*2021/22*	*2020/21*	*2019/20*
PHYS 111	68	76	75
PHYS 112	35	61	50
PHYS 121	51	57	47
PHYS 122	37	45	24
ASTR 111/112/311/312	122	130	115

- Overall numbers in first year physics courses continues to decline/remain low.
- Life sciences stream: PHYS 111 numbers remain historically low but relatively stable year-over-year; however, PHYS 112 enrolment this spring dropped significantly from that of recent years. The reason(s) for this sudden decline is unclear, though a mid-year retirement of the longtime instructor for this course (see below) may have contributed.
- PHYS 121 & 122 enrolments remain somewhat below “normal” historical levels.
- All physics labs and courses were offered “face-to-face” during this past academic year. A common refrain among instructors was how much easier it was to demonstrate, interact with, and offer aid to

students in this mode compared to online delivery. While remote lecture and laboratory delivery did provide some novel opportunities (greater accessibility for remote learners, improved flexibility in scheduling, reduced paper usage/printing, etc.), most students and faculty seemed to prefer in-person delivery overall.

- SCIE 312: Concepts of Relativity and Quantum Physics ran for the first time with 10 students. Utilizing a minimum of mathematics, it explored various topics in relativity & quantum in detail and was targeted at a broad, interdisciplinary audience. While first time enrolment was modest, students were interested and enthusiastic.
- Astronomy enrolment remains healthy across all four course offerings. Astronomy courses ran as "synchronous, remote" in the fall term and then "face- to-face" in the spring term. Some attempts were made to offer viewing sessions remotely; while nominally successful, these sessions required considerable effort and time with regard to setup & operation, largely due to the lack of a permanent observatory. Due to the number of students and COVID concerns/restrictions, regular in-person viewing sessions have continued to remain suspended but are planned to resume in the near future.
- The department had our two most senior members retire this year (one as of January, the other this coming summer); these faculty had been solely responsible for teaching our first year life sciences and physical sciences streams. The relative suddenness and timing of these retirements, without extensive succession planning in place, are expected to create some challenges but also offer some opportunities to remake and rebalance the department, which has not hired for regular faculty in either Physics or Astronomy in almost two decades.

As an added wrinkle, however, budgets remain tight, and "trimming" of under- enrolled sections has resulted in a reduction of overall workload within the department and may delay the full replacement of our retiring physics faculty members. It will further complicate workload assignments due to diminished flexibility to compensate for scheduling conflicts, etc.

Dr. Greg Arkos

Yukon University

Jaclyn Semple	Yukon University	jsemple@yukonu.ca

No information added at the meeting as Jaclyn was not present.

Yukon University Articulation Report May 2022

https://www.yukonu.ca/about-us/our-history
Yukon University traces its history to the founding in 1963 of the Whitehorse Vocational and Technical Training Centre (soon after renamed the Yukon Vocation and Training Centre), located on the banks of the Yukon River in downtown Whitehorse. College status was granted in the spring of 1983 when the Yukon Vocational and Technical Training Centre became Yukon College, and in 1988 the Whitehorse campus moved from downtown to its current location, 2 km up the hill.

In the spring of 2020 Yukon College was granted university status and all thirteen campuses were renamed Yukon University.
The main campus in Whitehorse was officially opened with a potlatch in October 1988, at which the institution was given to the people of the Yukon. First Nations people of the territory were represented by Mrs. Angela Sidney and Mr. George Dawson.

Acknowledging that we live and work in the traditional territory of the Kwanlin Dün First Nation and the Ta'an Kwäch'än Council.
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