



ABE SCIENCE ARTICULATION 2021 2021

Minutes by Christine Miller, TRU and Greg St.Hilaire, UFV

2021 ABE SCIENCE ARTICULATION MINUTES

Oct 21, 2021

Meetings of Subcommittees:

9 am – 12 pm

Physics Subcommittee

Attendance

Michael Willers – North Island College
Stephanie Ingraham – Camosun College
Fouzia Qasim – Vancouver Island University
Raji Balagopal – University of the Fraser Valley
Deb Heal – College of the Rockies
Marcie Lundin – Northern Lights College
Dino Giglotti – College of New Caledonia
Arthur Bakx – Okanagan College
Richard Farley – VCC
Derek Knox – Thompson Rivers Open Learning
Michael Nelligan – Coast Mountain College
Marissa Carrasco – Selkirk College

Approval of Agenda

Mover: Arthur Bakx

Seconder: Raji Balagopal

Motion carried

Approval of October 22, 2020 draft minutes

Mover: Derek Knox

Seconder: Fouzia Qasim

Motion carried

Business Arising

a. NVIT PHYS 050

- An e-mail was sent Oct 20th reminding them they need to attend to have course remain on transfer grid. This is ongoing since 2018.
- They are not in attendance (need send an e-mail to rep)

b. KPU PHYQ 1098

- Changes were made prior to April 1, 2021 and so the status of PHYQ 1098 is now approved

Discussion of the typographical error in the 2020-2021 and (draft) 2021-2022 ABE Articulation Handbook

- a. BCCAT knows about the error and will make edits if possible. We will postpone all Provincial Physics re-articulation until next year and only articulate new outlines this year.
- b. Next year, course outlines should either have the dated link for the 2022-2023 articulation guide or the Core Topics from this version of the guide copied and pasted into the outline.
 - o These changes will be sent to all institutions ASAP so changes can be made in time for articulation as the 2022-2023 guide will not be published until Spring 2022.

New Business

- Camosun PHYS 090; for now, we will articulate this outline based on the 2019-2020 outcomes which include the Kinematics unit

Motion to approve Camosun's PHYS 090 conditional to EdCo Approval:

Mover: Deb Heal – COTR

Seconder: Raji Balagopal – UFV

Motion carried

- CMTN Physics 050 (Provincial): Removed at the request of Michael Nelligan Coast Mountain College

Discussion of changes to the articulation handbook for Provincial other than typographical errors.

- a. "Resolve, add and subtract vectors"
 - Why is this in Kinematics only? should it be everywhere or elsewhere (e.g. it's own topic).
 - If we add a topic called 'measurement', do we repeat advanced topics there again? Shouldn't it be assumed? Why can't right angle trig be in advanced – because no 2D application necessary. Core Topics are bare minimum – you are free to teach more. Everyone has different allotted teaching time.

Motion to add a core topic: "A: Measurement & Mathematical Skills" with bullets "Review problems involving SI units, significant figures and uncertainties in measurement" and "Resolve, add and subtract vectors using trigonometry"

Mover: Marissa Carrasco SC

Seconder: Derek Knox – TRU – OL

Motion carried

- b. "Equilibrium" should not be it's own topic but should live under Dynamics in 2D
 - It is a subset of dynamics. We really wanted torque included.

Motion to remove the topic Equilibrium and add "Torque, Translational Equilibrium and Rotational Equilibrium" as a bullet under Dynamics in 2D. Also, to remove "two dimensions" from bullets as it is redundant.

Mover: Dino Giglotti CN

Seconder: Stephanie Ingraham – Camosun

Motion carried

Other business.

