UNIVERSITY OF THE FRASER VALLEY
Faculty of Science

SCIENCE FACULTY COUNCIL
AGENDA

Friday, October 3, 2025 - 1:15 PM - D213

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2. AGENDA and MINUTES

2.1. Adoption of Agenda

MOTION: that the Faculty Council approve the Agenda as presented.

3 – 4 2.2. Approval of the Minutes - September 5, 2025

MOTION: that the Faculty Council approve the Minutes as presented.

3. GUESTS

3.1. Kashvi Dhawan - LIYSF 2025 Student Rep Presentation (15 mins)

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5.1. Physical Geography major, minor, and Geographical Information Systems certificate Discontinuance

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77 – 82 6.3. CHEM 221 – 6-year review

83 – 86 6.4. FSCC Terms of Reference

6.5. Invitation to participate in a Community of Inquiry (CoI) on AI use cases in Teaching & Learning at UFV.

We invite you to participate in a Community of Inquiry (CoI) on AI use cases in Teaching & Learning at UFV. This CoI will bring together Arts and Science faculty who are currently using AI in their teaching and/or are interested in exploring how AI could be incorporated into their practice. Supported by Learning Designers and Specialists from the Teaching and Learning Centre, the group will meet monthly to discuss, debate, and explore how AI could be, should be, or shouldn't be used in teaching and learning at UFV. Together, we will share examples, tensions, successes, and outputs, with the goal of presenting insights during ConnectED 2026. Our first meeting will take place in mid-October (date TBA). **If you are interested in joining, please contact Marina at marina.tourlakis@ufv.ca .**

6.6. Monthly reports to the Provost from the Faculty of Science can be found below. If you have news to share, please email Science@ufv.ca so it can be included on our next report. https://ufv.ca/science/deans-office/monthly-department-highlights/

7. REPORTS

87 – 88 7.1. Teaching & Learning Advisory Council (TLAC) Report

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8. ADJOURN

Next Meeting: 31 OCT 2025 @ 1:00 PM, D213/Zoom

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Quorum - 14 voting members

UNIVERSITY OF THE FRASER VALLEY
Faculty of Science

SCIENCE FACULTY COUNCIL

MINUTES - DRAFT

Friday, September 5, 2025 - 1:15 PM - D213

Chair
Michael Hitch

In Person
David Chu, Robin Endelmen, Ali Fotouhi, Harley Gordon, Longlong Huang, Cynthia Loten, Justin Lee, Caroline Majeau, Stan Manu, Stefania PIzzirani, Afia Raja, Declan Roshea, Kristen Switzer, Ben Vanderlei, Natallia Varankovich, Luis DelRio, John B. Acharibasam, Mashhood Arif, Shayne Oberhoffner

Virtual
Cherie Enns, Dina Navon, Gillian Mimmack, Jason Thomas, Jenn Barrett, Carolyn Atkins, Jacob Spooner, Sandra Gillespie, Nathan Bialis, Yvonne Dahl, Linus Chang, James Bedard, Olav Lian, Carrie Sims, Debbie Wheeler, Andrew Staal, Don Mayder, Frank Zhang, Trevor Beugeling, Shaun Sun, Vahid Tadayon, Mitra Tabatabaee, Peter Mulhern, Marina Tourlakis

Recorder
Alison Reeves

1. WELCOME

2. AGENDA and MINUTES

2.1. Adoption of Agenda

MOTION: that Faculty Council approve the Agenda as presented.

1st Ian, 2nd Ben. Approved.

2.2. Approval of the Minutes - May 30, 2025

MOTION: that Faculty Council approve the Minutes as presented.

1st Kristen, 2nd Ian. Approved with corrections.

3. GUESTS

None

4. FOR DECISION

4.1 Bachelor of Science

4.1.1. Entrance Requirement Updates

Discussion: effective Fall 2027, to be published in the calendar in advance

1st Ben, 2nd Kristen. Approved with updates to memo.

4.2 Math Course Changes

4.2.1. Math 111

Update outline from A- to A.

4.2.2. Math 112

Add approval dates.

4.2.3. Math 125

4.2.4. Math 225

4.2.5. Math 355

LO1 missing 'and' to be updated before UEC.

1st Cindy, 2nd Robin. All outlines approved with updates.

5. FOR DISCUSSION

5.1. Option for Early Declaration of Major – Ian

Discussion about pros, cons, foreseeable issues, optional not mandatory

6. INFORMATION ITEMS

6.1 Monthly reports from the FoS to the Provost can be found at the link below. If you'd like included in the next report, please email Science@ufv.ca.

https://ufv.ca/science/deans-office/monthly-department-highlights/

7. REPORTS

Provost Lunch Sept 25 – Stefania to present Indigenization report.
Sept 30 – Truth and Reconciliation Day

8. ADJOURN

Next Meeting: October 3, 2025 @ 1:15 PM D213

Quorum - 14 voting members

Memo for Program Changes

To: FSCC/SFC

From: Jennifer Barrett and Dr. Debbie Wheeler

Date: 10/Sep/2025 (updated 25/Sep/2025, based on feedback from the FSCC)

Subject: Program change (insert program title)

1. Summary of changes (select all the apply):

   ☐ Program revision that requires new resources
   ☐ Addition of new course options or deletion or substitution of a required course
   ☐ Change to the majority of courses in an approved program
   ☐ Change to the duration, philosophy, or direction of a program
   ☐ Addition of a new field of specialization, such as a concentration
   ☐ Change in requirements for admission
   ☐ Change in requirements for residency or continuance
   ☐ Change in admission quotas
   ☐ Change which triggers an external review
   ☐ Deletion of a program not included in the Program Discontinuance policy
   ☒ Other – Please specify: Change in the course requirements for the Ecology and Biology of Organisms (EBO) concentration and a change of the name of the concentration to include "(RPBio)" as a suffix.

2. Rationale for change(s): To meet the accreditation requirements set by the College of Applied Biologists for the Biologist in Training (BIT) and Registered Professional biologist (RPBio) registrant categories. Students who complete their degree in a program that is accredited by the College are immediately eligible for registration as a BIT and are eligible to enter Stream 1 of the RPBio registration process, which requires less work experience than Steams 3 and 4, and a less tedious application process than Stream 2, with no risk of missing a core course requirement. Both BIT and RPBio. credentials are a requirement for many jobs in government (e.g., fish and wildlife management), industry, and environmental consulting. The addition of RPBio. to the suffix is required to distinguish students who graduate under the accredited version of the EBO concentration from those who are currently enrolled at UFV and have already declared the EBO concentration, and who may thus graduate following accreditation of our program by the College, but without completing the modified course requirements. The EBO concentration with the changes noted in the attached file ("EBOConcentration_CalendarChanges_RPBio.pdf") has already been approved by the College as fulfilling the academic requirements for the BIT and RPBio. designations with an anticipated start date of January 1st, 2026.

3. If program outcomes are new or substantially changed, explain how they align with the Institutional Learning Outcomes: No change.

4. What consideration has been given to Indigenizing the curriculum? Accreditation of the EBO concentration at UFV creates a pathway for Indigenous students to work towards the RPBio. professional designation in their community.

5. Will additional resources be required? If so, how will these costs be covered? No additional resources will be required.

6. How will students be impacted? (Indicate the projected number of students impacted.) Is the change expected to increase/decrease enrolment in the program. Over the past 6 years, there have been an average of 14 students enrolled in the EBO concentration in any given year, with an average of 6 students graduating with the EBO concentration each year. Students who are currently enrolled in the EBO concentration will have the option to complete the concentration following the existing requirements or to switch to the EBO concentration that is RPBio. accredited. In this manner, students who have already completed, for example, STAT 104, and who do not intent to pursue registration with the College, will not be forced to complete STAT 270 or STAT 271 to fulfill the concentration requirements.

   This change is not expected to decrease enrollment in the EBO concentration, and if anything, may increase enrolment of students in the concentration. For the benefits of this change, please see our answer to Q2 above.

7. Does the number of required core or elective credits from the program-specific discipline change? If so, will this change the total number of courses to be offered within the discipline? Depending on the courses that students choose to complete for the 24 UL BIO credit requirement of the Biology major, they will need an additional 1 to 3 science courses to fulfill the RPBio. educational requirement of 25 science courses, which will be completed as part of the students' elective credits. These courses may be completed within Biology or other disciplines. See Appendix E for a list of courses that meet the College's definition of a "science course" and that have been pre-approved by the College. This requirement will not change the total number of courses offered within Biology.

8. Identify any available resources that will be used to accommodate the program changes. (Eg. seats in existing classes, conversion of sections, timetabling changes, deletion of courses, etc.) No additional resources, conversion of sections, timetabling changes, or deletion of courses are required.

9. Is the number of required or elective courses from other disciplines in the program changing? If so, what is the estimated impact to enrolments in these courses? Provide a memo from the respective dean(s) of the impacted faculty to confirm if budgetary implications have been considered and addressed.

    a. **ENGL/CMNS requirements**: Students completing the BSc. are required to complete any two courses from the following: university-level ENGL, CMNS 125, or any CMNS course numbered 235 or higher. The new EBO concentration will **require either ENGL 105 or CMNS 125 as one of these two courses** to fulfill the Communications core requirement for entry as a BIT or RPBio. Please see the attached email from Dr. Sylvie Murray, Dean of the College of Arts, acknowledging that this change will have no budgetary implications of concern.

b. **MATH/STAT requirements**: Students in the Biology Major are required to complete either STAT 104, 106, or 270. BIT/RPBio. accreditation requires a second-year stats course. Given this, **STAT 270 or STAT 271 will be required** under the new EBO concentration. STAT 271 was added as an option after conversations with Dr. Affleck and members of the FSCC to offer more flexibility and a STATS option that was less calculus-heavy and more applicable to a career in applied biology.

c. As noted above, students in the new EBO concentration will be required to complete an additional **1 to 3 science courses** to fulfill the 25 science course requirement for RPBio. accreditation. These courses may be completed within Biology or other disciplines. See Appendix E for a list of courses that meet the College's definition of a "science course" and that have been pre-approved by the College.

10. Provide a memo from the program's dean to confirm that budgetary implications of the proposed changes have been considered and will be addressed within the faculty budget. As noted above, there are no budgetary implications associated with this change. Dr. Affleck and Dr. Hitch were contacted about the change. Please see the attached email from Dr. Affleck acknowledging that this change will have no budgetary implications of concern.

Ecology and Biology of Organisms (RPBio.) concentration

In addition to the courses required for a Biology major or Biology Honours, this concentration requires completion of the following:

Course	Title	Credits
ENGL 105	Academic writing	3
or CMNS 125	Introduction to Professional Communication	
STAT 270	Introduction to Probability and Statistics	3
or STAT 271	Introduction to Data Analysis and Statistical Modeling	
BIO 310	Conservation Biology	3

BIO 416	Evolution	3
Four of:		12–18
BIO 301	Anatomy and Physiology of Invertebrates	
BIO 305	Structural and Functional Anatomy of Vertebrates	
BIO 306	Vertebrate Organ Systems	
BIO 307	Anatomy and Diversity of Plants	
BIO 308	Plant Physiology	
BIO 312	Developmental Biology	

BIO 319/ GEOG 319	Swamps and Bogs	
BIO 330	Plants and Animals of British Columbia	
BIO 335/ GEOG 335	Freshwater Ecology	
BIO 340	Population and Community Ecology	
BIO 357/ GEOG 357	Conservation GIS	
BIO 360	Insect Biology	
BIO 370	Introduction to Mycology	
BIO 380	Ornithology	

BIO 390	Animal Behaviour	
BIO 410/ GEOG 410	Plant Ecology	
BIO 419/ GEOG 419	Paleoecology	
BIO 426	Environmental Microbiology	
BIO 430	Forest Ecology	
BIO 477/IPK 477	Traditional Ecological Knowledges	
Plus:	BIO special topics course or directed studies course designated for credit under the Ecology and Biology of Organisms concentration	

Plus:	Additional BIO, CHEM, ENV, GEOG, MATH, PHYS, and/or STAT courses to achieve a total of 25 science courses as per the College of Applied Biologists educational requirements for Stream 1. Please consult an advisor to view the list of courses that meet the College's Credentialing Standards for a science course.	

Appendices to RPBio accreditation application – University of the Fraser Valley

Prepared by: Jennifer Barrett, Biology Lab Instructor, UFV and Dr. Debbie Wheeler, Biology Lab Instructor, UFV.

Appendix A: Full titles of courses listed under the core requirements for RPBio. All of these courses are required under the Ecology and Biology of Organisms concentration in the Biology Major. For full course outlines please see:
Biology: https://www.ufv.ca/calendar/CourseOutlines/PDFs/BIO/
Chemistry: https://www.ufv.ca/calendar/CourseOutlines/PDFs/CHEM/
Math/Stat: https://www.ufv.ca/calendar/CourseOutlines/PDFs/MATH/
Communications: https://www.ufv.ca/calendar/CourseOutlines/PDFs/CMNS/
English: https://www.ufv.ca/calendar/CourseOutlines/PDFs/ENGL/

Course	Title
CMNS 125	Communicating Professionally to Academic and Workplace Audiences
or ENGL 105	Academic Writing
MATH 111	Calculus I
CHEM 113	Principles of Chemistry I
CHEM 114	Principles of Chemistry II
BIO 310	Conservation biology
MATH/STAT 270	Introduction to Probability and Statistics
STAT 271	Introduction to Data Analysis and Statistical Modeling
BIO 210	Introduction to Ecology
BIO 220	Genetics
BIO 201	Cellular Biochemistry/Metabolism
BIO 202	Cell Signaling/Gene Regulation
BIO 416	Evolution

Commented [JB1]: Note to SFC: As per the memo, STAT 271 was added after review by the FSCC. This change has been sent to the College of Applied Biologists and is awaiting approval.

Appendix B: Additional **required** courses under the Biology and Ecology of Organisms Concentration that will contribute towards the 13 biology course requirement of the RPBio. For full course outlines, please see the link provided above under Appendix A.

Course	Title
BIO 111	Introductory Biology I
BIO 112	Introductory Biology II
➡ **Plus four of the following upper-level BIO courses:**	
BIO 301	Anatomy and Physiology of Invertebrates
BIO 305	Structural and Functional Anatomy of Vertebrates
BIO 306	Vertebrate Organ Systems
BIO 307	Anatomy and Diversity of Plants
BIO 308	Plant Physiology
BIO 312	Developmental Biology

BIO 319	Swamps and Bogs
BIO 330	Plants and Animals of British Columbia
BIO 335	Freshwater Ecology
BIO 340	Population and Community Ecology
BIO 357	Conservation GIS
BIO 360	Insect Biology
BIO 370	Introduction to Mycology
BIO 380	Ornithology
BIO 390	Animal Behaviour
BIO 410/ GEOG 410	Plant Ecology
BIO 419/ GEOG 419	Paleoecology
BIO 426	Environmental Microbiology
BIO 430	Forest Ecology
BIO 477/IPK 477	Traditional Ecological Knowledges
Plus:	BIO special topics course (BIO 420) or directed studies course (BIO 408 or BIO 409) designated for credit under the Ecology and Biology of Organisms concentration

Appendix C: Additional upper-level (UL) biology courses that students **may select** (in addition to those listed above) to fulfill the 24 UL credit requirement of the Biology Major and the 13 biology course requirement for RPBio. For full course outlines, please see the link provided above under Appendix A.

