



WASHINGTON STATE UNIVERSITY
Office of the Provost

MEMORANDUM

TO: Faculty Senate

FROM: Elizabeth Chilton, Provost and Executive Vice President

A handwritten signature in black ink, appearing to read 'EAC'.

SUBJECT: Extend Bachelor of Arts in Chemistry to Vancouver

DATE: October 18, 2021

The attached proposal to extend the Bachelor of Arts in Chemistry to Vancouver has been reviewed by the Provost's Office review committee. The committee had some concerns about the currency of the demand analysis and accuracy of projected enrollment. The department has considered these issues and provided stronger justification for each in this revised proposal.

We are satisfied that the proposal is ready for Senate review.

PROPOSAL TO EXTEND AN EXISTING DEGREE TO AN APPROVED PHYSICAL LOCATION

Degree Title:	Bachelor of Arts in Chemistry
Academic Program:	Sciences
Academic Plan:	Bachelor
Number of Credits:	Standard option: 120 credits
Department(s) or Program(s):	Chemistry
College(s):	Arts and Sciences
Campus(es):	Vancouver
Method of Instructional Delivery:	Face-to-Face

Contact Name:	Adenike Otoikhian	Email Address:	adenike.otoikhian@wsu.edu
Contact Phone:	360-546-9626	*Proposed start date:	Fall 2022

***Proposed Start Date:** Approval must be received from the Northwest Commission on Colleges and Universities before the program may be advertised or recruited for. Financial aid may not be available until the program has been approved by the Department of Education subsequent to NWCCU approval.

SIGNATURES: The names typed below certify that the relevant academic and campus officials have reviewed and approved this proposal:

Chair Signature:		Date:	07/02/2021
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Dean Signature:		Date:	
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VP Global Campus		Date:	
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→ Submit to the Provost's Office at provost.deg.changes@wsu.edu

Everett Chancellor		Date:	
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Spokane Chancellor		Date:	
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Tri-Cities VCAA		Date:	
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Vancouver VCAA		Date	7/2/2021
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Provost Office:		Date:	
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Comments:			
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For Registrar's Office Use Only:			
Current CIP Code:		New CIP Code:	
		Date:	

Send completed form in Word format to: provost.deg.changes@wsu.edu

This template asks you to answer the array of questions about your proposed program that are important to your department, your college, the Faculty Senate, the State of Washington, accreditors and other external stakeholders.

By placing all proposals in a similar format, this template provides a common standard for comparison, ensuring that all potential programs can be evaluated in an equitable fashion. It can be used to determine whether or not a program is feasible within the university's academic and financial situation, and if it will have the resources to further the University's objective of providing high quality education and scholarship.

This template is also a framework to think about the viability of your ideas. It can thus be a tool for strengthening both your proposal and the resulting program itself, since a program that is starved for either students or resources from its inception is not likely to become a high quality program.

Here are some of the things to consider as you complete the template:

What are the aspirations for the reputation of this program – local, regional, national? What will it take to make that a reality?

Who are you trying to attract with this program in the new location? Will it bring new students to the university, better meet the needs of current students, or draw students away from other departments or campuses?

How strong is the demand for education of this kind, and in what specific careers will someone who receives such an education find meaningful employment?

How many students do you need to attract to break even, and can both the market and WSU's capacity support this number?

Providing good answers to hard questions maximizes the likelihood that a program extension will not just win acceptance by the Faculty Senate and administration, but will ultimately be successful in attracting students and placing graduates. The analyses in the Demand, Financial and Library workbooks will assist you in creating a persuasive proposal. The findings in each area, and their basis or justification, should be summarized in the proposal itself.

Proposal

Mission and Core Themes (Strategic Goals):

Explain how extending the degree to this location fulfills the strategic plan and the missions of the department, campus, and university.

Washington State University

Vision

Washington State University offers a premier undergraduate experience, conducts and stimulates world-class graduate education, research, scholarship and art, and provides an exemplary working and learning environment that fosters engagement.

Mission

Washington State University is a public research university committed to its land-grant heritage and tradition of service to society. Our mission is threefold:

- To advance knowledge through creative research and scholarship across a wide range of academic disciplines.
- To extend knowledge through innovative educational programs in which emerging scholars are mentored to realize their highest potential and assume roles of leadership, responsibility, and service to society.
- To apply knowledge through local and global engagement that will improve the quality of life and enhance the economy of the state, nation, and world.

Vancouver Campus

Vision

Washington State University Vancouver will be a positive force in bettering the lives of the people of Southwest Washington and beyond by contributing outstanding research; expanding access to the highest-quality university education where student success is central; and engaging with community partners to address the needs of our changing world.

Mission

Washington State University Vancouver is dedicated to its land-grant tradition “for openness, accessibility and service to people.” The campus’ mission stands on five pillars:

- To advance knowledge through research, innovation and creativity across a wide range of academic disciplines.
- To extend knowledge through innovative educational programs in which students and emerging scholars are mentored to realize their highest potential and assume roles of leadership, responsibility and service to society.
- To apply knowledge through local and global engagement that will improve quality of life and enhance the economy of the state, nation and world.
- To address the need for social justice, equity and a culture of inclusion in our society.
- To collaborate with partners to build the bonds that unite a healthy community.

Strategic Plan

Research and Student Success represent the core mission of the campus. Growth is both acknowledgement that WSU Vancouver was founded to help grow the baccalaureate attainment rate in the region, and that dramatic changes in public funding have occurred over the duration of the last strategic plan. At WSU Vancouver, Equity and Diversity, and Community are reflective of the university’s collective commitment to the region it serves. This plan redoubles the campus’s commitment to continued excellence and a symbiotic relationship to its community.

College of Arts and Sciences

A solid foundation in the arts and sciences is at the core of every WSU Vancouver education. We prepare students for a global, diverse and fast-changing world, our classes foster critical, analytical and creative thinking skills and effective communication. We offer opportunities for multidisciplinary and collaborative learning, hands-on research with faculty, and real-world engagement with the community.

Extending the B.A. in Chemistry to the Vancouver campus will fulfill the university and the campus mission of extending knowledge through innovative educational programs. Extension of this degree also aligns with part of WSU Vancouver vision of “expanding access to the highest-quality university education where student success is central”, and the “growth” goal of the WSU Vancouver Strategic plan 2016-2021.