Discussion: online or in-person

- Most institutions offering a mix
 - OC, SC, CNC & COTR are seeing fewer ppl in person.
 - VIU seeing difference between Cowichan (More in-person) and Nanaimo (more online)
 - UFV hybrid – lessons online, but labs in person. Students like F2F labs where they review concepts in addition to labs
 - UFV surveyed staff – 67% wanted hybrid vs fully online.
- UFV students want recordings – agreed by many
 - COTR has been taping for years! Thinking about Hyflex teaching.
- Students don't seem to be learning as well online (say they have pre-reqs but not really the skills).
- We are all learning new things other than course materials – emotional part of learning...new ways to socialize in class and stress and anxiety for all of us.
- Most institutions wants instructors back in person.
 - Camosun had to submit proposals for blended classes.
 - CNC is looking at what the demand is and making decisions (making accommodations for international students)
 - SC is trying new things out to see how to better support students

PHYSICS: PROVINCIAL LEVEL

Core Topics

A. Measurement & Mathematical Skills

- Review problems involving SI units, significant figures and uncertainties in measurement.
- Resolve, add and subtract vectors using trigonometry

B. Kinematics in Two Dimensions

- Use the language and concepts of kinematics to describe motion in two dimensions
- Analyze and solve kinematics in two dimensions

C. Dynamics in Two Dimensions

- Use the language and concepts of dynamics to describe forces, energy and momentum
- Analyze and solve dynamics in two dimensions using free body diagrams:
 - Newton's Laws ~~in two dimensions~~
 - Torque, Translational and Rotational Equilibrium
 - Momentum ~~in two dimensions~~
 - Energy conservation
 - Uniform circular motion

~~B. Equilibrium~~

~~□ Analyze and solve equilibrium in two dimensions using free body diagrams~~

~~_____ □ Translational Equilibrium~~

~~_____ □ Torque~~

~~_____ □ Rotational Equilibrium~~

GD. Electrostatics

- Use the language and concepts of physics to describe electrostatic phenomena

- Analyze and solve electrostatic forces and electric fields in two dimensions
- Analyze and solve electric potential and electric potential energy

DE. Electromagnetism

- Use the language and concepts of physics to describe electromagnetic phenomena
- Analyze and solve problems involving magnetic forces and magnetic fields in two dimensions
- Analyze and solve problems involving electromagnetic induction; includes Faraday's law and Lenz's law
- Describe devices that operate using electromagnetic induction

Options:

The following topics may be useful to students going on to further physics courses: **PUT THESE IN ALPHABETICAL ORDER**

- AC circuits
- **Astronomy**
- Relativity
- Quantum physics
- Electronics
- Fluids
- Nuclear physics
- Kirchhoff's laws

Laboratories:

There should be one laboratory from each topic and a minimum of seven laboratories.

Laboratory skills must include:

- Collecting data through observation:
 - Record a measurement to the appropriate level of precision
 - Recognize that all measured values have an uncertainty
- Constructing graphs:
 - Choose appropriate scales
 - Determine line of best fit
 - Label correctly
- Drawing conclusions from observations and data:
 - Identify and discuss sources of error
 - Calculate and interpret the slope of a line
 - Relate conclusion to objectives
- Calculating experimental error:
 - Determine % error and % difference where appropriate
- Writing formal laboratory reports
- Participate in experimental design

Biology Subcommittee

Attendance

Christine Miller, TRU
Steve Bigginpound, Yukon U
Stephanie Boychuk, VIU
Michelle Gunness, Cap U
Fouzia Qasim, VCC
Barnabe Assogba, KPU
Michele Jones, NIC
Ellie Knight, Selkirk
Jeanette Landry, NLC
Greg Colombo, VCC
Jessica Morcom, OC
Greg St. Hilaire, UFV
Michelle Jones, NIC
Ivan Kiss, NEC Vancouver
Ben Heyde, COTR
Dani Michael-Didlier, CNC

Approval of the 2020 Biology Subcommittee Minutes

Mover: Christine Miller

Seconder: Michelle Gunness

Motion carried

Follow up on edits that were not made last year in the transfer guide and should be entered this year:

1. On the Biology Transfer Guide (page 45), the course codes for NLC are incorrect. They should read BIOL 040 and BIOL 050, not BIOL 040 and BIO 050. Remove BIOL 060
2. Vancouver Island University course code changes – BIO 047 to BIOL 047 and BIO 067 to BIOL 067
3. Outstanding outlines from last year.
 - Okanagan College – BIO 011 (Advanced, pending approval from EdCo) - passed
 - Vancouver Community College – BIO 0861 & BIO 0871 (Advanced, ensure course outline includes an explicit reference to a minimum of seven labs)
 - COTR – Bio 080 – Just required an updated link, 7 labs was in place

Indigenization and Open Textbook Discussion

Present wording in Learning Outcomes- Integrate traditional knowledge focusing on local First People's content

