

OKANAGAN SENATE
MINUTES OF 18 MAY 2023

Attendance

Present: L. Cormack (Chair), R. Ng (Secretary), R. Sadiq, B. Traister, J. Eikenaar, S. McNeil, R. Campbell, A. Idowu, S. Tomášková, M. Tarrant, S. Hilton, P. Arthur, B. Lalonde, J. Picault, J. Cioe, P. Simpson, R. Frost, O. Sharma, A. Shinde, B. Marcolin, S. O’Leary, G. DiLabio, J. Olson, J. Jakobi, M. Legault, P. Barker, Y. Lucet, S. Stewart, S. Hafeez, P. Lasserre, S. Hutchinson, R. Johnson, A. Shatzko, M. Garg, A. Alnaar

Regrets: D. Buszard (Chair), P. Amuta, H. Berringer, T. Ebl, M. Evans, T. Forneris, K. Hodges, J. Holzman, R. Janke, M. Libben, J. Low, J. Milliken, M. Reeves, B. He, R. Zaitoun, M. Panah, M. Sandler, J. Hare, L. Markley, I. Parkins, B. Visscher

Clerk: A. Breen

Guests: R. Einarson, H. Manon, W. Hughes, S. Weyand, B. Annear, J. Cheng

Call to Order

The Vice-Chair, Dr Lesley Cormack, called the ninth regular meeting of the Senate for the 2022-2023 academic year to order at 3:32 pm.

Senate Membership

Nominating Committee – Student Members

The Registrar, Ms. Rella Ng, stated following a call for nominations, Saami Hafeez and Bowen He were acclaimed as elected to the Senate Nominating Committee until 31 March 2024 and thereafter until replaced.

Minutes of the Meeting of 27 April 2023

Jan Cioe	}	<i>That the Minutes of 27 April 2023 be adopted as presented.</i>
Peter Simpson		

Approved

Remarks from the Principal and Deputy Vice-Chancellor

Senator Cormack updated the Senate on a recent trip to Ottawa for UBC ‘Day on the Hill’ to meet with parliamentarians to showcase UBC research, with a focus on ‘resilient infrastructure’.

Senator Cormack met with Deputy Minister of Post-Secondary and Future Skills, Bobbi Plecas, who was recently on campus, and noted that they were surprised and pleased at the development of the UBC Okanagan campus over the years. The Minister was particularly impressed with the work being done to

support Truth and Reconciliation, particularly the Aboriginal Access Studies Program and the recently approved language fluency programs.

Both meetings went very well and encouraging for future conversations with the federal and provincial governments regarding support for UBC Okanagan.

The Deputy Vice-Chancellor commented that Convocation ceremonies will be taking place in a few weeks and include the conferral of Honorary Degrees. She highlighted that Convocation is also an opportunity to celebrate the first graduating class of the Nsyilxcn Language Fluency degree.

Senator Cormack concluded her remarks by noting that the Board of Governors will be meeting at the Okanagan campus in June.

Senator DiLabio thanked Senator Cormack for the updates and asked if there is any follow-up from the Ottawa visit that she can share.

Senator Cormack responded that UBC Government Relations is in the process of collating information on the visit and that there will most certainly be follow-ups. For example, there was a recent meeting with PacifiCan, and there is follow-up to be done, as is the case for several Ministries. While there is focus on UBC Okanagan's research activities or those of other universities, both levels of government are concerned about issues such as student affordability. Senator Cormack stated that the visit was intended to emphasize research and its value and remind the government that research has real-world applications that will be of benefit. Another area of discussion and follow-up is support for graduate students, and the Deputy Vice-Chancellor stated that she is hopeful that the conversations will be fruitful.

Senator Hafeez asked which specific ministers and ministries the UBC delegation met with, and where follow-up would be effective.

Senator Cormack responded that key ministries that the delegation engaged with are Ministry of Emergency Preparedness, the Ministry of Infrastructure, and the Ministry of Environment and Climate Change. UBC Okanagan representatives also had a meeting with PacifiCan, and someone from the Office of the Prime Minister. The Ministry of Emergency Preparedness is most likely to have follow-up.

Remarks from the Provost

Provost and Vice-President Academic, Dr Rehan Sadiq began his remarks by highlighting that June is National Indigenous History month. Pride week is also in June and all members of the UBC Okanagan community are encouraged to participate in Pride celebrations to be campus on June 7. The city of Kelowna's Pride week events were to be from June 2 to June 11. On June 21, the Turtle Island Festival will be hosted in Kelowna, and members of the UBCO community are also encouraged to participate.

Senator Sadiq stated that BC has recently announced a new funding initiative, the Stronger BC Future Skills Grant, which provides BC residents who are 19 years or older with up to \$3,500 per person for eligible short-term skills training and public post-secondary institutions. For the September launch, UBC has, as a system, provided 47 eligible options. Four options are from Okanagan campus micro credentials. More programs are to be added for the January time frame, including several more from UBCO. At this stage, most of the faculties are very interested to participate in this and there is a lot of success already in this round. There is a huge interest in micro credentials. Most universities are trying to position themselves on how they can bring different types of learning on campus.

Senator Sadiq stated that the ICI building has an expression of interest, and a deadline recently passed on May 15. The review panel has been oriented, and the review process has now commenced. In June, the Deans and external reviewers will be adjudicating it and will then make recommendations to the VPRI and Provost. This will be a very stringent, long process, but we are trying to ensure we are creating more transparency in the system.

Senator Sadiq stated that UBC Okanagan's third Indigenous Language Fluency (B.Stat.) degree was approved by the Ministry. This is in addition to the BNLF program and the B.Nlek program.

Senator Sadiq stated the UBC Okanagan Celebration for Teaching Excellence and Innovation was this week. It was a great opportunity to recognize our exceptional colleagues who received the Provost Award for Teaching Excellence and Innovation: Claire Yan, Fiona McDonald, and Peyman Yousefi. Peter Arthur was awarded the Killam Prize. The inaugural CTL Faculty fellows were also announced, and they will be working with the Centre for Teaching and Learning this coming year to continue to support our Teaching and Learning Committee. He thanked everyone who expressed interest in this new initiative.

Report from the Presidential Search Committee

Senator Legault stated that since the last report to the Senate, the Search Committee met once on May 5. The Committee is pleased to report that the search has generated strong interest in the position. The Committee has begun to review candidates, and continues to receive applications.

Senator Cormack thanked Senator Legault for serving on this Committee.

Expression of Thanks to 2020-2023 Members of Senate

As we come to end of the 2020-2023 Triennium, Senator Cormack expressed gratitude to all Senators, especially to those for whom this will be their last meeting. She thanked Senators for their service to Senate and to UBC. She specifically thanked the following outgoing Senators: Greg Garrard, Shirley Hutchinson, Stephen McNeil, Ilya Parkins, Ying Zhu, Jonathan Holzman, Loic Markley, Marianne Legault, Margaret Reeves, Sabre Cherkowski, Tanya Forneris, Jennifer Jakobi, and Mistaya Arthur.

Senator Cormack stated that in a few short weeks, the UBC Okanagan Convocation ceremonies will begin, and thanked the members of Senate who will be participating in the ceremonies. She extended her gratitude to all volunteers and staff who help make this occasion so successful, and offered her congratulations to graduands.

Candidates for Degrees

Senator Cormack called for the following motion:

Candidates for Degrees

Lesley Cormack
Robert Lalonde

}

That the candidates for degrees and diplomas as recommended by the faculties be granted the degree or diplomas for which they were recommended, effective 18 May 2023, and that a committee comprised of the Registrar, the dean of the relevant

*Faculty, and the Chair of the Senate be empowered to make any necessary adjustments.
(2/3 majority required).*

Approved

Academic Building and Resources Committee

The Chair of the Academic Building and Resources Committee, Senator Arthur, presented.

ANNUAL REPORT

Senator Arthur briefly outlined the Committee's terms of reference, topics discussed by the Committee over the last year, and a list of units that have engaged with the Committee.

Academic Policy Committee

The Chair of the Academic Policy Committee, Senator Cioe, presented.

AMENDMENTS TO POLICY GA-6: NAMING POLICY

Jan Cioe	}	<i>That Senate approve amendments to the Naming Policy (GA6).</i>
Sandy Hilton		

Senator Cioe noted that Policy GA-6 is a joint policy between the Okanagan Senate, Vancouver Senate and the Board of Governors. There are a number of proposed amendments, and key changes are outlined on pages 22 and 23 of the Senate materials. Senator Cioe stated that the report has been reviewed and approved by the Academic Policy Committees of both the Okanagan and Vancouver Senates.

Approved

Admissions Committee

See Appendix A: Awards Report

Senator Johnson presented on behalf of the Chair of the Admissions Committee, Senator Ebl.

NEW AWARD

Rob Johnson	}	<i>That the Senate approve the new award as listed, that it be forwarded to the Board of Governors for approval, and that a letter of thanks be sent to the donors.</i>
Jan Cioe		

Approved

AFFILIATION AGREEMENTS – INTERNATIONAL COOPERATION AGREEMENT: UBC AND UNIVERSITY OF BORDEAUX

Rob Johnson
Sandy Hilton

}

That the Senate approve the terms of affiliation between the University of British Columbia and the University of Bordeaux as set out in the “International Cooperation Agreement for Delivery of a Non-Credit Program for Level One of the Wine Tasting Ability Program in British Columbia, Canada.

Approved

AFFILIATION AGREEMENTS – TERMINATION OF BLOCK TRANSFER AGREEMENT: UBC AND OKANAGAN COLLEGE

Rob Johnson
Marie Tarrant

}

That the Senate approve the termination of the terms of affiliation between the University of British Columbia and Okanagan College as set out in the attached “Block Transfer and Admission Agreement.”

Senator Lalonde stated that UBC Okanagan had a functional relationship with Okanagan College for a number of years and asked what issues have prompted the termination of the current agreement.

Dr Sadiq responded that UBC Okanagan has an excellent relationship with Okanagan College and that there is a new arrangement in place. There was an agreement that gave at Okanagan College students block transfer of credits to UBC Okanagan but under the new agreement, students will come directly to UBC Okanagan campus. The proposed termination is not a reflection on the relationship between the two institutions.

Senator Tarrant commented that the proposed change results from provincial government’s decision related to funding of other health programs and the intention to offer more technically based programs at Okanagan College, for which it is better suited to offer. Senator Tarrant noted that this was a reallocation of seats from Okanagan College back to UBC Okanagan so that Okanagan College can offer the programs they are more suited to offer.

Senator Cormack confirmed that the proposed changes are a reallocation of seats and intended to offer more robust programming at UBC Okanagan.

In response to a comment from Senator O’Leary, Senator Tarrant commented that under the current agreement, students at Okanagan College complete Years 1 and 2 at the College and then transfer to UBC Okanagan for the third year of the Bachelor of Science in Nursing program. Senator Tarrant stated that the University has taken steps to respond to concerns regarding orientation to the UBC Okanagan campus and the tuition differential between Okanagan College and UBC Okanagan by way of several town hall meetings with students to address the tuition and orientation issues.

Dr Sadiq added that it should be recognize that UBC Okanagan delivers one of the largest and most reputable Nursing programs in the province and that the proposed changes have been

initiated by the Ministry (Ministry of Post-Secondary Education and Future Skills) as well as Okanagan College, independent of UBC Okanagan.

Approved

AFFILIATION AGREEMENTS – BLOCK TRANSFER AGREEMENT: UBC AND OKANAGAN COLLEGE

Rob Johnson
Barb Marcolin

}

That the Senate approve the new terms of affiliation between the University of British Columbia and Okanagan College as set out in the attached “Transfer and Admission Agreement.”

Approved

Senator Cioe noted that proposed changes to affiliation agreements will be forwarded to the Council of Senates for ratification following Senate approval.

Appeals on Standing and Discipline Committee

The Chair of the Appeals on Standing and Discipline Committee, Dr. Robert Campbell, presented.

ANNUAL REPORT

Senator Campbell noted that there is a level of confidentiality that has to be maintained, and the Committee’s report provides a high-level summary of its activities in the last year; there was one appeal for academic misconduct that was dismissed, and one appeal for non-academic misconduct that has been adjourned pending submission of further documents on the part of the appellant. There were no appeals pertaining to Policy SC-17 (Sexual Misconduct Policy). There was one academic standing appeal that was allowed, with a recommendation that the appellant be granted Aegrotat (AEG) standing.

Senator Campbell stated that the Committee noted the volume of materials has increased significantly, with some documents being upwards of 300-400 pages. The Committee has passed a motion to limit submissions to 75 pages, which will be brought forward to Senate for approval.

Senator Campbell noted that several times a year, appellants fail to appear for the hearing or give timely notice that they are unable to attend after Committee members have spent many hours preparing for the appeal hearing. The Committee will continue to discuss how best to address issues of late notice or non-attendance.

Curriculum Committee

See Appendix B: Curriculum Report

Senator Hilton presented on behalf of the Chair of the Curriculum Committee, Senator Lucet.

CURRICULUM PROPOSALS

Sandy Hilton
James Olson

} *That Senate approve and recommend to the Board of Governors for approval the new and revised programs, new subject code, new and revised courses, discontinued course, and discontinued program as presented by the Faculties of Applied Science, Arts and Social Sciences, Science, and Health and Social Development.*

Senator DiLabio stated that there are a number of issues with the Computer Engineering proposal before Senate. He noted that his concerns are not related to the curriculum but rather with the process by which the proposal has made its way to Senate for approval; the program budget fail to take into account the costs to all Faculties, not just the disciplinary Faculty of program delivery. Senator DiLabio noted that Faculty of Science is strongly impacted as half of the additional Computer Science courses that are integral to the program fall to the Faculty of Science to deliver.

Senator DiLabio commented that the major assumption that was made during the budgeting process is that Faculty of Science's Computer Science program can accommodate the additional teaching that will come with the new program by some mechanism such as increasing the number of seats in existing classes, etc. He noted that this assumption fails to consider the impacts to the quality of the student experience in those classes. Senator DiLabio stated that the Faculty and Department of Computer Science have been engaged in ongoing discussions to reduce the size of Computer Science classes so that the quality of instruction can be enhanced, and that the experience of instructors can be improved. Senator DiLabio noted that increasing the number of seats in Computer Science classes to accommodate the new Computer Engineering program is directly contrary to the Faculty's efforts to address these issues.

Senator DiLabio stated that one option to manage class size is to offer additional sections of Computer Science courses that are part of the Computer Engineering proposal. This option would have a different set of impacts such as impacts to scheduling, which will add to the administrative burden in the Computer Science, Math, Physics, and Statistics Department. This would also work against general efforts to reduce reliance on sessional lecturers and against improving the classroom experience for everyone. Senator DiLabio commented that the new program should not bind the Faculty of Science to supporting the teaching in the program in the absence of additional work on the operationalization of the program.

Noting concerns regarding the approval process for new programs, Senator DiLabio commented that curriculum development and the budget impact associated with new programs received approval from the Provost without consideration of the budgetary impacts on the Faculty of Science. This approach fails to consider the broader impacts of new programs, including impacts on other Faculties, space resources, student support needs, etc.

Senator DiLabio reiterated the importance of senators having a full understanding of the implications of approving a new program, noting the additional seats added for graduate programs in Data Science and Biotechnology, the Bachelor of Science in Nursing, and the proposed Computer Engineering program. In totality, the campus will need to accommodate approximately 400+ additional students. Senator DiLabio noted that this information is directed

specifically towards senators who serve on the committee approving enrolment targets. Given the current teaching space limitation and scheduling issues, approval of new programs without proper foresight will only exacerbate these challenges.

Senator Olson commented that the Faculty of Applied Science is very excited about the new program as it addresses both student and employer demand for trained engineers. It was noted that British Columbia graduates about half as many engineers per capita as Ontario and Quebec at the undergraduate level, about a third as many Masters students, and only a quarter as many doctoral students. Senator Olson noted that of all the engineering disciplines, Computer Engineering is the most in demand, and on the Vancouver campus, it is the highest in demand of the fourteen engineering programs UBC delivers.

Senator Olson stated that UBC has a long history of collaboration between Computer Science and Computer Engineering; both of them are partner programs. They support each other and provide the diversity of experience that students expect. Some students want to focus on software and theoretical aspects of Computer Science, while others want to focus on the integration of software and hardware, which is what is found in this proposal. At the request of Senator Olson, Senate recognized guests Will Hughes (Director, School of Engineering), Sabine Weyand (Associate Director for Undergraduate Studies, Electrical and Mechanical Engineering), and Julian Cheng (Professor, School of Engineering) so they may address any questions.

Dr. Hughes thanked Senator DiLabio for his comments and everyone who has engaged in the discussion. He noted that he took on the directorship of the School of Engineering only recently and that while he cannot comment on the process prior to his arrival, since his arrival the department has connected with Facilities, Enrolment Services, Scheduling Services, IT, Department of Computer Science, UBCO and UBCV Finance, and the Dean's Council to share plans and solicit feedback. Dr. Hughes noted that the feedback has been positive but that there is room for improvement.

Dr. Hughes stated that measures to address some of the concerns raised by Senator DiLabio include the elimination of 21 courses for sessional instructors as a way of increasing teaching quality and also free-up teaching space. Engineering has also started to identify and renegotiate physical space within the EME building to increase capacity and made significant financial decisions to mitigate any undue pressure on the Faculty of Science and the Department of Computer Science.

Senator Lalonde commented that there is a classroom space shortage and that the campus continues to take in more FTEs than it is actually funded for. There is a shortage of large classrooms and there are no new facilities expected to be entered in the inventory any time soon. He noted that while there is willingness to look into operationalizing the new program, perhaps the proposal could be tabled and reexamined in September thereby allowing more time to address the issues that have been raised in discussion.

Senator Sadiq responded that as the University grows, new programs will be added; these additions will have instructional space and resource implications and a more comprehensive overall strategy is needed. He noted that students who are not accepted to Applied Science programs in Vancouver are not coming to UBC Okanagan but rather are leaving British Columbia. The new program is very important for the Province; UBC is not producing enough computer engineers, and the industry is constantly

expressing this need. Senator Sadiq stated that international students are an important demographic for UBC broadly and that the proposed Computer Engineering program is highly preferred.

Senator Lalonde reiterated that the concerns expressed are not related to timelines, quality or demand for the program, but whether the program can be delivered without negatively impacting other programs that are equally valuable given the current space limitations.

Senator Cormack clarified that Senate is approving the academic program, not timelines associated with program delivery.

Senator Lucet stated that engineering engaged Computer Science in its curriculum process; the curriculum is a compromise between the two units (Engineering and Computer Science). The main concern is about resources: using courses in Computer Science is going to increase the number of students, which is going to put pressure on classroom size and scheduling. Senator Lucet stated that the easiest solution suggested was to introduce new sections, which is an ongoing budgetary conversation with the Dean of Applied Science and Director of the School of Engineering. The new program is intended to start in September 2023; the first year of the program is primarily engineering so the pressure on Computer Science courses will be in Year 2 of the program, September 2024. This allows for more time to further consider space, scheduling and resource issues.

Senator Jakobi stated that Appendix 11 of the proposal makes reference to “budget impact” but there is no budget material attached to the docket. She asked if the docket is missing pages, or if this information is unavailable.

Dr. Weyand responded that this information went to the Curriculum Committee, but it is not in the docket.

Senator McNeil commented that there are particular budgetary implications for Faculties other than the one in which the program will be housed. He stated he would have liked to have seen a detailed explanation about what those are going to be and how they will be resolved.