An extension of B.A. Chemistry major will also address a critical issue that was passed by Washington State Legislature during 2013-14 session. According to House Bill 1872 (<http://apps2.leg.wa.gov/billssummary?BillNumber=1872&Year=2013>), all institutions of learning in the State of Washington are required to establish a comprehensive initiative to increase learning opportunities and improve educational outcomes in science, technology, engineering, and mathematics (STEM) through multiple strategies and statewide partnerships, with a goal of strengthening the education pipeline and degree production in STEM. Due to the flexibility of the degree program, students upon graduation with a B.A in Chemistry would be able to enroll in the Masters in Teaching (MIT) secondary program on the Vancouver campus. The MIT program currently offer teacher certification programs that prepares students for career as a K-12 teacher, with secondary education endorsements currently in Biology and Mathematics (and some other academic disciplines). The B.A. in Chemistry program on the Vancouver campus will allow for an endorsement in Chemistry as well.

Educational Offerings:

Describe the program to be extended, and include copies of the four-year degree plan (undergraduate) or appropriate plan of study (graduate and professional).

Please note that any curricular changes must go through the Catalog Subcommittee before the degree extension will be reviewed.

The B.A.in Chemistry is a degree program that allows students to shape their own program of study. With sufficient elective credits incorporated into the program, it gives students flexibility and allows them to pursue secondary areas of interest, and possibly a dual major if their interest intersects with another field of study. This degree will also address the unmet need for STEM teachers at the secondary education level. With a B.A. in Chemistry from Vancouver, a student will be able to apply into Masters in Teaching (MIT) secondary program upon the completion of two required courses which they would have taken as part of their elective credits.

The offering of this degree program is overall less resource intensive because the Vancouver campus already offers a minor in Chemistry. The program would follow the curriculum for the B.A. in Chemistry – Standard option as offered by the chemistry department in Pullman (**Appendix A**).

Table 1: Required chemistry courses and current semester offerings in Vancouver.

Required Chemistry Courses	Offered, Semester
CHEM 105 Principles of Chemistry I (4 [3-3])	Yes, Fall
CHEM 106 Principles of Chemistry II (4 [3-3])	Yes, Spring
CHEM 220 Quantitative Analysis (3)	Yes, Fall
CHEM 222 Quantitative Analysis Laboratory (1 [0-3])	No
CHEM 301 Descriptive Inorganic Chemistry (3)	No
CHEM 338 Physical Chemistry for Chemical Biology (3)	No
CHEM 345 Organic Chemistry I (4 [3-3])	Yes, Fall
CHEM 348 Organic Chemistry II and Problem Solving (4 [3-2])	Yes, Spring
MBIOS 303 Introductory Biochemistry (4) (Substitute for CHEM 370)	Yes, Spring
CHEM 398 Undergraduate Seminar (1)	No
Advanced CHEM Elective: CHEM 347 Organic Qualitative Analysis Laboratory (3 [1-6])	Yes, Summer
CHEM 485 Senior Thesis in Chemistry (3)	No

CHEM 370 (3) and CHEM 425 (2) can be introduced later because there are other existing courses that can substitute for them. Course credit in parenthesis.

Table 2: Comparison between required chemistry courses and credits, and what is currently taught.

	Required courses	Currently taught	Difference
Total number	12	7	5
Total credits	37	26	11*

* 6 credits for 2 lecture courses, 1 credit for 1 lab course, 1 credit for seminar, and 3 credits for senior thesis.

Table 1 shows the list of chemistry required courses and those that are currently offered in Vancouver. As noted in Table 2, there are a total of 37 required chemistry course credits and 26 of those credits are currently offered in Vancouver. The extension of B.A. in Chemistry to Vancouver campus would require the initial addition of 5 chemistry courses to the ones currently offered. Of the 5 courses, 2 are lecture courses, 1 lab course and the remaining 2 are: seminar (1 credit) and thesis (3 credits). All other required, non-chemistry courses are currently offered in Vancouver.

Additionally, students will be able to find courses to fulfill a total of 29 credits, non-chemistry electives. With 29 credits of free electives, a student will be able to obtain a minor in another field of study and/or a dual degree.

Provide descriptive information regarding (the) method(s) of instructional delivery (percent face-to-face, hybrid, distance, and/or competency-based).

All required chemistry courses for the degree will be made available via face-to-face offering on the Vancouver campus. However, in the initial phase, one or two of the advanced chemistry courses, not currently taught in Vancouver, can be delivered via AMS from Pullman. Table 3 shows the proposed course rotations from year 1 (Y1) through year 3 (Y3). The numbers indicate the number of sections to be offered (number of lab sections is based on current enrollment). Courses in *italics* indicate courses not currently offered in Vancouver that would be added with the major. Two fulltime, career track, faculty will be hired to make these course rotations possible.

Table 3: Proposed chemistry course rotations.

Course	Y1 Fall	Y1 Spring	Y2 Fall	Y2 Spring	Y3 Fall	Y3 Spring
CHEM 105 Principles of Chemistry I (4 [3-3])*	1	1	1	1	1	1
CHEM 105 Laboratory	6	4	6	4	6	4
CHEM 106 Principles of Chemistry II (4 [3-3])*	1	1	1	1	1	1
CHEM 106 Laboratory	3	4	3	4	3	4
CHEM 220 Quantitative Analysis (3)*	1		1		1	
<i>CHEM 222 Quantitative Analysis Laboratory (1 [0-3])*</i>	1		1		1	
<i>CHEM 301 Descriptive Inorganic Chemistry (3)*</i>		1		1		1
<i>CHEM 338 Chemistry for Chemical Biology (3)*</i>			1		1	
CHEM 345 Organic Chemistry I (4 [3-3])*	1		1		1	
CHEM 345 Laboratory	5		5		5	
CHEM 347 Organic Qualitative Analysis Lab (3[1-6])** (currently offered in Summer)		1		1		1
CHEM 348 Organic Chemistry II and Problem Solving (4 [3-2])*		1		1		1

CHEM 348 Laboratory		2		2		2
CHEM 370 Chemical Biology (3)* (M BIOS 303 can substitute)				1		1
CHEM 398 Undergraduate Seminar (1)* (S/F)		1		1		1
CHEM 425 Quantitative Instrumental Analysis (2)** (STAT 412 can be taken instead)						1
CHEM 485 Senior thesis in chemistry (3)*						1

*Required course; **Elective course (major requires 5 elective credits). STAT 412, which will be offered as part of the data analytics major, can also be used as an elective.

Assessment of Student Learning and Student Achievement

* For graduate programs, please contact the Graduate School before completing this section.

Please provide a list and description of expected student learning outcomes.

Student Learning Outcomes (SLO) will follow the B.A. in Chemistry SLO as already established by the Chemistry Department in Pullman, which was mapped directly from the B.S. path, and these SLO align with WSU's Seven Goals of the Baccalaureate, addressing critical and creative thinking, quantitative reasoning, scientific literacy, information literacy, communication, diversity, and integration of learning.