Discussion on appropriate terminology. Traditional Knowledge and First Peoples are used in a TRU sustainability course created in consult with the indigenous community of the area. It is also used in the BC K -12 curriculum. The wording was considered still appropriate

Other recommendations –

- a. Use the First Peoples Principles of Learning to help guide the intent of your course <http://www.fnesc.ca/first-peoples-principles-of-learning/> and many other YouTube resources
- b. Observing Indigenous ways of obtaining knowledge with your teachings of the scientific method

Human Biology Textbook <https://humanbiology.pressbooks.tru.ca/>

Has many examples of indigenous knowledge integration. Much of this can be found in purple boxes e.g. 1.5 Traditional Ecological Knowledge, 3.5 Fats in Tanning

Please report to B.C. Campus if you are using open textbooks as it determines funding <https://open.bccampus.ca/use-open-textbooks/oer-adoption-form/>

General Discussion

Most students are taking Biology as prerequisites for health programs. VIU is looking at creating ABE student cohorts for students heading into certain programs such as nursing Health programs include indigenous pathways and rural health careers. An example was given of Math and English prerequisites offered on site in the indigenous community. Biology courses are being offered in a wide variety of formats this year including fully face to face and fully online with virtual and / or kitchen based labs. There are also a number of hybrid courses being offered. An example was given of a continuous intake course that offered periodic face to face labs.

McGraw – Hill was suggested as a lab resource

Open Resource course packs for Provincial Biology will be available in the future through BC Campus

NLC and OC still require a Bio 011 prerequisite for Bio 012 but all other colleges do not. If a student's assessment is low at Cap U they require students to do the General Science Biology course before taking Biology 12.

ABE student research is being promoted at KPU. VIU has looked into student research showcases. NIC does research at a local estuary. TRU uses research assistants

VIU is creating a case and budget approval for a lab technician. The case has been made that the work required for lab purchasing, set up, clean up and lab maintenance is not sustainable for instructors. VIU is creating a case and is seeking budget approval for a lab technician. The case has been made that the work required for lab purchasing, set up, clean up and lab maintenance is not sustainable for instructor

Presentation given by KPU on the science and technology behind the COVID 19 vaccine.

Reminder that Provincial Biology will be rearticulated next year. Please ensure changes from last year are made and it passes through your governing body

Motion to Adjourn

Mover: Barnabe Assogba

Seconder: Michele Jones

Motion carried

1 pm – 4pm

Chemistry Subcommittee

Attendance

Institution

BC Institute of Technology

Camosun College

Capilano University

Coast Mountain College

College of New Caledonia

College of the Rockies

North Island College

Northern Lights College

Okanagan College

Selkirk College

Thompson Rivers University – Open Learning

University of the Fraser Valley

Vancouver Community College

Vancouver Island University

Yukon University

Representative

Jennifer Wolf

Jimmy Lowe

Neil Meanwell

Bill Kershaw

Michael Nelligan

Dani Michael-Didier

Ben Heyde

Sherrie Wang

Jeanette Landry

Arthur Bakx

Ellie Knight

Derek Knox

Raji Balagopal

Judith Wallace

Natalie Cielenga

Stephen Biggin-Pound

Approval of the 202 Chemistry Subcommittee Agenda

Mover: Derek Knox

Secunder: Raji Balagopal

Motion carried

Approval of the 2020 Chemistry Subcommittee Minutes

Mover: Derek Knox

Secunder: Jimmy Lowe

Motion carried

Business Arising

INSTITUTION	REPRESENTATIVE 2021	ADVANCED CHEMISTRY ARTICULATION STATUS
Camosun College	Neil Meanwell	CHEM 070 No representative 2020, Conditionally Approved 2021 <ul style="list-style-type: none">Refer to the 2020-21 guidePut in the link to ABE articulation guide https://www.bctransferguide.ca/search/abeEnsure the third bullet under B. Properties of Substances reads "Describe early atomic theory and related laws"