Senator Hafeez commented that proposal indicates there will be changes to streamline Computer Science majors to make the first two years of Data Science, Math, and Physics majors the same. Senator Hafeez noted that the proposal also indicates that there are changes being made to the Statistics major as well and asked for confirmation that the first two years of Bachelor of Science in Statistics will also be streamlined. He noted that these changes are indicated to be effective for September 2023 and asked if this will impact students who are currently registered in the existing versions of the program.

Senator Lucet confirmed that students currently in those programs will have the option to follow either the current or revised curriculum. Incoming students will be required to follow the revised curriculum.

Senator Hafeez asked if there is any requirement for students in the existing program to complete it within a certain number of years.

Senator Lucet responded that time to completion is based on the year of registration, and added that units do their best to accommodate students when there are program changes and normally give students the option to continue with the existing or revised program. In the exceptional

circumstance this is not possible, and academic advisors will work with the student to find an appropriate alternative.

Senator Legault reiterated Senator McNeil's concerns, noting that Senate should review budgetary information prior to voting to determine the feasibility of implementing the new program.

Senator Cormack reminded senators that Senate does not have purview over budgetary matters and only reviews the program itself.

Senator Hilton noted Senator DiLabio's earlier concerns regarding the program approval process, and commented that he has been a member of the Senate Curriculum Committee for many years and that the Committee's focus is primarily on curriculum matters; members have subject matter or curricular expertise and budgetary and operational issues are not their primary concern. Senator Hilton acknowledged that Senator DiLabio's concerns should be addressed, though the resolution does not have to be reached at the meeting.

Senator Lucet reiterated that Senate does not vote on program budget and that its purview is only over the program and curriculum, adding that budget is supposed to be an agreement between the two Faculties. He noted that space and scheduling issues are operational and do need to be resolved by Senate and asked senators to focus on curriculum matters.

Senator Cioe commented that his understanding of the process is that the Committees make decisions about programs, and that the budget element goes through the Provost's Office to reconcile and see if things will actually work. He presumed that it is the responsibility of the Provost's Office to consider budgetary issues.

Senator Cioe reiterated Senator Lucet's comments, noting the separate consideration of curriculum and budgetary matters. He noted, however, the creation of new programs has implications for enrolment numbers, which are within the purview of the Senate. Senator Cioe asked if the 400+ seats that Senator DiLabio was alluding to are built into the enrolment figures reviewed by Senate, and if not, asked what the implications are in terms of percentage of funded versus unfunded full-time equivalent (FTE) seats.

The Provost responded that the budgetary review of the new program followed the standard process; the discussion regarding how this program will impact other programs was brought to Dean's table. There were many concerns regarding space issues. Senator Sadiq addressed the issue of 400 new seats, noting that the seats will be added incrementally over the next 5 to 6 years and will not occur right away. He commented that his office is working hard to lobby the government to support these seats and gave the example of the sustainability program which initially had no government support. Senator Sadiq noted that the program has been in discussion for six or seven years so should not come as a surprise.

Senator Olson reiterated that the Faculty of Applied Science is very excited about this program and that there is incredibly high demand from students, industry, the Province, and the campus. Noting the discussion of sufficient resourcing, he reminded senators that the number of courses within the School of Engineering has already been reduced by 21 in order to make way for scheduling of the additional courses. He noted that budget will follow as the program is expected to attract a high number of international students.

Senator Cormack reiterated that Senate is voting on the academic program, and not the budget.

Senator Lalonde suggested that the Computer Engineering proposal be considered separately from the remainder of the Curriculum report.

Robert Lalonde	}	<i>That Senate the main motion be divided to allow separate consideration of the proposed Computer Engineering program, the associated subject code and new courses (recommendations ai-aiii.</i>
Marianne Legault		

Approved

Robert Lalonde	}	<i>That Senate approve and recommend to the Board of Governors for approval items A1, A2, and A3 from the recommendations in the Curriculum Proposal.</i>
Marianne Legault		

Senator Jakobi spoke in support of the program, and commented on the need to increase the number of women and underrepresented persons in Engineering and Computer Science. She asked what measures this particular program will take towards increasing and retaining the number of women in the program, as well as exceed the national standard.

Senator Olson responded that the question of gender diversity in engineering is a longstanding concern and there are a host of programs and initiatives that UBC has developed to attract women to the discipline. It was noted that the Faculty of Applied Science sponsors a \$4M program called *Gearing Up*, which reaches out to women and members of underrepresented groups. The program has a 50% female participation rate in K-12 school system and reaches out to over 30,000 students a year, including 2,700 Indigenous students. Senator Olson outlined a number of other initiatives that the Faculty has invested in towards increasing equity, diversity and inclusion (EDI) in the Engineering, noting that UBC is one of the leading universities nationally with 34% of first year engineering students as women.

Senator Lucet commented that the Department of Computer Science is well aware of the underrepresentation issues and is actively working to address them via recruitment of faculty from minority groups. Senator Lucet noted that some of the majors in Computer Science are being revamped with focus on EDI. Senator Lucet thanked Senator Jakobi for her question and stated he takes note of it as Chair of the Curriculum Committee to ask about such information for new curriculum proposals, as it is a very important topic.

Approved

Robert Lalonde	}	<i>That Senate approve and recommend to the Board of</i>
Marianne Legault		

Governors for approval the remaining items from the recommendations in the Curriculum Proposal.

Senator Frost commented that while she was pleased to see a number of changes pertinent to the Department of History and Sociology, she was surprised to see that the changes expected for the first-year program were not there. Senator Frost raised concerns about the process, noting that coordination of changes has been a challenge as there are three Faculties involved in the proposed changes (Faculty of Arts and Social Sciences, Faculty of Creative and Critical Studies, and Faculty of Science). Senator Frost stated that the department will accommodate the proposed changes and hope that there will be more choices in the future for students in first-year options.

Senator Cormack asked Senator DiLabio if he could speak on the consultation process.

Senator DiLabio stated he has little knowledge on this topic, noting that his understanding is that the original proposal emerged from the Faculty of Creative and Critical Studies. Senator DiLabio noted that decisions made by the Curriculum Committee need to be communicated widely and to everyone involved in the programming; the more of these types of programs that Faculties engage in together, the more important communication will be.

Senator Idowu referenced the proposed changes to the Bachelor of Science in Economics program; the rationale states that ECON 225 will be added and will serve as a pre-requisite for ECON 327. She asked how this proposed change will affect current economics majors, as the existing pre-requisites for ECON 327 are different from ECON 225. Senator Idowu asked for clarification on the potential impact on current or prospective economics majors.

Senator Picault clarified that there will not be much impact as students will be able to register for ECON 327 with either pre-requisite. The proposed change in pre-requisite will only affect incoming students.

Senator Idowu stated that the current pre-requisites for ECON 327 are ECON 101, ECON 102, MATH 100, and MATH 101 and asked if these pre-requisites will remain the same.

Senator Picault responded that ECON 101, ECON 102, MATH 100, and MATH 101 are pre-requisites to the new ECON 225. These will still be required in the program.

In response to a question from Senator Idowu regarding upcoming course registration dates, Senator Hilton confirmed that the changes will be reflected in the next release of the Calendar, students looking at the Calendar after May 30 would see these pre-requisites in effect if they are registering in June or July.

Senator Hafeez referenced docket page 202 in the revisions for the Data Science major, noting that the course for Numerical Analysis, COSC 303, has been removed and no rationale is provided for this deletion. He asked Senator Lucet for clarification on whether or not the course has been removed as an elective for the Data Science majors.

Responding to Senator Hafeez, Senator McNeil stated COSC 303 is equivalent to MATH 303, which is still a possible elective choice. He added that the two courses are possibly being streamlined as they are the same course.

Approved

Learning and Research Committee

See Appendix C: Candidate for Emeritus Status

The Chair of the Learning and Research Committee, Senator Stewart, presented.

CANDIDATES FOR EMERITUS STATUS

Sally Willis-Stewart	}	<i>That the attached list of individuals for emeritus status be approved and that, pursuant to section 9(2) of the University Act, all persons with the rank of Dean, Professor, and Associate Professor Emeritus be added to the Roll of Convocation.</i>
Jan Cioe		

In response to a question from Senator Legault, Senator Stewart confirmed that the effective date of emeritus status for Associate Professor Bernard Schulz-Cruz's Emeritus status of 1 July 2022 is correct.

Senator DiLabio recognized Professor Melanie Jones and Associate Professor Karen Perry for their service and valuable contributions to the Faculty of Science.

Approved

Senator Willis-Stewart stated that one of the other roles and responsibilities of the Teaching and Learning Committee to review candidates for Honorary Degrees and encouraged senators to consider submitting nominations. Nominations are normally due by September 30th.

Nominating Committee

The Chair of the Nominating Committee, Senator Eikenaar, presented.

APPOINTMENTS TO THE ADVISORY COMMITTEE FOR THE SELECTION OF AN ASSOCIATE VICE-PRESIDENT, HEALTH

Jannik Eikenaar	}	<i>That Tanya Forneris and Jonathan Low be recommended for appointment to the Advisory Committee for the Selection of an Associate Vice-President, Health.</i>
Sandy Hilton		

Approved

APPOINTMENT OF STUDENT SENATORS TO COMMITTEES OF SENATE AND COMMITTEES OF THE COUNCIL OF SENATES

That Bowen He and Anand Brar be appointed to the Senate Academic Building and Resources Committee until 31 March 2024 and thereafter until replaced;

That Saami Hafeez, Ojus Sharma, and Michael Sandler be appointed to the Senate Academic Policy Committee until 31 March 2024 and thereafter until replaced;

That Raneem Zaitoun and Ayanfe-Oluwa Idowu be appointed to the Senate Admissions & Awards Committee until 31 March 2024 and thereafter until replaced;

That Amanda Shatzko and Jonathan Low be appointed to the Senate Agenda Committee until 31 March 2024 and thereafter until replaced;

Jannik Eikenaar
Marianne Legault

} *That Maziar Matin Panah and Jonathan Low be appointed to the Senate Committee on Appeals of Standing and Discipline until 31 March 2024 and thereafter until replaced;*

That Joshua Milliken and Muskan Garg be appointed to the Senate Curriculum Committee until 31 March 2024 and thereafter until replaced;

That Amanda Shatzko, Aparjita Shinde, and Princess Amuta be appointed to the Senate Learning & Research Committee until 31 March 2024 and thereafter until replaced; and

That Bowen He and Ayanfe-Oluwa Idowu be elected to the Council of Senates.

Approved

CONFLICT OF INTEREST GUIDELINES – REVIEW AND REFERRAL TO THE COUNCIL OF SENATES

Jannik Eikenaar
Rob Johnson

} *That the Okanagan Senate refer the draft Conflict of Interest Guidelines for the Okanagan and Vancouver Senates to the Council of Senates for review pursuant to notice given at the March 30, 2023 meeting of Senate as required by s. 20(o) of the Rules and Procedures of the Okanagan Senate.*

Senator Cioe expressed his appreciation for greater clarity in the guidelines with respect to the issue of personal versus professional academic elements. He stated he does take issue with section 5.5a, which is “where a member has a conflict of interest in respect of an agenda item...”

on page 249. He stated that the section indicating that “the member shall abstain from any discussions or votes concerning such matters that may occur during a Senate or Senate Committee meeting” is problematic. Senator Cioe also shared his concerns regarding processes to address conflicts retroactively, and noted that he will raise these concerns with the Council of Senates.

Approved

Lesley Cormack
Barb Marcolin

} *That the time to adjourn be extended by thirty minutes.*

Approved

TRIENNIAL REIVEW REPORT

Jannik Eikenaar
Sally Willis-Stewart

} *That Senate approve the recommendations of the Triennial Review, as set out in the report.*

Senator Eikenaar outlined three recommendations for approval related to the Learning and Research Committee: to set quorum to five voting members, a revision to Committee membership and composition correct the title of an ex-officio member, and the addition of the Director of Continuing Education or designate as an ex-officio member of the Committee.

Approved

Senator Eikenaar stated that a discussion item is listed on docket page 256 with regard to Rule 38 of the *Rules and Procedures of Senate*, which specifies that senators can serve as chair of a standing committee for a maximum of six consecutive years. During the triennial review process, the Nominating Committee received feedback that the rule should be revised or rescinded. In its discussions, the Nominating Committee found conflicting perspectives on this, so has brought the matter forward for Senate input.

Senator Campbell stated that there has been one exemption to Rule 38, which permitted him to continue as chair of the Senate Committee on Appeals of Standing and Discipline. He noted that he was reluctant to resume the role of Chair of the Appeals Committee at the beginning of the triennium, but an exemption was made and he agreed to continue on as chair. Senator Campbell noted that while the intent of the rule may have been to enable more senators to take on a leadership role, it potentially reduces the pool of senators who are willing and able to take on a chair role. In some cases, there is a reluctance on the part of senators to take on the responsibility of committee chair, and rescinding Rule 38 may result in a larger pool of senator willing to serve in that capacity.

Senator Cioe noted potential conflict of interest and stated that Rule 38 prevents him from returning as Chair of the Academic Policy Committee in the new triennium as he has already served six consecutive chairs as committee chair. He expressed his concerns regarding this rule, noting that the Academic Policy Committee has been working on a number of issues that

remained unresolved, and he would like to maintain his position as Chair of the Committee to see these come to fruition.

Senator Cioe commented that his experience has been that it is difficult to convince senators to serve as chair or vice-chair. He noted that from his perspective, the Academic Policy Committee has done exceptional work, which he would like it to continue to support. Senator Cioe stated his preference that this rule be removed. Alternately, another member of the Committee could serve as Chair for a brief period of time and then resign, enabling Senator Cioe to be eligible to again be Committee chair.

Senator Hilton spoke in support of the rule, noting that it enables and supports diversity in governance. Senator Hilton stated that he strongly opposes any revision or rescension of the rule and reiterated that it does not prevent an individual from serving on committees they may have previously chaired. In response to the concerns raised by Senator Cioe, Senator Hilton commented that former chairs play an important role in guiding an incoming committee members and chairs and are critical to preserving institutional memory.

Senator Lucet noted his opposition to rescinding or amending Rule 38, noting that the intent of the rule is to limit service as chair to two terms or six consecutive years. The rule was implemented to ensure diversity in committee leadership and without a term limit, senators with less experience will be less inclined to serve as chair as there will likely be a more experienced member who is willing to continue on as chair. This will likely result in the same individuals returning as committee chair each triennium. Senator Lucet noted that the fact that there has only been one exception is an indication that Rule 38 is working well. With respect to succession planning, Senator Lucet noted that it is critical to have a committee vice-chair who is sufficiently experienced and trained to step in as chair when needed.

Senator Legault commented that she is largely in support of the rule to set term limits for committee chairs. As UBC is a learning and research institution, governance experience is a critical development opportunity for faculty and other constituents of Senate. Senator Legault stated serving as chair of a Senate committee was an incredible learning opportunity and it is important to ensure that such opportunities are available to incoming senators and are guided by former committee chairs and vice-chairs. Senator Legault noted that this approach also works towards addressing issues of inclusion and diversity, which are not currently adequately addressed.

Senator Jakobi seconded Senator Legault's comments, noting that studies indicate that women and underrepresented persons hesitate to step up into leadership roles unless there is a specific call for such individuals to serve in leadership roles. A term limit such as Rule 38 better enables such individuals to step into leadership positions. Senator Jakobi noted that only two of the current six Senate committee chairs are women. There are no underrepresented or visible minority in those positions though these demographics are represented in the membership of Senate. Senator Jakobi reiterated her support for a term limit as specified in Rule 38.

Senator Cioe commented that this is a rule that Senate seems to want to maintain, and he would like to withdraw his objection to it.

Senator Reeves echoed statements from Senator Legault, Senator Jakobi, and Senator Lucet, noting that in some ways, the rule is indicative of Senate's commitment to equity, diversity and inclusion. Senator Reeves added that the rule serves to encourage people to step up and supports diversity in Senate committee leadership.

Senator Hilton stated that he strongly supports the EDI approach; a six-year term limit at least requires some turnover and while that may not achieve EDI objectives, it allows for renewed committee leadership.

Senator Eikenaar stated that while some concerns raised during the triennial review were immediately transformed into recommendations, there were a number of other issues that the Committee wished to share with the Senate. One concern is resourcing for the Senate Office, which has also been raised in past triennial reviews.

Senator Eikenaar commented that lack of sufficient resourcing and staffing negatively impacts Senate Office staff, with staff often working evenings and weekends, and increasingly long hours. The stress level of staff has increased tremendously, the impact of which is not being recognized. Senator Eikenaar noted that while there is no clear recommendation or motion the Committee can make to address resource issues, but the hope is that senators will encourage University leadership to provide the requisite resources to support the work of the Senate Office and the Senate.

Senator DiLabio agreed with Senator Eikenaar regarding the lack of resources as a challenge and asked which unit at UBC is responsible for providing support to the Senate Secretariat.

Several Senators indicated that the Board of Governors has oversight of budgetary matters.

Senator Cormack stated that there has been active discussion about the organization of governance on both campuses with the Senate, and the Board of Governors.

The Registrar recognized that there are stretched resources within the Senate Office, noting the unit goes through the same budget process as any other central administrative unit.

Senator Johnson stated it is important to advocate for the Senate staff because as Senator Eikenaar has mentioned, people are burning out. He estimated that it must take a significant amount of time to train people to do this type of work properly. Senator Johnson noted that the Nominating Committee struggled to identify who members can approach regarding resourcing concerns. He noted that has been a problem for a long time and is apparently not getting any better.

Senator Lasserre echoed earlier comments, noting that she has been in administration for quite some time and has routinely observed the Senate Office extremely at the limit of what staff can do. Senator Lasserre commented that several colleagues who were excellent at their position have left their roles because of inability to continue at the same level of workload. Senator Lasserre offered her support for more resources.

Senator Legault commented that the issue of resourcing has been discussed extensively by the Nominating Committee and that now might be a good time to bring this topic to the Board of Governors as the Board Office is facing the same resourcing challenges. Senator Legault noted that she has observed the impacts of resourcing shortage on staff and is concerned for their wellbeing.

Senator Cormack stated that a review of resourcing issues would need to be in the full context of the budget.

Senator Cioe commented that at a recent joint meeting of Board of Governors and Senate committee chairs, Board members confirmed their support of Senate and that the Board has the capacity to provide additional funding to support the Senate Secretariat. Senator Cioe stated that the additional funding that is required in the terms of several people's salaries, which is very manageable and can be addressed very quickly in a crisis.

Ruth Frost

Barb Marcolin

} *That the time to adjourn be extended by thirty minutes.*

Approved

Reports from the Provost

TUITION ALLOCATION MODEL

The Provost asked that Senate recognize Associate Vice-President, Finance and Operations, Rob Einarson.

Mr. Einarson stated that the Tuition Allocation Model (TAM) is one component of Faculty funding, along with the provincial grant. Together, these two sources of funding form the amount that is allocated to Faculties. There is domestic tuition, international base tuition, and international incremental tuition. There is a 60:40 split of the tuition after the payment of fees related to processing credit card payments, and for allocation for student financial aid, which goes into the overall financial aid package to fund support for students. These amounts are fairly consistent across the board. Prior to 2015 and 2016, before the Excellence Fund came into existence and the large increase that came forward, the international base tuition was split 50:50 after the allocations previously spoken about. At that point in time, the Board approved an increase, and the University shifted from cost-based tuition to market-based tuition. Those increases all went into what is known as 'international incremental tuition.' Mr. Einarson stated that two-thirds of this amount was to go to the Excellence Fund, now named the Academic Fund in Vancouver and the Excellence Fund in the Okanagan. The remaining amounts were split 50:50 between the Administration and the Faculties based on student registration.