Course	Title
BIO 309	Microbiology I
BIO 320	Biochemistry
BIO 333	Bioinformatics I
BIO 350	Medical genetics
BIO 383	Human physiology
BIO 385	Neurobiology
BIO 401	Molecular biology
BIO 403	Molecular techniques
BIO 406	Advanced genetics
BIO 407	Applied biotechnology
BIO 412	Advanced metabolism
BIO 414	Genomics
BIO 415	Cancer biology
BIO 418	Ethnobotany
BIO 421	Special topics in applied biology
BIO 425	Introductory medical microbiology
BIO 427	Plants and drugs
BIO 433	Bioinformatics II
BIO 422	Biological field school
BIO 448	Immunology
BIO 499	Honors research thesis

Appendix D: Non-biology science courses that are **required** for the Biology Major, that are not listed under the core requirements for RPBio, and that will contribute to the 25 science course requirement. For full course outlines, please see the links provided above under Appendix A and:
Physics: https://www.ufv.ca/calendar/CourseOutlines/PDFs/PHYS/

Course		Title
One of:	PHYS 105	Heat, Waves, and Optics
	PHYS 111 + PHYS 112	Mechanics (111), Electricity and Magnetism (112)
CHEM 213		Organic chemistry I
One of:	MATH 112	Calculus II
	MATH 118	Calculus II for Life Sciences
One of:	CHEM 214	Organic chemistry II
	CHEM 221	Inorganic Chemistry
	CHEM 224	Atoms, Molecules, Spectra
	CHEM 241	Analytical Chemistry
	CHEM 324	Chemical Kinetics and Thermodynamics

Appendix E: Additional science courses that students **may complete** to fulfill the 25 science course requirement for RPBio in addition to the courses already listed under Appendices B, C and D. For full course outlines, please see the links provided above under Appendix A and D and:

Geography: https://www.ufv.ca/calendar/CourseOutlines/PDFs/GEOG/
Environmental studies: https://www.ufv.ca/calendar/CourseOutlines/PDFs/ENV/

Course	Title
CHEM 311	Intermediate Organic Chemistry I
CHEM 312	Intermediate Organic Chemistry II
CHEM 320	Intermediate Inorganic Chemistry (no lab)
CHEM 325	Inorganic Chemistry Laboratory
CHEM 341	Instrumental Analysis/Applied Spectroscopy
CHEM 350	Introductory Biochemistry Laboratory
CHEM 401	Enzymes, Coenzymes, and Inhibitors
CHEM 422	Principles and Methods of Molecular Modeling
CHEM 444	Medicinal Chemistry
CHEM 455	Chemistry of Biological and Synthetic Polymers
GEOG 103	The Physical Environment
GEOG 111	Environmental Issues and Strategies
GEOG 116	Earth Rocks
GEOG 201	Climate and People
GEOG 202	Understanding Your Earth: Landforms and Processes
GEOG 219	Biogeography
GEOG 253	Introduction to Geographic Information Systems
GEOG 257	Environment: Science and Communications
GEOG 302	River Geomorphology
GEOG 303	Environmental Hydrology

Commented [JB2]: Note to FSCC: Biology majors are required to take CHEM 113, 114, 213 + an additional CHEM course at the 200 level or higher. I've listed here all those that they are eligible to take with only CHEM 113, 114, and/or 213 as pre-reqs.

Commented [JB3]: Note to FSCC: Under the College of Applied Biologists credentialing standards, a science course is defined as follows:

Science courses (general)
Science courses must include a majority (>50%) of scientific concepts, theory, or practice, and may include subject areas such as physics, chemistry, mathematics, geology, geography, environmental science, forestry and forest sciences, ecological restoration, and engineering.

Commented [JB4]: Note to FSCC: Some CHEM courses were omitted here because they require upper level CHEM courses as pre-reqs, which our EBO students do not generally complete.

Commented [JB5]: Note to FSCC: We didn't include any MATH in this list, because our students don't generally take math courses beyond Calculus II; however, if there are MATH courses that should be added here, we can contact the College for approval to add these courses to the list. Note that I will be asking for STAT 271, 272, 307, 315, 330 and 350 to be approved, as BIO honours students have to complete one of these courses (in addition to 104, 106 or 270) and thus we should have included them here.

GEOG 304	Coasts and Climate Change
GEOG 308	Climate Change and Variability
GEOG 315	Soilscapes
GEOG 319*	Swamps and Bogs
GEOG 331	Environmental Assessment and Management
GEOG 335*	Freshwater ecology
GEOG 357*	Conservation GIS
GEOG 410*	Plant ecology
GEOG 419	Paleoecology
ENV 212	Environmental Field and Lab Techniques
ENV 345	Invasive Species Management
STAT 104	Introductory Statistics
STAT 106	Statistics I
MATH/STAT 270	Introduction to Probability and Statistics
STAT 271	Introduction to Data Analysis and Statistical Modeling
STAT 272	Statistical Graphics and Languages
STAT 307	Data Visualization
STAT 315	Applied Regression Analysis
STAT 330	Design of Experiments
STAT 350	Survey Design and Sampling

* These three courses are cross listed with BIO and cannot be taken for additional credit by students who have already completed the BIO course.

Commented [JB6]: Note to SFC: STAT 104, 106, 270 and 271 were added here following feedback from the FSCC to add 271 as an option for the second-year stats requirement. This change has been sent to the College and is awaiting approval.

The remaining STATS courses were added here as one of these courses is required for the Biology Honours as per my note above. Again, this change has already been sent to the College and is awaiting approval.

From: Sylvie Murray
To: Jennifer Barrett
Cc: Debbie Wheeler; Heather McAlpine; Samantha Hannah
Subject: RE: Proposed change to Ecology and Biology of Organisms concentration - requirement for ENGL 105 or CMNS 125
Date: September 15, 2025 8:00:00 AM

Hello Jennifer,

Thank you for reaching out.

Given the average of students in the EBO concentration over the last six years, the budgetary implications of your change are not of great concern.

I copy the English department head and the School of Communication director on my reply. Heather and Samantha, if you have concerns or suggestions, please chime in.

Good luck with completion of your program revision.

Sylvie

Dr. Sylvie Murray (she/her)
Dean, College of Arts
Faculty of Humanities
Faculty of Social Sciences

Sylvie.murray@ufv.ca
604-854-4515
Toll Free (Canada): 1-888-504-7441 x4515

I respectfully acknowledge that I live and work on the traditional, ancestral, and unceded land of Stó:lō, People of the River. Long before Canada was formed, Stó:lō communities occupied the land on which UFV is located. The Stó:lō traditional territory in the Fraser Valley and Fraser Canyon extends from Yale to Langley, B.C., which is where the upriver dialect of Halq'eméylem is spoken. UFV supports Indigenous learners and seeks to incorporate Indigenous ways of knowing in the curriculum.

From: Jennifer Barrett <Jennifer.Barrett@ufv.ca>
Sent: Monday, September 15, 2025 7:30 AM
To: Sylvie Murray <Sylvie.Murray@ufv.ca>

Cc: Debbie Wheeler <Debbie.Wheeler@ufv.ca>
Subject: Proposed change to Ecology and Biology of Organisms concentration - requirement for ENGL 105 or CMNS 125

Hi Sylvie,

I'm an instructor in the Biology Dept. and I'm currently in the process of completing a memo for the Faculty of Science Curriculum Committee for some minor changes to our Ecology and Biology of Organisms (EBO) concentration to meet the educational requirements for RPBio. There is one question in the memo that requires a "memo" from you:

Is the number of required or elective courses from other disciplines in the program changing? If so, what is the estimated impact to enrolments in these courses? Provide a memo from the respective dean(s) of the impacted faculty to confirm if budgetary implications have been considered and addressed.

Currently, students completing a BSc. are required to complete **any two** courses from the following: university-level ENGL, CMNS 125, or any CMNS course numbered 235 or higher. The new EBO concentration will **require either ENGL 105 or CMNS 125 as one of these two courses**. I believe that most of our students take ENGL 105 or CMNS 125 anyways, so I don't imagine that the above change will impact enrolment in these courses in any substantial way. In addition, looking back over the past 6 years, there has been an average of 14 students enrolled in the EBO concentration in any given year and an average of 6 graduates per year from this concentration, and so this change won't be impacting a large number of students.

If you have any questions or concerns about this change, please let me know. Otherwise, I believe that I just require a statement from you confirming that budgetary implications of the above change to our concentration are not of great concern.

Thanks for your attention to this matter.

Cheers,
Jenn

Jennifer Barrett, MRM (she/her)
Lab instructor, Biology Department, UFV
Stó:lō Temexw | 33844 King Rd, Abbotsford, BC Canada, V2S 7M8
Office: Building A, Room 317

"The more clearly we can focus our attention on the wonders and realities of the universe about us, the less taste we shall have for destruction." - Rachel Carson

Outlook

Re: FSCC memo - budgetary implications of change to EBO concentration

From Ian Affleck <Ian.Affleck@ufv.ca>
Date Thu 9/18/2025 9:47 AM
To Jennifer Barrett <Jennifer.Barrett@ufv.ca>
Cc Biology Department Head <biology.departmenthead@ufv.ca>; Debbie Wheeler <Debbie.Wheeler@ufv.ca>

Hi Jenn,

Your message describes two ways in which enrolment patterns would change as a result of the proposed changes to the Ecology and Biology of Organisms (EBO) concentration: change in Statistics course requirement, and increase in number of science courses required.

We don't anticipate significant budgetary impact due to these changes, due to the relatively small number of students involved. The current number of sections of STAT 104, 106 and 270 will not need to change, and neither will the number of upper-level science courses offered.

Thanks,
Ian

From: Jennifer Barrett <Jennifer.Barrett@ufv.ca>
Sent: Wednesday, September 17, 2025 16:08
To: Ian Affleck <Ian.Affleck@ufv.ca>
Cc: Biology Department Head <biology.departmenthead@ufv.ca>; Debbie Wheeler <Debbie.Wheeler@ufv.ca>
Subject: FSCC memo - budgetary implications of change to EBO concentration

Hi Ian,

Just forwarding my original email from Friday re: the changes to the EBO concentration, so that you can provide a statement to forward to FSCC.

Thanks!

Cheers,
Jenn

Hi Ian and Michael,

I'm in the process of completing a memo for FSCC for some minor changes to our Ecology and Biology of Organisms concentration to fulfill the educational requirements for accreditation by the College of Applied Biologists for BIT/RPBio. There are two questions in the memo that require memos from either of you (I'm not sure which, so I've addressed you both):

9. Is the number of required or elective courses from other disciplines in the program changing? If so, what is the estimated impact to enrolments in these courses? Provide a memo from the respective dean(s) of the impacted faculty to confirm if budgetary implications have been considered and addressed.

There are two changes that fall under this question:

1. Currently, students in the BIO major have a choice between STAT 104, 106, or 270; however, RPBio accreditation requires a **second-year stats** course and so **STAT 270** will be required under the new EBO concentration (i.e., students will not get to choose 104 or 106).

2. The educational requirements for RPBio also include a **total of 13 biology courses and 25 science courses** (the 13 biology courses are included in this 25). All students graduating from the BIO major, no matter which courses they take for their upper-level biology electives, will have completed 13 biology courses as part of their degree; however, they will need to take an additional 2 to 3 science courses as part of their electives to fulfill the 25 science course requirement. Science courses that have been approved by the College based on their credentialling standards are attached (See Appendix E - I submitted an application for accreditation last winter, so we are pre-approved pending the changes to our EBO concentration that we'll present to FSCC).

Looking back over the past 6 years, there has been an average of 14 students enrolled in the EBO concentration in any given year and an average of 6 graduates per year from this concentration, so I don't think that enrollment in 270 (or 104/106) will be greatly affected. Also, we don't expect the change in the EBO requirements to decrease enrollment in this concentration, and if anything, it may have the potential to increase it slightly (e.g., I encountered a student last winter who was planning to leave UFV for UBC-O because they are accredited and we are not – I told her to wait on that). Change 2) above does mean that students in this concentration will have less choice in their electives, as they will need to take an additional 2 to 3 science courses as part of their elective credits; however, the vast majority of our students take science courses for their elective credits anyways, and based on our calculations, there will still be "leftover" elective credits for courses outside the Faculty of Science.

10. Provide a memo from the program's Dean to confirm that budgetary implications of the proposed changes have been considered and will be addressed within the faculty budget.

See attached for all of the proposed course changes to the EBO concentration (as you can see, there are only a few). There really shouldn't be any budgetary implications and given the number of EBO graduates noted above, we don't anticipate that the changes will affect fill rates or require new sections…etc.

Thanks for your attention to this. We're really hoping we can squeeze this into the next FSCC meeting, so that it might make it into the calendar for January.

Cheers,
Jenn

Jennifer Barrett, MRM (she/her)
Lab instructor, Biology Department, UFV
Stó:lō Temexw | 33844 King Rd, Abbotsford, BC Canada, V2S 7M8
Office: Building A, Room 317

"The more clearly we can focus our attention on the wonders and realities of the universe about us, the less taste we shall have for destruction." - Rachel Carson

Memo for Course Changes

To: FSCC

From: Cherie Enns, Chair, BRCP, and Afia Raja, Head, PGES

Date: 25 April 2025

Subject: Proposal for cross-listing Geog 160 with PLAN 160

Note that even minor changes may result in comments from committees on all aspects of the course.

1. Summary of changes (select all that apply):
   - ☐ Six-year review
   - ☒ Number and/or course code
   - ☐ Credits and/or total hours
   - ☐ Title
   - ☐ Calendar description
   - ☐ Prerequisites and/or co-requisites
   - ☐ Frequency of course offering
   - ☐ Learning outcomes
   - ☐ Delivery methods and/or texts and resource materials
   - ☐ PLAR options, grading system, and/or evaluation methods
   - ☐ Discontinuation of course
   - ☐ Other – Please specify:

2. Rationale for change:

Change to Geog 160: As part of applying for accreditation from the Planning Standards Board, selected planning-focused courses in the Geography program are being shifted to cross-list with PLAN

Course Updates Accordingly, the following changes have been made:

- Geog 160 is to be crosslisted with PLAN 160.

3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the Institutional Learning Outcomes (ILOs):

   NA

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

   NA

5. Which program areas have been consulted about the change(s)?

   None outside of PGES.

6. In what ways does this course (not just the proposed changes) contribute to Indigenizing Our Academy? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: UFV Integrated Strategic Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05), the TRC Calls to Action, and/or the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

   This course serves as a foundation course for geography and planning and will address Indigenous knowledges, values and practices in planning, and ethical practice more generally.

7. How does the course reflect principles of equity, diversity, and inclusion, through assignment design, topic selection, curriculum delivery, or other methods?

   The Canadian context will highlight how diversity is an asset and a factor in the design of community settlements. In addition, students are expected to speak to integrating EDI principles into settlement studies.

8. If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.

9. Estimate of the typical costs for this course, including textbooks and other materials (excluding tuition):

   None generally expected.

UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: September 2025

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:** February 2031

Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: GEOG 160	**Number of Credits:** 3 Course credit policy (105)
Course Full Title: Settlements: Why We Live Where We Do **Course Short Title:** Settlements	
Faculty: Faculty of Science	**Department/School:** Planning, Geography, and Environmental Studies

Calendar Description:

Explores the relationships between people and place by examining why and how people live where they do. Considers patterns, processes, and scales of settlement within and across natural systems. Analyzes rights to access and/or control land and resources as an organizing principle for settlements. Interprets settlement patterns and placemaking and examines how effectively communities can adapt to technological and climate changes.

Prerequisites (or NONE):	None.
Corequisites (if applicable, or NONE):	None.
Pre/corequisites (if applicable, or NONE):	None.

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number:

Cross-listed with: ~~PLAN 160~~

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	25
Tutorials/workshops	20
Total hours	**45**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: **No**

Course Details

Special Topics course: **No**

(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: **No**

(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: **May be offered in multiple delivery modes**

Expected frequency: **Every semester**

Maximum enrolment (for information only)**: 36**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See bctransferguide.ca.)*

Transfer credit already exists: **No**

Submit outline for (re)articulation: **Yes**

(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:** ~~September 10, 2024~~April 25, 2025
Faculty Council approval	**Date of meeting:**
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:

1. Describe how settlements emerge in relationship to and, at times, in conflict with natural systems (topography, hydrology, ecology, etc.).
2. Discuss how colonization influenced the progression of settlements, and their ongoing impacts on culture worldwide.
3. Develop preliminary assessments of settlement patterns through use of online geographic data and tools (census, Google Earth, etc.).
4. Analyze relationships between spatial trends (population growth, economic influence, land rights, and internal geographies) at local and global scales.
5. Explain how different cultures (including Indigenous cultures) influence settlement geographies through varied conceptions and systems of property (commons, private, etc.).
6. Reflect on how one's connection to home and community are shaped by cultural, environmental, and global relationships.
7. Assess the strengths and vulnerabilities of settlements in the face of changing climate and technologies.
8. Examine one's own personal and cultural biases in regard to how communities should adapt to future technological and environmental shifts.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Assignments: 55%	Quizzes/tests/midterm: 20%	Project: 25%

Details:

Assignments for this course will include:

1. Reflecting on personal geography, incorporating Google mapping tools in written response: 10%
2. Understanding, collecting, and comparing census data (Statistics Canada): 10%
3. Relating property ownership to settlement patterns (case study): 10%
4. Decolonizing settlements discussion piece: 10%
5. In-class rapid research and presentation exercises: 15%

Additional assessment:

6. 2 quizzes or midterm exam: 20%
7. Future settlement geographies group project/ presentation: 25%

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

In-person instruction consists primarily of weekly faculty presentations, seminar discussions, and workshop exercises utilizing online and observational tools. Online instruction includes synchronous course meetings, interactive online activities and data collection with course material and assessment organized in modules.