		<ul style="list-style-type: none"> • Add “There will be a minimum of 8 laboratory activities covering the core concepts.”
Coast Mountain College	Michael Nelligan	<p>CHEM 040 or CHEM 0401 & 0402 No representative 2020, Conditionally Approved 2021 CHEM 040 and CHEM 0401:</p> <ul style="list-style-type: none"> • Refer to the 2020-21 guide • Put in the link to ABE articulation guide https://www.bctransferguide.ca/search/abe • Ensure the third bullet under B. Properties of Substances reads “Describe early atomic theory and related laws”
College of New Caledonia	Dani Michael-Didier	<p>CHEM 045 Conditionally Approved 2020, 2021</p> <ul style="list-style-type: none"> • Add “There will be a minimum of 8 laboratory activities covering the core concepts.”
College of the Rockies	Ben Heyde	<p>CHEM 080 No representative 2020, Conditionally Approved 2021</p> <ul style="list-style-type: none"> • Refer to the 2020-21 guide • Put in the link to ABE articulation guide https://www.bctransferguide.ca/search/abe • Ensure the third bullet under B. Properties of Substances reads “Describe early atomic theory and related laws” <p>Will review again next year once outline has passed through institutional EdCo</p>
Kwantlen Polytechnic University		<p>CHEQ 1094 No representative 2020, 2021 Outline emailed to group, will be reviewed 2022</p>
Nicola Valley Institute of Technology		<p>CHEM 050 No representative 2020, 2021 Committee recommends removal</p>
North Island College	Sherrie Wang	<p>CHE 051 Conditionally Approved 2020, 2021</p> <ul style="list-style-type: none"> • Refer to the 2020-21 guide
Thompson Rivers University		<p>CHEM 0500 Conditionally Approved 2020, Reviewed and approved 2021</p>
Thompson Rivers University – Open Learning	Derek Knox	<p>CHEM 0501 Conditionally Approved 2020, Reviewed and approved 2021</p>
University of the Fraser Valley	Raji Balagopal	<p>CHEM 083 Conditionally Approved 2020, 2021</p> <ul style="list-style-type: none"> • Refer to the 2020-21 guide • Put in the link to ABE articulation guide https://www.bctransferguide.ca/search/abe

Native Education College		CHEM 060 No representative 2020, 2021 Committee recommends removal
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Please note the following changes need to be made to course codes:
Coast Mountain College, Provincial Chemistry should be CHEM 050

Approval of 2020 conditional courses (Oct 21)

Mover: Arthur Bakx

Second: Ben Heyde

Motion carried

Approval of 2020 conditional courses (Oct 22)

Mover: Derek Knox

Second: Natalie Cielenga

Motion carried

Approval of courses recommended to be removed 2020

Mover: Jeanette Landry

Second: Jimmy Lowe

Motion carried

New Business

Changes to the course outcomes are highlighted and shown in red.

CHEMISTRY: PROVINCIAL LEVEL

Core Topics

A. Reaction Kinetics

- Describe the collision model of chemical reactions
- Describe activation energy, endothermic and exothermic reactions using potential and kinetic energy diagrams
- Describe the factors that affect reaction rate including temperature, concentration, surface area, and catalysts

B. Equilibrium

- Explain the nature of chemical equilibrium using examples
- Apply Le Chatelier's Principle
- Calculate equilibrium constants of homogenous and heterogeneous systems and equilibrium concentrations from equilibrium constants
- Calculate K_{sp} and solubility

C. Acid-Base

- Describe Bronsted-Lowry acids and bases including acid-base pairs
- Predict the relative strengths of acids
- Calculate $[H^+]$, $[OH^-]$, pH, and pOH from any one known
- Calculate pH from K_a or K_b
- Describe the characteristics of a buffer system

D. Oxidation-Reduction

- Assign oxidation states to elements in compounds
- Identify oxidizing and reducing agents

- Balance redox equations
 - Describe the components of electrochemical and electrolytic cells
 - Predict the voltage, E_0 , of electrochemical and electrolytic cells
 - Describe the applications of oxidation-reduction to everyday and industrial processes
- E. Gas Laws
- Use the appropriate units and conversions for pressure, **volume**, and temperature
 - Apply Boyle's, Charles', **Gay-Lussac's**, and the Combined Gas Laws to predict pressure, volume, or temperature
 - Describe an ideal gas and make calculations using the Ideal Gas Law

No changes are required for the general outcomes, Options, or Laboratories sections.