In response to a question from Senator Lalonde regarding the Excellence Fund, Mr. Einarson stated a third of it is earmarked for our capital projects, such as ICI, downtown campus, and projects to expand academic space on campus. Another large sum is dedicated to research startups for incoming Faculty members and continuing Faculty members. Funding has also been used for recruitment and hiring of BIPOC faculty and the internationalization of the campus.

Senator Cormack summarized that the simplest way to think of the Excellence Fund is that one-third of it is going towards capital projects, one-third towards research, including the Principal's Excellence Chair, the Aspire program, and startups, and the last one-third is directed towards Faculty initiatives and student support.

Dr Rehan Sadiq commented that the Excellence Fund provides a level playing field for the faculties because not all faculties have international students. This gives them access to resources as well.

Senator Cormack stated that she has been involved in complex conversations for years on how to have drivers to measure everything in budget allocations. The new Vice President of Finance and Operations is

starting a process to think holistically about the budget for both campuses, which will include looking at the TAM on both campuses.

Senator Lucet commented that when the budget model was proposed, it was said that the curriculum decided in Senate would compensate for that, which is not the right answer. He noted that if his department can bring in revenue doing something, of course it will do this. The system, at the very least, needs to avoid rewarding that attitude. Senator Lucet stated that the budget model needs to seriously think about all the side effects that it is creating. We cannot prevent courses from being created because the program needs them. This is not a good use of resources, and we are not using the expertise that we really want to shine. The budget model is really amplifying this. Senator Lucet stated that he hopes this will be taken seriously, as we need another mechanism for this. The budget needs to emphasize the University's priorities and strategic direction.

Senator Cormack responded that these points will be useful going forward in conversations on this matter.

Senator DiLabio thanked Mr. Einarson for the presentation and supported a review of the budget model as it does not work and promotes the types of behaviours described by Senator Lucet. This is because funding is tied to students and courses, a model that does not work. Senator DiLabio stated that the current budget model will put almost all of the faculties in a structural deficit within the next couple of years, which is a serious concern. Central services are also under a great deal of stress and the present centralized budget model does not support the operations of either. For example, we are now in the position of paying for what have traditionally been considered central services (like research finance support, and so on), out of Faculty budgets because there is no funding to pay for these critical services elsewhere. Senator DiLabio concluded his comments by noting that for the campus to survive, there needs to be a serious and collective conversation regarding the budget model and identify potential solutions.

Senator Cormack thanked Mr. Einarson and his team for the presentation.

COURSE SCHEDULING REPORT 2023

The Provost asked that Senate recognize Deputy Registrar, Burt Annear, and invited Mr. Annear to present the course scheduling report.

Mr. Annear stated that the report before Senate includes information from faculty about their primary concerns, data regarding the current scheduling process, information on classroom designations and utilization, and information on future plans.

As outlined in the report, 75% of faculty members have three teaching days per week, and there are many professors who set their teaching load in one term or the other. They give themselves clear time in one term for research, which is not a scheduling issue, but a workload planning issue. Mr. Annear highlighted slide 7 which shows teaching days by Faculty by term. On slide 9, student length of day is shown. Generally, the average for students is 5 hours per day, with some programs being longer, such as Science and Applied Science.

Bert Annear stated that slide 11 outlines room availability, which shows the rooms we have been using on campus the past few years. This chart shows general use, classroom use for program areas such as labs, and studio-restricted spaces. Slide 12 shows how many rooms will be coming into use in a general sense from the ICI building; there is some growth, but limited in the area we need space. Slide 13 shows us where the demand is; we have a number of room sizes where we are using 100%. Some room types we

only have one of. Normally in educational institutions you are looking to have around a 75-80% room utilization rate, but we have a 91-93% utilization rate. This means we are in a situation where it is challenging to move things around within the schedule.

Mr. Annear presented slide 14 detailing future plans and noted that a concession/exemption committee will be established shortly to look at exceptional circumstances when there are changes needed within the schedule. This committee will then decide whether that change will be applicable, taking into consideration all of the different things that are already in the scheduling process. There was also a request for improved training for program coordinators, which is being developed. Mr. Annear stated that it would be beneficial to share more information with the University community so there is a better understanding of scheduling restraints and issues and the impact of potential changes. The hope is to move to a more proactive process where Scheduling Services will consult programs and attempt to determine what can be done to address requests for changes early in the process as opposed to when the schedule is ready to go live.

Senator Frost noted that program coordinators have a fairly good understanding of their program and how the program works. In terms of program coordinator training, it is her understanding this typically means how to work within the confines of the WDC program, which is a slightly different thing. Program coordinators have a good idea of what to do to keep their programs conflict free and how to work with the scheduling program. With respect to timing, in the Department of History and Sociology, a number of courses have gone through Senate in both March and April. New courses that go through Senate must be added to the course scheduling program before Enrolment Services staff can add them to the system. A department may know in January that it intends to offer a particular course, but if it has not had Senate approval, it cannot be entered into the scheduling system. There is at this moment, no placeholder, which is problematic.

Senator Frost also addressed the question that originally came before Senate, which was of four days a week of teaching. The original motion was for research faculty, for pre-tenure and tenured faculty who are predominantly in research. In the Faculty of Arts and Social Sciences [economics, philosophy, political science, history, and sociology] of the 35 faculty members who next year have a tiered course with two terms, 51% are teaching four days a week for at least one term. There are 18 professors teaching both terms at four days a week. Of those, quite a number are pre-tenured, so 50% of the pre-tenured group in those departments are teaching at least one term of four days a week. For lecturers and sessionals, if you lump the people up who are either teaching one in three, or one in one, or zero in one, or three in three if they are lecturers, we have 52 people in those departments, and the combined number of four days a week classes equals 36.5%. This is much higher than the figure in the presentation. Senator Frost stated that teasing out some of this information is crucial, because while there are many difficulties and challenges in scheduling, there is still a concern about colleagues who are teaching four days a week, as one example.

Senator Lasserre commented that often there is a side effect when classrooms of a certain size are not available and 100% of small classrooms are filled and asked if there has been any analysis of the impact. She also stated that there are situations where for designated programs, it is necessary to have one classroom, such as Master of Data Science. This is very difficult considering the number of classrooms that are available. Senator Lasserre stated that her department had considered renting a space off-campus to run the program to alleviate this issue, but apparently this is not an option and has been dismissed as a possibility. Senator Lasserre asked why this was not considered a reasonable option.

Senator Cioe stated he has not received a good explanation as to why the department heads cannot move people around within their particular department. For example, the History Department could move its faculty around in order to alleviate some of the issues. That was a practice that used to work reasonably well, and allows for accommodation of circumstances that are associated with a variety of issues, such as child care, family commitments, etc.

Senator Tomášková agreed that education plans need to be started much earlier, possibly in the Fall, rather than January and noted that on docket page 282, the representation numbers seem unrecognizable and seem to suggest that the vast majority of faculty and staff teach two or three days a week, which is simply not accurate. She questioned the veracity of these facts in the docket.

Mr. Annear agreed that there is a need to look deeper into the data and have it in relationship to the status of the professoriate, whether they are tenure or not, and what is going on within the program areas. This is something he is looking into, but unfortunately, the resources to provide a fulsome list of that type of breakdown were not available. This is something that is being examined and collection of information regarding rank and how that relates to teaching and load. This information will be shared with programs.

Mr. Annear stated that more and more programs are asking for dedicated classrooms. Dedicated spaces will result in more classes being delivered evenings and weekends. There is no other option within our structure to be able to do something different.

In response to Senator Lasserre's comment, Mr. Annear stated that the tendency is to fill the larger classrooms with classes that are of a size that will not fit into the room that they have. We find that we cannot put a class into a specific room because it is already full, so they are moved to a larger sized classroom. In effect, we push further out into the system, so we have less and less potential use of those rooms. There has been some analysis of the impacts but more work is needed.

Senator Lasserre clarified that her question was more about the possibility of renting outside of campus to actually minimize the impact of designated room on campus.

Mr. Annear responded that this idea has had some preliminary discussion. The campus has partnerships with some places off campus that have space, but there are cost considerations. There has also been consideration of renovating some of the spaces that we do already own, and currently the cost for those renovations exceeded the possible budgets in those areas. There is further discussion needed on this.

Senator Sadiq shared that the downtown campus will support professional programs once it is completed. This has a broad consensus amongst the Deans, and is not an immediate solution, but a longer term one. He stated he has also started a discussion regarding the possibility of new student housing to include some sort of classroom space. This is a different type of exploration, as it is funded by a different mechanism. The Provost stated that with ICI and the downtown campus, they will be backfilling of space that becomes vacant. All of these various strategies will alleviate some pressure and are longer term solutions.

Senator McNeil commented that the first three concerns given by faculty on the presentation are time for child care, 8 am classes, and evening classes. These are all largely the same thing; the reason that faculty with child care responsibilities cannot teach at 8 am is because schools do not open until 8:30 am. The same faculty also cannot teach until 6 pm because daycare closes at 5:30 pm. Senator McNeil stated that classes will have to run early and late, but departments can choose which faculty members are assigned to the courses that are offered early or late in the day. The concern has been raised in the past and the response has been that there is no requirement to accommodate faculty with family obligations as being a parent is not a protected class under the BC Human Rights Code. Senator McNeil commented that there must processes in place to assign

teaching loads and teaching times to junior, to pre-tenured, and to women faculty that make sure they can meet childcare responsibilities.

The Registrar acknowledged Senator McNeil's comments and stated that as Mr. Annear has noted there will be a committee established to consider scheduling exemptions. There will be guidelines, terms of reference, and consultation concerning how some of these roles will be adjusted. Ms. Ng added that the Committee will be working with the appropriate people, including the Provost, and Senator Eikenaar for an EDI lens. Human resources will also be included in these conversations to ensure all concerns are heard. This work will be done over the summer months.

Senator Cormack called for the following motion:

Amanda Shatzko	}	<i>That the time to adjourn be extended by fifteen minutes.</i>
Julien Picault		

Approved

Senator Tomášková commented that gender parity is an important issue, but that in her Faculty there are a number of fathers who are responsible for childcare and cannot teach early morning classes. She noted that her department has hired a number of junior faculty members who are fathers, and have the same demand on child care.

Senator Cormack thanked Mr. Annear for his presentation, and senators for their contributions to the discussion.

Senator Sadiq also thanked Mr. Annear and his team for their hard work. He stated that we try to address all needs and be as equitable as possible.

Report from the Registrar

ADJUSTMENTS TO THE ACADEMIC YEAR 2023-2024

The Registrar notified senators that 2023-2024 academic dates have been updated in light of the statutory holiday for the National Day for Truth and Reconciliation. The number of term teaching days have been updated and there will a formal announcement that the National Day for Truth and Reconciliation will be observed on 2 October 2023.

2023-2026 TRIENNIAL ELECTION RESULTS

The Registrar noted that there is currently a third call for nominations to fill the remaining faculty vacancies on Senate for the 2023-2026 triennium.

Ms. Ng thanked Amandeep Breen for stepping into the Senate Clerk role for the last six months, and Senate Office staff for their work.

Senator Cormack thanked Ms. Ng for her report.

Adjournment

Senator Willis-Stewart commented that the chairs of Okanagan and Vancouver Senate committees met with their Board of Governor counterparts in Vancouver last week. She stated that it was an incredible opportunity and a privilege to attend a discussion on university governance facilitated by Dr Deborah Buszard and Dr Martha Piper. Their message was very inspiring and highlighted that UBC is an incredible institution and there are many opportunities for collaboration amongst governance bodies to make it even better. Senator Stewart stated that it is great to be able to work with Senate and hear inspiration from those two phenomenal leaders.

Senator Cormack stated that this is the final meeting of the Triennium and thanked all the Senators for attending and for striving to make UBCO better. She stated she looks forward to seeing some of the Senators next year.

The meeting was adjourned at 6:36 pm.

Appendix A: Awards Report

New Awards:

Canadian Federation of University Women Kelowna Bursary in Engineering

Bursaries totalling \$2,000 have been made available annually through a gift from the Canadian Federation of University Women Kelowna for third- or fourth-year undergraduate students who identify as women in the School of Engineering in the Faculty of Applied Science at the University of British Columbia, Okanagan campus. The bursaries will be adjudicated by Enrolment Services. (First award available for the 2023/2024 winter session).



18 May 2023

To: Okanagan Senate
From: Curriculum Committee
Re: Curriculum Proposals (approval)

The Curriculum Committee has reviewed the material forwarded to it by the Faculties and encloses those proposals it deems ready for approval.

Therefore, the following is recommended to Senate:

Motion: *That Senate approve and recommend to the Board of Governors for approval the new and revised programs, new subject code, new and revised courses, discontinued course, and discontinued program as presented by the Faculties of Applied Science, Arts and Social Sciences, Science, and Health and Social Development.*

- a. From the Faculty of Applied Science
 - i. New Program: Computer Engineering
 - ii. New Subject Code: CMPE – Computer Engineering
 - iii. New Courses: CMPE 201, 301, 401, 402, 409, 410, 461, 465, 485
 - iv. New and Revised Courses: MANF 277, 330, 377, 386, 378, 416, 475, 496, 516
 - v. Revised Courses: ENGR 315, 480, 481, 486, 487
 - vi. Revised Program Requirements: Manufacturing Engineering
 - vii. Revised Program Requirements: Mechanical Engineering
 - viii. Revised Program Requirements: Electrical Engineering for Students who entered the B.A.Sc. program in 2020/21 or earlier
 - ix. Revised Program Requirements: Electrical Engineering for Students who entered the B.A.Sc. program in 2022/22 or later
- b. From the Faculty of Arts and Social Sciences

- i. New Course: GEOG 280
 - ii. Revised Program Requirements: B.A. Degree Requirement for students entering the program in 2021/2022 or later
- c. From the Faculty of Science
- i. New Courses: ASTR 401, 411, 501, 511
 - ii. Revised Program Requirements: Major in Economics (B.Sc.)
 - iii. Revised Program Requirements: Psychology Honours Program (B.Sc.)
 - iv. Revised Calendar Entry: Requirements of an Annotation of a Second or Subsequent Major or Honours Designation on a Baccalaureate Degree Previously Conferred
 - v. Revised Program Requirements: B.Sust. Environmental Analytics Concentration
 - vi. Revised Program Requirements: B.Sust. Environmental Humanities Concentration
 - vii. Revised Program Requirements: Major in Data Science, Minor in Data Science
 - viii. Revised Program Requirements: Major in Earth and Environmental Sciences
 - ix. New Course: EESC 112
 - x. Revised Program Requirements: Major in Freshwater Science
 - xi. Revised Program Requirements: Major in Mathematics (B.Sc.)
 - xii. Discontinuation of Program: Mathematical Sciences
 - xiii. Revised Program Requirements: Major in Physics, Physics Honours Program
 - xiv. Revised Program Requirements: Combined Major in Physics and Mathematics
 - xv. Revised Program Requirements: Major in Statistics, Minor in Statistics
- d. From the Faculty of Health and Social Development
- i. Revised Course: HINT 320
 - ii. Discontinued Course: HEAL 307

For the Committee,

Dr. Yves Lucet
Chair, Curriculum Committee



THE UNIVERSITY OF BRITISH COLUMBIA
Okanagan Campus

New Undergraduate Program Proposal

Bachelor of Applied Science (B.A.Sc.)
Computer Engineering

*Faculty of Applied Science - School of Engineering
University of British Columbia, Okanagan Campus (UBCO)*

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Overview

The proposed program is a Bachelor of Applied Science (BASc) in Computer Engineering (CMPE), located at The University of British Columbia, Okanagan Campus. The program will be offered within the Faculty of Applied Science and administered by the School of Engineering (SoE).

SoE will offer this Computer Engineering Undergraduate Degree program parallel with the other Civil, Electrical, Mechanical, and Manufacturing Engineering programs. The Computer Engineering program will have the standard first-year engineering curriculum, partially common Year 2, and specialized curriculum in Years 3 and 4. A five-year degree program will also be available for students wishing to take a lighter course load. A Co-Op option is also available.

Computer Engineering is designed to address the demand of engineering professionals who are well trained in electrical and computer technology. Despite this high demand, there is no Computer Engineering Undergraduate Degree Program in the British Columbia Interior being offered. Currently, institutions such as Thompson Rivers University, Okanagan College, and other regional colleges offer the Software Engineering Programs; therefore, they are not competitive to this program. Instead, the proposed Computer Engineering program would be seen as more complementary. Unlike Computer Science, which focuses more on software, computer engineering focuses more on hardware and solves real-life problems using a combined knowledge of electrical engineering and computer science. For this reason, the industry demand for computer engineering graduates has been strong, and a skilled computer engineering graduate can lead to high-paying jobs with some of the best companies such as Apple, Amazon, Google, Intel, and Tesla. While the Bureau of Labor Statistics (BLS) projects a slower-than-average growth rate of 2% for computer engineers, these professionals earned a healthy median annual salary of \$119,560 as of 2020. Indeed.ca currently shows that more than 3,000 unfilled computer engineering positions are just in the greater Toronto area alone and another 6,000 unfilled computer engineering positions in Canada. In addition, our local companies, such as ESS Technology, have ongoing unfilled computer engineering positions. Currently, the Department of Electrical and Computer Engineering offers a computer engineering program on the Vancouver campus, and the program disappoints 50% of the applicants each year with its competitive entry. Our uniquely designed computer engineering program will attract applicants from UBC Vancouver and other talents to the Okanagan region by providing a new computer engineering program. Indeed, according to our recent student survey, our students will strongly welcome such a new program. In addition, the proposed computer engineering program will focus on artificial intelligence (AI) applications. It will create a strong push for start-ups to tackle the 390 billion global AI market by 2025 (according to Grand View Research), and computer hardware lies underneath each AI application. For example, Intel predicts that the AI accelerator market for data centers alone was valued at 13.7 billion in 2021 and is expected to reach 65.3 billion by 2026.

Credential to be awarded

The proposed credential will be a Bachelor of Applied Science in Computer Engineering.

Location

The Computer Engineering program will be delivered in person at the University of British Columbia, Okanagan Campus.

Faculty

The Computer Engineering program will reside in the School of Engineering, Faculty of Applied Science. *See Appendix #2.*

Anticipated Program Start Date

Engineering students choose their specialized program in year two. We are hoping this first intake of year two Computer Engineering students will be September 2024.

Anticipated Completion

The first intake is tentatively scheduled to graduate in 2027W.

Program Outcomes

The BASc in Computer Engineering aims to prepare students for professional practice, graduate studies in engineering, or entrepreneurship in the hi-tech industry. Students will have a fundamental knowledge of both electrical and computing science.

Students will be able to:

- Develop the ability to formulate and solve engineering problems using computer engineering principles based on applied science and mathematics
- Utilize the basic principles of electronic circuit design and analysis, including computer-aided design tools to design and implement computing hardware.
- Design and implement systems that integrate hardware and software to solve practical problems.
- Develop safe, secure, and scalable computing applications and solutions having appropriate design trade-offs.
- Communicate ideas effectively, using suitable media.
- Contribute to communities positively through a reflective and thoughtful application of technical skills, professionalism, ethics, and a deep understanding of social contexts.
- Demonstrate an ability to learn continuously, generate new knowledge, advance professionally, and take on new responsibilities and leadership roles.