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	OER	Villagomez, E	The Laws of Settlement: 54 Laws Underlying Settlements Across Scale and Culture. KPU	2020
2.	Article	Coates, Ta-Nehisi	The Case for Reparations. The Atlantic, June 2014	2014
3.	OER	Caldaruru, A., et al.	Canadian Settlement in Action: History and Future (selected chapters). Open Education Alberta network	2024
4.	Other	Harris, C.	Making Native Space. UBC Press	2003
5.	Other	Wiseman, Alan	The World Without Us. St. Martin's Thomas Dunne Books	2007
6.	Other	Gandhi, E. L.	Archipelago of Resettlement. UC Press	2022

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

None

Course Content and Topics

Module 1/ Weeks 1-3: Why we live where we do

- What if we all disappeared tomorrow? Considering the legacy of human settlement across the globe
- Our personal geographies and the footprints (palimpsests) of home(s): reflecting on our settlement histories, communities, and placemaking processes. How globalized are we and our home spaces?

- Settlements: Interdependence across multiple scales
- Geographic tools used to examine settlement sites, situations, patterns, trends, and relationships
- Building a glossary of course terminology

Module 2/ Weeks 4-6: Patterns of settlements across time, place, and environmental conditions

- Land as “blank slate” or land as family? Different ways of thinking of evolving human-environment relationships in settlements
- Historical perspectives on human settlement patterns (e.g., hydraulic civilizations, agricultural revolution)
- Colonization and the myth of empty space, historically and today
- Expansionism, development, and the (problematic) efforts to define, quantify, and model settlement types and hierarchies (e.g., Christaller, Innis)
- Why settlements decline or disappear, while others thrive and grow larger
- Environmental change and health within settlements

Module 3/ Weeks 7-10: Critical dimensions of property, claims to space, and wealth within settlements

- Beyond sedentarism and individual property rights: reframing settlement narratives using Indigenous geographies
- How private property and commons property regimes shape distinct settlement patterns, belonging, and environmental relationships
- Segregation and the reproduction of wealth within and across settlements
- Technology, mobility, and globalization as redistributors of population

Module 4/ Weeks 11-14: The Ecumenopolis (“one global cit”y) and other settlement futures

- Power, economic nationalism, and the changing shape and constitution of settlements
- Why and where settlements will disappear
- Three trends that will reshape settlements in Canada and globally:
    - Artificial Intelligence and other technologies of work/ production
    - Indigenous land claims
    - Climate change and environmental displacement
- Is the Ecumenopolis inevitable or impossible?

ORIGINAL COURSE IMPLEMENTATION DATE:

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:**

Course outline form version: 06/18/2021

OFFICIAL UNDERGRADUATE CROSS-LISTED OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: PLAN 160	**Number of Credits:** 3 Course credit policy (105)
Course Full Title: Settlements: Why We Live Where We Do **Course Short Title:** Settlements	
Faculty: Faculty of Science	**Department (or program if no department):** Planning, Geography and Environmental Studies

Official Course Outline:

This is a cross-listed course. Please refer to **Geog 160** for the official course outline.

Calendar Description:

Explores the relationships between people and place by examining why and how people live where they do. Considers patterns, processes, and scales of settlement within and across natural systems. Analyzes rights to access and/or control land and resources as an organizing principle for settlements. Interprets settlement patterns and placemaking and examines how effectively communities can adapt to technological and climate changes. Note: Field trips outside of class time will be required. Please refer to the department website for scheduling information.

Note: This course is offered as Geog 160 and PLAN 160. Students may take only one of these for credit.

Note: Students with credit for Geog 160 cannot take this course for further credit.

Prerequisites (or NONE):	15 university-level credits.
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE

Antirequisite Courses *(Cannot be taken for additional credit.)* Former course code/number: Cross-listed with: **GEOG 160** Equivalent course(s): *(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)*	**Transfer Credit** *(See bctransferguide.ca.)* Transfer credit already exists: **Click to select** Submit outline for (re)articulation: **[click to select]** *(If yes, fill in transfer credit form.)*

Department / Program Head or Director:	**Date approved:** April 25, 2025
Faculty Council approval	**Date approved:**
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Memo for Course Changes

To:

From: (Department head or Chair of Program Working Group)

Date: May 21, 2025

Subject: Proposal for revision of BIOC 404; cross-listing as CHEM 404

Note that even minor changes may result in comments from committees on all aspects of the course.

1. Summary of changes (select all that apply):
   - ☒ ~~☐~~ Six-year review
   - ☒ ~~☐~~ Number and/or course code
   - ☐ Credits and/or total hours
   - ☐ Title
   - ☒ ~~☐~~ Calendar description
   - ☐ Prerequisites and/or co-requisites
   - ☐ Frequency of course offering
   - ☒ ~~☐~~ Learning outcomes
   - ☒ ~~☐~~ Delivery methods and/or texts and resource materials
   - ☒ ~~☐~~ PLAR options, grading system, and/or evaluation methods
   - ☐ Discontinuation of course
   - ☐ Other – Please specify:

2. Rationale for change:

   ~~**[rationale for all changes to BIOC 404 outline]**~~

   This course has been offered as BIOC 404/CHEM 412F since 2017, and the department was not aware that this had not been formally approved. Rather than continue to cross-list with a special topics CHEM course, it would be preferable to offer this as BIOC 404/CHEM 404. The course contains a mix of biochemistry, chemistry, and biophysics topics and thus is applicable to both BIOC and CHEM majors who may require course credit in their respective majors. All changes are minor to better reflect the current course structure. ~~**[Rationale for why it should be cross-listed as CHEM]**~~.

3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the Institutional Learning Outcomes (ILOs): The changes have no significant effect on the learning outcomes.

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs? This course is not required by any programs beyond the B.Sc. in Chemistry or Biochemistry.

~~5. Which program areas have been consulted about the change(s)?~~

5. Which program areas have been consulted about the change(s)? None outside of the Department of Chemistry, as this course is only regularly used by this department

6. In what ways does this course (not just the proposed changes) contribute to Indigenizing Our Academy? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: UFV Integrated Strategic Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05), the TRC Calls to Action, and/or the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) This course contributes to indigenizing the academy primarily through curriculum delivery, where several aspects align with a number of indigenous ways of knowing. In lab courses, some knowledge is gained through *practical applications* and experiential learning. While this course does not have a lab, several topics are introduced and critically discussed by examining key experiments and interpreting the results before analysing the authors conclusions. This also follows the principle of *inherited wisdom*, as in science we continue to learn from the efforts of those who have gone before us. *Community engagement* comes from in-class discussions, and also from a term presentation where students are encouraged to work in groups of 2-3 students, select a relevant topic on their own or from a list of suggestions, compile data from a variety of sources, correlate and analyse the data, and present their topic before the class near the end of term. Students need to contribute to all aspects of the project. Finally, some topics are enhanced by discussing the life and background or ideas of key scientists and seeing them as real people who often faced significant challenges. Thus, even in science there are elements of *Storytelling* that can bring additional light to a topic.

How does the course reflect principles of equity, diversity, and inclusion, through assignment design, topic selection, curriculum delivery, or other methods? Principles of EDI are primarily instilled in curriculum delivery. It is understood that enrolled students originate from a wide range of socio-economic, educational and personal backgrounds. To ensure students from such diverse backgrounds will receive equal opportunities to excel in the course:

a) All course materials (notes, problem sets, assignments, solutions) will be available to students free of charge electronically *via* the current course delivery system

b) Student unable to obtain electronic copies will be provided with physical copies of the course material above upon request

c) Suggested textbooks are not required, and students can achieve success in the course using provided materials and various online materials (such as online research papers available from the UFV library or copies of relevant texts).

d) Office hours are flexible for in person or virtual discussions throughout the work week.

~~7.~~ An inclusive environment will be encouraged when students work together on group assignments or presentations.

~~8.~~7. If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.

~~9.~~8. Estimate of the typical costs for this course, including textbooks and other materials (excluding tuition): The textbook(s) are suggested only, and are not required for success in the course, and efforts will be made to ensure that the library has copies. Thus there are no required costs for the course.

ORIGINAL COURSE IMPLEMENTATION DATE: September 2016

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:**

Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: BIOC 404	**Number of Credits:** 3 Course credit policy (105)
Course Full Title: Biomembranes **Course Short Title:** Biomembranes	
Faculty: Faculty of Science	**Department/School:** Chemistry

Calendar Description:

~~Topics include the structure, dynamics, and function of membranes, membrane lipids, and proteins. Recent research in these areas will be examined.~~ This course focuses on the structure and functions of biological membranes and their protein and lipid components. Emphasis is placed on techniques used to study membranes, the use of model systems, and biomedical applications of lipid nanoparticle systems based on membrane structure.

Note: This course is offered as BIOC 404 and CHEM 404. Students may take only one of these for credit.

Note: Students with credit for CHEM 412F cannot take this course for further credit.

Prerequisites (or NONE):	One of the following: BIO 320/BIOC 320 or BIOC 350/CHEM 350.
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number:

Cross-listed with: **CHEM 404 (formerly CHEM 412F)**

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	~~33~~45
Tutorials/workshops	~~12~~-
[click to select]	
[click to select]	
[click to select]	
Total hours	**45**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: **No**

Course Details

Special Topics course: **No**

(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: **No**

(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: **Face-to-face only**

Expected frequency: **Every other year**

Maximum enrolment (for information only)**: 24**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See **bctransferguide.ca**.)*

Transfer credit already exists: **No**

Submit outline for (re)articulation: **No**

(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:** June 6, 2025
Faculty Council approval	**Date of meeting:**
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:

1. Describe the structure and chemical properties of lipid bilayers and biological membranes.
2. ~~Explain why~~Critically discuss how lipids can self-assemble to form a variety of structural phases and the biological roles for these properties.
3. Explain how spectroscopic methods can be used to characterize lipid bilayers.
4. Describe the basic theory behind magnetic resonance and ~~infrared~~ other spectroscopy methods.
4.5. Apply basic NMR theory to calculate several properties of lipid or membrane systems (correlation times, order parameters, NMR linewidths)
5.6. ~~Explain~~ Explain the roles of membrane proteins in cellular metabolism.
6.7. Relate the structure of membrane proteins and lipids to their biological functions.
7.8. Critically analyze recent membrane science research literature.
8. ~~Analyze recent research literature.~~
9. Select and integrate data from several literature sources in a term paper and/or class presentation.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Final exam:	~~40~~30%	Assignments:	~~10~~35%	Project:	20%
Quizzes/tests/midterm:	~~30~~15%	[click to select]	%	[click to select]	%

Details:

Final exam: ~~40~~30%
Midterm exam: ~~20~~15%
~~Quizzes/tests~~Problem Sets: ~~10~~35%
~~Assignments: 10%~~
Project/presentation: 20%

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Lecture course, student presentations

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	Lehninger, A.L., et a	Principles of Biochemistry, USA	2012
2.	Textbook	Luckey, M.	Membrane Structural Biology with Biochemical and Biophysical Foundations, UK	2008
3.	~~[click to select]~~Textbook	~~——~~Gennis, Robert B.	~~——~~Biomembranes: Molecular Structure and Function. Springer Science+Business Media, LLC	~~——~~ 1989
4.	[click to select]			
5.	[click to select]			

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

(Use this section for supplies and materials for all sections of this course.)

Course Content and Topics

- Membrane morphology
- Structure and properties of membrane lipids
- Membrane self-Assembly: the hydrophobic effect
- Liposomes: structure and use as model systems
- Lipid polymorphism
- Lipid membranes: phase diagrams and cholesterol
- Characterization of membranes using physical techniques: diffraction, magnetic resonance (NMR/ESR), infrared spectroscopy
- ~~Infrared spectroscopy~~
- Membrane asymmetry and lipid microdomains (RAFTS)
- Membrane potential
- Transport energetics
- Membrane proteins: ion channels, receptors, transporters, and proton pumps
- Liposomes: biomedical applications
- Student presentations

ORIGINAL COURSE IMPLEMENTATION DATE:

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:**

Course outline form version: 06/18/2021

OFFICIAL UNDERGRADUATE CROSS-LISTED OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: CHEM 404	**Number of Credits:** 3 Course credit policy (105)
Course Full Title: Biomembranes **Course Short Title:** Biomembranes	
Faculty: Faculty of Science	**Department (or program if no department):** Chemistry
Official Course Outline: This is a cross-listed course. Please refer to **BIOC 404** for the official course outline.	
Calendar Description: This course focuses on the structure and functions of biological membranes and their protein and lipid components. Emphasis is placed on techniques used to study membranes, the use of model systems, and biomedical applications of lipid nanoparticle systems based on membrane structure. ~~Topics include the structure, dynamics, and function of membranes, membrane lipids, and proteins. Recent research in these areas will be examined.~~ Note: This course is offered as BIOC 404 and CHEM 404. Students may take only one of these for credit. Note: Students with credit for CHEM 412F cannot take this course for further credit.	
Prerequisites (or NONE):	One of the following: BIO 320/BIOC 320 or BIOC 350/CHEM 350.
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE
Antirequisite Courses *(Cannot be taken for additional credit.)* Former course code/number: **CHEM 412F** Cross-listed with: **BIOC 404** Equivalent course(s): *(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)*	**Transfer Credit** *(See **bctransferguide.ca**.)* Transfer credit already exists: **No** Submit outline for (re)articulation: **No** *(If yes, fill in transfer credit form.)*

Department approval	**Date of meeting:** June 6, 2025
Faculty Council approval	**Date of meeting:**
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Memo for Course Changes

To:

From: (Department head or Chair of Program Working Group)

Date: March 2025

Subject: Proposal for revision of CHEM 241

Note that even minor changes may result in comments from committees on all aspects of the course.

1. Summary of changes (select all that apply):
   - ☒ Six-year review
   - ☐ Number and/or course code
   - ☒ Credits and/or total hours
   - ☐ Title
   - ☐ Calendar description
   - ☐ Prerequisites and/or co-requisites
   - ☐ Frequency of course offering
   - ☒ Learning outcomes
   - ☒ Delivery methods and/or texts and resource materials
   - ☒ PLAR options, grading system, and/or evaluation methods
   - ☐ Discontinuation of course
   - ☐ Other – Please specify:

2. Rationale for change: The learning outcome has been updated to further align with the materials taught in this course. The evaluation method has been updated so all the class activities including quizzes and midterms are grouped together. An open-source textbook is added to the resource materials to improve accessibility for students. Also, laboratory is updated to engage students working on real samples.
3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the Institutional Learning Outcomes (ILOs): The changes are minor and have no significant effect on learning outcome.
4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

   This course is not required by any programs beyond the B.Sc. in Chemistry.
5. Which program areas have been consulted about the change(s)?

   None
6. In what ways does this course (not just the proposed changes) contribute to Indigenizing Our Academy? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: UFV Integrated Strategic Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05), the TRC Calls to Action, and/or the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). In this course,

students are engaged in laboratory where they learn by doing. Learning is experiential based which aligns with First Peoples Principals of Learning.

7. How does the course reflect principles of equity, diversity, and inclusion, through assignment design, topic selection, curriculum delivery, or other methods? Students will experiment an inclusive environment when they need to collaborate with each other. The diversity that students bring to this class is valued as a source of strength. The materials and activities are presented in the way that are respectful of diversity, including gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture. Also, students will have the option of using an open-source textbook which provide them access to the materials with no cost associated.
8. If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc. The course needs a laboratory where students performing their experiments.
9. Estimate of the typical costs for this course, including textbooks and other materials (excluding tuition): The recommended textbook costs $477 and the open-source textbook is free.