Approval of changes to Provincial Chemistry outcomes

Mover: Ben Heyde

Secunder: Jeanette Landry

Motion carried

General Discussion:

- Lots of talk about virtual/remote labs vs in-person, will discuss more with entire committee
- Discussion about duration of course delivery, hours per week and weeks per term in each institution

There is no official business for chemistry for articulation 2022, but we will likely have more outlines to pass through their conditional acceptance from this year.

Motion to Adjourn (Oct 21)

Mover: Stephen Biggin-Pound

Secunder: Ben Hyde

Motion carried

Motion to Adjourn (Oct 22)

Mover: Sherrie Wang

Secunder: Ben Hyde

Motion carried

General Science Subcommittee

Attendance

Jessica Morcom - OC

Marcie Lundin – NLC

Faezeh Mohammad Beigi – VCC

Christine Miller - TRU

Approval of the Agenda

Mover: Jessica Morcom

Second: Christine Miller

Approval of the October 21, 2020 draft minutes

Mover: Jessica Morcom

Second: Christine Miller

Business Arising

- VCC SCI 051 removed from the grid - complete
- TRU SINC 0400 changed to SINC 0440. - complete
- Other – no other courses brought forward

New Business

SINC 0440 – Open Course Resource available through BC Campus aligned with Intermediate General and Applied Science, found [here](#)

Discussion of potential changes to articulation handbook

No changes at this time

Motion to Adjourn

Mover: Marcie Lundin

Second: Jessica Morcom

Motion carried

Business Meeting

Oct 22, 2021

Attendance

Name	Institution	Email	Subcommittee
Arthur Bakx	OC	abakx@okanagan.bc.ca	Chemistry, Physics
Barnabe Assogba	KPU	dossou.assogba@kpu.ca	Biology
Ben Heyde	COTR	heyde@cotr.bc.ca	Chemistry
Bill Kershaw	CapU	wkershaw@capilanou.ca	Chemistry
Christine Miller	TRU	cmiller@tru.ca	Biology, General Science Chair, General Science Subcommittee
Derek Knox	TRU-OL	dknox@tru.ca	All subcommittees
Dino Gigliotti	CNC	gigliottid1@cnc.bc.ca	Chemistry and Physics
Dani Michael-Didier	CNC	michaeld@cnc.bc.ca	Biology
Ellen Turone	VCC	eturone@vcc.ca	Biology, Physics, General Science
Ellie Knight	Selkirk	eknight@selkirk.ca	Chemistry, Biology Chair, Chemistry Subcommittee
Fiona McQuarrie	BCCAT	fiona.mcquarrie@bccat.ca	BCCAT Representative
Fouzia Qasim	VIU	Fouzia.qasim@viu.ca	Biology
Greg Colombo	VCC	gcolombo@vcc.ca	Biology
Greg St.Hilaire	UFV	Greg.sthilaire@ufv.ca	Biology Chair, ABE Science Articulation
Jeanette Landry	NLC	jlandry@nlc.bc.ca	All subcommittees
Jessica Morcom	OC	jmorcom@okanagan.bc.ca	Biology and General Science Chair, Biology Subcommittee
Krista Lambert	BCcampus	klambert@bccampus.ca	BCcampus
Marcie Lundin	NLC	mlundin@nlc.ca	Physics and General Science
Judith Wallace	VCC	juwallace@vcc.ca	Chemistry
Michele Jones	NIC	michele.jones@nic.bc.ca	Biology
Marrisa Carrasco	Selkirk	mcarrasco@selkirk.ca	Physics and Chemistry Chair, Physics Subcommittee

Natalie Cielanga	VIU	Natalie.cielanga@viu.ca	Chemistry
Neil Meanwell	Camosun	meanwen@camosun.bc.ca	Chemistry
Michael Nelligan	CMTN	MNelligan@coastmountaincollege.ca	All subcommittees
Raji Balagopal	UFV	Raji.balagopal@ufv.ca	Chemistr, Physics
Sherrie Wang	NIC	Sherrie.wang@nic.bc.ca	Chemistry
Stephan Biggin-Pound	Yukon University	sbigginpound@yukon.ca	Biology, Chemistry
Stephanie Boychuk	VIU	Stephanie.Boychuk@viu.ca	Biology
Stephanie Ingraham	Camosun	IngrahamS@camosun.bc.ca	Physics