Students graduating with a B.A. from the Chemistry Department will be able to demonstrate:

1. A thorough knowledge of the basic principles of chemistry, including atomic and molecular structure, chemical dynamics and the chemical and physical properties of substances.
2. The ability to communicate effectively about chemistry both verbally and in writing.
3. A foundational knowledge of the subfields of chemistry, including analytical, inorganic, organic, biochemistry, and physical chemistry.
4. The ability to retrieve, read, critically evaluate, and interpret general scientific information.

Student Learning Outcome (SLO) 3 above differs from the B.S. in that B.A. students are not required to take more than one course in inorganic, biochemistry, or physical chemistry. SLO 4 is a broad enough outcome to include not only chemistry (B.S. and B.A.) but also secondary areas of specialization (B.A. only)

Alignment with the seven goals of the baccalaureate:

B.A. SLO	Seven Goals of the Baccalaureate
1, 2, 4	CRITICAL and CREATIVE THINKING. Graduates will use reason, evidence, and context to increase knowledge, to reason ethically, and to innovate in imaginative ways.
1, 2, 3, 4	QUANTITATIVE REASONING. Graduates will solve quantitative problems from a wide variety of authentic contexts and everyday life situations.
1, 2, 3, 4	SCIENTIFIC LITERACY. Graduates will have a basic understanding of major scientific concepts and processes required for personal decision-making, participation in civic affairs, economic productivity and global stewardship.
4	INFORMATION LITERACY. Graduates will effectively identify, locate, evaluate, use responsibly and share information for the problem at hand.
2, 4	COMMUNICATION. Graduates will write, speak and listen to achieve intended meaning and understanding among all participants.
	DIVERSITY. Graduates will understand, respect and interact constructively with others of similar and diverse cultures, values, and perspectives.
1, 2, 3, 4	DEPTH, BREADTH, AND INTEGRATION OF LEARNING. Graduates will develop depth, breadth, and integration of learning for the benefit of themselves, their communities, their employers, and for society at large.

For undergraduate programs, provide the department's plan for assessing student learning outcomes. Describe briefly how information on student learning will be collected and incorporated into existing processes for evaluating student learning in the department. Please attach the plan and a curriculum matrix.

The B.S. in Chemistry program assessment plan is being used as a basis for the B.A. in Chemistry assessment, and it is managed through the department's undergraduate curriculum committee. The department constantly strives for a unified and system-wide program assessment across all campuses. Annual trips to the urban campuses are made and a faculty member from Pullman sits in on chemistry courses, meet with instructors to discuss observations, and provide annual reports to the committee and department chair. Additionally, the department's undergraduate curriculum committee, and faculty in Vancouver and Tri-Cities meet annually to go over program assessment.

Please indicate as appropriate:

- Assessment of this program will be incorporated into the existing assessment plan for B.A. in Chemistry in Pullman. Please attach a copy of the existing plan. (**Appendix B**)
- A draft assessment plan is attached.
- A curriculum matrix is attached. (**Appendix C**)

Planning:

1. Summarize the need for the degree at this location, and what planning steps led to the decision to extend the degree. Who was consulted, and how was the feedback incorporated into this plan?

A survey of students, both at WSU Vancouver and Clark College, as part of the Vancouver campus 2014 year-long academic planning process, showed that chemistry was on the top of the list of the top preferred majors by students not currently in their preferred major (**Appendix D**), and one of the three most in-demand majors not currently offered in Vancouver. The 2014 detailed report from Penson Associates consulting, have looked at national survey and local survey data, identified the most in-demand majors not offered in Vancouver as: Communication, Chemistry, and Mathematics. Since then, the other two majors (B.A. in Strategic Communications and B.S. in Mathematics) have been extended to Vancouver. Currently, there is no in-person option for a bachelor's degree in Chemistry in SW Washington. The offering of a B.A. in Chemistry at WSU Vancouver will therefore be the only option for students who seek a bachelor's degree Chemistry in the SW Washington area.

2. Describe the target audience.

Provide realistic justification for the projected FTE.

How can transfer students matriculate smoothly into the program and complete it with approximately the same number of total credits as students who enter WSU as freshmen?

Please describe specific efforts planned to recruit and retain students who are persons of color, disabled, or whose gender is underrepresented in this discipline.

The B.A. in Chemistry will mainly serve the student population in the SW Washington area, with WSU Vancouver being the only R-1 institution offering a clear and well-defined path to a chemistry degree. Traditionally, these students would have had no other choice than to enroll in one of the universities in the Portland area who offer chemistry degree or would have had to look somewhere else. The option of going to Portland area universities mean that the students would have to pay nonresident tuition rates, in addition to the inconvenience of commuting in traffic. Anyone who lives in Vancouver can testify to the bad traffic that exist when commuting back and forth from Portland. Currently, the Washington Border Policy guidelines at Portland State University (PSU) limits enrollment to 8 or fewer credits per term (including summer) in order for students who live in one of the 11 approved border counties to be granted resident tuition rates. University of Portland, a private institution which is much closer to SW Washington, is more expensive and, because it is a private institution, does not have any Washington border policy.

As shown in table 4, there is a steady interest in our chemistry minor and one can only imagine that these students who are already hungry for some type of a chemistry program will transition to getting a B.A. degree in chemistry.

Table 4: Headcount of Vancouver students certified in Chemistry Minor from AY 2013 – AY 2020.

	AY 2013 - 2014	AY 2014 - 2015	AY 2015 - 2016	AY 2016 - 2017	AY 2017 - 2018	AY 2018 - 2019	AY 2019 - 2020
Fall	6	27	20	18	16	18	21
Spring	29	19	23	14	19	16	21
Total	35	46	43	32	35	34	42

In addition, students who complete the Associate of Science Transfer Degree 1 (AST1) with a focus in Chemistry at Clark College (in Vancouver Washington) would have the option of transferring to WSU Vancouver to complete a bachelor's degree in Chemistry. The four-year degree plan (**Appendix A**) has students taking general science required courses in their first two years and core required chemistry courses at the beginning of the third year. This makes it easy for students to transfer smoothly into the program and complete their degree with approximately the same number of total credits as students who enter WSU Vancouver as freshmen. Overall, the four-year plan allows students to complete the first two years of the program at a community college that offer either organic chemistry or analytical chemistry.

It is anticipated that the offering of this degree will attract diverse student populations with career interests in the following areas: (i) professional health (medicine, dentistry, pharmacy, among others), (ii) STEM education (secondary teachers, graduate education in chemistry or other sciences), (iii) scientific laboratory, field research, and biotechnology sector. Upon completion of their degree, our graduates will be well equipped to compete for jobs in the industry, government, and private sectors of the economy. According to the Bureau of Labor Statistics (<https://www.bls.gov/ooh/life-physical-and-social-science/chemists-and-materials-scientists.htm>), the median annual wage for chemist was \$79,300 in May 2020 and overall employment is projected to grow 6 percent from 2020 to 2030, about as fast as the average for all occupations.