ORIGINAL COURSE IMPLEMENTATION DATE:

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:**

Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: CHEM 241	**Number of Credits:** 4 Course credit policy (105)
Course Full Title: Analytical Chemistry **Course Short Title:** (To be assigned by OReg based on university standards.)	
Faculty: Faculty of Science	**Department/School:** Chemistry

Calendar Description:

An introduction to analytical chemistry with an emphasis on analysis of solutions. Lecture material includes handling and interpreting of experimental measurements, equilibrium, principles of titrimetry, electrochemical methods, statistical analysis, analytical separation and chromatography. Laboratory experiments illustrate lecture materials.

Prerequisites (or NONE):	CHEM 114
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number:

Cross-listed with:

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	45
Supervised laboratory hours (science lab)	45~~39~~
[click to select]	
[click to select]	
[click to select]	
Total hours	90~~84~~

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: **Yes**

Course Details

Special Topics course: **No**

(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: ~~[click to select]~~**No**

(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: ~~[click to select]~~**May be offered in multiple delivery modes**

Expected frequency: **Annually**

Maximum enrolment (for information only)**: 24**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See bctransferguide.ca.)*

Transfer credit already exists: **Yes**

Submit outline for (re)articulation: **[click to select]**

(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:** ~~April 11, 2025~~
Faculty Council approval	**Date of meeting:** ~~May 16, 2025~~
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:

•Identify ~~absolute and relative~~experimental errors and use statistics to address that.
•~~Identify random and systematic errors.~~
•Present results, and test for precision and accuracy.
•Prepare standard solutions and use appropriate calibration methods.
•Use Microsoft Excel to perform scientific calculations and produce graphs.
•Use volumetric glassware correctly to prepare solutions and perform titrations.
•Perform a back titration and ~~analyse~~analyze data.
•Describe basic concepts of potentiometry.
•Use pH meter ~~and ion-selective electrodes~~ correctly to perform a redox titration.
•Describe basic concepts of analytical separation.
•Describe basic concepts of precipitation and perform a precipitation titration.
•Describe basic chromatographic theory (HPLC and GC).

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Final exam:	40%	Assignments:	5%	Quizzes/tests/midterm:	~~30~~35%
Project:	~~5%~~	Lab work:	20%	[click to select]	%

Details:

~~(Provide a full assessment breakdown and any other relevant information.)~~

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Lectures, labs, group problem-solving sessions.

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	Harris, D.C.	Quantitative Chemical Analysis	2019
2.	~~[click to select]~~Online resource	Harvey, D	Analytical Chemistry 2.0	
3.	[click to select]			
4.	[click to select]			
5.	[click to select]			

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

~~(Use this section for supplies and materials for all sections of this course.)~~Lab coats and safety glasses required.

Course Content and Topics

- Statistics
- Method Validation
- Chemical Equilibrium
- Titrations
- Fundamentals of Electrochemistry
- Electrodes and Potentiometry
- Redox Titrations
- Introduction to Analytical Separations
- Gas Chromatography (GC) and High-Performance Liquid Chromatography (HPLC)

LABORATORY EXPERIMENTS
Representative experiments for this course:

- Introduction to Microsoft Excel and graphing with Microsoft Excel

- Dilution and calibration curve
- Precipitation and Ksp
- Fajans titration
- ~~Wine titration~~Measuring the total titrable acidity of wine using pH meter
- ~~pH meter and galvanic cell~~
- Redox titration

~~HPLC~~

Memo for Course Changes

To:

From: (Department head or Chair of Program Working Group)

Date: March 25th

Subject: Proposal for revision of CHEM 320

Note that even minor changes may result in comments from committees on all aspects of the course.

1. Summary of changes (select all that apply):
   - ☒ Six-year review
   - ☐ Number and/or course code
   - ☐ Credits and/or total hours
   - ☐ Title
   - ☐ Calendar description
   - ☐ Prerequisites and/or co-requisites
   - ☐ Frequency of course offering
   - ☒ Learning outcomes
   - ☒ Delivery methods and/or texts and resource materials
   - ☒ PLAR options, grading system, and/or evaluation methods
   - ☐ Discontinuation of course
   - ☐ Other – Please specify:

2. Rationale for change:

   This course was previously approved by UEC in 2012. Since then, changes have been made to the material to be covered and their corresponding learning outcomes for modernization purposes, which are reflected in the updated course outline.

3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the Institutional Learning Outcomes (ILOs):

   Core learning outcomes remain unchanged, just updated with greater specificity with explicit examples and worded such that they meet the institutional learning outcomes (ILOs).

Course learning outcomes	ILOs
Describe the ligand-metal bonding in transition metal complexes using Crystal Field and Molecular Orbital theories.	1, 2
Critically discuss the evidence for different mechanisms of ligand exchange and redox reactions of transition metal complexes.	1, 2, 3, 5,
Analyze the position of ligands in the spectrochemical series by reference to ligand to metal sigma and pi bonding, and metal to ligand pi bonding.	1, 2, 3
Describe the relationships between electron configuration, crystal field stabilization energy and geometry for octahedral, tetrahedral, and square planar complexes.	1, 2, 3

Describe and predict ionic solid structures based on the periodic trends of the constituent atoms.	1, 2, 3, 5
Explain the relationship between thermodynamic data enthalpy and entropy terms) and stability constants for ligand exchange reactions.	1, 2, 3, 6
Synthesize microstate tables for octahedral complexes with different d-electron configurations, and relate the reducible and irreducible representations of electronic states to Tanabe-Sugano diagrams.	1, 2
Interpret UV-visible spectra using microstate tables and Tanabe-Sugano diagrams	1, 2
Interpret Nuclear Magnetic Resonance (NMR) spectroscopy data based on the presence and coupling of spin-active nuclei.	1, 2, 3, 5
Interpret magnetic susceptibility data to relate the electronic and geometric structure of inorganic compounds	1, 2, 3, 6

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

   This course is not required by any programs beyond the B.Sc. in Chemistry.

5. Which program areas have been consulted about the change(s)?

   None outside of the Department of Chemistry, as this course is only regularly used by this department.

6. In what ways does this course (not just the proposed changes) contribute to Indigenizing Our Academy? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: UFV Integrated Strategic Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05), the TRC Calls to Action, and/or the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

   Where appropriate, Indigenous Knowledge is integrated into assignment design and curriculum. For example, we discuss various ionic solids in this course. Examples such as salts used for the preservation of meats, wound treatment, spiritual and ceremonial practices are discussed. More complex examples of ionic solids arising metallurgical processes adopted by indigenous communities are also highlighted.

7. How does the course reflect principles of equity, diversity, and inclusion, through assignment design, topic selection, curriculum delivery, or other methods?

   Principles of EDI are primarily instilled in the curriculum delivery. It is understood that enrolled students originate from various socio-economic, educational and personal backgrounds. To ensure students from such diverse backgrounds will receive equal opportunities to excel in the course:
   a) All course materials (notes, problem sets, assignments, solutions, labs) will be available to students free of charge electronically *via* the current course delivery system,
   b) Student unable to obtain electronic copies will be provided with physical copies of the course material above,
   c) Suggested textbooks are not required, but copies are available free of charge in the UFV library,
   d) Flexible office hours for in person or virtual discussions throughout the work week,

8. If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.

   No additional special considerations have been made for this revision, as the credit value, class size limit, frequency of offering, delivery and evaluation of the course remains identical to the previous edition.

9. Estimate of the typical costs for this course, including textbooks and other materials (excluding tuition):

   $100. Course textbooks are not required, students are provided with physical and electronic copies of assignments, problem sets, notes and any related course material that will suffice for their studies. The cost listed covers the printing costs of the material should the student choose to print the material for their purposes.

UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE:

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:**

Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: CHEM 320	**Number of Credits: 3** Course credit policy (105)
Course Full Title: Intermediate Inorganic Chemistry **Course Short Title:** (To be assigned by OReg based on university standards.)	
Faculty: Faculty of Science	**Department/School:** Chemistry

Calendar Description:

This course concentrates on the coordination chemistry of the transition metals. Topics covered include nomenclature, isomerism, crystal field theory, molecular orbital theory, thermodynamic aspects, UV-visible spectroscopy and Tanabe-Sugano diagrams, and the kinetics and mechanisms of ligand substitution and redox reactions.

Note: Students planning to take CHEM 325 should do so in the same semester as either CHEM 320 or CHEM 420.

Note: Students with credit for 321 cannot take this course for further credit.

Prerequisites (or NONE):	CHEM 221
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number: CHEM **321**

Cross-listed with:

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	45
[click to select] Choose an item.	
[click to select]	
[click to select]	
[click to select]	
Total hours	**45**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: **No**

Course Details

Special Topics course: **No**

(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: **No**

(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: **May be offered in multiple delivery modes**

Expected frequency: **Annually**

Maximum enrolment (for information only)**: 24**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See bctransferguide.ca.)*

Transfer credit already exists: **[click to select]**

Submit outline for (re)articulation: **[click to select]**

(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:** April 11, 2025
Faculty Council approval	**Date of meeting:**
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:

~~1. Critically discuss the electron configuration of transition metal ions by reference to effective nuclear charge and orbital energy level diagrams.~~
~~2.~~1. Describe the ligand-metal bonding in transition metal complexes using Crystal Field and Molecular Orbital theories.
~~3.~~2. Critically discuss the evidence for different mechanisms of ligand exchange and redox reactions of transition metal complexes.
~~4.~~3. Analyze the position of ligands in the spectrochemical series by reference to ligand to metal sigma and pi bonding, and metal to ligand pi bonding.
~~5.~~4. Describe the relationships between electron configuration, crystal field stabilization energy and geometry for octahedral, tetrahedral, and square planar complexes.
5. Describe and predict ionic solid structures based on the periodic trends of the constituent atoms.
6. Explain the relationship between thermodynamic data enthalpy and entropy terms) and stability constants for ligand exchange reactions.
7. Synthesize microstate tables for octahedral complexes with different d-electron configurations, and relate the reducible and irreducible representations of electronic states to Tanabe-Sugano diagrams.
8. Interpret UV-visible spectra using microstate tables and Tanabe-Sugano diagrams
9. Interpret Nuclear Magnetic Resonance (NMR) spectroscopy data based on the presence and coupling of spin-active nuclei.
10. Interpret magnetic susceptibility data to relate the electronic and geometric structure of inorganic compounds

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Final exam:	40%	Quizzes/tests/midterm:	40~~30~~%	Assignments:~~Project:~~	20%
[click to select]	~~10%~~	[click to select]	%	[click to select]	%

Details:
(Provide a full assessment breakdown and any other relevant information.)

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Presentation of the course will be by inter-related theory classes (lectures) and discussion periods. Audio-visual aids will be used where appropriate.

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	Housecroft, C.E., Sharpe, A.G.~~G.L. Miessler and D. A. Tarr~~	Inorganic Chemistry	2018
2.	[click to select]			
3.	[click to select]			
4.	[click to select]			
5.	[click to select]			

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

(Use this section for supplies and materials for all sections of this course.)

Course Content and Topics

Introduction
Some history of coordination chemistry, coordination numbers, geometry, isomerism and types of ligands, nomenclature, electron configurations of transition metals

~~Symmetry~~
~~Symmetry operations and group theory, applications of group theory to infrared spectroscopy~~

The Metal-Ligand Bond
Applications of various bonding theories to coordination chemistry with emphasis on Molecular Orbital Theory, -electron configurations of coordination complexes in various geometries such as octahedral, tetrahedral and square planar, the spectrochemical series, magnetic moments, Jahn-Teller distortion

UV-Visible Spectra of Coordination Compounds
Quantum numbers of multi-electron atoms, ground and excited state terms, interpretation of UV-visible spectra using Tanabe-Sugano diagrams

Complex Stability
Stability -constants, factors that influence stability

Ionic solids
Identification of types of structures, prediction of structure using radius ratio rules

Kinetics
Inert and labile compounds, mechanisms of ligand substitution reactions and redox reactions

NMR Spectroscopy
Basic theory, interpretation of data

Magnetic susceptibility
Basic theory, interpretation of data

Memo for Course Changes

To:

From: (Department head or Chair of Program Working Group)

Date: March 2025

Subject: Proposal for revision of CHEM 341

Note that even minor changes may result in comments from committees on all aspects of the course.

1. Summary of changes (select all that apply):
   - ☒ Six-year review
   - ☐ Number and/or course code
   - ☒ Credits and/or total hours
   - ☐ Title
   - ☒ Calendar description
   - ☒ Prerequisites and/or co-requisites
   - ☒ Frequency of course offering
   - ☐ Learning outcomes
   - ☒ Delivery methods and/or texts and resource materials
   - ☒ PLAR options, grading system, and/or evaluation methods
   - ☐ Discontinuation of course
   - ☒ Other – Please specify: course content and topics

2. Rationale for change: Students will work together in small groups of 3-4 people, on their topic of interest related to the content of the course using literature to write a report on that topic as well as give an oral presentation which is worth 15% of their final mark. Also, the course content and lab is updated to include more modern instrumentations and technique used in analytical labs. The textbook is changed to include broader topics in instrumental analysis.
3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the Institutional Learning Outcomes (ILOs): The changes have no significant effect on learning outcome.
4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

   This course is not required by any programs beyond the B.Sc. in Chemistry.
5. Which program areas have been consulted about the change(s)?

   None
6. In what ways does this course (not just the proposed changes) contribute to Indigenizing Our Academy? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: UFV Integrated Strategic Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05), the TRC Calls to Action, and/or the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). In this course,

students are engaged in laboratory where they learn by doing. Learning is experiential based which aligns with First Peoples Principals of Learning.

7. How does the course reflect principles of equity, diversity, and inclusion, through assignment design, topic selection, curriculum delivery, or other methods? Students will experiment an inclusive environment when they need to collaborate with each other in the lab as well as in groups in class to work on several class activities. They are also expected to work together in groups of 3-4 to present on their topic of interest related to the content of the course. The diversity that students bring to this class is valued as a source of strength the materials and activities are presented in the way that are respectful of diversity, including gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture.
8. If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc. The course needs a laboratory where students performing their experiments.
9. Estimate of the typical costs for this course, including textbooks and other materials (excluding tuition): The recommended textbook costs $220.

UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE:

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:**

Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: CHEM 341	**Number of Credits: 4** Course credit policy (105)
Course Full Title: INSTRUMENTAL ANALYSIS / APPLIED SPECTROSCOPY **Course Short Title:** (To be assigned by OReg based on university standards.)	
Faculty: Faculty of Science	**Department/School:** Chemistry

Calendar Description:

An introduction to instrumental analysis with the emphasis on spectroscopic methods. Lecture material covers principles of chromatography and applied spectroscopy. Laboratory experiments illustrate lecture material.

~~Note: Students with credit for 441 cannot take this course for further credit.~~

Prerequisites (or NONE):	~~CHEM 211 or~~ CHEM 213; and CHEM 241 ~~Note: After April 2007, CHEM 211 will no longer be accepted as a prerequisite for this course~~
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number:

Cross-listed with:

Equivalent course(s): ~~441~~

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	45~~2~~
Supervised laboratory hours (science lab)	~~32~~45
[click to select]	~~12~~
[click to select]	
[click to select]	
Total hours	**90~~86~~**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: **~~[click to select]~~Yes**

Course Details

Special Topics course: **No**

(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: **~~[click to select]~~No**

(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: **~~[click to select]~~May be offered in multiple delivery modes**

Expected frequency: **~~[click to select]~~Annually**

Maximum enrolment (for information only)**: 24**

Prior Learning Assessment and Recognition (PLAR)

~~[click to select]~~PLAR is available for this course.

Transfer Credit *(See bctransferguide.ca.)*

Transfer credit already exists: **Yes**

Submit outline for (re)articulation: **[click to select]**

(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:** April 11, 2025
Faculty Council approval	**Date of meeting:** May 16, 2025
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:

Students will become competent with a variety of techniques of instrumental analysis. They will be able to display their expertise in understanding the lecture material and handling the laboratory experiments.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Final exam:	~~40~~30%	Quizzes/tests/midterm:	30%	~~[click to select]~~Project:	~~%~~15%
Lab work:	~~30~~20%	~~[click to select]~~Assignments:	~~%~~5%	[click to select]	%

Details:

(Provide a full assessment breakdown and any other relevant information.)