The proposed program will leverage the current robust UBCO Electrical Engineering program and work closely with the Computer Science unit on the UBC Okanagan campus. We can offer the first two years of the computer engineering curriculum with our existing resources. In addition to the program design, SoE also has facilities such as the microfabrication laboratory and special arrangements with Canadian Microelectronics Corporation (CMC)

Microsystems with CAD licenses and FAB Services for making working prototypes. The upper-year computer engineering courses and capstone design projects will use these facilities and services.

Degree Credits

The students will compete 144 total program credits. The core curriculum consists of 120 credits with 24 credits being elective options for students.

Linkages between Program Learning Outcomes and Curriculum Design

The proposed CMPE program has been built to remain competitive within the industry while also contributing to the departments and university's strategic plan. CMPE will provide the students with hands-on training through project work that will emerge from practical needs. Training will be available in engineering entrepreneurship to prepare our students to launch high-tech start-up companies in the Okanagan region. This program will foster and promote interdisciplinary research with other existing programs such as Manufacturing Engineering, which focuses on Industry 4.0 and contains many computer-related skills that deal with sensors, data, logic control, etc. This program hopes to strengthen relationships and collaboration with other academic units within the university such as Computer Science.

Delivery Methods

This program is intended to be delivered in person on the UBC Okanagan Campus.

Anticipated Contribution to the Mandate of the Institution

This program falls directly in line with *UBC's Shaping the Next Century* by tackling all three themes of *Inclusion, Collaboration, and Innovation*. This Computer Engineering program will *attract, engage and retain students and faculty* both internationally and domestically. Collaborating from various backgrounds, these students will learn how to leverage research and expand on opportunities made available to them to solve real work problems.

A core commitment of UBCO Okanagan's ASPIRE vision is Research Excellence. This degree program will allow UBCO to acquire emerging technologies and connect globally for excellence in research and learning in computer engineering, which is an interdisciplinary major between electrical engineering and computer science. Another ASPIRE core commitment is Transformative Learning. With hands-on training through engineering projects, the students will be well equipped with creative and critical thinking skills. Finally, the other ASPIRE core commitment of Community Engagement will be highlighted as the program partners with regional and national hi-tech companies. It will make an economic impact on the regional and national economies.

Program Strengths

With this program already being successfully offered at the UBC Vancouver campus, we know that its popularity has made it the second most popular engineering program in Vancouver, following Mechanical Engineering. We anticipate that the proposed computer engineering program will attract domestic and international students. The students will receive hands-on training through project work that will emerge from practical needs. Training in engineering entrepreneurship is also available to prepare our students to launch high-tech start-up companies in the Okanagan region. The Computer Engineering discipline can

foster interdisciplinary research with other existing programs such as Manufacturing Engineering, which focuses on Industry 4.0 and contains many computer-related skills that deal with sensors, data, logic control, etc. Computer Engineering can build on existing investments made with the SoE and strengthen relationships with other academic units such as Computer Science.

Target Audience

The anticipated audience for this program is domestic and international students with a desire to study Electrical and Computer Engineering and have a solid mathematical background. In a recent survey of the current Electrical Engineering students, 103 of the 157 respondents (*See Appendix 6*) stated they would stay at the Okanagan campus if offered a Computer Engineering program. We would be able to accommodate 50 students into this capped program including the students who could not get a seat in the highly competitive UBC Vancouver Computer Engineering program.

Course Information

First year curriculum is common amongst all engineering students. Second year is when students choose their program of choice and take prescribed courses. *See Appendix #4.*

Second Year Computer Engineering Curriculum		Credits
APSC 201	Technical Communications	3
APSC 246	System Dynamics	3
APSC 248	Engineering Analysis III	3
APSC 255	Electric Circuits and Power	3
APSC 256	Numerical Methods for Analysis	3
APSC 262	Digital Systems Design	3
APSC 278	Electric and Magnetic Fields	3
CMPE 201	Computing for Science and Technology	3
CMPE 246	Computer Engineering Design Studio	3
COSC 121	Computer Programming II	3
COSC 221	Introduction to Discrete Structures	3
COSC 222	Data Structure	3
Total Credits		36

Third Year Computer Engineering Curriculum		Credits
APSC 270	Signal and Communications	3
CMPE 301	Software System Design for Engineers	3
COSC 310	Software Engineering	3
COSC 315	Introduction to Operating System	3
ENGR 303	Engineering Project Management	3
ENGR 305	Engineering Economic Analysis	3
ENGR 350	Linear Circuit Theory	3
ENGR 351	Microelectronics I	3
ENGR 359	Microcomputer Engineering	3
ENGR 360	Engineering Probability and Statistics	3
ENGR 362	Digital Signal Processing I	3
MANF 386	Industrial Automation	3
Total Credits		36

Fourth Year Computer Engineering Curriculum		Credits
CMPE 485	Introduction to Quantum Computing	3
ENGR 413	Law and Ethics for Engineers	3
ENGR 499	Engineering Capstone Design Project	6
	Design Electives	12
	Technical Electives	9
	Humanities Elective	3
Total Credits		36

Approved Design Electives and Technical Electives for Computer Engineering:

COSC 320 Analysis of Algorithms
COSC 322 Introduction to Artificial Intelligence
COSC 304 Introduction to Database
COSC 404 Data System Implementation
COSC 407 Introduction to Parallel Computing

ENGR 415 Microelectronics II
ENGR 418 Machine Learning for Engineers
ENGR 453 Internet of Things
ENGR 463 Communication Networks
ENGR 464 Distributed Ledger Technologies with Engineering Applications
ENGR 466 Introduction to VLSI Systems
ENGR 467 Real-Time and Embedded System Design
ENGR 468 Advanced Digital System Design
ENGR 474 Analog Integrated Circuits
ENGR 480 Modern Control
ENGR 486 Robot Modelling and Control

CMPE 461 Introduction to Cloud Networking
CMPE 410 Network Security and Cryptography
CMPE 465 Computer Architecture & Organization
CMPE 402 Compiler Engineering
CMPE 401 Deep Learning for Engineers
CMPE 409 Artificial Intelligence for Robotics

Three possible specialization pathways – not formally implemented, only suggested.

1. Advanced Computing & Networks

- COSC 407 Introduction to Parallel Computing
- CMPE 461 Introduction Computing Networking
- CMPE 410 Network Security and Cryptography
- ENGR 453 Internet of Things
- ENGR 464 Distributed Ledger Technologies with Engineering Applications
- ENGR 463 Communication Networks

2. Computer Systems, Analog and Digital Designs

- a. CMPE 402 Compiler Engineering
- b. CMPE 465 Computer Architecture and Organization
- c. ENGR 467 Real-time and Embedded System Design
- d. ENGR 468 Advanced Digital System Design
- e. ENGR 466 Introduction to VLSI Systems
- f. ENGR 474 Analog Integrated Circuits
- g. ENGR 451 Microelectronics II

3. Intelligent Systems

- a. CMPE 401 Introduction to Deep Learning for Engineers
- b. CMPE 409 Artificial Intelligence for Robotics
- c. ENGR 418 Applied Machine Learning for Engineers
- d. ENGR 480 Modern Control
- e. ENGR 494 Autonomous Vehicle
- f. ENGR 486 Robot Modelling and Control
- g. MANF 465 Digital Enterprise

Potential Areas and/or Opportunities for Further Study

SOE hopes to create a Master's degree program in Electrical and Computer Engineering that the students can transition to. Additionally, during their 4-year undergraduate degree program, students have the option to of participate in Coop.

UBC Vancouver vs. UBC Okanagan

The program proposed by the School of Engineering has been developed in consultation with the Vancouver Computer Engineering program, and shares the same high-level program learning outcomes for the core elements of the program. However, given the different course names and organization of courses on the two campuses, the programs may not be equal but are designed to be equivalent. This is the same approach taken for the Manufacturing Engineering programs on both campuses.

As with any program, students take both core and elective courses, and while the range of electives offered at the Okanagan campus would be limited at first, we would aim to grow the number of electives offered to be comparable to the Vancouver program as new faculty members are hired. As with the Vancouver program, the Okanagan program has been designed to meet the criteria required by the Canadian Engineering Accreditation Board which further ensures that both programs meet the same specific graduate attributes defined by CEAB. Since the programs are at least 80% similar, a Ministry Stage One Application is not required. See *Appendix 3*.

Contact Person

Dr. Julian Cheng, Professor of Electrical Engineering
250.807.8800 - Julian.Cheng@ubc.ca

Appendices

Appendix 1: Computer Engineering Task Force Members

Dr. Julian Cheng; Task Force Chair; Professor; Electrical

Dr. Zheng Liu; Professor; Civil, Electrical, Manufacturing

Dr. Chen Feng; Associate Professor; Electrical

Dr. Ayman Elnaggar; Associate Professor of Teaching; Electrical

Dr. Ahmad Al-Dabbagh; Assistant Professor; Electrical, Manufacturing, Mechanical

Patti Ostrihoff; Curriculum and Accreditation Advisor

Appendix 2: Current Faculty and Course Commitments

While the intention is to hire one instructor and up to five research professors over the span of five years, the existing robust electrical faculty do hold the expertise relevant to support the CMPE program and teach all core courses with the exception of COSC 310. Although the faculty members listed below have existing research and teaching assignments, SOE is committed to providing adjustments to support the CMPE program. The following faculty are qualified to teach the new CMPE courses and some of the COSC courses.

Dr. Julian Cheng – Professor; Electrical

Research Interests: Wireless Digital Communications Theory; Optical Wireless Communications Theory; 5G Wireless Networks and Beyond; Quantum Information Processing and Communications; Machine Learning and Deep Learning; Wireless Location Technology

Courses & Teaching: ENGR 350 Linear Circuit Theory; ENGR 361 Signals and Communication Systems; ENGR 460 Probability and Stochastic Processes for Engineers; ENGR 461 Digital Communications; ENGR 502 Technical Communication for Engineering Research; ENGR 550 Stochastic Processes; ENGR 560 Probability and Stochastic Processes for Engineers; ENGR 564 Fundamentals of Digital Communications

Potential CMPE Courses: CMPE 246, CMPE 402, CMPE 401, CMPE 409, COSC 121, COSC 221, COSC 222, COSC 320, COSC 322

Dr. Zheng Liu - Professor; Civil, Electrical, Manufacturing

Research Interests: Intelligent sensing, measurement, and instrumentation; Diagnostics, prognostics, and health management; Predictive maintenance; Digital twin; Computational intelligence and data/information fusion; Non-destructive testing & Evaluation; Machine/computer vision; Data analytics and machine learning.

Courses & Teaching: ENGR 598 (I&II): Predictive Data Analytics; Machine Learning Algorithms; ENGR 526: Multi-Sensor Data Fusion: System Architecture and Applications;

Potential CMPE Courses: CMPE 409, COSC 320

Dr. Chen Feng - Associate Professor; Electrical

Research Interests: Information and Coding Theory; Blockchain Technology

Courses & Teaching: APSC 254 Instrumentation and Data Analysis, ENGR 453 Internet of Things; ENGR 463 Communication Networks; ENGR 464 Distributed Ledger Technologies with Engineering Applications; ENGR 465 Wireless Communications; ENGR 501 Deep and Reinforcement Learning for Engineers; ENGR 565 Advanced Wireless Communications; ENGR 566 Advanced Communication Networks

Potential CMPE Courses: CMPE 301, CMPE 410, CMPE 485, CMPE 461, COSC 221, COSC 222, COSC 320, COSC 407

Dr. Ayman Elnaggar - Associate Professor of Teaching; Electrical

Research Interests: Engineering Education: Conducting fundamental research on engineering education and bridging research and practice; Identifying the reasons why effective practices work; Assessing how students learn, and moving those findings into the classrooms of tomorrow's engineers; Mental Health and Well-being of students.

Courses & Teaching: Real-Time Embedded Systems Design; Advanced Digital Systems Design; Microcomputer Engineering (Embedded Systems & Microprocessor Interfacing); Digital Logic Design; Electric Circuits & Power; Numerical Methods for Engineers.

Potential CMPE Courses: CMPE 246, CMPE 465

Dr. Anas Chaaban - Assistant Professor; Electrical

Research Interests: Network Information Theory; Interference Mitigation; Wireless Communications; Optical Wireless Communications; Coding Theory

Courses & Teaching: ENGR 562 Information Theory; ENGR 463 Communication Networks; ENGR 418/518 Applied Machine Learning for Engineers; APSC 177 Engineering Computation and Instrumentation; APSC 173 Engineering Analysis II

Potential CMPE Courses: CMPE 401, COSC 221

Dr. Ahmad Al-Dabbagh - Assistant Professor; Electrical, Manufacturing, Mechanical

Research Interests: Control systems; fault diagnosis; cyber security; alarm management

Courses & Teaching: MANF 465 Digital Enterprise; ENGR 315 Systems and Control; ENGR 453 Internet of Things

Potential CMPE Courses: CMPE 410

Richard Aleong - Lecturer

Research Interests: Engineering education research; Interdisciplinary learning and practice; Human-centered design and systems thinking; Qualitative research methods; Educational development for engineering education transformation

Potential CMPE Courses: CMPE 201

Appendix 3 UBCO vs. UBCV Curriculum Mapping

Computer Engineering (CMPE) - Okanagan (144 Credits)

Code	Course Title	Cr
APSC 169	Fundamentals of Sustainable Engineering Design	3
APSC 171	Engineering Drawing and CAD/CAM	3
APSC 172	Engineering Analysis I	3
APSC 173	Engineering Analysis II	3
APSC 176	Engineering Communication	3
APSC 177	Engineering Computation and Instrumentation	3
APSC 178	Electricity, Magnetism, and Waves	3
APSC 179	Linear Algebra for Engineers	3
APSC 180	Statics	3
APSC 181	Dynamics	3
APSC 182	Matter and Energy I	3
APSC 183	Matter and Energy II	3
Total Credits		36

Computer Engineering (CPEN) – Vancouver (150 Credits)

Code	Course Title	Cr
APSC 100	Introduction to Engineering I	3
APSC 101	Introduction to Engineering II	3
APSC 160	Introduction to Computation in Engineering Des.	3
CHEM 154	Chemistry for Engineering	3
MATH 100	Differential Calculus with Applications	3
MATH 101	Integral Calculus with Applications	3
MATH 152	Linear Systems	3
PHYS 157	Introductory Physics for Engineers I	3
PHYS 158	Introductory Physics for Engineers II	3
PHYS 159	Introductory Physics Laboratory for Engineers	3
PHYS 170	Mechanics I	1
WRDS 150	Writing and Research in the Disciplines	3
Complimentary Studies		3
Total Credits		37

Note that Y1 engineering curriculum is considered equivalent as per the BC common year 1 engineering curriculum

Year 2

APSC 201	Technical Communication	3	CPEN 211	Intro to Microcomputers	5
APSC 246	System Dynamics	3	CPEN 212	Computing Systems II	4
APSC 248	Engineering Analysis III	3	CPEN 221	Principles of Software Constructions	4
APSC 255	Electric Circuits and Power	3	CPEN 281	Technical Communications	3
APSC 256	Numerical Methods for Analysis	3	CPEN 291	Computer Engineering Design Studio I	6
APSC 262	Digital Systems Design	3	CPSC 221	Basic Algorithms & Data Structures	4
APSC 278	Electric and Magnetic Fields	3	ELEC 201	Circuit Analysis I	4
CMPE 201	Computing for Science, Engineering, and Tech.	3	MATH 220	Mathematical Proof	3
CMPE 246	Computer Engineering Design Studio	3	MATH 253	Multivariable Calculus	3
COSC 121	Computer Programming II	3	MATH 256	Differential Equations	3
COSC 221	Introduction to Discrete Structures	3			
COSC 222	Data Structure	3			
Total Credits		36	Total Credits		39

Year 3

APSC 270	Signal and Communications	3	CPEN 331	Operating Systems	4
CMPE 301	Software System Design for Engineers	3	CPEN 391	Computer Engineering Design Studio II	6
COSC 310	Software Engineering	3	CPSC 320	Intermediate Algorithm Design & Analysis	3
COSC 315	Operating Systems	3	MATH 318 /302	Probability	3
ENGR 303	Engineering Project Management	3	Complimentary Studies		6
ENGR 305	Engineering Economic Analysis	3	Electives		16
ENGR 350	Linear Circuit Theory	3			
ENGR 351	Microelectronics I	3			
ENGR 359	Microcomputer Engineering	3			
ENGR 360	Probability and Statistics	3			
ENGR 362	Digital Signal Processing I	3			
MANF 386	Industrial Automation	3			
Total Credits		36	Total Credits		38

Year 4

CMPE 485	Introduction to Quantum Computing	3	APSC 450	Professional Engineering Practice	2
ENGR 413	Ethics and Law for Engineers	3	CPEN 481	Economic Analysis of Engineering Projects	3
ENGR 499	Capstone	6	CPEN 491	Capstone	10
Electives (Humanities, Technical and Design)		24	Electives		23
Total Credits		36	Total Credits		38