Proactive efforts will be made when advertising the program to recruit students who are persons of color, disabled, or whose gender is underrepresented in this discipline. Creative and effective messaging will be used when creating marketing materials, admission presentations, and media representations of the program. The university, Admissions, and CAS websites will be updated to reflect the new program. CAS sciences faculty, CAS academic coordinators, Office of Admissions, and the Office of Marketing and Communications on the Vancouver campus will help promote the program. We will develop and/or adopt materials used by CAS, Admissions, and Marketing, such as flyers, program brochure, program PowerPoint presentation to show to parents and prospective students when they visit campus. Links to these materials will be uploaded to a website that will be developed and devoted to the proposed B.A. in Chemistry and linked to the WSU Vancouver page. Recruitment efforts will target school districts serving underrepresented populations in the region. Program faculty will attend local, regional and/or national meetings of the American Chemical Society (ACS) to advertise and recruit potential students. There are currently a number of on-campus groups and initiatives geared at helping to retain our diverse student population. WSU Vancouver's Center for Intercultural Learning and Affirmation is one of such established groups on campus (<https://studentaffairs.vancouver.wsu.edu/student-diversity/mission-learning-outcomes>). We also have the campus office on Equity and Diversity (<https://www.vancouver.wsu.edu/equity-diversity>). CAS sciences faculty and CAS academic Coordinator will work with Academic Affairs, Student Affairs, the Library, Math and Science Skills Center, and the office of Equity and Diversity to retain underrepresented students pursuing the degree.

Using the current headcount in the chemistry minor program on the Vancouver campus (Table 4) as a guide, the following enrollment has been projected for the B.A. in Chemistry.

Table 5: Projected FTE

	Year 1	Year 2	Year 3	Year 4	Year 5
FTE	10	15	20	25	30

3. What will need to happen at the instructional location in order for this degree to be offered, and what other steps will need to be taken for WSU to offer it?

We would need to offer 5 new courses. Two of the classes are 3-credit lecture classes; one of the five is a lab course (CHEM 222, 1 credit); another is a 1 credit Undergraduate Seminar (CHEM 398); and the last is a 3-credit senior thesis (CHEM 485). Eventually, we may also need to move one of our currently offered courses (CHEM 347), which is an elective for the major, from summer to fall or spring. We also plan to eventually offer CHEM 370 and CHEM 425, even though other courses can substitute for them initially. To staff these courses and also balance the workload of existing scholarly faculty, we would need to hire two full-time teaching faculty. One of the faculty would begin in Year 1, and the second in Year 2. The two faculty would have standard workloads (12 credits/semester + service).

Name or Position Identifier	Rank/Title	Status	FTE	% Effort in Program	FTE in Program
New Faculty	Teaching Assistant Professor	Non-Tenure track	1.00	100.0%	1.00
New Faculty	Teaching Assistant Professor	Non-Tenure track	1.00	100.0%	1.00
Total Faculty FTE					2.00

Instructors workload (S=Scholarly faculty; 1=Teaching faculty 1; 2=Teaching faculty 2)

Course	Fall	Spring
CHEM 105 Principles of chemistry I (4 [3-3])	S	1
CHEM 105 Laboratory (6 sections fall, 4 sections spring)	S	1
CHEM 106 Principles of chemistry II (4 [3-3])	1	S
CHEM 106 Laboratory (3 sections fall, 4 sections spring)	1	S
CHEM 220 Quantitative analysis (3)	1	
CHEM 222 Quantitative analysis laboratory (1 [0-3])	1	
CHEM 301 Descriptive inorganic chemistry (3)		1
CHEM 338 Chemistry for chemical biology (3)	2	
CHEM 345 Organic chemistry I (4 [3-3])	2	
CHEM 345 Laboratory (5 sections)	2	
CHEM 348 Organic chemistry II and problem solving (4 [3-2])		2
CHEM 348 Laboratory (2 sections)		2
CHEM 347 Organic Qualitative Analysis Lab (3[1-6])		2
CHEM 370 Chemical biology (3) (M BIOS 303 can substitute)		2
CHEM 398 Undergraduate seminar (1)		1
CHEM 425 Quantitative Instrument Analysis (2)		2
CHEM 485 Senior thesis in chemistry (3)		2

Workload credits¹.

	Year 1	Year 1	Year 2	Year 2	Year 3	Year 3
	Fall	Spring	Fall	Spring	Fall	Spring

¹ Teaching credits for lead instructor = course credits; Teaching credits for supervising adjuncts/TAs who teach lab sections = .33 x total lab contact hours; Teaching credits for adjuncts/instructors who teach lab sections=.66 x total lab contact hours

Revised 10.04.17

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Scholarly faculty	10.0	8.0	10.0	8.0	10.0	8.0
Teaching faculty 1	12.0	12.0	12.0	12.0	12.0	12.0
Teaching faculty 2			12.0	12.3	11.0	13.3

Teaching workloads for both teaching faculty will range between 11 and 13.3 credits every semester, with a mean workload of 12.1 credits (15=full-time teaching). This load is conventional, and leaves time for standard faculty service contributions. The scholarly faculty is expected to lead the development of the new degree and has a standard teaching load for this rank (8 or 10 credits every semester, which would increase if more lab sections for CHEM 105 and 106 were needed). If enrollments in existing courses remained unchanged, then a slight reduction in employment of adjuncts and teaching assistants would result, because the new full-time faculty would take over some courses currently taught by adjunct faculty. However, if enrollment growth continues, then this reduction in adjuncts/TAs might be offset, or outweighed, by the requirement to teach new lab sections. Increased setup/takedown of laboratory teaching materials would eventually require increased time from one lab technician.

Additionally, the degree requires the offering of one additional lab course (CHEM 222, 1 credit) over the ones currently taught in Vancouver. This course would be supported by course fees, but there would be a one-time costs for lab equipment.

4. Lay out a three-year timetable for implementation, including hiring plans, partnership contracts if needed, facilities modification, recruiting, and other elements of implementation. Provide dates for each step.

	Year 1	Year 2	Year 3
Equipment for CHEM 222	Equipment will be purchased prior to start of fall semester.		
Recruitment	Program will be advertised and recruited for as soon as the proposal is approved.	Program will continue to advertise and find more unique ways to recruit students locally, regionally, and nationally.	Program will continue to advertise and find more unique ways to recruit students locally, regionally, and nationally.
Teaching Faculty 1	Position announcement will be created and advertised at the end of the academic year leading to Year 1. Qualified candidates will be interviewed, and Faculty will be hired prior to start of fall semester.		
Teaching Faculty 2		Position announcement will be created and advertised at the end of year 1. Qualified candidates will be interviewed, and Faculty will be hired prior to start of fall semester in Year 2.	