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Lectures, labs, group problem-solving sessions, literature review and presentation~~.~~

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	Skoog & West	Principles of Instrumental Analysis~~Fundamentals of Analytical Chemistry~~	~~~~ 2017
2.	[click to select]			
3.	[click to select]			
4.	[click to select]			
5.	[click to select]			

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

~~(Use this section for supplies and materials for all sections of this course.)~~
Lab coats and safety glasses required.

Course Content and Topics

1. Data and sample handling.
2. Principles of chromatography
3. Atomic spectra. AAS.
4. Electronic spectra. UV/Vis spectroscopy
5. Vibrational spectra. IR and Raman spectroscopy
6. Principles of NMR
7. Principles of mass spectroscopy
8. Gas Chromatography
9. High Performance Liquid Chromatography
~~7.~~10. Capillary Electrophoresis

Laboratory Experiments:

~~1. TLC lab~~
~~1. GC lab~~
~~2.~~11. HPLC lab
~~3.~~12. AAS lab
~~4.~~13. UV/Vis lab
~~5.~~14. IR lab
~~6.~~15. ~~NMR~~ Fluorescence lab
~~7. Lab exam~~

Memo for Course Changes

To:

From: (Department head or Chair of Program Working Group)

Date:

Subject: Proposal for revision of ~~(insert title of course)~~CHEM 350 BIOC 350 Introductory Biochemistry Laboratory

Note that even minor changes may result in comments from committees on all aspects of the course.

1. Summary of changes (select all that apply):
   - ☒~~☐~~ Six-year review
   - ☐ Number and/or course code
   - ☐ Credits and/or total hours
   - ☐ Title
   - ☐ Calendar description
   - ☐ Prerequisites and/or co-requisites
   - ☐ Frequency of course offering
   - ☐ Learning outcomes
   - ☒~~☐~~ Delivery methods and/or texts and resource materials
   - ☒~~☐~~ PLAR options, grading system, and/or evaluation methods
   - ☐ Discontinuation of course
   - ☐ Other – Please specify:

2. Rationale for change: These are minor changes that reflect the current course structure.
3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the Institutional Learning Outcomes (ILOs): All changes are minor and do not affect the learning outcomes.

Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs? This course is not required by any programs beyond the B.Sc. in Chemistry.

~~4.~~

~~5.~~4. Which program areas have been consulted about the change(s)? None outside of the Department of Chemistry, as this course is only regularly used by this department

5. In what ways does this course (not just the proposed changes) contribute to Indigenizing Our Academy? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: UFV Integrated Strategic Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05), the TRC Calls to Action, and/or the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). As a practical lecture/laboratory course, many of the Indigenous ways of knowing are integrated into the mode of curriculum delivery. An important part of the course are the labs, where knowledge is gained through *practical applications* and experiential learning. The different topics are usually introduced

with some historical background, which follows the principle of *inherited wisdom*, as in science we continue to learn from the efforts of those who have gone before us. *Community engagement* comes primarily from the labs where students interact and discuss experiments and results with each other. Outside of the laboratory, communication-based learning and passage of knowledge between peers is required as several labs involve analysis of all the data collected by students. Respect for nature and all living things is constantly highlighted through reminders of how chemical waste generated during experiments must be disposed of appropriately. Finally, some topics are enhanced by discussing the life and background or ideas of key scientists, seeing them as real people who often faced significant challenges. In this way elements of *Storytelling* can be introduced into science with the hope that this will bring additional interest and insights to a topic.

6.

How does the course reflect principles of equity, diversity, and inclusion, through assignment design, topic selection, curriculum delivery, or other methods? Principles of EDI are primarily instilled in curriculum delivery. It is understood that enrolled students originate from a wide range of socio-economic, educational and personal backgrounds. To ensure students from such diverse backgrounds will receive equal opportunities to excel in the course:

a) All course materials (lecture notes, lab handouts and report requirements, problem sets, assignments, solutions) will be available to students free of charge electronically *via* the current course delivery system

b) Student unable to obtain electronic copies will be provided with physical copies of the course material above upon request

c) Suggested textbooks are not required, and students can achieve success in the course using provided materials and various online materials (such as online research papers available from the UFV library or copies of relevant texts).

d) Office hours are flexible for in person or virtual discussions throughout the work week.

~~7.~~ An inclusive environment will be encouraged when students work together in the lab or outside of lab when sharing and analysing data.

~~8.~~7. If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.

~~9.~~8. Estimate of the typical costs for this course, including textbooks and other materials (excluding tuition): There is no required text. Students are responsible to purchase their own lab coat and safety glasses, for which the cost is around $30.

ORIGINAL COURSE IMPLEMENTATION DATE:

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:**

Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: CHEM 350	**Number of Credits: 3** Course credit policy (105)
Course Full Title: Introductory Biochemistry Laboratory **Course Short Title:** (To be assigned by OReg based on university standards.)	
Faculty: Faculty of Science	**Department/School:** Chemistry

Calendar Description:

Introduction to biochemical laboratory techniques; lectures provide theoretical background. Topics include spectrophotometry, chromatography, enzyme kinetics, protein and lipid assays, protein characterization, model membrane systems, and lipid-based systems for biomedical applications.

Note: This course is offered as CHEM 350 and BIOC 350. Students may take only one of these for credit.

Prerequisites (or NONE):	CHEM 214 or BIO 320/BIOC 320.
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number:

Cross-listed with: **BIOC 350**

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	22.5
Supervised laboratory hours (science lab)	45
[click to select]	
[click to select]	
[click to select]	
Total hours	**67.5**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: **Yes**

Course Details

Special Topics course: **No**

(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: ~~[click to select]~~No

(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: ~~[click to select]~~Face-to-face only

Expected frequency: **Annually**

Maximum enrolment (for information only)**: 24**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See bctransferguide.ca.)*

Transfer credit already exists: **Yes**

Submit outline for (re)articulation: ~~[click to select]~~No

(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:** ~~June 6, 2025~~
Faculty Council approval	**Date of meeting:**
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:

1. Explain the theoretical concepts that underlie modern biochemical laboratory techniques.
2. Apply knowledge of molecular structure and function in the context of laboratory experiments and data analysis.
3. Apply the scientific method to laboratory experiments and data analysis.
4. Explain the strengths and limitations of modern biochemical instrumentation.
5. Perform basic laboratory techniques used in modern biochemistry and molecular biology such as spectrophotometry, chromatography, gel electrophoresis, protein and lipid analysis.
6. Communicate newly acquired data and knowledge through written laboratory reports.
7. Demonstrate technical acumen as it relates to computers, appropriate software, and the organization and analysis of data.
8. Cooperate with a team of other students to complete selected laboratory experiments.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Final exam:	~~25~~ 35 %	Quizzes/tests/midterm:	15 %	Lab work:	~~5~~ 50 %
[click to select]	~~10 %~~	[click to select]	~~40 %~~	[click to select]	~~5 %~~

Details:

~~Teamwork is evaluated as part of the lab work grade and is based upon peer evaluation, team workload plan, and the quality of the final report. Communication is evaluated through formal and results reports.~~

~~Final Exam: 35%~~

~~Midterm: 15%~~

Formal report (Liposomology): 15%

Results reports: 35%

The liposomology lab is written as a formal report in the form of a scientific paper. The rest of the experiments involve analysing data from the lab and answering a number of questions. Several labs require students to share and analyze class data for their report, thus fostering teamwork and communication. All labs involve students working in groups of 2 or 3.

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Lectures, lab experiments, lab reports

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	Stryer (recommended)	Biochemistry, ~~8th~~ Current edition	2019
2.	[click to select]		~~and laboratory handout (this may change).~~	
3.	[click to select]			
4.	[click to select]			
5.	[click to select]			

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

~~(Use this section for supplies and materials for all sections of this course.)~~
Lab coat and safety glasses required

Course Content and Topics

An appropriate number of experiments will be selected from the following list. Topics may change from year to year depending on availability of instrumentation and feedback from previous years.

The course will consist of weekly lectures in which the biochemical basis, theoretical concepts, instrumentation strengths and limitations, and data analysis techniques relevant to ~~of the week's~~the experiments will be summarized and discussed. These lectures will also include ~~discussions~~ relevant extra material such as~~of~~ the structure and function of biomolecules, ~~and~~ key metabolic pathways, and ~~relevant~~ related experimental techniques. The labs will constitute the main part of the course~~,~~ and will follow directly from the lectures. Students will hand in one ~~two~~ formal report~~s~~, and ~~smaller~~ results reports for the remaining experiments ~~which do not require formal reports~~. There will also be a written midterm and final exam~~s~~.

The lecture topics are as follows:

Spectroscopy 1: Beer's Law & Standard Curves, Phosphate Assay
Spectroscopy 2: Determination of Protein by A280 and other assays. Determination of nucleic acids.
Meet the amino acids!
Spectroscopy 3: Structure and Spectroscopy of Myoglobin and Hemoglobin; Atomic absorption spectroscopy for the determination of Fe
Gel Filtration and other forms of Column Chromatography
Biological Buffers
Amino Acid Labelling: N- and C-terminal analysis of peptides and proteins. Determination of protein sequence. Variations of the dipeptide lab.
Chymotrypsin Enzyme Kinetics: determination of KM, Vmax, and Ea
Model membranes & Lipid Nanoparticles: Uptake of drugs and ions in response to ΔpH; Lipid Phase Transitions and Permeability
Model membranes & Lipid Nanoparticles: Measurement of Trapped Volume, ΔpH and Lipid Asymmetry
Model membranes & Lipid Nanoparticles: Medical Applications

The lab topics are:

Check-in, pipetting exercises, lab notebook and report expectations, use of computer programs to organize and analyze quantitative data.
Spectrophotometry (including assays involving standard curves)
Gel filtration chromatography
Proteolytic enzymes
Enzyme kinetics
Sequencing of a dipeptide
~~Basic~~ Liposomology (loading calcium into vesicles using pH gradients)
Other possible experiments may include:

- Purification of a protein or enzyme
- Determination of fatty acid profiles of natural & commercial fats (saturated, unsaturated, and trans fatty acids).
- Carbohydrates and polarimetry
- Characterization of a protein by SDS-PAGE

ORIGINAL COURSE IMPLEMENTATION DATE:

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:**

Course outline form version: 06/18/2021

OFFICIAL UNDERGRADUATE CROSS-LISTED OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: BIOC 350	**Number of Credits:** 3 Course credit policy (105)
Course Full Title: Introductory Biochemistry Laboratory **Course Short Title:**	
Faculty: Faculty of Science	**Department (or program if no department):** Chemistry
Official Course Outline: This is a cross-listed course. Please refer to **CHEM 350** for the official course outline.	
Calendar Description: Introduction to biochemical laboratory techniques; lectures provide theoretical background. Topics include spectrophotometry, chromatography, enzyme kinetics, protein and lipid assays, protein characterization, model membrane systems, and lipid-based systems for biomedical applications. Note: This course is offered as BIOC 350 and CHEM 350. Students may take only one of these for credit.	
Prerequisites (or NONE):	CHEM 214 or BIO 320/BIOC 320
Corequisites (if applicable, or NONE):	~~—~~NONE
Pre/corequisites (if applicable, or NONE):	~~—~~NONE
Antirequisite Courses *(Cannot be taken for additional credit.)* Former course code/number: Cross-listed with: **CHEM 350** Equivalent course(s): *(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)*	**Transfer Credit** *(See bctransferguide.ca.)* Transfer credit already exists: ~~Click to select~~Yes Submit outline for (re)articulation: ~~[click to select]~~No *(If yes, fill in transfer credit form.)*
Department / Program Head or Director:	**Date approved:** ~~—~~June 6, 2025
Faculty Council approval	**Date approved:**
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Memo for Course Changes

To:

From: (Department head or Chair of Program Working Group)

Date: March 25th

Subject: Proposal for revision of CHEM 420

Note that even minor changes may result in comments from committees on all aspects of the course.

1. Summary of changes (select all that apply):
   - ☒ Six-year review
   - ☐ Number and/or course code
   - ☒ Credits and/or total hours
   - ☐ Title
   - ☒ Calendar description
   - ☐ Prerequisites and/or co-requisites
   - ☐ Frequency of course offering
   - ☒ Learning outcomes
   - ☒ Delivery methods and/or texts and resource materials
   - ☒ PLAR options, grading system, and/or evaluation methods
   - ☐ Discontinuation of course
   - ☐ Other – Please specify:

2. Rationale for change:

   This course was previously approved by UEC in 2012. Since then, changes have been made to the material to be covered and their corresponding learning outcomes for modernization purposes, which are reflected in the updated course outline.

3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the Institutional Learning Outcomes (ILOs):

   Core learning outcomes remain unchanged, just updated with greater specificity with explicit examples and worded such that they meet the institutional learning outcomes (ILOs).

Course learning outcomes	ILOs
Critically discuss the relative stability of different organometallic compounds by reference to the 18 electron rule.	2, 5
Describe the ligand-metal bonding in organometallic compounds using Molecular Orbital theory.	1, 2, 3
Critically discuss the evidence for different mechanisms of ligand exchange and other reactions of organo-metallic compounds.	1, 2, 5
Interpret a variety of spectroscopic data to rationalize the reactivity exhibited by organometallic compounds,	1, 2, 5

Explain the formation of different polymeric material based on organometallic compounds that catalyze their production,	1, 2, 6
Critically discuss the difference between homogeneous and heterogeneous catalysis,	1, 2, 3
Explain the difference between inorganic complexes vs. traditional organic drug molecules	1, 2, 5, 6
Describe different models of how inorganic complexes are utilized in medicine and their modes of action	1, 2, 5, 6, 7

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

   This course is not required by any programs beyond the B.Sc. in Chemistry.

5. Which program areas have been consulted about the change(s)?

   None outside of the Department of Chemistry, as this course is only regularly used by this department.

6. In what ways does this course (not just the proposed changes) contribute to Indigenizing Our Academy? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: UFV Integrated Strategic Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05), the TRC Calls to Action, and/or the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

   Where appropriate, Indigenous Knowledge is integrated into assignment design and curriculum. For example, we discuss various electrochemical reactions and their investigation via the appropriate electrochemistry experiments in this course. Examples such as metallurgical processes adopted by indigenous communities via electrochemical plating techniques to enhance the aesthetic and functional qualities of the material is discussed. In addition, ligand design for various purposes is discussed throughout the course. Examples such as the use of plants rich in heavy metal coordinators to facilitate food preservation and treatment of heavy metal toxicity by indigenous communities are discussion.

7. How does the course reflect principles of equity, diversity, and inclusion, through assignment design, topic selection, curriculum delivery, or other methods?

   Principles of EDI are primarily instilled in the curriculum delivery. It is understood that enrolled students originate from various socio-economic, educational and personal backgrounds. To ensure students from such diverse backgrounds will receive equal opportunities to excel in the course:
   a) All course materials (notes, problem sets, assignments, solutions, labs) will be available to students free of charge electronically *via* the current course delivery system,
   b) Student unable to obtain electronic copies will be provided with physical copies of the course material above,
   c) Suggested textbooks are not required, but copies are available free of charge in the UFV library,
   d) Flexible office hours for in person or virtual discussions throughout the work week,

8. If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.

No additional special considerations have been made for this revision, as the credit value, class size limit, frequency of offering, delivery and evaluation of the course remains identical to the previous edition.

9. Estimate of the typical costs for this course, including textbooks and other materials (excluding tuition):

   $100. Course textbooks are not required, students are provided with physical and electronic copies of assignments, problem sets, notes and any related course material that will suffice for their studies. The cost listed covers the printing costs of the material should the student choose to print the material for their purposes.

ORIGINAL COURSE IMPLEMENTATION DATE:

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:**

Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: CHEM 420	**Number of Credits: 3** Course credit policy (105)
Course Full Title: Advanced Inorganic Chemistry **Course Short Title:** (To be assigned by OReg based on university standards.)	
Faculty: Faculty of Science	**Department/School:** Chemistry

Calendar Description:

This course concentrates on organo-transition metal chemistry, with emphasis on bonding theories, the 18-electron rule, and their reactivity ~~cluster compounds.~~ Emphasis is also placed on the role of organometallic complexes in organic syntheses and catalytic processes.

Note: Students planning to take CHEM 325 ~~should~~ are recommended to do so in the same semester as either CHEM 320 o 420.