Appendix 4: Course Descriptions

Existing Courses	
Course Title	Academic Calendar Description
APSC 201 Technical Communications	Written and oral communication in engineering. Report preparation, business correspondence, and oral presentation of technical material. Principles of communication with Indigenous communities. [3-0-0] <i>Prerequisite:</i> APSC 176.
APSC 246 System Dynamics	Introduction to the Fourier series. Linear time invariant system, impulse response function, operator, convolution, system characterization, complex numbers, solution of linear ordinary differential equations, Laplace transform and its applications, transfer function, frequency response, solution to system of linear differential equations. Fourier series and transform. [3-0-1] <i>Prerequisite:</i> All of APSC 173, APSC 179, APSC 181.
APSC 248 Engineering Analysis III	Multivariable functions, Lagrange multipliers; line integrals, surface integrals, volume integrals; divergence, curl, gradient; divergence and Stokes' theorems; engineering applications of vector field theory. Introduction to partial differential equations. [3-0-1] <i>Prerequisite:</i> All of APSC 173.
APSC 255 Electric Circuits and Power	Circuit analysis techniques for steady-state AC and DC circuits containing independent and dependent voltage and current sources, resistance, capacitance and inductance. DC maximum power transfer. AC power including real, reactive, apparent and complex power and power factor. AC power analysis using phasors. Three-phase AC power systems. [3-2*-1] <i>Prerequisite:</i> APSC 178.
APSC 256 Numerical Methods for Analysis	Circuit analysis techniques for steady-state AC and DC circuits containing independent and dependent voltage and current sources, resistance, capacitance and inductance. DC maximum power transfer. AC power including real, reactive, apparent and complex power and power factor. AC power analysis using phasors. Three-phase AC power systems. [3-2*-1] <i>Prerequisite:</i> APSC 178.
APSC 262 Digital Systems Design	Logic design methods, hardware description language (HDL), number representation and arithmetic circuits, combinational circuits, flip-flops, registers, programmable logic devices (FPGAs), counters, finite state machines, digital system designs. [3-2*-0] <i>Prerequisite:</i> APSC 178.
APSC 270 Signal and Communication	Fourier series and Fourier transform analysis of signals; sampling theorem; amplitude; phase; and frequency modulation; baseband digital transmission; pulse code modulation and quantization; Nyquist pulses; inter-symbol interference. Credit will be granted for only one of APSC 270 or ENGR 361. [3-2*-0] <i>Prerequisite:</i> APSC 246.
APSC 278 Electric & Magnetic Fields	Fourier series and Fourier transform analysis of signals; sampling theorem; amplitude; phase; and frequency modulation; baseband digital transmission; pulse code modulation and quantization; Nyquist pulses; inter-symbol interference. Credit will be granted for only one of APSC 270 or ENGR 361. [3-2*-0] <i>Prerequisite:</i> APSC 246.
COSC 121 Computer Programming II	Advanced programming in the application of software engineering techniques to the design and implementation of programs manipulating complex data structures. [3-2-0] <i>Prerequisite:</i> A score of 60% or higher in one of COSC 111, COSC 123.
COSC 221 Introduction to Discrete Structures	Introduction to sets, logic, combinatorics, and graph theory, as applied in computing: sets and propositions, permutations and combinations, graphs and trees, Boolean algebra, algorithms, and applications. [3-0-1] <i>Prerequisite:</i> One of MATH 101, MATH 142, APSC 173. <i>Corequisite:</i> COSC 121.
COSC 222 Data Structures	Introduction to the design, implementation and analysis of data structures. Topics will include lists, stacks, queues, trees, and graphs. Credit will only be granted for one of COSC 210 or COSC 222. [3-2-0] <i>Prerequisite:</i> A score of 60% or higher in COSC 121.
COSC 310 Software Engineering	Techniques to construct large systems using fundamental activities of specification, design, implementation, testing, and maintenance. Various life cycle models, exposure to software development tools, modelling techniques, good development practices, and project management. [3-2-0] <i>Prerequisite:</i> One of COSC 210, COSC 222, COSC 223 and third-year standing
COSC 315 Operating Systems	Introduction to batch, multiprogramming, and time-sharing systems. Process synchronization and communication. Main memory allocation techniques including virtual memory; process scheduling; deadlock avoidance and prevention; file organization and device management. [3-2-0] <i>Prerequisite:</i> All of COSC 221, COSC 222.
ENGR 303 Engineering Project Management	Project management including initiating, planning, executing, controlling, and closing engineering projects. Managing the scope, costs, schedule, risks, and human resources in

	engineering projects. External party engagement, including Indigenous communities. [3-0-0] <i>Prerequisite:</i> All of APSC 169, APSC 201.
ENGR 305 Engineering Economic Analysis	Cost concepts, accounting, time value of money; depreciation and taxes; public sector projects; economic evaluation techniques; handling uncertainty; sustainability in economic evaluation; societal context; infrastructure management needs; project impacts, mitigating risk. Case studies. [3-0-0] <i>Prerequisite:</i> Second-year standing in the B.A.Sc. program.
ENGR 350 Linear Circuit Theory	Transient and steady-state analysis of linear circuits, Laplace transform analysis, mutual inductance and ideal transformers, frequency response and Bode plots, passive and active filters, introduction to synthesis of passive networks, two-port network models for linear systems, and circuit simulation. [3-0-0] <i>Prerequisite:</i> All of APSC 246, APSC 255.
ENGR 351 Microelectronics	Signals and amplifier fundamentals, the operational amplifier, diodes, metal-oxide-semiconductor field effect transistor amplifier circuits, and bipolar junction transistor amplifier circuits. [3-2*-0] <i>Prerequisite:</i> APSC 255.
ENGR 359 Microcomputer Engineering	Microcomputer architecture, number representation, assembly language, parallel and serial input/output, interrupts, memory, peripherals. [3-2*-0] <i>Prerequisite:</i> APSC 255.
ENGR 360 Probability & Statistics	Set theory, conditional probability, distribution function, functions of random variables, central limit theorem, sample distributions, confidence intervals, elements of parameter estimation and hypothesis testing, testing the fit of a distribution. Applications of probability and statistics in engineering. Credit will be granted for only one of ENGR 360 or ENGR 460. [3-0-1] <i>Prerequisite:</i> All of APSC 248, APSC 254.
ENGR 362 Digital Signal Processing I	Discrete-time signals and systems, difference equations, sampling and aliasing, decimation and interpolation, quantization errors, z-transform, discrete Fourier transform, fast Fourier transform, implementation of discrete-time systems, finite and infinite impulse response filter design. [3-0-1] <i>Prerequisite:</i> APSC 246.
ENGR 413 Ethics and Law for Engineers	Ethical theories and their application. The Canadian legal system. Companies, partnerships, independent contractors. Contract documents, specifications, liability, torts and liens. Intellectual property. Agency; evidence; role of an expert witness. Employment law. Professional Governance Act, Code of Ethics, consultation and engagement with Indigenous communities. [3-0-0] <i>Prerequisite:</i> Fourth-year standing.
ENGR 499 Capstone	A capstone design project in response to an actual engineering problem. The project can be multi-disciplinary or in a specialized area of engineering. Students are required to submit a comprehensive project report and deliver a formal presentation. [2-3-0; 0-6-0] <i>Prerequisite:</i> Fourth-year standing.
New Courses & Possible Existing Faculty to Teach	
CMPE 201 Computing for Science & Technology	Invention and evolution of computers; impact of computing technology on science and engineering including Internet of Things (IoT) and Industry 4.0 [3-0-0] <i>Prerequisite:</i> APSC 176 or a three-credit English course <i>Instructor:</i> Richard Aleong
CMPE 246 Computer Engineering Design Studio	Embedded systems programming, App development for Internet of Thing applications, Microprocessor Programming [3-2-0] <i>Prerequisite:</i> APSC 177 or COSC 111 <i>Instructor:</i> Dr Ayman Elnaggar
CMPE 301 Software System Design for Engineers	Software development life cycle, architectural patterns, design patterns and anti-patterns, model-view-controller pattern, object-oriented design principles, design for scalability and performance, design for maintainability and testability, agile development. [3-0-0] <i>Prerequisites:</i> APSC 177 or COSC 111, COSC 121, COSC 122. <i>Instructor:</i> Dr. Feng Chen
CMPE 401 Deep Learning for Engineers	Neural networks, computation graph, hyper-parameter tuning, regularization, batch normalization, convolutional neural networks, sequential models, recurrent neural networks, natural language processing, applications of deep learning to electrical, civil, mechanical and manufacturing engineering. [3-0-0] <i>Prerequisite:</i> Fourth-year standing. <i>Instructor:</i> Dr. Julian Cheng or Dr. Anas Chaaban
CMPE 402 Compiler Engineering	Lexical analysis and parsing analysis, semantic analysis, understanding variables, functions, global and local variables, type names and class names, stack frames, instruction selection, register allocation, data flow analysis and optimization, control flow analysis, code generation, loop finding, static single assignment and the optimization [3-0-0] <i>Prerequisites:</i> APSC 179, COSC 222, and ENGR 359 <i>Instructor:</i> Dr. Julian Cheng
CMPE 409 Artificial Intelligence for Robotics	Sensor fusion, state estimation, localization, control, robot planning, machine learning algorithms, artificial neural network, reinforcement learning [3-0-0] <i>Prerequisites:</i> APSC 179, APSC 258, ENGR 360 <i>Instructor:</i> Dr. Julian Cheng or Dr. Zheng Liu

CMPE 410 Network Security & Encryption	Computer networks, security and privacy, threats and vulnerabilities, intrusion detection, authentication, encryption, and cloud security and Internet of Things security. [3-0-0] <i>Prerequisite:</i> fourth-year B.A.Sc. or B.Sc. standing <i>Instructor:</i> Dr. Ahmad Al-Dabbagh
CMPE 461 Cloud Networking	Cloud traffic patterns, physical network structure, virtualization techniques, SDN architecture, CDN architecture, inter-data center networking, and application layer techniques. [3-0-0] <i>Prerequisite:</i> fourth-year B.A.Sc. or B.Sc. Standing <i>Instructor:</i> Dr. Chen Feng
CME 465 Computer Architecture & Organization	Modern processors, GPUs, quantitative principles and instruction set design; pipelining, superscalar issue, out-of-order execution, branch prediction and speculation; memory hierarchies, caches, virtual addressing, prefetching, coherence, and consistency; computer design trade-offs performance evaluation and benchmarks; multicores, VLIW, on-chip networks, and other advanced architectures. [3-2*-0] <i>Prerequisite:</i> APSC 262 and ENGR 359. <i>Instructor:</i> Dr. Ayman Elnaggar
CMPE 485 Introduction to Quantum Computing	Qubit states, operations and measurements, quantum circuits, basic quantum algorithms, Grover's algorithm, Shor's algorithm, Hamiltonian simulation, quantum programming languages. [3-0-0] <i>Prerequisites:</i> All of ENGR 350, ENGR 360. <i>Instructor:</i> Dr. Chen Feng

Appendix 5: Endorsement Letters



From: Niu Liu <Niu.Liu@synopsys.com>

Sent: May 17, 2022 7:57 PM

To: Cheng, Julian <Julian.Cheng@ubc.ca>

Subject: RE: Requesting comments on a proposed computer engineering curriculum at UBC Okanagan

Dear Professor Cheng,

It's a great joy to read this proposal. As a UBC Okanagan alumnus and a hiring manager in the semiconductor industry, I'm fully embracing the proposed computer engineering program.

Semiconductor and all the related hi-tech industries are going through a special period of time. The demand for well-trained engineers has been soared in recent years. At Synopsys, we have been interviewing newly graduated students from all the universities across the country. It's common for a semiconductor company having its openings not filled for a year. On the other hand, it's fairly difficult to seek young candidates who are qualified for the job.

The gap between industry requirement and academic programs are clear. A good candidate is expected to have good understanding of both computer architecture and how it works at transistor level. Computer science background candidates usually don't fit well since they mainly focus on software. For this reason, a good computer engineering program is essential and beneficial for students, the university, and our industry.

Furthermore, AI is re-shaping the technology world right now. It's exciting to see AI related courses are included in this proposal and I believe it will bring the latest prevailing technology to our undergraduates.

As a UBC Okanagan alumnus, it's a pleasure to hear our university is proposing new computer engineering program. I'm keen to see more of our School of Engineering students joining Synopsys.

Sincerely,

Niu



From: Motasem Sakr <motasem.a.sakr@gmail.com>

Sent: May 17, 2022 6:09 PM

To: Cheng, Julian <Julian.Cheng@ubc.ca>

Subject: Re: Requesting quick comments and feedback on the proposed computer engineering curriculum
Hello Prof. Cheng,

The curriculum seems very good and organized. I believe we can add couple of courses:

- * VLSI design/Advanced VLSI, which discusses the chip design track "This can be elective"
- * FPGA architecture
- * Web/Mobile Application development

I think the elective can be distributed in Year 3 and 4 to give the students time to choose the courses as it might be hard to find a lot of interesting electives for the students and suitable time.

Regards,

Mo Sakr - Motasem – Sr. Computer Engineer at Nvidia in Toronto



Dr Rehan Sadiq
Professor and Associate Dean School of Engineering
University of British Columbia Okanagan Campus
1137 Alumni Avenue Kelowna, BC, V1V 1V7

Dear Rehan,

Subject: Supporting letter for Computer Engineering program at UBCO

This letter is to underline my commitment to support the University of British Columbia Okanagan - School of Engineering's implementation of a new degree program, namely Computer Engineering.

As a Senior Executive at ESS Technology in Kelowna, I have seen firsthand the need for this type of curriculum in our valley. We have hired and will continue to hire many of UBCO's Engineering graduates. Admittedly, one program that would assist our firm as well as many others in the valley would be a Computer Engineering program. The skills and experience gained through such a program would allow our firm to step up our R&D efforts as well our success overall in a growing segment of the Okanagan Tech sector.

Please advise if there are other things we at ESS can do to help with getting such a pivotal educational program up and running at UBCO.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Dustin Forman', followed by a long, horizontal, wavy line that serves as a flourish or underline.

Dustin Forman
Sr. Vice President of Engineering & Managing Director
ESS Technology
601-1726 Dolphin Avenue
Kelowna, BC, V1Y 9R9

December 7, 2021

Dr Rehan Sadiq
Professor & Associate Dean
School of Engineering
University of British Columbia/Okanagan Campus 1137 Alumni Avenue
Kelowna BC V1V 1V7 Dear Dr. Sadiq,

Subject: Supporting Letter for Computer Engineering program at UBCO

This letter is to underline SKYTRAC Systems Ltd.'s support of a Computer Engineering program at the University of British Columbia Okanagan/School of Engineering.

SKYTRAC, an aerospace leader in satellite communications and intelligent connectivity, provides innovative technology solutions for the world's largest aircraft and avionics manufacturers. Today, SKYTRAC is actively developing new technologies through broadband connectivity to increase pilot situational awareness, flight safety, and bring value to operators through seamless connectivity. Our head office is based in Kelowna.

Our rapidly growing company continues to seek talented professionals looking to grow their careers within the aviation industry and to be a part of a high-performance culture. We welcome applications from UBCO's Engineering programs whether current students for our many co-op opportunities or graduates for entry level full-time engineering positions. I would anticipate that a robust Computer Engineering program would support a larger pool of applicable talent for us to draw from.

Please let me know if any further information can be provided. Sincerely,

A handwritten signature in dark ink, appearing to read "Karolina May".

Karolina May Senior HR Manager kmay@skytrac.ca
SKYTRAC Systems Ltd. 210-1631 Dickson Avenue Kelowna, BC
Latitude Technologies Corp. 3375 Whittier Avenue Victoria, BC
skytrac.ca latitudetech.com



From: jack@vanderstar.com <jack@vanderstar.com>

Sent: May 19, 2022 12:31 PM

To: Cheng, Julian <Julian.Cheng@ubc.ca>

Subject: Re: Requesting your comments and support for the proposed computer engineering program

Julian,

Thank you for the opportunity to review the proposed computer engineering program. I would like to offer the following as feedback:

1. Having been a CTO of a Silicon Valley based tech company and CTO/CEO of an Okanagan Valley based company this program is definitely needed for the region and the emerging local tech industry in general. The value added and commercialization tech opportunities that the scope of this program covers in its syllabus are the areas where new global opportunities will arise and therefore are essential for UBCO SoE to contribute to the local economy and to be recognized as a leader in these fields.
2. The new Director (Dr Will Hughes) should find this program familiar and complimentary to his background. Therefore, a key position is already in place to drive and support this program.
3. In terms of the proposed courses, I am generally in favour of the Curriculum Map, however, I would like to ensure that technical writing & communications skills remain an integral part of the students learning experience in the SoE at UBCO as part of this Computer Engineering program. To be successful after graduation the students need to be able to write reports, explain complex concepts in simple terms and provide effective presentations to management and stakeholders.
4. I would also like to see that students are exposed to business courses that cover commercialization and entrepreneurial areas so that they have an opportunity to develop these skill sets. Perhaps as an add-on.
5. In the computer engineering area gaming (eg. EA Sports) has an economic impact larger than Hollywood. Adding a course in this area should be considered particularly since positions in this area can largely be virtualized which would be ideal for gaming developers who are trying to make the Okanagan home.

I hope you find this feedback is instructive Julian. Good luck with the implementation of this substantive computer engineering program.

Next time you are in the Okanagan I would like to visit and have lunch.

Best Regards,

Jack

16026 Greenhow Crt. Oyama, BC, Canada, V4V 2E6 (1.250.317.0516)



Jack Van der Star, B.A.Sc., M.A.Sc., P.Eng.,
President Vanderstar Engineering Ltd.

Hi Dr. Cheng,

It's great to hear from you, and I'm excited that UBCO may have a Computer Engineering program in the near future. I think it will be a very important next step for the Okanagan campus, and aligns well with the current job market and global trends. This was made even more important during the pandemic, as companies shifted online, work from home became more practical, and new technologies emerged.

I'm also glad to see you're partnering with the existing computer science program to offer several COSC courses to engineering students. Hopefully some computer engineering courses will be offered to computer science students as well, as I can imagine several of the CMPE courses being applicable to computer science students.

Overall, I think the new courses are well selected, and the 3 presented specializations make sense to me. My biggest concern is that although the learning objectives sound decent, the practice of teaching these things may be difficult. There will be a lot of weight on the instructor/professor to get these concepts across properly, and on the labs/assignments/exams to test the knowledge of the students. I've met too many computer science and computer engineering graduates who cannot program anything non-trivial. A few comments on the new courses:

CMPE 201 - Great idea, a lot of the time we forget the "why" of things, and going over some of the history on why things are the way they are is a great idea.

CMPE 301 - I suggest covering garbage collection and virtual machine-based languages (JVM, .NET, etc) as well (not hardware virtual machines or virtualization, but languages that operate usually via a just in time compiler or are interpreted).

CMPE 402 - It might be worth using a Lisp like language (scheme?) to create a fourth or similar basic language in the course. Might be a good place to introduce functional languages (F#, Lisp, Haskell, etc)

CMPE 410 - I suggest covering proper storage of credentials and backup/redundancy in this course as well. Everyone should know that backups that aren't tested might as well be no backups in most cases.

CMPE 465 - Awesome course, I'd even suggest this could be a 6-credit course.

CMPE 461 - I suggest making CMPE 410 a prerequisite for this course, and building upon the computer networks lessons from 410 by creating VPCs on a Cloud provider. Would be great to partner with Azure/GCP/AWS or similar. Most of these cloud providers have a 'free tier' that allows a decent amount of compute/database/etc. Cloudflare is free by default. Many people fire up compute/databases/etc in a single VPC with no restrictions, leading to many cloud providers having exposed databases, etc. Anyone working with computers should be aware of that, and the cloud with their default configurations and one click deploys sometimes make this worse.

A few courses I would love to see:

"Introduction to Mechanical Computing" (third-or fourth-year course - perhaps offered to electrical/mechanical/computer engineering students) - Analysis of historic mechanical computers (such as the Antikythera Mechanism), early modern mechanical computers, the shift away from analog to digital, and the reemergence of mechanical computing in the quest to accelerate neural networks and other types of computers.

"GPU/FPGA Compute Acceleration" (fourth year course, building upon CMPE 465) - Utilize PCIe connected GPUs and FPGAs to accelerate certain types of compute loads by offloading calculations to massively parallel hardware.

"Redundant System Design" (third- or fourth-year course) - Architect and build fault tolerant systems that involve both software and hardware failover, fail safes and redundancies (classic example being the space shuttle main computers). Analysis of algorithms and methods to handle fault recovery.

Also, a few concepts that I hope are covered in one of the existing courses, but I want to draw some attention to because I think they're important:

- * Use of version control systems (git/SVN/perforce)
- * How to code with others (pull requests, code reviews, merging, branching)
- * The software interview process (trick questions, coding puzzles, classic algorithms/data structures, big O notation, etc) - see the book "Cracking the Coding Interview"
- * Introduction to web technologies (web assembly, browsers, JavaScript/typescript, npm)
- * Software licensing specifically (maybe dropped into engineering law/ethics?)
- * Introduction to open source software (and what open source means, copyleft licensing, etc)
- * Efficient coding (coding for low memory footprint, or low power footprint, etc)
- * Linux command line tools, WSL
- * Introduction to IDEs (Visual Studio, Visual Studio Code, Eclipse, Rider, etc)

In Kelowna there are employers like Skytrac, AEM and KF Aero who would benefit from computer engineering graduates. In Vernon we have large companies like KalTire and Tolko who run large compute workloads. The startup and accelerator workspace surrounding Accelerate Okanagan and the satellite programs in Penticton/Vernon/Kamloops would also see huge benefits from this type of program. So, you definitely have my support!

Let me know if you'd like to discuss further. Also, if you're looking for an instructor for September 2023, I may be available then!