Budget:

Attach the Financial Worksheet with five-year FTE, revenue and expenditure projections. Fully account for costs such as staff support, training, library, facilities and so on.

Please describe the funding picture narratively, including funding sources, department, college and/or campus commitments, investments already made, one-time costs, facilities costs (labs, classrooms, offices, telecom etc.) and library costs.

Funding for current chemistry scholarly faculty member and adjuncts would continue. Advising for the major would be handled by current advising staff.

Other Funding (please specify): New funding estimate.

	Year 1	Year 2
Personnel		
Teaching Faculty 1 (salary & benefits) (PBL)	\$77,832	
Teaching Faculty 2 (salary & benefits) (PBL)	--	\$77,832
Equipment (one-time) (flexible)	\$100,000	--
Faculty Start-up funds (one-time)	\$5,000	\$5,000
Total*	\$182,832	\$82,832

*Includes only costs for adding major; even if major is not added, there may be new costs for adjuncts and instructional technician support due to enrollment growth on campus, especially in engineering, sciences, and other areas.

Student Services:

Describe how the proposed location will support students (advising, tutoring, health and welfare, childcare, career services, financial services, technology support, etc.).

Advising for the proposed major would be handled by current CAS advising staff. Other students support will be provided through already existing students' resource/service center already available on campus (<https://studentaffairs.vancouver.wsu.edu/src>).

Physical Facilities and Equipment:

Describe the physical facilities and equipment at the proposed location that will support the program and its projected growth. Include videoconferencing and other technologies that support course delivery as well as classrooms, labs, and office space.

CHEM 222 would be supported by course fees.

Current chemistry teaching laboratory facilities are much stretched. Since only one new laboratory course is required (CHEM 222), it is possible to offer the B.A. degree with current lab capacity. Nevertheless, additional growth of existing classes is expected regardless of whether the B.A. is added or not, and lab space has potential to become a limiting factor. To mitigate against this, we are moving to a schedule where we offer CHEM 105 and 106 off-sequence (offer one section of both, each semester), which spreads lab sections more evenly through the year, minimizing limitations during the busiest (fall) semester. Also, the proposed degree program does not require advanced undergraduate chemistry research.

Existing technologies, classrooms and office space are adequate to support the proposed degree program and its projected growth. To accommodate for future growth in Vancouver, a new life science building is in its design phase and when completed, it would help absorb overall growth on campus. The life sciences building has two new teaching labs planned into it.

Instructional Laboratory Equipment – There would be one-time costs for lab equipment.

A list of needed equipment was developed, based on correspondence with Greg Crouch of Pullman Chemistry.

The cost estimate for core equipment is given below:

Item	Price
7" Hot Plate/Stirrer	8990.78

50 mL Burette	862.93
2 mL Volumetric Pipette	363.07
5 mL Volumetric Pipette	275.67
10 mL Volumetric Pipette	128.59
25 mL Volumetric Pipette	421.70
10 mL Volumetric Flask	775.51
50 mL Volumetric Flask	1775.72
250 mL Volumetric Flask	953.04
125 mL Erlenmeyer Flask	175.95
150 mL Beaker	103.37
400 mL Beaker	143.14
125 mL Separatory Funnel	2476.21
65 mm Short Stem Conical Funnel	986.82
1 L Long Neck Flat Bottom Boiling Flask	388.39
500 mL Side Arm Flask	898.94
1 L Plastic Bottle	183.29
DI Wash or Squirt Bottles	77.35
Scoopula	54.43
95 mm Watch Glass	44.01
100 uL Micropipette and Tips	4100.80
1000 uL Micropipette and Tips	4100.80
Gas Chromatography (GC)	28826.96
TOTAL	57,107.46

These costs assume that sufficient replicates of each item are purchased to run a lab section of 24 students. The cost of each item was estimated by obtaining quotes from 3 suppliers, averaging, and adding 10% to account for tax and shipping. Taking the lowest cost option typically reduces costs by about 15% from those given above, although sometimes the lowest cost option is not the best choice.

The committee identified three scenarios:

- Scenario 1: equipment purchases are limited to those outlined above, so the total cost is near \$57,000.
- Scenario 2: Includes purchase of Atomic Absorption (AA) Spectrophotometer (\$23,100-\$34,254) in addition to all the equipment outlined above, giving a total cost between \$93,565 and \$104,719.

Scenario 2 would strengthen students' hands-on experiences in several laboratory courses, including CHEM 345 and CHEM 347 (normally taught in the summer). In the absence of equipment that would allow students to collect their own data, students in both labs are restricted to analysis of existing data provided by the instructor.

Library and Information Resources:

Describe the availability and adequacy of library and information resources for this degree, degree level, and location. Note plans to address gaps.

Because WSU licenses resources for all campuses whenever possible, Vancouver faculty and students already have access to the necessary electronic resources (providing full-text) to support their research needs and these resources are available 24/7 from on or off campus. See the list below. In addition, the Library currently supports resources for teaching in STEM areas for our Masters in Teaching students. There is a librarian assigned to work with faculty in the sciences, including Chemistry, and they are assigned a small budget for investment in any one-time purchases (books, media, etc.) to support Chemistry students and faculty. Pre- and post-COVID, the Library is open more than 80 hours/week, 7 days/week and provides both in-person and virtual services. During COVID, the Library continues to provide a full-range of services virtually with limited in-person services.

In addition, the Library has active programs with the Center for Intercultural Learning and Affirmation (CILA), Veteran's Center and others to support students from traditionally under-represented groups and so can be of assistance to all departments in their enrollment and retention goals.

List of Major Resources which provide full-text access:

SciFinder Scholar which provides access to ChemAbs, CAS REACT and other materials.

American Chemical Society Publications from 1879-present.

American Mathematical Society Journals

Science Citation Index through Web of Science

IEEE Xplore

Wiley Interscience Journals

Science Direct

Blackwell Science Journals

Academic Search Complete

There are no gaps at this time. As the degree grows and if new tenure-track, research faculty are hired, the Library will work with them on any potential gaps in their research needs.

Karen R. Diller, PhD

Library Director

Faculty:

List the anticipated sources or plans to secure qualified faculty and staff.