~~Note: Students with credit for CHEM 421 cannot take this course for further credit.~~

Prerequisites (or NONE):	CHEM 320
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number: **CHEM 421**

Cross-listed with:

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	45
[click to select]	
[click to select]	
[click to select]	
[click to select]	
Total hours	**45**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: **No**

Course Details

Special Topics course: **No**

(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: **No**

(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: **May be offered in multiple delivery modes**

Expected frequency: **Every other year**

Maximum enrolment (for information only)**: 24**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See bctransferguide.ca.)*

Transfer credit already exists: **[click to select]**

Submit outline for (re)articulation: **[click to select]**

(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:** April 11, 2025
Faculty Council approval	**Date of meeting:**
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:

1. Critically discuss the relative stability of different organometallic compounds by reference to the 18 electron rule.
2. Describe the ligand-metal bonding in organometallic compounds using Molecular Orbital theory.
3. Critically discuss the evidence for different mechanisms of ligand exchange and other reactions of organo-metallic compounds.
4. Interpret a varietyExplain the unifying nature of spectroscopic data to rationalize the reactivity exhibited by the isolobal concept.
5. 4. Critically compare the nature of boron-cluster and organometallic compounds,cluster compounds using the 18 electron rule and the isolobal concept.
6. 5. Explain the formation of different polymeric material based on Interpret NMR spectra of organometallic compounds that catalyze their production,in terms of structure and fluxionality.
6. Critically discuss the difference between homogeneous and heterogeneous catalysis,
7. Explain the difference between inorganic complexes vs. traditional organic drug molecules
8. Describe different models of how inorganic complexes are utilized in medicine and their modes of action

7. Synthesize models of IR spectra of metal carbonyl compounds by consideration of group theory and the nature of metal ligand bonding.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Final exam: 2040%	Quizzes/tests/midterm: 30%	Assignments: 3010%
Project: 5020%	[click to select] %	[click to select] %

Details:

The term project is separated into three components:

1. An oral interview, presented privately to the instructor only, based on recent literature selected by the student (15%),
2. A written term paper (2015%)
3. A final oral presentation presented to the class (15%)

(Provide a full assessment breakdown and any other relevant information.)

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Presentation of the course will be by inter-related theory classes (lectures) and discussion periods. Audio-visual aids will be used where appropriate.

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	Housecroft, C.E., Sharpe, A.G.G.O. Spessard and G.L. Miessler	InorganicOrganometallic Chemistry	2018
2.	[click to select]			
3.	[click to select]			
4.	[click to select]			
5.	[click to select]			

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

(Use this section for supplies and materials for all sections of this course.)

Course Content and Topics

Introduction: How to perform literature searches, reading scientific literature

Electron transfer reactions: Electrochemistry experiments, electron transfer mechanism, X-ray absorption spectroscopy

Organometallics: Introduction, ligands, 18 e- counts

Inorganic catalysis: hydrogenation, hydroformylation, hydroboration/hydrosilation, Wacker process, Cross coupling reactions, olefin metathesis / general polymerization catalysis, heterogeneous catalysis

Medicinal inorganic Chemistry: Diagnostics (imaging agents, ligand design) and therapeutics (anticancer agents such as cis-platin)

- ~~Theories of bonding; molecular orbital description of bonding in organometallics; the 18-electron rule; hard and soft ligands.~~
- ~~The use of spectroscopic techniques in characterizing organometallic compounds; timescales of various physical techniques and fluxionality.~~
- ~~Bonding of common ligands, such as carbon monoxide, hydride, phosphine, alkene, and carbene, in organo-transition metal compounds.~~
- ~~Boron-cluster and metal-cluster compounds; methods of electron counting.~~
- ~~The isolobal concept and its applications.~~
- ~~Arene-transition metal complexes.~~

~~The role of organo-transition metal complexes in organic synthesis~~

Memo for Course Changes

To:

From: (Department head or Chair of Program Working Group)

Date:

Subject: Proposal for revision of ~~(insert title of course)~~CHEM 451 Bio-inorganic chemistry

Note that even minor changes may result in comments from committees on all aspects of the course.

1. Summary of changes (select all that apply):
   - ☒ ~~☐~~ Six-year review
   - ☐ Number and/or course code
   - ☐ Credits and/or total hours
   - ☐ Title
   - ☐ Calendar description
   - ☒ ~~☐~~ Prerequisites and/or co-requisites
   - ☐ Frequency of course offering
   - ☒ ~~☐~~ Learning outcomes
   - ☒ ~~☐~~ Delivery methods and/or texts and resource materials
   - ☒ ~~☐~~ PLAR options, grading system, and/or evaluation methods
   - ☐ Discontinuation of course
   - ☐ Other – Please specify:

2. Rationale for change: the changes are minor ones that sharpen the language, revise the order of topics covered to reflect the current course, and update the textbooks and grading scheme.
3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the Institutional Learning Outcomes (ILOs): there are no changes that effect the learning outcomes.

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs? This course is not required by any programs beyond the B.Sc. in Chemistry.

~~4.~~5.

Which program areas have been consulted about the change(s)? None outside of the Department of Chemistry, as this course is only regularly used by this department.

~~5.~~6.

In what ways does this course (not just the proposed changes) contribute to Indigenizing Our Academy? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: UFV Integrated Strategic Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05), the TRC Calls to Action, and/or the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). This course contributes to indigenizing the academy primarily through curriculum delivery, where several aspects align with a number of indigenous ways of knowing. In lab courses, some knowledge is

gained through *practical applications* and experiential learning. While this course does not have a lab, several topics are introduced and critically discussed by examining key experiments and interpreting the results before analysing the authors conclusions. This also follows the principle of *inherited wisdom*, as in science we continue to learn from the efforts of those who have gone before us. *Community engagement* comes from in-class discussions, and also from a term presentation where students are encouraged to work in groups of 2-3 students, select a relevant topic on their own or from a list of suggestions, compile data from a variety of sources, correlate and analyse the data, and present their topic before the class near the end of term. Students need to contribute to all aspects of the project. Finally, some topics are enhanced by discussing the life and background or ideas of key scientists, seeing them as real people who often faced significant challenges. In this way elements of *Storytelling* can be introduced into science with the hope that this will bring additional light to a topic.

~~6.~~7.

How does the course reflect principles of equity, diversity, and inclusion, through assignment design, topic selection, curriculum delivery, or other methods? Principles of EDI are primarily instilled in curriculum delivery. It is understood that enrolled students originate from a wide range of socio-economic, educational and personal backgrounds. To ensure students from such diverse backgrounds will receive equal opportunities to excel in the course:

a) All course materials (notes, problem sets, assignments, solutions) will be available to students free of charge electronically *via* the current course delivery system

b) Student unable to obtain electronic copies will be provided with physical copies of the course material above upon request

c) Suggested textbooks are not required, although one of them is available in pdf form for free online. Students can achieve success in the course using provided materials and various online materials (such as online research papers available from the UFV library or copies of relevant texts).

d) Office hours are flexible for in person or virtual discussions throughout the work week.

~~7.~~ An inclusive environment will be encouraged when students work together on group assignments or presentations.

8. If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.
9. Estimate of the typical costs for this course, including textbooks and other materials (excluding tuition): One textbook(s) is available online for free, while the others are suggested only, and are not required for success in the course. Efforts will be made to ensure that the library has copies. Thus there are no required costs for the course.

UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE:

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:**

Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: CHEM 451	**Number of Credits: 3** Course credit policy (105)
Course Full Title: Bio-inorganic Chemistry **Course Short Title:** (To be assigned by OReg based on university standards.)	
Faculty: Faculty of Science	**Department/School:** Chemistry

Calendar Description:

Bio-inorganic chemistry is a rapidly expanding area and provides an important bridge between chemistry and biology. Students will study a variety of biological systems involving both main-group and transition metals.

Prerequisites (or NONE):	CHEM 221 and one of the following: CHEM 320, CHEM 341, CHEM 350, BIOC 350, ~~or~~ BIO 320, or BIOC 320.
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number:

Cross-listed with:

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	45
Supervised laboratory hours (science lab)	
[click to select]	
[click to select]	
[click to select]	
Total hours	**45**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: **No**

Course Details

Special Topics course: **No**

(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: ~~[click to select]~~No

(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: ~~[click to select]~~Face-to-face only

Expected frequency: **Every other year**

Maximum enrolment (for information only)**:** 24

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See bctransferguide.ca.)*

Transfer credit already exists: ~~[click to select]~~No

Submit outline for (re)articulation: ~~[click to select]~~No

(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:** June 6, 2025
Faculty Council approval	**Date of meeting:**
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:

1. Describe the properties of biological molecules (proteins, nucleic acids, and other metal-binding biomolecules) that contain metal ions.
2. Describe critically the type of information relating to metal ions that can be obtained from certain physical methods, such as X-ray diffraction, NMR and EPR, Mossbauer spectroscopy, FT-IR spectroscopy, circular dichroism, and UV-Visible spectroscopy.
3. Describe the choice, uptake, and assembly of metal-containing units in biology.
4. Explain the means by which organisms regulate metal ion concentrations in the cell.
5. Summarize the involvement of metal ions in determining the correct folding and cross-linking of biomolecules.
6. Discuss critically the factors that determine the binding of metal ions and complexes to proteins and nucleic acids.
7. Explain the role of metals in electron-transfer proteins.
8. Outline the role of metal ions in specific enzyme reactions involving non-redox reactions, and atom- and group-transfer reactions.
9. Expound upon several examples by which proteins tune the properties of metals to achieve specific functions.
9.10. Discuss the role of several metals that function as or are found in medicines.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Final exam:	4040%	Quizzes/tests/midterm:	4020%	Assignments:	20%
[click to select]Project:	%20%	[click to select]	%	[click to select]	%

Details:

(Provide a full assessment breakdown and any other relevant information.)
Final Exam: 40%
Midterm: 20%
Problem Sets: 20%
Group Presentation: 20%

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Presentation of the course will be by interrelated theory classes ("lectures"), and discussion periodsas well as group presentations ("seminars"). Audio visual aids will be used where appropriate, and students will be expected to use the UFV library for literature research. Students may be required to present seminars or research papers.

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	Lippard, S.J. and J.M. Berg	Principles of Bioinorganic Chemistry	1994
2.	Textbook	Wolfgang Kaim, Brigitte Schwederski, Axel Klein	Bioinorganic Chemistry, Inorganic Elements in the Chemistry of Life	2013
3.	Textbook	Dieter Rehder	Bioinorganic Chemistry	2014
4.	[click to select]Textbook	Ivano Bertini, Harry B. Gray, Stephen J. Lippard, and Joan Selverstone Valentine	Bioinorganic Chemistry	1994
5.	[click to select]			

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

(Use this section for supplies and materials for all sections of this course.)

Course Content and Topics

1: Overview of Bioinorganic Chemistry
2: Properties of Biological Molecules
3: Principles of Coordination Chemistry Related to Bioinorganic Chemistry
4: Physical Methods
5: Transition-Metal Storage, Transport, and Biomineralization

6: The Reaction Pathways of Zinc Enzymes and Related Biological Catalysts
7: Calcium in Biological Systems
8: Biological and Synthetic Dioxygen Carriers
9: Dioxygen Reactions
10: Electron Transfer
11: Ferredoxins, Hydrogenases, and Nitrogenases: Metal-Sulfide Proteins
12: Metal/Nucleic-Acid Interactions
13: Metals in Medicine

None of the texts are required, but the 4th one listed is available as a free downloadable pdf, as well as being available in a more accessible format on the Libretexts Chemistry site.

~~The course will be based on the required text. The course will also make use of reprint materials.~~

1. ~~**Introduction** - Essential and non-essential elements. Cycles of macronutrients and trace elements. Biological ligands and ligand specificity. Hard and soft acids and bases. Stability constants. Kinetics of aquo exchange processes. Binding residues in amino acids.~~
2. ~~**Phosphorus Chemistry** - Transport enzymes involving ATP. Kinases, role of group IA and IIA cations. Cell membranes.~~
3. ~~**Review of Protein Structure, Enzymes, Coenzymes.**~~
4. ~~**Metals in Photosynthesis** - Role of magnesium and manganese.~~
5. ~~**Dioxygen Carriers and Storage** - Hb Mb Hc and Hr and O2 binding. Synthetic models for oxygen-binding proteins. O2 activation. Monooxygenases. Cytochrome P450. Tyrosinase. Methane mono--oxygenase. Role of copper. Dioxygenases and oxidases. Superoxide Dismutase. Horse Radish Peroxidases. Catalase.~~
6. ~~**Electron Transfer Processes** - Cytochrome a, b and c. Blue copper protein. Fe-S protein. Molybdoenzymes and cobalamins.~~
7. ~~**Non-Redox Metalloenzymes.**~~
8. ~~**Nitrogen Fixation** - Nitrogenases. Nitrate reductase. Fe and Mo proteins and enzymes.~~
9. ~~**Pharmaceuticals** - Therapeutic activity of chelating agents. Platinum complexes in chemotherapy. Biological chemistry of gold complexes. Radiopharmaceuticals.~~
10. ~~**Toxicity of Heavy Metals and Other Elements** - Toxicity of Cu, Cd, Pb, Hg, Se, As, Be, V, Cr, Mn, Ni.~~
11. ~~**Physical Methods** - Illustrative examples involving.~~

Memo for Course Changes

To: Science Faculty Council, Undergraduate Education Committee

From: Ben Vanderlei, Department Head of Math & Stats

Date: Sept. 9, 2025

Subject: Proposal for revision of STAT 104

Note that even minor changes may result in comments from committees on all aspects of the course.

1. Summary of changes (select all that apply):
   - ☒ Six-year review
   - ☐ Number and/or course code
   - ☐ Credits and/or total hours
   - ☐ Title
   - ☐ Calendar description
   - ☐ Prerequisites and/or co-requisites
   - ☐ Frequency of course offering
   - ☒ Learning outcomes
   - ☒ Delivery methods and/or texts and resource materials
   - ☐ PLAR options, grading system, and/or evaluation methods
   - ☐ Discontinuation of course
   - ☐ Other – Please specify:

2. Rationale for change: *STAT 104 is due for a six-year review. Minor edits were made to the learning outcomes for clarification.*
3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the Institutional Learning Outcomes (ILOs):

   No substantial changes have been made to the learning outcomes.
4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

   STAT 104 serves as a numeracy requirement for programs across UFV. The changes proposed will not affect these programs.
5. Which program areas have been consulted about the change(s)? *No consultation has been made. The proposed changes are simple updates and clarifications.*

6. In what ways does this course (not just the proposed changes) contribute to Indigenizing Our Academy? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: UFV Integrated Strategic Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05), the TRC Calls to Action, and/or the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

We identify how Indigenization of the course delivery has been given consideration in reference to First Peoples Principles of Learning:

- Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place): Students are encouraged to learn from and help each other for in assignments and homework. Some instructors allow students who work together to turn in single copies of assignments for the group.
- Learning involves recognizing the consequences of one's actions: Students are provided with online homework and encouraged to attempt questions from the textbook. Thus, they take responsibility for their own learning. Instructors are available via email, online or in person for help. Feedback on learning is provided via weekly quizzes and/or written assignments.
- Learning involves generational roles and responsibilities: Students and instructors work through examples together in class so that students learn techniques of data analysis as well as learning how to study this analytic subject. Students learn how to communicate their interpretations of data so that the results of their investigations are passed on to others.
- Learning is embedded in memory, history, and story: This course supports the well-being of the individual and their community in that it helps students to understand and interpret information collected from the world in which we live. The techniques learned apply to any evidence-based field of study and they also apply to every student in their daily life. The broad range of examples and real-life data presented demonstrates the wide applicability of statistics to life in general, from agriculture and the environment to complicated fields of scientific study. For example, on their very first day of class, students see data relating to world-wide child mortality, costs of health care around the world, health benefits of a variety of food oils, and data showing the decline in the number of fur seal pups born over the past 40 years.
- Learning involves patience and time: Instructors emphasize in class that data sets contain meaning which can be found by exploring the data using correct methods. These methods are often layered upon one another, meaning that patience is needed to follow correct procedures.

7. How does the course reflect principles of equity, diversity, and inclusion, through assignment design, topic selection, curriculum delivery, or other methods?