Cheers,
Montana Reid
UBCO – Electrical Engineering Program Alumni (2010)
Microelectronics Consultant



Dear Martin,

One again I wanted to thank you for taking your time to speak with Julian and myself this week. It was very helpful to hear your thoughts on what companies like yours need in terms of talent, and how you would see a new program in computer engineering supporting your company's growth in the Okanagan.

As we discussed, what would really help Julian and myself is if you could provide a quote that would highlight for the government why more engineering graduates in BC, and specifically the Okanagan region would be important, and more specifically the importance of computer engineering graduates.

If you have any further thoughts you would like to share, or would like to be kept in the loop as the program proposal is developed, please let us know.

Kind regards,

Jody L Swift Ph.D

Director, Special Projects and Strategic Initiatives

Faculty of Applied Science | Dean's Office

From: Martin Mallinson <martin.mallinson@siliconintervention.com>

Sent: Monday, October 11, 2021 12:12 PM

To: Swift, Jody <jody.swift@ubc.ca>

Cc: Cheng, Julian <Julian.Cheng@ubc.ca>

Subject: Re: Thank you for your time

My pleasure to meet you too Jody.

Key to establishing a high-tech business is available talent. There will always be a need to work in one place where the vision and techniques from the established engineers can most easily pass to the upcoming generations. This is a question asked of us as we seek investment for the Okanagan area: "How many local staff do you have and how can you grow?" We are proud to be able to say that the local university, UBCO, is thriving, keen to help local tech companies, and able to attract a Canadian and worldwide student pool, who, having experienced the beautiful Okanagan area, are happy to be employed by local tech start-ups such as Silicon Intervention. I encourage the university in the recent efforts to establish what we need: software and hardware are merged in the new fields of AI and IoT; we need graduates schooled in both arts because our success is the optimum mixing of hardware and software to a make valuable and successful product.

Or, that may be too verbose: here is a shorter version (use whichever makes sense)

This is a question asked of us as we seek investment for the Okanagan area: "How many local staff do you have and how can you grow?" We are proud to be able to say that the local university, UBCO, is thriving and keen to help local tech companies. We identified a competitive edge that comes from the optimum mix of software and hardware in AI, IoT and similar products. I am encouraged to see the university recognize this need and pleased to support the Computer Engineering initiative.

Martin M



From: Michael McGuire <mmcguire@uvic.ca>

Sent: May 19, 2022 2:10 AM

To: Cheng, Julian <Julian.Cheng@ubc.ca>; 'mmcguire@ece.uvic.ca' <mmcguire@ece.uvic.ca>

Subject: Re: Requesting feedback on the proposed computer engineering curriculum on UBC Okanagan campus

Hello,

This looks like a good curriculum for a computer engineering program. I like the computer science and software engineering courses in the program. I think that this is a good idea for a computer engineering program. A problem with many computer engineering programs that our faculty members have encountered is that they look very similar to electrical engineering program and these kinds of differences make the computer engineering program distinctive and also make the programs more attractive to potential students.

Cheers,

Michael McGuire

UVIC

ELEC and Computer Engineering Department Head



Dr. Youry Khmelevsky
Chair, Computer Science Department
Okanagan College, Kelowna, BC
Phone: 250 762 5445 ext. 4741
Email: YKhmelevsky@okanagan.bc.ca
Web: www.okanagan.bc.ca/cosc

Dr. William Hughes (will.hughes@ubc.ca)
Professor and Director for the School of Engineering University of British Columbia | Okanagan Campus
1137 Alumni Avenue Kelowna, BC, V1V 1V7

Date: March 20, 2023

Subject: Supporting letter for Computer Engineering program at UBCO

Dear Dr. William Hughes,

This letter underlines my commitment to supporting the University of British Columbia Okanagan — School of Engineering's implementation of a new degree program, Computer Engineering.

It will be a significant next step for the Okanagan campus and aligns well with the current job market and global trends. This was even more critical during the pandemic, as companies shifted online and work from home because more practical and new technologies emerged.

A problem that many computer engineering programs I have encountered is that they look like electrical engineering programs. These differences make the programs distinctive and more attractive to potential students. I would also strongly advise adding a Software Engineering option to the program.

Please let us know if you have any further thoughts or would like to be kept in the loop as the program proposal is developed.

Sincerely,

A handwritten signature in black ink, appearing to read "YKhmelevsky", with a stylized flourish at the end.

Youry Khmelevsky

Central Okanagan Region • Kelowna Campus Kelowna, British Columbia V1Y 4X8 Canada • Phone (250) 762-5445 • www.okanagan.bc.ca

Appendix 6: Sample Job Postings

Verification Engineer Company: Microchip Technology Location: Burnaby, BC
Job Description <ul style="list-style-type: none">• Develop and execute verification test plans to verify complex digital integrated circuits (100K to 10M+ gates), which are coded in System Verilog/Verilog/VHDL using coverage metrics and constrained random-driven verification techniques.• Design, implement and maintain verification test benches and bus-functional models in Specman or System Verilog using best-in-class verification methodologies such as UVM.• Write and execute testcases according to the verification test plans to verify these complex designs. Track down bugs and technical problems and work with the design team to ensure timely resolution.• Read and understand applicable storage protocol standards. Job Requirements <ul style="list-style-type: none">• Bachelor's degree in Electrical Engineering or Computer Engineering or Master's degree• Scripting and programming skills. Experience using Verilog / VHDL is required.• Knowledge of System Verilog and knowledge of UVM or OVM is an asset.• Working knowledge with verification tools such as Cadence NC-Sim, waveform viewers, and other similar tools.• Knowledge of CPU architecture, PCIe or SAS/SATA is an asset.• Excellent analytical and debugging skills and the ability to proactively solve issues.• Excellent teamwork and time management skills and the ability to work under pressure.• Proven ability to learn and adapt to new methodologies and technologies.• Excellent verbal and written communication skills in English.
System Development Engineer Company: Amazon Location: Vancouver, BC
Basic Qualifications <p>Degree in Computer Science, Computer Engineering, Electrical Engineering, MIS, or 5 years equivalent technology experience. Equivalent experience to a Bachelor's degree based on 1 year of related work experience for every 1 year of education. Strong written and spoken English language communication skills. Strong customer focus. Ability to prioritize multiple tasks and projects in a dynamic environment. Proficient operating in a Linux environment, including configuration of networking and security. Ability to work independently with sometimes minimal direction. A drive to take ownership of problems and solve them.</p> Preferred Qualifications <p>Hands on AWS experience with production workloads Some Windows experience or willingness to learn will be required Experience with CloudFormation Proficiency in computer security: network security, application security, security protocols, cryptography Experience in a DevOps team, supporting CI/CD workloads Python/Ruby and Unix shell scripting experience Job details Vancouver, Canada Systems, Quality, and Security Engineering Software Development</p>
MPDP Architect

Company: Government of The Province of British Columbia

Location: Victoria, BC

The MPDP Architect is responsible for applying business and technical acumen towards new product design, enhancement/maintenance to existing products and integrations in the new or existing platform. This role is also responsible for reviewing application work products and providing guidance and direction to team members in areas of application design, build and implementation standards and processes such as ITIL framework, SDLC methodologies, project management methodologies adopted by Advanced Solutions.

Job Requirements:

In order to be considered for this position, your application must clearly demonstrate how you meet the education and experience as outlined below:

- Bachelor's Degree or higher in Software Engineering, Computer Science or a related field; OR
- Post-Secondary Diploma in Software Engineering, Computer Science or a related field; OR
- An equivalent combination of education and experience may be considered.
- Minimum of 5 years' experience (with Bachelor's Degree or higher) or a minimum of 7 years' experience (with a Post-Secondary Diploma) in an Information Technology capacity as an application designer, developer/analyst.
- Minimum of 5 years' experience (with Bachelor's Degree or higher) or a minimum of 7 years' experience (with a Post-Secondary Diploma) working within a Software Development Life Cycle methodology such as Waterfall or Agile.
- Minimum of 2 years' experience (with a Bachelor's Degree or higher) or a minimum of 4 years' experience (with a Post-Secondary Diploma) working within ITIL Best Practices process model in an application management enhancement, maintenance and production support environment.
- Minimum of 2 years' experience (with a Bachelor's Degree or higher) or a minimum of 4 years' experience (with a Post-Secondary Diploma) designing, developing and managing commercial grade software solutions using e-Commerce platforms in a SOA at scale.
- Minimum of 2 years' experience (with a Bachelor's Degree or higher) or a minimum of 4 years' experience (with a Post-Secondary Diploma) and expertise building and scaling citizen facing responsive designed web-based portals preferably on C#, ASP.NET MVC, HTML5, CSS3, JavaScript, JavaScript libraries and MS SQL Server.

Preference may be given to applicants with the following:

- Bachelor's Degree or higher in Software Engineering, Computer Science or a related field AND a minimum of 6 years' experience.

Applicants selected to move forward in the hiring process may be assessed on the Knowledge, Skills, Abilities and Competencies as outlined in the attached Job Profile located in the Additional Information section at the bottom of the posting.

A Criminal Record Check (CRC) will be required.

Embedded Software Developer 3

Company: Randstad

Location: Burnaby, BC

Job Responsibilities:

- Development, design and test the software for Leading Technology Company products
- Hands on in bug fixing
- Maintain and document code using source control system

<ul style="list-style-type: none"> • Maintenance, performance tuning, and support of implemented software or firmware products • Implement new features according to identified specs • 3 years+ of C/C++ experience • Experience with TCP/IP, Firewall, UTM • Software development experience in Unix/Linux environment • Capable of switching focus in various situations and apply themselves to quickly learning new technologies and adopting new methodologies • Excellent problem solving and troubleshooting skills • Relational database skills are an asset <p>Educational Requirements:</p> <ul style="list-style-type: none"> • Bachelor's Degree (Masters or PhD is an asset) in Computer Science or similar degree
<p>Senior Software Engineer (Cloud) Company: Annex Consulting Group Location: Greater Vancouver</p>
<p>Job Responsibilities:</p> <p>Our client is looking for Senior Software Engineer to join their team.</p> <ul style="list-style-type: none"> • Work with product managers to plan out feature scope and requirements • Design and build features and functionality delivered on time and within scope • Demonstrate ownership of solution architecture, end-to-end code quality, system tests, functional tests and integration • Participate in code and design reviews, attend regular team meetings, and apply software development best practices • Mentor team members and contribute to the improvement of team culture • Take ownership of your code and be comfortable working autonomously • Contribute to the continual improvement of the development process • Stay informed of advances in development techniques, technologies and methods <p>Requirements:</p> <ul style="list-style-type: none"> • Bachelor's Degree in Computer Science, Engineering, or related software technology field, or demonstrated job experience equating to a Bachelor's Degree • Minimum 5 years relevant work experience developing in C# .NET • Microsoft Azure Developer Associate certificate is an asset • Solid understanding of and working experience with cloud technologies and architecture • Experience in web application development using Microsoft .NET platform • Strong experience in designing solutions with proven software best practices and design patterns • Working knowledge of GIT, Azure DevOps or similar systems • Experience with Agile or Scrum process • Microsoft SharePoint and/or Microsoft Office development experience an asset • Excellent communication skills and ability to collaborate
<p>Hardware Engineer Company: Intel Location: Vancouver, BC</p>
<p>Job Description:</p> <p>Conducts or participates in multidisciplinary research in the design, development, testing and utilization of information processing hardware and/or electrical components, mechanisms, materials, and/or circuitry, processes, packaging, and cabinetry for central processing units (CPUs) and/or peripheral equipment. Prepares specifications, evaluates vendors, and analyzes test reports. Ensures products conform to standards and specifications. Develops plans and cost estimates and assesses projects to</p>

analyze risk. Develops procedures, analysis and design for computer components, products, and systems. Initiates, guides, and coordinates overall design and development of new ideas and products. Responds to customer/client requests or events as they occur. Develops solutions to problems utilizing formal education and judgement.

The ideal candidate should exhibit the following behaviors:

- Good analytical skills and ability to understand and communicate complex concepts
- Strong planning, and documentation and leadership skills
- Good communication, interpersonal and problem-solving skills
- Work effectively both, independently and in a team environment

Qualifications - Education:

- Bachelor's or Master's degree in Electrical Engineering, Computer Engineering or related discipline

Minimum Requirements:

- 4+ years with Bachelor's or 2+ years with Master's degree in hardware design & validation flow
- 2+ years of signal integrity, high speed signal fundamentals and power systems design
- 2+ years with lab tools such as oscilloscopes, power supplies and soldering equipment.

Preferred Skill or Experience:

- Prefer experience with NAND/Optane technology

Inside this Business Group Non-Volatile Solutions Memory Group:

The Non-Volatile Memory Solutions Group is a worldwide organization that delivers NAND flash memory products for use in Solid State Drives (SSDs), portable memory storage devices, digital camera memory cards, and other devices. The group is responsible for NVM technology design and development, complete Solid-State Drive (SSD) system hardware and firmware development, as well as wafer and SSD manufacturing.

Appendix 7: Environment Scan of Institutions offering Computer Engineering

Institution	Program
UBC Vancouver	BASc Computer Engineering https://ece.ubc.ca/undergraduates/programs/computer-engineering-program/
SFU	BASc Computer Engineering http://www.sfu.ca/engineering/current-students/undergraduate-students/programs-and-requirements/computer-engineering.html
UVIC	BEng – Computer Engineering https://www.uvic.ca/undergraduate/programs/undergraduate-programs/pages/computer-engineering.php
University of Alberta	Electrical & Computer Engineering https://www.ualberta.ca/engineering/electrical-computer-engineering/index.html
University of Sask.	BE – Computer Engineering https://programs.usask.ca/engineering/computer-engineering/index.php
University of Manitoba	BSc – Computer Engineering https://umanitoba.ca/explore/programs-of-study/computer-engineering-bsc
York University	B.Eng. Computer Engineering https://lassonde.yorku.ca/academics/computer-engineering
University of Waterloo	BASc in Computer Engineering https://uwaterloo.ca/future-students/programs/computer-engineering
University of Toronto	BASc Computer Engineering https://www.ece.utoronto.ca/undergraduate-students/program-requirements-options/program-requirements/
University of Ottawa	Computer Engineering https://www.uottawa.ca/faculty-engineering/undergraduate-studies/programs/computer-engineering
University of Guelph	B. Eng Computer Engineering https://www.uoguelph.ca/engineering/undergraduate/future-students/computer
Toronto Metropolitan University (Ryerson)	B.Eng Computer Engineering https://www.torontomu.ca/programs/undergraduate/computer-engineering/
Royal Military College of Canada	B.Eng Computer Engineering https://www.rmc-cmr.ca/en/registrars-office/electrical-engineering-and-computer-engineering-undergraduate-programmes
Queen’s University	BASc Computer Engineering https://engineering.queensu.ca/programs/undergraduate/computer-engineering.html
McMaster University	B.Eng Computer Engineering https://www.eng.mcmaster.ca/ece/programs/degree-options/beng-computer-engineering/
McGill University	B.Eng Computer Engineering https://www.mcgill.ca/study/2022-2023/faculties/engineering/undergraduate/programs/bachelor-engineering-beng-computer-engineering
Concordia University	B.Eng Computer Engineering https://www.concordia.ca/ginacody/electrical-computer-eng/programs/computer-eng.html

Appendix 8: Intentional Engagement

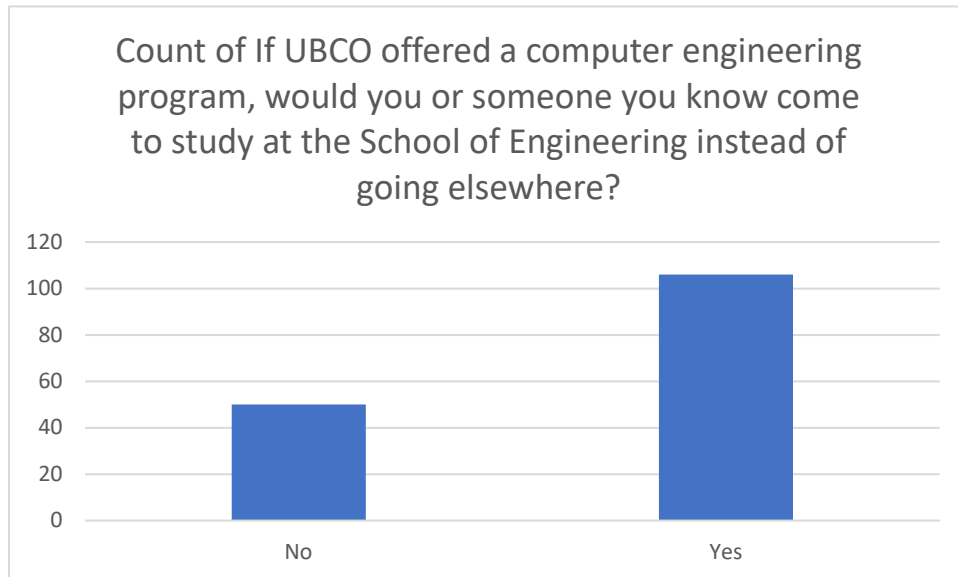
SoE is committed to a process of resource optimization in order to help offset the majority of new resource allocation needs for this program. This would be done by working collaboratively with SoE staff, IT, scheduling services, facilities to complete a review of existing course enrollments, and evaluating whether there are any existing course offerings within the SoE which are no longer serving our students and our programs.

In December 2022, consultation meetings were held with the following to ensure viability of the program on the campus, specifically, proponents of the program met with the following groups:

Group	Context of meeting	Outcome /Actions
Enrollment Services <i>James Olson, Will Hughes, Bert Annear, Jay Graham and Jody Swift</i>	To discuss potential changes in enrollment for CMPE program and how this would fit within the context of the APSC faculty wide strategic growth initiative, on both campuses.	<p>Agreement that CMPE is a strategic priority that would help ensure that the Okanagan campus remains an attractive for both domestic and international students.</p> <p>Recognition that to launch the program we only need to create 4 new core courses – not a big change</p> <p>Timing of the program introduction is important (relative to space), and the minor increase in the enrollment may be managed by the SoE's proposed plan to minimize impact by resource optimization will be viewed as positive.</p> <p>The team will further review after answer all questions raised by Natalie and to meet again if needed.</p>
Facilities <i>Will Hughes, Natalie Walliser and Jody Swift</i>	Discussed potential timeline for new CMPE program, and overall impact to scheduling.	Natalie provided a list of questions for the SoE to answer, answers to be returned early January with the option to meet again if needed.
It <i>Todd Zimmerman, Rebecca Kaus, Sky Mooney, Paul Levinson, Nathan Cable, Andy Fehr, Connor English, Patti Ostrikoff, Julian Cheng, and Ahmad Al-Dabbagh</i>	To discuss IT needs (computer labs), and determine anticipated costs and resource allocation required for the program	Support for the new CMPE program and confirmation that the campus computer lab facilities and classrooms will support the program. The IT department has plans to expand on the computer lab facilities which will work in favour of this program and the timeframe given for the higher-level courses.

Appendix 6: Student Survey

A survey was conducted with the UBCO Electrical Engineering students in April 2021. The results favoured adding a Computer Engineering program at the Okanagan campus of UBC.