To secure qualified faculty, a search committee will be formed. The committee will be made of diverse faculty and staff to ensure good representation. Committee members will complete the BaCE training workshop in Advancing Equity in the Search for Faculty and Staff. The committee will be tasked with putting together the job announcement for the position. The notice of vacancy will be advertised on the WSUV HR page, Chronicle of Higher Education, Workplace Diversity, HigherEdJobs, National Registry of Diverse & Strategic Faculty, and other advertising sites in order to reach a diverse pool of candidates. Phone and in-person interviews will be conducted to identify the qualified candidates.

Impact on Other Locations/Programs:

Briefly describe any impacts on other WSU programs and locations, and how you came to these conclusions (who was consulted?). If there are potential adverse impacts, describe how these will be addressed. Consider such things as: reallocation of faculty time, reallocation of AMS courses, impact of blended courses, internal competition, “cannibalization” of other programs, curricular effects for other degrees, and effects on recruitment markets for other campuses. Indicate how such problems will be addressed for each campus or department affected.

The B.A. in chemistry will not adversely impact other WSU programs and locations. As stated earlier, this degree was identified in the 2014 detailed report from Penson Associate consulting, using a national survey and local survey data, as one of the most in-demand majors not offered in Vancouver. It was determined that offering of this degree will attract students in the SW Washington area. These students have traditionally had to enroll at out of state institutions or at institutions farther from home in order to get a degree in chemistry. The program will also seek students regionally and nationally. The proposed B.A. in Chemistry degree allows a student to gain a secondary area of expertise outside of chemistry. In addition, if aligned with other departments, it may lead to a second baccalaureate.

Two additional teaching faculty will be hired to teach the new courses that would be offered.

With strategic recruitment of students and hiring of new faculty into the program, there will be no “cannibalization” of other programs, faculty time will not be reallocated, and there will be no need to reallocate or deliver AMS courses.

Sustainability

What are the plans for continuing the program past 5 years if the goals for enrollment are not met, or other circumstances prevent the execution of the plan described here?

Given the success with the CHEM minor program, we don’t envision circumstances that will prevent the execution of the plan in this proposal. Significant efforts will be made to continuously advertise and recruit students into the program.

Attachments:

- Financial Worksheet
- Four-Year Degree Plan (undergraduate); curriculum overview (graduate and professional)
- Curriculum Map (undergraduate)
- Assessment Plan
- Letters of financial commitment
- Contracts or MOUs if applicable

Send in Word format to: provost.deg.changes@wsu.edu

Appendix A: Curriculum – Four-Year Degree Plan

Bachelor of Arts in Chemistry – Standard Option (120 Hours)

First Year

<i>First Term</i>	<i>Hours</i>
Arts [ARTS]	3
CHEM 105 [PSCI]	4
ENGLISH 101 [WRTG]	3
Humanities [HUM]	3
MATH 106 ¹	3

<i>Second Term</i>	<i>Hours</i>
BIOLOGY 106 [BSCI] or 107 [BSCI]	4
CHEM 106	4
HISTORY 105 [ROOT]	3
MATH 108 ¹	2
Social Sciences [SSCI]	3

Second Year

<i>First Term</i>	<i>Hours</i>
CHEM 220	3
CHEM 222	1
Diversity [DIVR]	3
MATH 140 [QUAN] ¹	4
PHYSICS 101 ²	4

<i>Second Term</i>	<i>Hours</i>
BIOLOGY 106 or 107	4
CHEM 301	3
PHYSICS 102 ²	4
Electives ³	3
Complete Writing Portfolio	

Third Year

<i>First Term</i>	<i>Hours</i>
CHEM 338 or 331 ⁴	3
CHEM 345	4
CHEM 398	1
STAT 212	4
Electives ³	3

<i>Second Term</i>	<i>Hours</i>
Arts [ARTS], Humanities [HUM], or Social Sciences [SSCI]	3
CHEM 348	4
CHEM 370 or MBIOS 303	3 or 4
ENGLISH 402 [WRTG] [M]	3
Electives ³	2

Fourth Year

<i>First Term</i>	<i>Hours</i>
Advanced Chemistry Electives ⁵	2
Foreign Language, if needed, and/or Electives ^{3,6}	12
<i>Second Term</i>	<i>Hours</i>
Advanced Chemistry Electives ⁵	3
CHEM 485 [CAPS] [M]	3
Foreign Language, if needed, and/or Electives ^{3,6}	9
Exit Interview	

Footnotes

¹ The minimum math requirement is MATH 140. Students who place into MATH 140 or higher are not required to take MATH 106 or 108 but must take an additional 5 credits of electives. MATH 171 may be substituted for MATH 140. Students who place into MATH 140 should take it during their first year, and may delay one of the UCORE courses [ARTS], [HUM], or [SSCI].

² PHYSICS 201 and 202 may be substituted for PHYSICS 101 and 102.

³ At least 11 credits in addition to those specified must be at the 300-400-level, for a total of at least 40 upper division credits.

⁴ CHEM 331 has prerequisites of PHYSICS 202 and MATH 273, each with a C or better.

⁵ Advanced Chemistry Electives (minimum 5 credits): Approved courses include CHEM 347, 425, 426, 490, 499 (maximum 2 credits), any 500-level CHEM course, or STAT 412. Other electives may be used with permission.

⁶ The Foreign Language requirement is that of the College of Arts and Sciences and may be fulfilled with two years of a foreign language in high school. Students are encouraged to pursue a minor while fulfilling the electives requirement.

Appendix B: Assessment of Student Learning Outcomes and Student Achievement by Chemistry department

The B.S. in Chemistry degree is certified through the American Chemical Society (ACS) and will continue to be the model for the non-certified B.A. pathway. In addition to the program assessment described below, the Assistant Dean in charge of Assessment for the College of Arts and Sciences, will continue to work with chemistry to develop various assessment metrics, including a program rubric that, along with the CAPSTONE course, will provide a program-level assessment by evaluating mastery at the senior level (This applies to both the existing B.S. and B.A.). This work is ongoing and will be evaluated by a college-level advisory board. These new metrics will add to our current assessment practices that include:

1. Final exam scores in selected courses will be used for first-year students in Chem 105 and Chem 106. These exams will either be used in their entirety or contain selections from the American Chemical Society semester one and two standardized instruments. All instructor-authored exams will undergo peer evaluation to verify the appropriateness of the exam in terms of assessing identified student learning outcomes.
2. Core writing components in Chem 105 and 106 are assessed according to an established critical thinking rubric. Chem 222 involves formal laboratory report and writing assessment.
3. Chemistry 485 (CAPS) will be required for both the B.A. and B.S. degree pathway and serve as a senior-level assessment SLO assessment. The following assessment matrix illustrates how curriculum and the B.A. learning goals map to outcomes in CHEM 485.