The course reflects principles of equity, diversity and inclusion inherently because students in the course are students in many different fields of study. Statistics is a great leveler, because methods of analysis are the same regardless of field of study or type of researcher. Students are encouraged to work together wherever possible, so it often happens that students work with others who are in very different fields of study. The data analyzed in the course comes from many different fields, supporting the idea that everyone is included, although individual needs may vary. Students in the course vary in terms of their level of preparation and particular needs: all students are accommodated regardless, via the Centre for Accessibility Services, and via having diverse evaluations (online or on paper or in class). Most instructors provide notes which are the result of in-class work.

8. If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.

9. Estimate of the typical costs for this course, including textbooks and other materials (excluding tuition): *Expected cost is $100 for e-book and online homework system.*

UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: ~~———~~September 1993

REVISED COURSE IMPLEMENTATION DATE: ~~———~~January 2026

COURSE TO BE REVIEWED (six years after UEC approval)**:** ~~———~~September 2031

Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: STAT 104	**Number of Credits:** ~~———~~4 Course credit policy (105)
Course Full Title: Introductory Statistics **Course Short Title:** (To be assigned by OReg based on university standards.)	
Faculty: Faculty of Science	**Department/School:** Mathematics & Statistics

Calendar Description:

A basic introduction to descriptive statistics, probability, sampling, estimation, hypothesis testing, correlation, and regression. Recommended for anyone who wishes to evaluate research involving statistical analysis, especially students in humanities and social science. Using statistical computer software is essential to this course.

Note: As a general rule, students with Mathematics 11 are prepared to take STAT 104, those with Mathematics 12 are prepared to take STAT 106, and those with a full year of calculus are prepared to take STAT 270/MATH 270. Before registering, students should check the requirements of their program. The UFV Mathematics major program requires STAT 270, while the Mathematics minor program requires STAT 106 or STAT/MATH 270.
Note: Some degree and diploma credentials may allow only one of STAT 104 or STAT 106 to count as credit towards meeting program requirements.

Prerequisites (or NONE):	One of the following: (C or better in one of Principles of Mathematics 11, Applications of Mathematics 11, MATH 085, Foundations of Mathematics 11, Pre-calculus 11, Calculus 12, or Statistics 12) or (B or better in Workplace Mathematics 11, History of Mathematics 11, Apprenticeship Mathematics 12, or Apprenticeship and Workplace Mathematics 12) or (one of Foundations of Mathematics 12, Pre-calculus 12, Principles of Mathematics 12, or Applications of Mathematics 12) or (any UFV MATH course numbered 092 or higher) or (a score of 17/25 or better on Part A of the MSAT) or (45 university-level credits with department permission).
Corequisites (if applicable, or NONE):	~~———~~NONE
Pre/corequisites (if applicable, or NONE):	NONE

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number: **MATH 104**

Cross-listed with: **n/a**

Equivalent course(s): **n/a**

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	40
Supervised laboratory hours (computer lab)	20
[click to select]	
[click to select]	
[click to select]	
Total hours	**60**

Course Details

Special Topics course: **No**

(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: ~~[click to select]~~**No**

(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: ~~[click to select]~~**May be offered in multiple delivery modes**

Expected frequency: **Every semester**

Maximum enrolment (for information only)**: 36**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See bctransferguide.ca.)*

Scheduled Laboratory Hours Labs to be scheduled independent of lecture hours: **No**	Transfer credit already exists: **Yes** Submit outline for (re)articulation: ~~**[click to select]**~~**No** *(If yes, fill in transfer credit form.)*

Department approval	**Date of meeting:** August 25, 2025
Faculty Council approval	**Date of meeting:**
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:

1. Construct histograms, boxplots, and other graphs from raw data, and interpret these graphs.
2. Obtain simple measures of location and dispersion from the data~~,~~ and interpret the same.
3. Calculate the correlation between two linearly related variables, create scatterplots, and obtain, use, and interpret lines of "best" fit.
4. Solve simple problems in probability requiring knowledge of conditional probability and statistical independence.
5. Use simple mathematical models (e.g. normal and binomial distributions) for commonly occurring situations such as sampling with replacement, and physical or biological measurements.
6. Solve simple problems involving the distribution of the sample mean using statistical theory such as the Central Limit Theorem~~.~~
7. Construct and interpret confidence intervals for means and proportions and for differences in ~~means, and~~ means and check the conditions for inference in these cases.
8. Conduct tests of hypotheses for means and proportions and for differences in means, interpret p-values, check the conditions for inference in these cases.
9. Draw inferences using linear regression.
10. Apply Pearson's chi-square statistic to draw inferences in appropriate categorical sampling situations.
11. Identify potential sources of ~~potential~~ bias in data collection methods ~~-~~and be able to obtain their own random samples.
12. Use statistical software for calculations and graphs throughout the course.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Final exam:	40%	Assignments:	10%	[click to select]	%
Quizzes/tests/midterm:	50%	[click to select]	%	[click to select]	%

Details:

(Provide a full assessment breakdown and any other relevant information.)

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

~~A calculator is required.~~Lecture and computer lab hours.

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Book	Moore, D.S., Notz, W.I. & Fligner, M.A.	The Basics Practice of Statistics, ~~7~~ 9TH Edition	~~2015~~ 2021
2.	[click to select]			
3.	[click to select]			
4.	[click to select]			
5.	[click to select]			

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

(Use this section for supplies and materials for all sections of this course.)

Course Content and Topics

1. Introduction to statistical concepts, e.g. variation; and software, e.g. MINITAB, Excel, SPSS.
2. Descriptive statistics: Use statistical software to obtain histograms, stem-and-leaf plots, boxplots, etc. Measures of location, e.g. mean, median, mode; and scale, e.g. standard deviation, quartiles. Bivariate data: use statistical software to obtain correlation, linear regression line, use and interpret computer output.
3. Probability: Two-way tables, Venn and tree diagrams; joint, marginal and conditional probability. Independence and dependence. Simple models for discrete random variables, sampling with and without replacement. The normal distribution, standardization, application of Central Limit Theorem.
4. Inferential statistics: Estimation, use statistical software to obtain confidence intervals and conduct tests of hypothesis for means, proportions and differences of means; p-values; conditions for inference. Use statistical software to calculate Pearson's chi-square statistic ~~applied to~~ in a variety of ~~problems~~ situations, e.g. goodness-of-fit, testing for independence in a two-way table. Use statistical software to calculate ~~C~~ confidence intervals and conduct tests of hypothesis about the slope in simple linear regression.
5. Bad sampling designs (eg voluntary response samples, convenience samples) and other sources of error in data, use random number table to obtain simple random samples.
6. If time allows: simple experimental design.

Memo for Course Changes

To:

From: (Department head or Chair of Program Working Group)

Date:

Subject: Proposal for revision of CHEM 114 Principles of Chemistry II

Note that even minor changes may result in comments from committees on all aspects of the course.

1. Summary of changes (select all that apply):
   - ☒ Six-year review
   - ☐ Number and/or course code
   - ☐ Credits and/or total hours
   - ☐ Title
   - ☒ Calendar description
   - ☐ Prerequisites and/or co-requisites
   - ☒ Frequency of course offering
   - ☐ Learning outcomes
   - ☒ Delivery methods and/or texts and resource materials
   - ☒ PLAR options, grading system, and/or evaluation methods
   - ☐ Discontinuation of course
   - ☐ Other – Please specify:

2. Rationale for change: The changes reflect minor changes to the course delivery.
3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the Institutional Learning Outcomes (ILOs): All changes are minor and have no effect on the learning outcomes.
4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs? These changes are minor and will have no effect on the other departments that require this course as part of the B.Sc..
5. Which program areas have been consulted about the change(s)? None, due to the minor nature of the changes.
6. In what ways does this course (not just the proposed changes) contribute to Indigenizing Our Academy? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: UFV Integrated Strategic Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05), the TRC Calls to Action, and/or the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). This course contributes to indigenizing the academy primarily through curriculum delivery, where several aspects align with a number of indigenous ways of knowing. An important part of the course are the labs, where knowledge is gained through *practical applications* and experiential learning. The different topics are usually introduced with some historical background, which follows the principle

of *inherited wisdom*, as in science we continue to learn from the efforts of those who have gone before us. *Community engagement* comes from in-class discussions, and also from the labs where students interact and discuss experiments and results with each other. Finally, some topics are enhanced by discussing the life and background or ideas of key scientists, seeing them as real people who often faced significant challenges. In this way elements of *Storytelling* can be introduced into science with the hope that this will bring additional interest and insight to a topic.

7.

How does the course reflect principles of equity, diversity, and inclusion, through assignment design, topic selection, curriculum delivery, or other methods? Principles of EDI are primarily instilled in curriculum delivery. It is understood that enrolled students originate from a wide range of socio-economic, educational and personal backgrounds. To ensure students from such diverse backgrounds will receive equal opportunities to excel in the course:

a) Some course materials (notes, problem sets, assignments, solutions) will be available to students free of charge electronically *via* the current course delivery system

b) While the course textbook and online homework are mandatory, the cost is quite reasonable, in the range of $90 for both 113 and 114. There are also a few low-cost lab materials that students must purchase.

c) Office hours are flexible for in person or virtual discussions throughout the work week.

An inclusive environment will be encouraged when students work together in the lab, or on in-class problems or collaborate during SLG sessions (when available).

8. If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.
9. Estimate of the typical costs for this course, including textbooks and other materials (excluding tuition): The text for both CHEM 113 and 114 is $90, plus lab materials for $31, and lab coat/glasses for $28.

ORIGINAL COURSE IMPLEMENTATION DATE:

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:**

Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: CHEM 114	**Number of Credits:** 5 Course credit policy (105)
Course Full Title: Principles of Chemistry II **Course Short Title:** (To be assigned by OReg based on university standards.)	
Faculty: Faculty of Science	**Department/School:** Chemistry

Calendar Description:

Topics include chemical thermodynamics and kinetics, aqueous equilibria, and the reactivity of organic molecules. Work performed in the laboratory complements lecture material. ~~With CHEM 113, this course satisfies the requirements for honours, majors, or minors programs in science.~~

Prerequisites (or NONE):	CHEM 113
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number: ~~**CHEM 112**~~

Cross-listed with:

Equivalent course(s): ~~**CHEM 112**~~

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	45
Tutorials/workshops	12
Supervised laboratory hours (science lab)	45
[click to select]	
[click to select]	
Total hours	**102**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: ~~**[click to select]**~~**Yes**

Course Details

Special Topics course: **No**

(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: **No**

(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: ~~**[click to select]**~~**Face-to-face only**

Expected frequency: ~~**Twice per year**~~**Every semester**

Maximum enrolment (for information only)**: 36**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See bctransferguide.ca.)*

Transfer credit already exists: **Yes**

Submit outline for (re)articulation: ~~**[click to select]**~~**No**

(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:** ~~June 6, 2025~~
Faculty Council approval	**Date of meeting:**
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:
1. Define the basic terminology, conventions, and laws of thermodynamics.
2. Explain concepts of enthalpy, entropy, and free energy, and how they relate to spontaneity and equilibrium.
3. Apply thermodynamic principles to solve problems involving simple chemical and physical systems.
4. Describe the properties and theories of acids and bases, and solve quantitative problems related to acid/base equilibria.
5. Explain the basic terminology and concepts of chemical kinetics.
6. Derive rate laws and apply them quantitatively to solve problems in chemical kinetics.
7. Explain and predict the kinetics, mechanisms, and stereochemical outcomes of organic substitution reactions.
8. Exhibit safe handling and disposal of chemicals.
9. Write formal chemistry laboratory reports.
10. Use basic chemical equipment and techniques to measure or analyze acid dissociation constants, thermodynamic values, partition coefficients, kinetic rate constants, rate orders, equilibrium constants and solution concentrations.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Final exam:	40%	Assignments:	10%	[click to select]	~~20%~~
Quizzes/tests/midterm:	~~10~~30%	Lab work:	20%	[click to select]	%

Details:

(Provide a full assessment breakdown and any other relevant information.)

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Lectures, labs, group problem-solving sessions, computer-based problem solving.

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	John A. Olmsted, Gregory M. Williams, Robert C. Burk.~~Petrucci R.H., et al.~~	~~General Chemistry: Principle and Modern Applications~~Chemistry: 4th Canadian Edition	2020~~10~~
2.	Other	Fritzke, G., Webb, J.	Chemistry 114 Lab Manual	
3.	[click to select]		~~Molecular Model Kit (available in the UFV Bookstore)~~	
4.	~~[click to select]~~Online resource	**Macmillan Learning Achieve**~~——~~		
5.	[click to select]			

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

~~(Use this section for supplies and materials for all sections of this course.)~~
Lab coat and safety glasses required.

Course Content and Topics

1. Principles of thermodynamics. Thermodynamic terminology and definitions. Gas Laws. Heat, work, enthalpy and the First Law of Thermodynamics. Entropy and the Second law of Thermodynamics. Gibbs free energy and the relationship to spontaneity and equilibrium. Application of these principles to problems involving physical and chemical systems.
2. Equilibria. Thermodynamics of aqueous equilibria, Le Châtelier's principle, and relationship to kinetics. Solubility equilibria. Brønsted Lowry and Lewis theories of acids and bases. Weak and strong acids, monoprotic and polyprotic acids, buffers, and titrations.
3. Chemical Kinetics. Concepts of reaction order and molecularity, elementary reaction steps, reaction mechanisms, rate-limiting steps, transition states and reaction coordinate diagrams. Derivation of zeroth, first, and second order rate laws and their application to chemical reactions. The effect of temperature on reaction rates.
4. Organic Chemistry. Introduction to organic reactivity through the study of nucleophilic substitution reactions of alkyl halides. Properties, kinetics, and mechanisms of SN1 and SN2 reactions of alkyl halides. Effect on substitution reaction rates of the properties of the nucleophile, leaving group, solvent, and substrate structure. Stereochemical outcomes of substitution mechanisms.

LABORATORY CONTENT:

1. Determination of sodium, calcium and magnesium ions in a sample of seawater
2. Chemical Equilibrium: Reversible reactions and chemical equilibrium

3. Determination of an equilibrium constant
4. Potentiometric acid-base titrations and identification of a weak acid
5. Investigation of buffer systems
6. Thermodynamics: The entropy and enthalpy of solution for potassium hydrogen tartrate in water
7. Rates of Chemical Reactions: The iodination of acetone
8. Determination of the Universal Gas Constant
9. Preparation and analysis of benzoic acid
10. Extraction: The determination of a partition coefficient

Memo for Course Changes

To:

From: (Department head or Chair of Program Working Group)

Date: March 25th

Subject: Proposal for revision of CHEM 221

Note that even minor changes may result in comments from committees on all aspects of the course.

1. Summary of changes (select all that apply):
   - ☒ Six-year review
   - ☐ Number and/or course code
   - ☐ Credits and/or total hours
   - ☐ Title
   - ☐ Calendar description
   - ☐ Prerequisites and/or co-requisites
   - ☐ Frequency of course offering
   - ☒ Learning outcomes
   - ☒ Delivery methods and/or texts and resource materials
   - ☐ PLAR options, grading system, and/or evaluation methods
   - ☐ Discontinuation of course
   - ☐ Other – Please specify:

2. Rationale for change:

   This course was previously approved by UEC in 2018. Since then, limited changes have been made to the material to be covered and learning outcomes, which are reflected in the updated course outline.

3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the Institutional Learning Outcomes (ILOs):

   Core learning outcomes remain unchanged, just updated with greater specificity with explicit examples and worded such that they meet the institutional learning outcomes (ILOs).

Course learning outcomes	ILOs
Describe periodic trends (i.e., radii, ionization energy, electronegativity) observed across the periodic table.	1, 2, 3
Apply theories of bonding to describe the properties of inorganic molecules and materials.	1, 2
Apply Group Theory to identify symmetry element and operations of molecules.	1, 2, 5
Utilize Group Theory in the construction of molecular orbital (MO) diagrams of molecules.	1, 2
Describe the electronic structures of molecules based on how electrons are distributed in their respective MO diagrams.	1, 2

Apply Crystal Field Theory to rationalize the geometric and electronic structures of transition metal complexes.	1, 2, 3, 5
Correlate experimental results (i.e., photoelectron, UV-Vis spectroscopies, magnetism) with the electronic structure of an inorganic compound.	1, 2, 3, 5
Perform the synthesis and characterization of inorganic compounds in a laboratory safely with care and precision.	1, 5, 6, 7, 8
Interpret laboratory results to establish a connection between experimental and theoretical science.	1, 7, 8

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

   This course is not required by any programs beyond the B.Sc. in Chemistry.