Appendix 11: Budget Impact

-To be added after Dean's Council-



Curriculum Proposal Form

NEW Program – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty/School Approval Date: 2022.05.11 Effective Session: 2023W	Curriculum Committee Date: 2022.05.03 Contact Person: Dr. Sabine Weyand Phone: 250.807.9643 Email: Sabine.weyand@ubc.ca
Type of Action: New Program	
<p>Rationale: Computer Engineering is designed to address the demand of engineering professionals who are well trained in electrical and computer technology. Despite this high demand, there is only one other institution, Thompson Rivers University who has to been approved, but yet to start a degree in Computer Engineering. Okanagan College and other regional colleges offer the Software Engineering Programs in which this proposed Computer Engineering program would be seen as more complementary. Unlike Computer Science, which focuses more on software, computer engineering focuses more on hardware and solves real-life problems using a combined knowledge of electrical engineering and computer science. For this reason, the industry demand for computer engineering graduates has been strong, and a skilled computer engineering graduate can lead to high-paying jobs with some of the best companies such as Apple, Amazon, Google, Intel, and Tesla. While the Bureau of Labor Statistics (BLS) projects a slower-than-average growth rate of 2% for computer engineers, these professionals earned a healthy median annual salary of \$119,560 as of 2020. Indeed.ca currently shows that more than 3,000 unfilled computer engineering positions are just in the greater Toronto area alone and another 6,000 unfilled computer engineering positions in Canada. In addition, our local companies, such as ESS Technology, have ongoing unfilled computer engineering positions. Currently, the Department of Electrical and Computer Engineering offers a computer engineering program on the Vancouver campus, and the program has to disappoint 50% of the applicants each year. Our uniquely designed computer engineering program will attract applicants from UBC Vancouver and other talents to the Okanagan region. According to our recent student survey, our students would strongly welcome this new program. In addition, the proposed computer engineering program will focus on artificial intelligence (AI) applications. It will create a strong push for start-ups to tackle the 390 billion global AI market by 2025 (according to Grand View Research), and computer hardware lies underneath each AI application. For example, Intel predicts that the AI accelerator market for data centers alone was valued at 13.7 billion in 2021 and is expected to reach 65.3 billion by 2026.</p>	

**Proposed Academic Calendar Entry:****Bachelor of Applied Science Program****Contents**

Admission Requirements	→
Academic Advising	→
Academic Regulations	→
Degree Requirements	→
Year 1	→
Civil Engineering	→
Computer Engineering	→
Manufacturing Engineering	→
Mechanical Engineering	→
Minor in Arts	→
Minor in Computer Science	→
Minor in Management	→
Co-operative Education Program	→
Dual Degree Program Option: Bachelor of Applied Science and Master of Management	→
Undergraduate Certificate in Communications and Rhetoric	

Proposed Academic Calendar Entry:**Admission Requirements**

...

[17079] Transition from UBC Vantage One Engineering

...

[17085] ¹Eligible programs include: Okanagan Campus: Civil, **Computer**, Electrical, Manufacturing, and Mechanical Engineering. Vancouver Campus: Biomedical, Chemical, Chemical and Biological, Civil, Computer, Electrical,

Draft Academic Calendar URL:

<https://www.calendar.ubc.ca/okanagan/proof/edit/index.cfm?tree=18,317,989,0>

Present Academic Calendar Entry:**Bachelor of Applied Science Program****Contents**

Admission Requirements	→
Academic Advising	→
Academic Regulations	→
Degree Requirements	→
Year 1	→
Civil Engineering	→
Electrical Engineering	→
Manufacturing Engineering	→
Mechanical Engineering	→
Minor in Arts	→
Minor in Computer Science	→
Minor in Management	→
Co-operative Education Program	→
Dual Degree Program Option: Bachelor of Applied Science and Master of Management	→
Undergraduate Certificate in Communications and Rhetoric	

Draft Academic Calendar URL:

<https://www.calendar.ubc.ca/okanagan/proof/edit/index.cfm?tree=18,317,989,1183>

Present Academic Calendar Entry:**Admission Requirements**

...

[17079] Transition from UBC Vantage One Engineering

...

[17085] ¹Eligible programs include: Okanagan Campus: Civil, Electrical, Manufacturing, and Mechanical Engineering. Vancouver Campus: Biomedical, Chemical, Chemical and Biological, Civil, Computer, Electrical, Engineering Physics, Environmental, Geological, Integrated,



Engineering Physics, Environmental, Geological, Integrated, Manufacturing, Materials, Mechanical and Mining Engineering.

Proposed Academic Calendar Entry:

Introduction

...
[13595] The School of Engineering at the UBC Okanagan campus offers the Bachelor of Applied Science (B.A.Sc.) degree in Civil Engineering, **Computer Engineering**, Electrical Engineering, **Manufacturing Engineering** and Mechanical Engineering. Each program, **excluding the newly added Computer Engineering**, is accredited by the Canadian Engineering Accreditation Board. Qualified applicants can be admitted directly from secondary school into Engineering One. Students may also enter the Engineering program after having successfully completed the equivalent of first-year Science. There are also admission routes via engineering transfer programs at various colleges and Engineering Bridge programs with Okanagan College and Camosun College.

Proposed Academic Calendar Entry:

Year 1

...
[17695] Students proceeding to second year will have the option of continuing their Engineering program at the UBC Okanagan campus in Civil Engineering, **Computer Engineering**, Electrical Engineering, Manufacturing Engineering or Mechanical Engineering, or transferring to the UBC Vancouver campus* into one of the following programs: Biomedical Engineering, Chemical and Biological Engineering,

Manufacturing, Materials, Mechanical and Mining Engineering.

Draft Academic Calendar URL:

<https://www.calendar.ubc.ca/okanagan/proof/edit/index.cfm?tree=18,317,988,0>

Present Academic Calendar Entry:

Introduction

...
[13595] The School of Engineering at the UBC Okanagan campus offers the Bachelor of Applied Science (B.A.Sc.) degree in Civil Engineering, Electrical Engineering, and Mechanical Engineering. Each program is accredited by the Canadian Engineering Accreditation Board. ~~The School also offers a Bachelor of Applied Science (B.A.Sc.) degree in Manufacturing Engineering.~~ Qualified applicants can be admitted directly from secondary school into Engineering One. Students may also enter the Engineering program after having successfully completed the equivalent of first-year Science. There are also admission routes via engineering transfer programs at various colleges and Engineering Bridge programs with Okanagan College and Camosun College.

Draft Academic Calendar URL:

<https://www.calendar.ubc.ca/okanagan/proof/edit/index.cfm?tree=18,317,989,1379>

Present Academic Calendar Entry:

Year 1

...
[17695] Students proceeding to second year will have the option of continuing their Engineering program at the UBC Okanagan campus in Civil Engineering, Electrical Engineering, Manufacturing Engineering or Mechanical Engineering, or transferring to the UBC Vancouver campus into one of the following programs: Biomedical Engineering,



Civil Engineering, Computer Engineering, Electrical Engineering, Engineering Physics, Geological Engineering, Integrated Engineering, Manufacturing Engineering, Materials Engineering, Mechanical Engineering, or Mining Engineering. Admission to a selected program is dependent on performance in first year.

Proposed Academic Calendar Entry:

Degree Requirements

[13653] Complementary Studies Courses

[13654] Students must take complementary studies courses **totaling** at least 21 credits. The minimum requirements are as follows:

[13655]

- Professional Development - ENGR 413: Law and Ethics for Engineers (3 credits);
- Communication - APSC 176: Engineering Communication (3 credits) and APSC 201: Technical Communication (**CIVIL, ELEC, MANF, MECH Students - 3 credits**);
- **Communication - APSC 176: Engineering Communication (3 credits) and CMPE 201: Computing for Science and Technology (CMPE Students - 3 credits)**;
- Impact of Technology on Society - APSC 169: Fundamentals of Sustainable Engineering Design (3 credits);
- Management - ENGR 303: Engineering Project Management (CIVIL, **CMPE**, ELEC, MECH Students - 3 credits);

Chemical and Biological Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Engineering Physics, Geological Engineering, Integrated Engineering, Manufacturing Engineering, Materials Engineering, Mechanical Engineering, or Mining Engineering. Admission to a selected program is dependent on performance in first year.

Draft Academic Calendar URL:

<https://www.calendar.ubc.ca/okanagan/prof/edit/index.cfm?tree=18,317,989,1187>

Present Academic Calendar Entry:

Degree Requirements

[13653] Complementary Studies Courses

[13654] Students must take complementary studies courses ~~totaling~~ at least 21 credits. The minimum requirements are as follows:

[13655]

- Professional Development - ENGR 413: Law and Ethics for Engineers (3 credits);
- Communication - APSC 176: Engineering Communication (3 credits) and APSC 201: Technical Communication (3 credits);
- Impact of Technology on Society - APSC 169: Fundamentals of Sustainable Engineering Design (3 credits);
- Management - ENGR 303: Engineering Project Management (CIVIL, ELEC, MECH Students - 3 credits);
- Management - MANF 470 Production Systems Management III (MANF Students – 3 credits)
- Engineering Economics - ENGR 305: Engineering Economic Analysis (3 credits);



- Management - MANF 470 Production Systems Management III (MANF Students – 3 credits)
- Engineering Economics - ENGR 305: Engineering Economic Analysis (3 credits);
- Humanities and Social Sciences electives (3 credits). In general, scientific geography courses, statistical courses, and studio/performance courses in visual arts, music, and theatre will not satisfy this requirement. Courses that teach language skills are not acceptable. Suggested subjects include Anthropology, Art History, Cultural Studies, Economics, English (not ENGL 109, 112, 114), Geography (GEOG 128 or 129), Health Studies (HEAL 100), History, Indigenous Studies, Philosophy (not PHIL 120 or 125), Political Science, Psychology, and Sociology.

Proposed Academic Calendar Entry:

Computer Engineering

In the second, third and fourth years, students will follow a program in Computer Engineering.

<u>Second Year Computer Engineering Curriculum</u>		<u>Credits</u>
APSC 201	Technical Communications	3
APSC 246	System Dynamics	3
APSC 248	Engineering Analysis III	3
APSC 255	Electric Circuits and Power	3
APSC 256	Numerical Methods for Analysis	3
APSC 262	Digital Systems Design	3
APSC 278	Electric and Magnetic Fields	3
CMPE 201	Computing for Science and Technology	3
CMPE 246	Computer Engineering Design Studio	3
COSC 121	Computer Programming II	3
COSC 221	Introduction to Discrete Structures	3
COSC 222	Data Structure	3
Total Credits		36
<u>Third Year Computer Engineering Curriculum</u>		<u>Credits</u>

- Humanities and Social Sciences electives (3 credits). In general, scientific geography courses, statistical courses, and studio/performance courses in visual arts, music, and theatre will not satisfy this requirement. Courses that teach language skills are not acceptable. Suggested subjects include Anthropology, Art History, Cultural Studies, Economics, English (not ENGL 109, 112, 114), Geography (GEOG 128 or 129), Health Studies (HEAL 100), History, Indigenous Studies, Philosophy (not PHIL 120 or 125), Political Science, Psychology, and Sociology.

Draft Academic Calendar URL:

N/A

Present Academic Calendar Entry:

N/A



APSC 270	Signal and Communications	3
CMPE 301	Software System Design for Engineers	3
COSC 310	Software Engineering	3
COSC 315	Introduction to Operating System	3
ENGR 303	Engineering Project Management	3
ENGR 305	Engineering Economic Analysis	3
ENGR 350	Linear Circuit Theory	3
ENGR 351	Microelectronics I	3
ENGR 359	Microcomputer Engineering	3
ENGR 360	Engineering Probability and Statistics	3
ENGR 362	Digital Signal Processing I	3
MANF 386	Industrial Automation	3
Total Credits		36

Fourth Year Computer Engineering Curriculum		Credits
CMPE 485	Introduction to Quantum Computing	3
ENGR 413	Law and Ethics for Engineers	3
ENGR 499	Engineering Capstone Design Project	6
	Humanities Elective ¹	3
	Design Electives ^{2 3}	12
	Technical Electives ⁴	9
Total Credits		36

¹ In general, scientific geography courses, statistical courses, and studio/performance courses in fine arts, music, and theatre will not satisfy this requirement. Courses that teach language skills are not acceptable. See Complementary Studies Courses

² To be chosen from a list of Computer Engineering design elective courses provided by the School of Engineering.

³ Students with transfer credits from other institutions (e.g. transfer programs, Go Global/CIE or Bridge programs) should consult the Civil Engineering Advising sheet and check with an Engineering Advisor prior to their 4th year registration date.

⁴ To be chosen from a list of Computer Engineering technical elective courses provided by the School of Engineering.



Admissions Proposal Form Okanagan Campus

Faculty of Applied Science School of Engineering Approval Date: 2022.05.10 Effective Session: 2023W	Date: 2022.10.15 Contact People: Dr. Yang Cao (yang.cao@ubc.ca) Dr. Julian Cheng
Type of Action: New Admissions requirements – University level	
Rationale: The School of Engineering is proposing a new under graduate program in Computer Engineering. The admissions will follow typical BAsC. undergraduate studies requirements for	
Proposed Academic Calendar Entry: Admission Requirements ... [17085] 'Eligible programs include: Okanagan Campus: Civil, Computer , Electrical, Manufacturing, and Mechanical Engineering.	Draft Academic Calendar URL: Admission Requirements - Bachelor of Applied Science Program - School of Engineering - Faculties, Schools, and Colleges - Okanagan Academic Calendar 2022/23 - UBC Student Services Present Academic Calendar Entry: Admission Requirements ... [20208] Students transferring into the second year of the Biomedical Engineering program who have not completed all required first year BME courses may be required to complete additional first year course work during second year. [17085] 'Eligible programs include: Okanagan Campus: Civil, Electrical, Manufacturing, and Mechanical Engineering. Vancouver Campus: Biomedical, Chemical, Chemical and Biological, Civil, Computer, Electrical, Engineering Physics, Environmental, Geological, Integrated, Manufacturing, Materials, Mechanical and Mining Engineering.



Curriculum Proposal Form

New Program – Okanagan campus

Category: 1																																																																			
School of Engineering Faculty of Applied Science Faculty Approval Date: 2022.05.11 Effective Session: 2023W	SOE Curriculum Date: 2022.05.03. Contact Person: Dr. Sabine Weyand Phone: 250.807.8068 Email: Sabine.Weyand@ubc.ca																																																																		
Type of Action: New Course Code																																																																			
Rationale:																																																																			
<p>Proposed Academic Calendar Entry:</p> <p style="text-align: center;">Courses by Subject Code</p> <p>This chapter provides an archive of courses offered by the UBC Okanagan campus. For current course sections and schedules, please visit the online Course Schedule.</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: right;"><u>ANTH</u></td><td><u>Anthropology</u></td></tr> <tr><td style="text-align: right;"><u>APSC</u></td><td><u>Applied Science</u></td></tr> <tr><td style="text-align: right;"><u>ARTH</u></td><td><u>Art History and Visual Culture</u></td></tr> <tr><td style="text-align: right;"><u>ASTR</u></td><td><u>Astronomy</u></td></tr> <tr><td style="text-align: right;"><u>BIOC</u></td><td><u>Biochemistry</u></td></tr> <tr><td style="text-align: right;"><u>BIOL</u></td><td><u>Biology</u></td></tr> <tr><td style="text-align: right;"><u>CCS</u></td><td><u>Creative and Critical Studies</u></td></tr> <tr><td style="text-align: right;"><u>CHEM</u></td><td><u>Chemistry</u></td></tr> <tr><td style="text-align: right;"><u>CHIN</u></td><td><u>Chinese</u></td></tr> <tr><td style="text-align: right;"><u>CMPE</u></td><td><u>Computer Engineering</u></td></tr> <tr><td style="text-align: right;"><u>COOP</u></td><td><u>Cooperative Education</u></td></tr> <tr><td style="text-align: right;"><u>CORH</u></td><td><u>Communications and Rhetoric</u></td></tr> <tr><td style="text-align: right;"><u>COSC</u></td><td><u>Computer Science</u></td></tr> <tr><td style="text-align: right;"><u>CRWR</u></td><td><u>Creative Writing</u></td></tr> <tr><td style="text-align: right;"><u>CULT</u></td><td><u>Cultural Studies</u></td></tr> <tr><td style="text-align: right;"><u>CUST</u></td><td><u>Curriculum Studies</u></td></tr> <tr><td colspan="2">...</td></tr> </table>	<u>ANTH</u>	<u>Anthropology</u>	<u>APSC</u>	<u>Applied Science</u>	<u>ARTH</u>	<u>Art History and Visual Culture</u>	<u>ASTR</u>	<u>Astronomy</u>	<u>BIOC</u>	<u>Biochemistry</u>	<u>BIOL</u>	<u>Biology</u>	<u>CCS</u>	<u>Creative and Critical Studies</u>	<u>CHEM</u>	<u>Chemistry</u>	<u>CHIN</u>	<u>Chinese</u>	<u>CMPE</u>	<u>Computer Engineering</u>	<u>COOP</u>	<u>Cooperative Education</u>	<u>CORH</u>	<u>Communications and Rhetoric</u>	<u>COSC</u>	<u>Computer Science</u>	<u>CRWR</u>	<u>Creative Writing</u>	<u>CULT</u>	<u>Cultural Studies</u>	<u>CUST</u>	<u>Curriculum Studies</u>	...		<p>Draft Academic Calendar URL: https://www.calendar.ubc.ca/okanagan/p/roof/edit/courses.cfm?go=code</p> <p>Present Academic Calendar Entry:</p> <p style="text-align: center;">Courses by Subject Code</p> <p>This chapter provides an archive of courses offered by the UBC Okanagan campus. For current course sections and schedules, please visit the online Course Schedule.</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: right;"><u>ANTH</u></td><td><u>Anthropology</u></td></tr> <tr><td style="text-align: right;"><u>APSC</u></td><td><u>Applied Science</u></td></tr> <tr><td style="text-align: right;"><u>ARTH</u></td><td><u>Art History and Visual Culture</u></td></tr> <tr><td style="text-align: right;"><u>ASTR</u></td><td><u>Astronomy</u></td></tr> <tr><td style="text-align: right;"><u>BIOC</u></td><td><u>Biochemistry</u></td></tr> <tr><td style="text-align: right;"><u>BIOL</u></td><td><u>Biology</u></td></tr> <tr><td style="text-align: right;"><u>CCS</u></td><td><u>Creative and Critical Studies</u></td></tr> <tr><td style="text-align: right;"><u>CHEM</u></td><td><u>Chemistry</u></td></tr> <tr><td style="text-align: right;"><u>CHIN</u></td><td><u>Chinese</u></td></tr> <tr><td style="text-align: right;"><u>COOP</u></td><td><u>Cooperative Education</u></td></tr> <tr><td style="text-align: right;"><u>CORH</u></td><td><u>Communications and Rhetoric</u></td></tr> <tr><td style="text-align: right;"><u>COSC</u></td><td><u>Computer Science</u></td></tr> <tr><td style="text-align: right;"><u>CRWR</u></td><td><u>Creative Writing</u></td></tr> <tr><td style="text-align: right;"><u>CULT</u></td><td><u>Cultural Studies</u></td></tr> <tr><td style="text-align: right;"><u>CUST</u></td><td><u>Curriculum Studies</u></td></tr> <tr><td colspan="2">...</td></tr> </table>	<u>ANTH</u>	<u>Anthropology</u>	<u>APSC</u>	<u>Applied Science</u>	<u>ARTH</u>	<u>Art History and Visual Culture</u>	<u>ASTR</u>	<u>Astronomy</u>	<u>BIOC</u>	<u>Biochemistry</u>	<u>BIOL</u>	<u>Biology</u>	<u>CCS</u>	<u>Creative and Critical Studies</u>	<u>CHEM</u>	<u>Chemistry</u>	<u>CHIN</u>	<u>Chinese</u>	<u>COOP</u>	<u>Cooperative Education</u>	<u>CORH</u>	<u>Communications and Rhetoric</u>	<u>COSC</u>	<u>Computer Science</u>	<u>CRWR</u>	<u>Creative Writing</u>	<u>CULT</u>	<u>Cultural Studies</u>	<u>CUST</u>	<u>Curriculum Studies</u>	...	
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Curriculum Proposal Form