Capstone Course Learning Goal	Course Topics that Advance this Learning Goal	Method of Evaluation	Maps to SLO
LG1: To locate, read, comprehend, and critique primary scientific literature	Thesis development starting with topic selection to outline to finished presentation. Use of online search engines. Preparation of citations and use of EndNote.	Appropriate citations based on thesis topic, Iterative editing in stages throughout the semester with the culmination of a thesis document	4
LG2: Integrate and synthesize information from peer reviewed sources into a coherent thesis	Written thesis	Grading of thesis for breadth of content, logical coherence, and writing quality.	1,3 4
LG3: Prepare group evaluation rubric	Develop rubric to be used to evaluate PowerPoint Presentation OR poster	Rubric will be used by audience members during the presentations and posters. Audience members will be asked to judge the completeness of the rubric.	2
LG4: Prepare and present a PowerPoint or poster presentation of a research thesis	PowerPoint Presentation <i>OR</i> poster	1. Evaluation of PowerPoint or Poster 2. Responses to questions	2
LG5: Write summary in language appropriate for the general public	Written assignments	1. Group discussion 2. Evaluation of written summary.	1, 2, 3, 4
LG6: Identify the fundamental concepts behind publication and research ethics, peer review, responsible conduct of research, and the rules for scientists serving on government review panels.	In class activities related to ethics, misconduct, and research regulations	Participation in discussions about case studies and other provided materials.	4
LG7: Effectively communicate science to peers in both written and oral formats	1. PowerPoint <i>OR</i> poster presentation in public arena. 2. Thesis summary paper 3. Critiques	1. Evaluation of ability to answer questions following presentation. 2. Thesis summary evaluation. 3. Evaluation of presentation using rubric.	2

4. Effective communication (SLO 2) is a key goal of CHEM 485 (for both B.S. and B.A. students).
5. Student surveys are used extensively in Chemistry to assess student satisfaction and help guide course development.
6. Formative assessment technology: Bring Your Own Device (BYOD, in Pullman) and i>Clicker (in Vancouver) are used to access conceptual bottlenecks during course delivery and necessary clarifications are made before exams. Additionally, in Vancouver, courses are designed to help students gain significant problem-solving skills. Workshop problems have been designed and students work in groups to solve the problems, after which feedback is then provided by the instructor.
7. Senior exit interviews as currently implemented for B.S. students will be expanded to encompass students in the B.A. pathway.

Appendix C: Curriculum Map for B.A in Chemistry Showing Courses and Alignment with Learning Outcomes

Objectives	Course Numbers (CHEM)										
	105	106/116	220	222	301	338	345	348	370	398	485
1. A thorough knowledge of the basic principles of chemistry, including atomic and molecular structure, chemical dynamics and the chemical and physical properties of substances.	I	I	D	D	I	D	I	D	D		M
2. The ability to communicate about chemistry effectively both verbally and in writing.	I	I		D			D	D		D	M
3. A thorough knowledge of the subfields of chemistry, including analytical, inorganic, organic, biochemistry, and physical chemistry.	I	I	I	I	I	D	I	D	D		M
4. The ability to read, critically evaluate and interpret numerical, chemical and general scientific information.	I	I	I	D	D	D		D	D	D	M
5. The ability to design experiments and to use appropriate experimental apparatus effectively.				I			I	D			

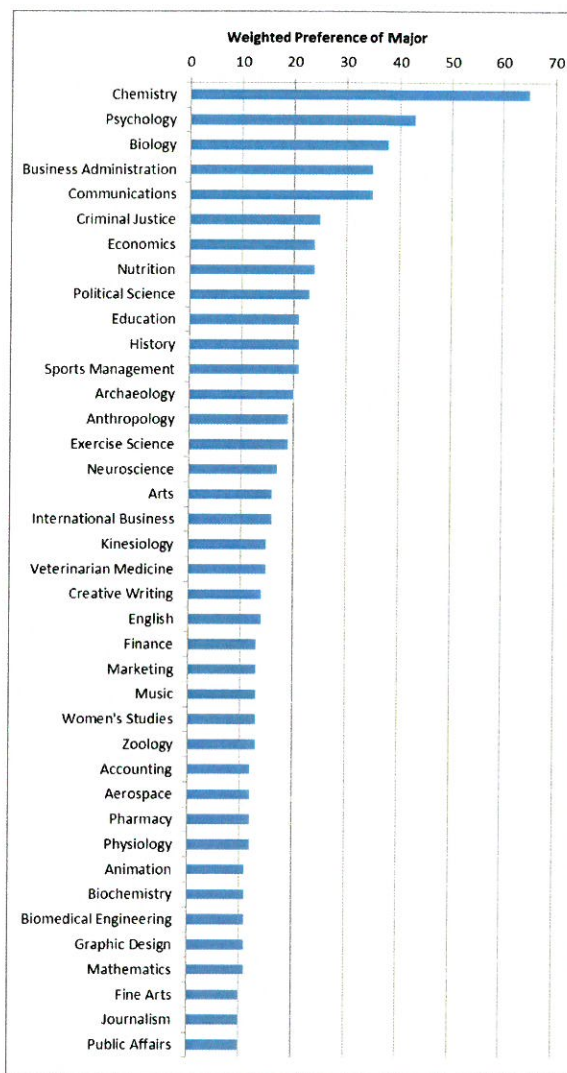
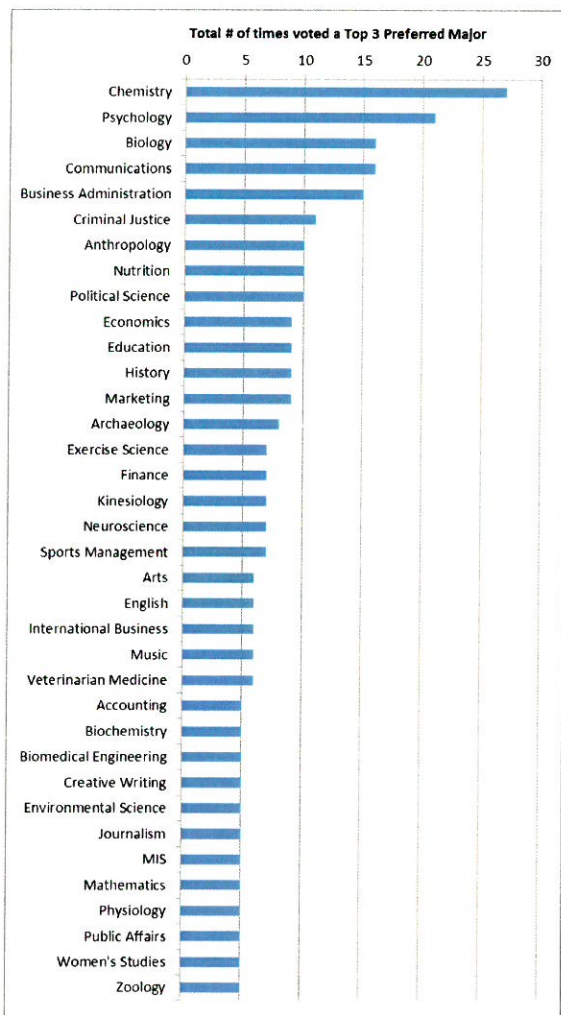
I = Introduced, D = Developed, M = Mastery

Appendix D: Student Interest Survey, from 2014 Academic Planning

Top Preferred Majors (from students not currently in their preferred major)

If students indicated they were not currently in their preferred major, they were asked to specify their top 3 preferred majors (regardless of whether they were currently offered at WSU Vancouver). Therefore, this does not necessarily represent the top preferred majors among all students.