5. Which program areas have been consulted about the change(s)?

   None outside of the Department of Chemistry, as this course is only regularly used by this department.

6. In what ways does this course (not just the proposed changes) contribute to Indigenizing Our Academy? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: UFV Integrated Strategic Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05), the TRC Calls to Action, and/or the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

   Where appropriate, Indigenous Knowledge is integrated into assignment design and curriculum. For example, we discuss Crystal Field Theory in this course as a general bond theory to rationalize observed colors of inorganic materials. Examples such as vibrant metal-containing minerals, commonly used by indigenous people as pigments for art and ceremonial purposes, are highlighted. Another prominent theme in this course is the introduction of how spectroscopy is utilized. Examples of the characterization of indigenous plants (with minor emphasis on their medicinal uses), or the use of stellar scintillation to predict weather and seasonal changes are highlighted.

   In the practical laboratory component of the course, many of the Indigenous ways of knowing are integrate into the mode of curriculum delivery. For example, the interconnected nature of the experiments performed are highlighted through examples in the introduction. In the laboratory, conclusions regarding the products of the experiments requires numerous methods of verification before a unified conclusion is made. Recording observations made during the experiments accurately is heavily emphasized, as written (i.e., lab reports) dissemination of these results relies on these records. Respect for nature and all living things is constantly highlighted through reminders of how chemical waste generated during experiments must be disposed of appropriately. Outside of the laboratory, communication-based learning, passage of knowledge between peers is encouraged.

7. How does the course reflect principles of equity, diversity, and inclusion, through assignment design, topic selection, curriculum delivery, or other methods?

   Principles of EDI are primarily instilled in the curriculum delivery. It is understood that enrolled students originate from various socio-economic, educational and personal backgrounds. To ensure

students from such diverse backgrounds will receive equal opportunities to excel in the course:
a) All course materials (notes, problem sets, assignments, solutions, labs) will be available to students free of charge electronically *via* the current course delivery system,
b) Student unable to obtain electronic copies will be provided with physical copies of the course material above,
c) Suggested textbooks are not required, but copies are available free of charge in the UFV library,
d) Flexible office hours for in person or virtual discussions throughout the work week,

8. If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.

   No additional special considerations have been made for this revision, as the credit value, class size limit, frequency of offering, delivery and evaluation of the course remains identical to the previous edition.

9. Estimate of the typical costs for this course, including textbooks and other materials (excluding tuition):

   $100. Course textbooks are not required, students are provided with physical and electronic copies of assignments, problem sets, notes and any related course material that will suffice for their studies. The cost listed covers the printing costs of the material should the student choose to print the material for their purposes.

ORIGINAL COURSE IMPLEMENTATION DATE:

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:**

Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: CHEM 221	**Number of Credits: 4** Course credit policy (105)
Course Full Title: Inorganic Chemistry **Course Short Title:** (To be assigned by OReg based on university standards.)	
Faculty: Faculty of Science	**Department/School:** Chemistry

Calendar Description:

Exploring chemistry of the elements and their inorganic compounds through fundamental concepts: periodicity of properties, molecular orbitals, valence, ionization potential, electron affinity, electronegativity, oxidation states, bonding and structures of inorganic solids, and coordination complexes.

Prerequisites (or NONE):	CHEM 114
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number:

Cross-listed with:

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	45
Supervised laboratory hours (science lab)	45
[click to select]	
[click to select]	
[click to select]	
Total hours	**90**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: **Yes**

Course Details

Special Topics course: **No**

(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: ~~[click to select]~~**No**

(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: ~~[click to select]~~**May be offered in multiple delivery modes**

Expected frequency: **Annually**

Maximum enrolment (for information only)**: 24**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See bctransferguide.ca.)*

Transfer credit already exists: **Yes**

Submit outline for (re)articulation: **[click to select]**

(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:** April 11, 2025
Faculty Council approval	**Date of meeting:**
Undergraduate Education Committee (UEC) approval	**Date of meeting:**

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

Upon successful completion of this course, students will be able to:

1. Describe periodic trends (i.e., radii, ionization energy, electronegativity) observed across the periodic table.
2. Apply theories of bonding to describe the properties of inorganic molecules and materials.
3. Apply Group Theory to identify symmetry element and operations of molecules. ~~Describe and predict ionic solid structures based on the periodic trends of the constituent atoms.~~
4. Utilize Group Theory in the construction of molecular orbital (MO) diagrams of molecules.
5. Describe the electronic structures of molecules based on how electrons are distributed in their respective MO diagrams.
~~4.~~6. Apply Crystal Field Theory to rationalize the geometric and electronic structures of transition metal complexes.
~~5.~~7. Correlate experimental results (i.e., photoelectron, UV-Vis spectroscopies, magnetism) with the electronic structure of an inorganic compound.
~~6.~~8. Perform the synthesis and characterization of inorganic compounds in a laboratory safely with care and precision.
~~7.~~9. Interpret laboratory results to establish a connection between experimental and theoretical science.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Final exam:	40%	Quizzes/tests/midterm:	30%	Assignments:	10%
Lab work:	20%	[click to select]	%	[click to select]	%

Details:
(Provide a full assessment breakdown and any other relevant information.)

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

The course material will be delivered through in-person lectures, in-class problem solving exercises, and out-of-class problem sets and assignments. Weekly laboratory sessions provide hands-on training in inorganic synthetic and characterization techniques.

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	Housecroft, C.E., Sharpe, A.G.	Inorganic Chemistry	2018
2.	[click to select]		~~UFV Lab Manual~~	
3.	[click to select]			
4.	[click to select]			
5.	[click to select]			

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

Laboratory supplies required.

Course Content and Topics

1. Electronic structure of Atoms – Atomic orbitals, effective nuclear charge
2. Theories of Atomic Structure and Periodic Trends (i.e., Atomic radii, ionization energy, electronegativity)
3. Covalent bonding and molecular structures – Valence bond theory, VSEPR Theory, Orbital hybridization
4. Group Theory – Symmetry elements and symmetry operations
5.~~4.~~ Molecular Orbital (MO) Theory – Homonuclear diatomics, heteronuclear diatomics, polyatomics
6~~5~~. Photoelectron Spectroscopy
~~6. Ionic Solids – Structures, lattice energy calculation~~
7. Chemistry of Hydrogen
8. Coordination Chemistry – Coordination Number, nomenclature, electronic configuration of transition metal complexes, spin states
9. Crystal Field Theory – Optical (UV-Vis) spectroscopy, magnetism

Typical Laboratory Experiments
1. Qualitative Analysis: Reactions of Transition Metals
2. Infrared Spectroscopy: Coordination by Polyatomic Ions
3. Coordination Chemistry – Werner Complexes
4. Coordination Chemistry – Linkage Isomers
5. Preparation of Compounds with Unusual Oxidation States
6. Synthesis of an Electron-deficient Compound
7. Preparation of an Organosilicon Polymer

UNIVERSITY OF THE FRASER VALLEY

FACULTY OF SCIENCE CURRICULUM COMMITTEE (FSCC)

A Standing Committee of the Faculty of Science

Terms of Reference

1. MANDATE

The Faculty of Science Curriculum Committee (FSCC) serves as an advisory body to the Faculty of Science. The FSCC reviews new and revised credentials, programs and courses under the purview of the Faculty of Science for accuracy, feasibility, academic relevance, and academic quality. It does so while recognizing the diversity of program needs.

2. DEFINITIONS

In an effort to maximize committee effectiveness and minimize redundancies in faculty council, the FSCC groups its deliberations into two categories for purposes of reporting to Science Faculty Council (SFC), both of which are defined below:

Significant Changes include all major course and program changes, as defined by UEC, and are brought to SFC for approval.

Reportable Changes include all minor course and program changes, as defined by UEC. Reportable changes are brought to SFC as information items in the meeting agenda, and are discussed and voted upon only at the request of one or more faculty.

3. RESPONSIBILITIES

The FSCC is responsible for the review of changes to existing programs and courses, and all new programs and courses, according to the following criteria:

- Accuracy
- Feasibility
- Academic Relevance
- Academic Quality
- Alignment with Program and/ or Institutional Learning Outcomes

Accordingly, the FSCC shall:

I. Approve reportable changes and inform SFC.
II. Review and provide a recommendation to the SFC for approval for:
    a. Significant changes;
    b. New disciplines;
    c. New interdisciplinary programs housed outside of the Faculty of Science that require faculty review and approval;
    d. Changes to the requirements of credentials under the purview of the Faculty of Science;
    e. Changes to entrance requirements of credentials under the purview of the Faculty of Science;

f. Policy changes from within the Faculty of Science that impact the delivery of Science-related programming;

III. Provide a forum for discussion of and recommendations for changes to other program areas that involve courses and disciplines within the Faculty of Science, to be followed by:
   a. Departmental submission of recommended proposal to the appropriate Area or Committee for approval;
   b. A note of approval to be forwarded by the FSCC chair to the chair of the relevant committee for verification;

IV. Provide a forum for discussion of:
   a. New curricular initiatives related to the Faculty of Science;
   b. Annual and multi-year curricular planning within the Faculty of Science, as reflected within the Education Plan and other documents;
   c. New and innovative models for program and course delivery, and potential problems arising from these;
   d. Suggested changes to procedures that will improve Science offerings.

V. Provide a forum to review and (potentially) recommend approval of all requested exceptions to graduation requirements for credentials under the purview of the Faculty of Science. (This does not include requests for exceptions to disciplinary requirements, such as the requirements of a major or minor.)

4. MEMBERSHIP

I. Voting Membership:
   a. The department head or designated faculty member representing each of the following disciplines: Agriculture Technology, Biology, Chemistry, Computer Science, Geoscience, Mathematics / Statistics, Physics, and Planning, Geography, and Environmental Studies;
   b. A representative from the Advising Centre with expertise in Science.

II. Ex-officio and Non-voting Membership:
   a. Dean of the Faculty or designate;
   b. A representative from Upgrading and University Preparation.

Other guests may be present for committee proceedings as required and will be considered non-voting members. Such individuals may include:
   a. Department heads and/or course and program developers who will speak to specific proposals and changes;
   b. Program Development Coordinator;
   c. Representatives of program areas outside of the Faculty of Science, as invited by committee;
   d. Other individuals who will provide needed input to review of curriculum of relevance to the Faculty of Science.

5. FSCC PROCEDURES

Any new curriculum developments or changes that affect credentials under the purview of the Faculty of Science must first be presented to the FSCC for review and approval, prior to continuing to the SFC. Department heads and program representatives are responsible for

forwarding appropriate materials for review, including official course outlines and supporting memoranda, to the committee assistant for the FSCC by agenda deadline.

Reportable items that have been granted final approval by the FSCC will be brought to SFC as information items. Any member of the Faculty of Science Council may request that an item be brought forward for discussion and vote at the faculty council meeting at which it is on the agenda. After these items have been reported to SFC, they will be forwarded to UEC for final institutional review and approval. Items that have been designated as significant by the FSCC will be brought to SFC as decision items. Final approval of these items may then be provided by the SFC.

The committee assistant will record any changes to proposals that are required for committee approval, and will work with the department heads, program representatives, and assistants to ensure that these changes are reflected in the materials forwarded to council. The committee assistant will also ensure that items that are proceeding as information items are subsequently forwarded to UEC for institutional review.

FSCC business will normally be carried out at regularly scheduled meetings where there is quorum. In extraordinary and unforeseen circumstances, such as weather-related closures, discussion of urgent matters may be completed through alternate media. This can include conference calling or on-line technologies. Voting, in these cases, may be completed on-line. A record of these discussions and votes must be kept as part of the official meeting minutes.

6. QUORUM

Quorum shall be five voting members.

7. CHAIR

The Dean of the Faculty shall assume the role of chair, until such time as a chair may be elected. Nominations for chair are made at the first meeting of the academic year. Committee membership will then select a chair from among nominees. The Chair will be elected for a two-year term.

The chair is responsible for the following tasks:

a. Organizing the agenda, in consultation with the committee assistant;
b. Consulting with program areas and others outside of the Faculty of Science, as needed to support committee business;
c. Representing the FSCC at SFC;
d. Introducing those items which need faculty-wide decision at SFC.

In the event that the Chair is unable to attend a meeting, an ad hoc chair will be nominated by the Chair and approved by the Committee membership prior to the meeting, either at the previous meeting or by email communication.

8. AGENDA AND MINUTES

a. The committee's agenda will be set by the Chair in consultation with the committee;
b. Minutes will be kept by a committee assistant appointed by the Dean;

c. Agenda, minutes and written reports will be circulated to committee members at least three days prior to meetings, though normally committee members will be given at least seven days advanced notice on voting matters.

9. MEETING TIMES

Meetings will be held once a month, as required, two weeks in advance of the Faculty Council.

10. REVIEW OF TERMS OF REFERENCE

A review of the terms of reference will commence two years following ratification of the terms of reference at the Faculty Council.

Approved by the Science Faculty Council:
November 3, 2023
December 2011, September 2014, May 2016, September 2017, January 2019,
October 2019, September 2020, October 2022, September 2025

Next review date: ~~September 2025~~September 2028

TLAC Report Out – Sept 9, 2025

- Lorna Andrews offerings
  - https://events.ufv.ca/tlc/events/pining-for-needles-2/
  - https://events.ufv.ca/tlc/events/chat-r-chat-reconciliation-22/
  - Sharing Indigenous Resources Forum (SIRF)

- Dr. Sameena Karim Jamal, Assistant Professor in the Department of Adult Education, has developed a course on AI for Teaching, Learning, and Research (ADED 330CC) which is being offered this term.
  Sameena will also be offering a series of workshops for UFV faculty and staff. **All sessions will take place on Zoom from 11am to 12pm.** Please see the registration link for more information: https://forms.office.com/r/qNptmaTjnS

  Session 1 - Sept 26 AI 101 for Faculty: Trends, Opportunities, Risks, Ethics, and Limitations

  Session 2 - Oct 24 Spark Your Imagination: AI for Creative Teaching

  Session 3 - Jan 16 Serious Fun: Using AI to Reimagine Learning

  Session 4 - March 20 Research Smarter, Not Harder: AI for Scholars

  Session 5 - May 22 Leveling the Playing Field: AI for Accessibility, Inclusion, and Comprehension

- Brightspace tips from Luisa Giles
  - A one stop approach to provide student accommodations: https://carleton.ca/brightspace/instructors/setting-accommodations-in-brightspace/
  - A quick way to add students to groups that you have already created
    - Activities> groups
    - When in groups select all groups (with the checkmark)
    - Hit the drop-down arrow next to the title of your groups and click enroll users
    - This provides a matrix of group numbers and all students in the course and allows for a quick group sign up.

- End of Blackboard: Courtney Boisvert
  - If you need to restore or migrate any courses from Blackboard to Brightspace, please see this link IT Restore/migrate form
  - For the information about Blackboard, there is an announcement in Brightspace. Please log in to myClass using your UFV email and password.
  - If you need to access Blackboard before the October 31st Deadline visit: https://ufv.blackboard.com/

- Reconcili-Action Literacy Luncheon | Teaching & LearningTeaching & Learning – Mon, Sept 29, 11 am – 3 pm, Gathering Place, CEP

Please join Claire Hay in setting the table to share your favourite dish with the Indigenous faculty, staff, and students at UFV. You can see here and sign up for what is needed and what others are bringing to coordinate the menu choices.
We will also be hosting an Indigenous book exchange to celebrate Indigenous authors and their brilliance. Please bring any Indigenous authored books that you would like to donate, or exchange, or sell.

Senate Notes

September 19, 2025

First meeting of the 2025-2026 academic year and first meeting with New President, James Mandigo, and Acting Provost, Tracy Ryder-Glass.

Presentation on Fall Enrollment by David Johnson and Vlad Dvoracek

Total enrollment in Fall 2025 is very slightly down from Fall 2024 (-4% or -450 students) due to a significant decrease in international (-28.5% or -724 students) and a modest increase in domestic (3.1% or 274 students). New to UFV enrollments show a very similar pattern.

With each international student paying approximately 4.5x the tuition of a domestic student the university understands this is a significant loss in revenue and is actively working on ways to increase international enrollment in coming semesters.

Decision items

Nothing major to report, revisions to terms of reference on Graduate Studies Committee and the Senate Standing Committee.