Territorial Acknowledgement

Welcome by Greg St-Hilaire, Chair

Presentation by Krista Lambert, BCcampus

Krista informed the group about the growth of open text books in the past two years. Quotes include:

Oct, 2019	Oct, 2021
Student Savings \$13,000,000 +	Student Savings \$27,600,000 +
287 resources across all disciplines	390 resources across all disciplines
600+ instructors	700+ instructors

Current work related to Open Education Resources that is current and upcoming include:

- Provincial Biology – Christine Miller, TRU
- Advanced Physics – Terry Berg, KPU
- Advanced Chemistry – Tory Anchikoski, TRU

Current open courses developed by Christine Miller at TRU include:

- Intermediate General and Applied Science
- Human Biology

There is an Open Course Collection which serves as a repository of complete courses. Criteria for these courses include:

- Meeting accessibility guidelines
- Following UDL principles
- Considering EDI
- Course are reviewed for quality

The process for adopting an open textbook was described. The following steps were explained.

- Finding the book in the [BCcampus Collection](#)
- Upon detecting needed changes, one contact Pressbooks
- Once a book is adopted, report adoption to BC Campus and share with colleagues
- One can review an open textbook for a \$250 honorarium

Presentation by Fiona McQuarrie, BCCAT

ABE courses are now listed on a searchable section of the BC Transfer Guide

<https://www.bctransferguide.ca/search/abe>

When the course information was moved from the PDF of the Articulation Guide to the Transfer Guide, errors became apparent (e.g. incorrect course prefixes/numbers). These errors were corrected when the information was posted on the Transfer Guide. So when doing reviews/updates, please work from the information on the BC Transfer Guide, not from the transfer tables in the PDF (p. 30-48). The learning outcomes in the PDF have not changed.

Because the Transfer Guide information can be changed in real time, if you come across errors there, such as incorrect course numbers, please notify Mike Winsemann at BCCAT (mwinsemann@bccat.ca). He can fix the Transfer Guide information. Changes to articulation agreements still go through the ABE steering committee as before.

Past Articulation Guides are now archived on the BC Transfer Guide website:

<https://www.bctransferguide.ca/search/abe/archive>

BCCAT's Joint Annual Meeting (JAM) is online again this year, Nov. 3 and 4, with no registration fee. It is open to all participants in the transfer system. Registration at <https://www.bccat.ca/articulation/jam>

Ruth Erskine has retired as BCCAT Committees Coordinator – her replacement is Anabella Chun achun@bccat.ca

BCCAT's fall 2021 activities report

<https://www.bccat.ca/Media/NEWBCCAT/pubs/Resources/ACUUpdate202110.pdf>

Acting chair of ABE steering committee is Wilma Gus at North Island College wilma.gus@nic.bc.ca

Group Discussion for Online Labs

Some institutions now use some form of hybrid. Labs being in a physical classroom environment and lectures being online. Satisfaction by using that method was expressed. Other instructors shared about using having students use “home kits” which are safe materials that can be purchased and then used in a home setting so students can practice gathering, recording, and analyzing data. There was an understanding that some institutions have situations where having completely online courses are necessary and may continue for some time to come due to the unpredictable ongoing pandemic. There was a general agreement that labs in designated classrooms are optimum when possible.

Institutional Updates

Some institutions have had a drop in enrollments for ABE Science courses. Some of the other that have Nursing, Health Sciences, or Science programs for ABE students to feed into have had ongoing full enrollments. Issues identified include not replacing retired ABE instructors, restructuring ABE departments into other or new faculties, reduced funding, finding better ways of reaching out to indigenous and remote communities, and ensuring that disadvantaged adult learners can continue to access post secondary institutions. Institutions showed a general interest in continuing to improve Indigenization, decolonization, and upholding the principles of EDI.

Reports of Subcommittees

Approval of all subcommittee meeting minutes

Elections

None

ABE Science Articulation 2022

Tentatively at Capilano University on Oct 20 and 21, 2022. In the event that COVID makes a face-to-face meeting difficult or untenable, online/zoom may be used again. Consideration of using hyflex technology may also be used for institutions that may not be able to physically attend.