A total of 135 unique majors were suggested. In order to save space, the graph on the left shows the 64 programs that received 5 or more endorsements. The graph on the right is weighted by preference (e.g., 3 points assigned to the #1 choice, 2 points to a #2 choice, and 1 point to a #3 choice).



Merrill, Angela Lori

From: Parks, Craig
Sent: Tuesday, October 5, 2021 12:39 PM
To: Otoikhian, Adenike Ajoke
Cc: Narayanan, Pavithra; Peterson, Kirk; Merrill, Angela Lori
Subject: RE: Extend BA in Chem to Vancouver

Hi Nike. Thank you for your quick response. This all looks good. We will forward the proposal to Faculty Senate. You'll be able to track its progress via the Senate website. Matt Hudelson, Executive Secretary of the Senate, will be able to answer any questions you might have about their process.

Regards,
Craig

From: Otoikhian, Adenike Ajoke
Sent: Friday, September 24, 2021 9:30 AM
To: Parks, Craig <parksd@wsu.edu>
Cc: Narayanan, Pavithra <pavitraa@wsu.edu>; Peterson, Kirk <kipeters@wsu.edu>
Subject: RE: Extend BA in Chem to Vancouver

Hi Craig,

Thank you for your feedback on the BA in Chemistry proposal. I have reviewed your comments and in consultation with the CAS director in Vancouver (Dr. Pavithra Narayanan), we have addressed the issues that the Faculty Senate might raise. Below are our responses to those potential issues.

- (1) For the most part your proposal looks good, but we have concerns about your expected demand for the degree. Your analysis is based on a 2014 planning report. While those results could still be valid, we are collectively skeptical that they are. We recommend you bring in newer data.

Yes, my analysis for the need to extend B.A. in Chemistry to Vancouver is mainly based on a 2014 planning report and I believe the data is still accurate based on the number of students we have enrolled in the CHEM minor (table 4). Also, this proposal has been in the works for quite some time now. The hold up as been the budget freeze that happened over the last couple of years at WSU. We do not have the ability to generate new data at this time but our academic advisors mention that they still have students who ask about the degree option . That said, based on what is known and also affirmed by Vice Chancellor, Renny Christopher, the offering of BA in Chemistry in Vancouver will be an addition to degrees offered at WSU Vancouver and will be the only option for students seeking a Bachelor's degree in Chemistry the SW Washington area (included on page 7).

- (2) Along these lines, your projected FTE in Table 5 may be overly optimistic given the actual demand in Pullman for the degree. Over the last four years, the number of Pullman students majoring in Chem (BA) has been 12, 20, 23, and 41 students. This is at a campus 5x the size of Vancouver. It is certainly possible that the student demographic at Vancouver will be more attracted to this degree than Pullman students are proving to be, but the Faculty Senate is going to want justification of your projections.

The projected FTE is based on the number of students that are currently enrolled in our CHEM minor. As noted by the Chair of the Chemistry department in Pullman (Dr. Kirk Peterson), there are two Chemistry degree options (B.Sc. and B.A. in Chemistry) in Pullman that also compete heavily with the BS in chemical engineering

but that would not be the case in Vancouver. I feel the degree will be attractive to prospective students given the wide range of career options that are possible with a degree in Chemistry, and the latest data from the Bureau of Labor Statistics (included on page 8) projects that there will be a 6 percent employment growth for Chemistry based occupation from 2020 to 2030.

- (3) Finally, we recommend you delete the “Scenario 3” bullet on page 12. The funding memo from campus admin covers the total of all items in the table plus the AA spectrophotometer, so Scenario 2 is clearly what will come to pass.

I have deleted “Scenario 3” from the proposal.

I have attached the updated copy of the proposal here. Please let me know what you think of the responses.

Best,
Nike

Adenike A. Otoikhian, Ph. D.
Assistant Professor of Chemistry, Career Track
Program leader: Physical Sciences
2020-2021 Provost’s Featured Faculty – WSU Vancouver
College of Arts and Sciences, VLIB 210 H
Washington State University Vancouver
14204 NE Salmon Creek Avenue
Vancouver, WA 98686
adenike.otoikhian@wsu.edu
360-546-9626

From: Parks, Craig
Sent: Tuesday, September 7, 2021 1:59 PM
To: Otoikhian, Adenike Ajoke <adenike.otoikhian@wsu.edu>
Cc: Merrill, Angela Lori <awight@wsu.edu>
Subject: Extend BA in Chem to Vancouver

Adenike,

The provost’s review committee has completed work on your proposal to extend the BA in Chemistry to Vancouver. Note that we do not approve or reject degree proposals. Our job is to anticipate issues that the Faculty Senate might raise and suggest how you might address them.

For the most part your proposal looks good, but we have concerns about your expected demand for the degree. Your analysis is based on a 2014 planning report. While those results could still be valid, we are collectively skeptical that they are. We recommend you bring in newer data.

Along these lines, your projected FTE in Table 5 may be overly optimistic given the actual demand in Pullman for the degree. Over the last four years, the number of Pullman students majoring in Chem (BA) has been 12, 20, 23, and 41 students. This is at a campus 5x the size of Vancouver. It is certainly possible that the student demographic at Vancouver will be more attracted to this degree than Pullman students are proving to be, but the Faculty Senate is going to want justification of your projections.

Finally, we recommend you delete the “Scenario 3” bullet on page 12. The funding memo from campus admin covers the total of all items in the table plus the AA spectrophotometer, so Scenario 2 is clearly what will come to pass.

Please revise the proposal as you see fit and return directly to me. We will then submit the proposal to the Faculty Senate on your behalf. Let me know if I can answer any questions you might have.

Regards,
Craig

Craig D. Parks
Vice Provost for System Innovation and Policy
Washington State University
French Ad 436, ph. 509-335-5581
parksd@wsu.edu

Once, I rose above the noise and confusion.