New Course – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty Approval Date: 2022.05.11 Effective Session: 2023W	Date: 2022.05.03 Contact Person: Julian Cheng Phone: 250.807.8808 Email: julian.cheng@ubc.ca
Type of Action: New Course	
Rationale: This course is required for the second-year computer engineering students who will gain a good overview of the historical evolution of computers and their impacts on science and technology. We will survey the role of computers during the WWII, especially in nuclear engineering, computers as a simulation and scientific tool, the mathematical logic and automation of proof for computers, and computers as roles in aerospace engineering, medicine, control, communication, network, as well as the roles of computer in modern Internet of Things (IoT). While surveying the history, the emphasis will be placed on the computer architecture and design. Throughout this course, the student will develop the skill and ability to research and write about a research topic and further develop their written and presentation skills.	
Proposed Academic Calendar Entry: <u>CMPE 201 (3) Computing for Science, Engineering, and Technology</u> <u>Invention and evolution of computers; impact of computing technology on science and engineering including Internet of Things (IoT) and Industry 4.0. [3-0-0]</u> <u>Prerequisite: APSC 176 or a three-credit English course</u>	Present Academic Calendar Entry: N/A



Curriculum Proposal Form

New Course – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty Approval Date: 2022.05.11 Effective Session: 2023W	Date: 2022.05.03 Contact Person: Dr. Julian Cheng Phone: 250.807.8800 Email: julian.cheng@ubc.ca
Type of Action: New Course	
<p>Rationale: This course is required for the second-year engineering students who need to practice doing project skills. Besides the traditional materials covered in a programming, this course will introduce Embedded System Programming, Android and Internet of Things (IoT) Development, the Raspberry Pi Platform and Python Programming. This course will focus on arise the programming interests of students with multiple platforms and tools. This course will also update the curriculum of School of Engineering programs.</p> <p>We are structuring a curriculum in programming to provide students with a set of basic knowledge and skills. This subject encompasses a wide variety of topics including embedded systems programming, embedded design rules and interfaces, error handling, debugging, logic analyzers, Android, IoT, Java programming, implementation and maintenance of Android SDK, Android user interface design, Android lifecycle, sensor interfacing, file storage, Bluetooth, Wi-Fi, Raspberry Pi Platform and Python Programming. There exist three modules including: module 1 - Embedded System Programming for Using C/C++ (Lectures approx. 5 weeks), module 2 - Android and Internet of Things (IoT) Development (Lectures approx. 5 weeks), and module 3 - the Raspberry Pi Platform and Python Programming for the Raspberry Pi (Lectures approx. 3 weeks). Due to the popularity of Python, there is already a course, namely APSC 258, focusing on Python programming hence only three weeks are assigned to the modules 3. This course will focus on arising students' programming interests with some basic introductions to multiple programming languages, tools, and platforms. When the students find their own interests, they are encouraged to investigate that topic further and dig it deeper. Additionally, this course supports team playing and allows up to 5 students in a group that will encourage students to work co-operatively.</p>	
Proposed Academic Calendar Entry: <u>CMPE 246 (3) Computer Engineering Design Studio</u> <u>Embedded systems programming, App development for Internet of Thing applications, Microprocessor Programming [3-2-0]</u> <u>Prerequisite: APSC 177 or COSC 111</u>	Present Academic Calendar Entry: N/A



Curriculum Proposal Form

New Course – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty/School Approval Date: 2022.05.11 Effective Session: 2023W	Date: 2022.05.03 Contact Person: Julian Cheng Phone: 250.807.8800 Email: julian.cheng@ubc.ca
Type of Action: New Course	
<p>Rationale: This course will allow the students to develop skills in designing and developing software solutions. This course will expose the students to the fundamentals of software designing, software development, the interaction between software and other components of computer systems. A new faculty member who holds software engineering or related engineering expertise may add more value to the course. This course will also update the curriculum of School of Engineering programs.</p> <p>Over the past few years, the demand for software to automate our life has increased dramatically. Software systems and design for engineers determine the architecture, interfaces (user and software), attributes of a system, and the result of that process. In other words, software system and design is the wheel of activity in which specific parameters are outlined and determined, then transcribed into a description of a software system's internal structure to obtain a result. This course commences with the fundamentals of system design fundamentals. The course also progresses through classical software models, structure and architecture, user interface design, evaluation and analysis, testing, and strategies to maintain software quality. Hence, the addition of this course can prepare our students for better jobs and facilitate their careers.</p>	
Proposed Academic Calendar Entry: <u>CMPE 301 (3) Software System and Design for Engineers</u> <u>Software development life cycle, architectural patterns, design patterns and anti-patterns, model-view-controller pattern, object-oriented design principles, design for scalability and performance, design for maintainability and testability, agile development. [3-0-0]</u> <u>Prerequisites: APSC 177 or COSC 111, COSC 121, COSC 122.</u>	Present Academic Calendar Entry: N/A



Curriculum Proposal Form

New Course – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty/School Approval Date: 2022.05.13 Effective Session: 2023	Date: 2022.05.03 Contact Person: Julian Cheng Phone: 250.807.8800 Email: julian.cheng@ubc.ca
Type of Action: New Course	
Rationale: This is an elective course for the proposed Computer Engineering program. It aims to teach students how to apply deep learning to solve various engineering problems. It can be an attractive elective course to undergraduate students with strong engineering background and programming skills in the School of Engineering.	
Proposed Academic Calendar Entry: <u>CMPE 401 (3) Deep Learning for Engineers</u> <u>Neural networks, computation graph, hyper-parameter tuning, regularization, batch normalization, convolutional neural networks, sequential models, recurrent neural networks, natural language processing, applications of deep learning to electrical, civil, mechanical and manufacturing engineering. [3-0-0]</u> <u>Prerequisite: fourth-year standing.</u>	Draft Academic Calendar URL: N/A Present Academic Calendar Entry: N/A



Curriculum Proposal Form

New Course – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty/School Approval Date: 2022.05.11 Effective Session: 2023	Date: 2022.05.03 Contact Person: Dr. Julian Cheng Phone: 250.807.8800 Email: julian.cheng@ubc.ca
Type of Action: New Course	
<p>Rationale: This course is required for the third-year engineering students who need the fundamentals of compiler. Besides the traditional materials covered in a programming, this course will emphasize the understanding and analysis of coding generation. This course will also update the curriculum of School of Engineering programs.</p> <p>A compiler is a computer program that translates a source program written in one language into another target program. It is critically important to study how the compiler do the translation and improvement of programs. Hence, we are structuring a curriculum in compiler to provide students with a set of base skills required to understand and build new compiler components. Students will understand the basic knowledge and skills, for example, how a compiler writer would reduce the aggregate code space employed by a register-save code. This subject encompasses a wide variety of topics including logic, lexical analysis and parsing analysis, semantic analysis, variables, functions, global and local variables, stack frames, instruction selection, register allocation, data flow analysis and optimization, control flow analysis, code generation, loop finding, static single assignment and the optimization techniques. The subject will provide an essential foundation for computer engineering students.</p>	
Proposed Academic Calendar Entry: <u>CMPE 402 (3) Compiler Engineering</u> <u>Lexical analysis and parsing analysis, semantic analysis, understanding variables, functions, global and local variables, type names and class names, stack frames, instruction selection, register allocation, data flow analysis and optimization, control flow analysis, code generation, loop finding, static single assignment and the optimization [3-0-0]</u> <u>Prerequisite: APSC 177, COSC 222, and ENGR 359</u>	Present Academic Calendar Entry: N/A



Curriculum Proposal Form

New Course – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty/School Approval Date: 2022.05.11 Effective Session: 2023	Date: 2022.05.03 Contact Person: Julian Cheng Phone: 250.807.8800 Email: julian.cheng@ubc.ca
Type of Action: New Course	
<p>Rationale: This course prepare the fourth-year engineering students for a career working with intelligent automation and robotics. This course will provide the acknowledge and skills about the artificial intelligence and robotic systems. This course aims to help students understand and practice how a robot senses, decides and acts in an uncertain environment from a computational perspective. The emphasis will be on algorithms, probabilistic reasoning, optimization, control theory and state-the-art artificial intelligence techniques.</p> <p>A robot is regarded as an computer that is equipped with sensors and can interact with the surrounding uncertain environment. The robotics system can be divided into three parts: sensing, deciding and acting. This course introduces the intelligent robotic system from a computational perspective and encompasses a wide variety of topics in terms of robot sensing, deciding and acting, such as sensor fusion, state estimation, localization, control and robot planning. The subject will provide an essential foundation for engineering students to learning a variety of polular algorithms in two directions. The first direction leads to the classical algorithms including the Kalman filter, PID control, path planning algorithms. The other direction leads to the state-of-the-sart artificial intelligence techniques, such as the regression, classification, clustering and reinforcement learning. Along with the theory delivered in ths class, the relavant projects and detailed step-by-step guidelines will be provided to apply the theoretical to practical implementations. The projects will designed using Python. The pratical implementations will provide students valuable experience to investigate real-world engineering problems and transfer the theory learned in class to hands-on application using the most popular programming language. The projects help concrete the understanding of the course topics and improve the problem solving skills for students. As an exmaple, we will provide the project about trajectory tracking and navigation of a moving robot. This project can integrate most of the algorithms covered in this course in one application that the robot can estimate the position from sensor data, plan a path and reach the destination by following the planned path. First, the real-world map will be modeled into a graph having nodes and edges, the classical search algorithms and reinforcement learning algorithms can be used to find available trajectory from a starting position to a destination position. Then, the Kalman filter will be used to estimate the locations of the moving robot. Furthermore, the proportional-integral-derivative (PID) controller and a model predictive controller (MPC) will be implemented to track and correct the trajectory of the moving robot. It is worth noting that the project can be designed either a hardware realization or simulation-based, depends on the course will be delivered on-site or remote.</p>	



<p>Proposed Academic Calendar Entry:</p> <p><u>CMPE 409 (3) Artificial Intelligence for Robotics</u></p> <p><u>Sensor fusion, state estimation, localization, control, robot planning, machine learning algorithms, artificial neural network, reinforcement learning [3-0-0]</u></p> <p><u>Prerequisites: APSC 179, APSC 258, ENGR 360</u></p>	<p>Present Academic Calendar Entry:</p> <p>N/A</p>
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Curriculum Proposal Form

New Course – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty/School Approval Date: 2022.05.11 Effective Session: 2023	Date: 2022.05.03 Contact Person: Julian Cheng Phone: 250.807.8800 Email: julian.cheng@ubc.ca
Type of Action: New Course	
Rationale: This is an elective course for the proposed computer engineering program. The course introduces the students to the concepts of security and encryption in computer networks. It covers threats and vulnerabilities involved in computer networks as well as techniques developed for security and privacy. It also discusses applications related to cloud security and Internet of Things security. The objective of this course is to train the students in understanding and tackling the growing need for network security as well as designing secure networked systems. It fits in the theme of cybersecurity, and can be an attractive elective course to many undergraduate students in the School of Engineering.	
Proposed Academic Calendar Entry: <u>CMPE 410 (3) Network Security and Encryption</u> <u>Computer networks, security and privacy, threats and vulnerabilities, intrusion detection, authentication, encryption, and cloud security and Internet of Things security [3-0-0]</u> <u>Prerequisite: fourth-year B.A.Sc. or B.Sc. Standing</u>	Present Academic Calendar Entry: N/A



Curriculum Proposal Form

New Course – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty/School Approval Date: 2022.05.11 Effective Session: 2023W	Date: 2022.05.03 Contact Person: Julian Cheng Phone: 250.807.8808 Email: julian.cheng@ubc.ca
Type of Action: New Course	
Rationale: This is a technical elective course for the proposed Computer Engineering program. The course will introduce the fundamental ideas behind cloud networking, such as network virtualization, physical interconnection of servers, routing, congestion control, and application-level techniques. In particular, we will focus on the following questions. How do we build a network infrastructure that facilitates deploying multiple virtual networks (on a shared infrastructure)? How do we achieve efficient transfer of big data and low latency communication? How do we enable high-performance applications across countries and continents? A combination of lectures and hands-on programming assignments will expose the students to the leading cloud networking paradigms. Unlike a typical cloud computing course, this course emphasizes the underlying critical communications infrastructure for many popular cloud applications today. The course can also be attractive for undergraduate students with strong programming skills in SoE.	
Proposed Academic Calendar Entry: <u>CMPE 461 (3) Introduction to Cloud Networking</u> <u>Cloud traffic patterns, physical network structure, virtualization techniques, SDN architecture, CDN architecture, inter-data center networking, and application layer techniques. [3-0-0]</u> <u>Prerequisites: Fourth-year B.A.Sc. or B.Sc. Standing</u>	Present Academic Calendar Entry: N/A



Curriculum Proposal Form

New Course – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty/School Approval Date: 2022.05.11 Effective Session: 2023W	Date: 2022.05.03 Contact Person: Julian Cheng Phone: 250.807.8800 Email: julian.cheng@ubc.ca
Type of Action: New Course	
<p>Rationale: This course prepares the fourth-year engineering students for a career working in designing computer systems. This course will provide the basic knowledge and skills about the computer architecture and organization. This course aims to help students understand and practice how computers are designed. The emphasis will be the mechanisms used to improve performance given a fixed implementation technology (e.g., 14 nm silicon), and techniques used in designing computer systems at both the microarchitecture and architecture level.</p> <p>Computer architecture and organization is critically important. Hence, this course will help you by providing not only implementation techniques for performance and energy efficiency as well as a framework for understanding how hardware design affects overall system performance, but also the understanding required to write efficient code that takes full advantage of modern hardware — a nontrivial task unless you understand how the underlying microarchitecture operates. The course combines both theoretical and practical components and students will be evaluated on their proficiency in both aspects.</p>	
Proposed Academic Calendar Entry: <u>CMPE 465 (3) Computer Architecture and Organization</u> <u>Modern processors, GPUs, quantitative principles and instruction set design; pipelining, superscalar issue, out-of-order execution, branch prediction and speculation; memory hierarchies, caches, virtual addressing, prefetching, coherence, and consistency; computer design trade-offs performance evaluation and benchmarks; multicores, VLIW, on-chip networks, and other advanced architectures. [3-2*-0]</u> <u>Prerequisite: APSC 262 and ENGR 359.</u>	Present Academic Calendar Entry: N/A



Curriculum Proposal Form

New Course – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty/School Approval Date: 2022.05.11 Effective Session: 2023W	Date: 2022.05.03 Contact Person: Julian Cheng Phone: 250.807.8808 Email: julian.cheng@ubc.ca
Type of Action: New Course	
Rationale: This is an elective course for the proposed Computer Engineering program. It aims to teach students how to program quantum computers by using programming languages such as Python and PennyLane. It can be an attractive elective course to undergraduate students with strong programming skills in SoE.	
Proposed Academic Calendar Entry: <u>CMPE 485 (3) Introduction to Quantum Computing</u> <u>Qubit states, operations and measurements, quantum circuits, basic quantum algorithms, Grover's algorithm, Shor's algorithm, Hamiltonian simulation, quantum programming languages [3-0-0]</u> <u>Prerequisite: ENGR 350, ENGR 360.</u>	Present Academic Calendar Entry: N/A



Curriculum Proposal Form

Change to Program – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty Approval Date: 2023.03.14 Effective Session: 2023W	SOE Curriculum Date: 2023.03.13 Contact Person: Dr. Sabine Weyand Phone: 250.807.8068 Email: Sabine.Weyand@ubc.ca
Type of Action: Changes to Program Requirements	
<p>Rationale: The proposed changes and their rationale are listed below:</p> <ul style="list-style-type: none"> MANF 368 (Engineering Measurements and Instrumentation) is removed as a MANF program requirement and much of its content is moved to MANF 386 (Industrial Automation). Rationale: MANF 368 covers industrial sensor/measurement needs, which is an integral part of the PLC control systems taught in MANF 386. Combining the content of these two courses provides a better flow of material and benefits students learning about industrial automated systems. Students still received the content that is removed from MANF 386 to make space for MANF 368 with the addition of ENGR 315 (Systems and Control) as a MANF program requirement (see next proposed change). ENGR 315 (Systems and Control) is added as a MANF program requirement. Rationale: Currently ENGR 315 content is condensed and covered in MANF 386. When combined with the PLC content in MANF 386, there is very little continuity in the course content and students struggle to connect the two topics. Pedagogically, it is best to separate the PLC content with the control theory content. ENGR 381 (Kinematics and Dynamics of Machinery) and ENGR 476 (Mechanics of Materials II) are removed from the MANF program. Rationale: The MANF program currently requires students to take 7 courses in 2 of their terms. In many cases, students elect to take courses in the summer or an extra year to complete the program. In evaluating the required courses for the program, the faculty has decided that ENGR 381 and ENGR 476 (which focuses on structures), are not relevant enough for manufacturing engineers to justify the increased workload. The removal of these courses better distinguishes the MANF program from the MECH program. Students interested in these topics may still take them as elective courses. Remove MANF 230 from MANF program requirements. Rationale: After piloting this course for 3 years it has been determined that the [1-2-0;1-2-0] course vector is not conducive to student learning; 1hr/week of theory is insufficient for students to benefit from the 2hr/week lab. Alternatively, the students would benefit from a course focused on foundational manufacturing engineering topics in their second year. New course MANF 277 (Fundamentals of Design for Manufacturing) is added as a MANF program requirement. Rationale: This course will focus on 	



engineering drawing, metrology, and design for manufacturing. These are foundational topics in manufacturing engineering and will provide students the requisite knowledge for MANF 330 (Manufacturing Engineering Project) in year three of the program. MANF 330 is a capstone-style course and the fundamentals of design for manufacturing taught in MANF 277 are necessary to maximize the student learning experience in MANF 330.

- **MANF 377 (Manufacturing Processes), which appears in the current calendar as ENGR 377, is added as a MANF program requirement.**

Rationale: With the removal of MANF 230 (Manufacturing Engineering Laboratory) from the program, students miss content on manufacturing processes. MANF 377 is an existing course at the School of Engineering and will be used to strengthen student's knowledge and skills in manufacturing processes. As an added bonus, any student taking a number of related fourth year courses will have consistent pre-requisite knowledge since both MECH and MANF students will take MANF 377.

- **Manufacturing courses with course code ENGR are changed to MANF course codes.** Rationale: The MANF program is establishing its identity within the School of Engineering. Brining manufacturing courses under the MANF course code better represents the focus and strengths of the MANF program. These courses will now appear under the MANF section of the Academic Calendar which will help students navigate the program better. The courses impacted are:

Current course code	Proposed course code	Course title
ENGR 377	MANF 377	Manufacturing Processes
ENGR 439	MANF 378	Advanced Manufacturing
ENGR 416/516	MANF 416/516	CAD/CAM/CAE
ENGR 496	MANF 496	Aerospace Materials and Mfg. Processes

- **The vector of MANF 377 (Manufacturing Processes), which appears in the current calendar as ENGR 377, is changed from [2 -3*-2*] to [2 -3*-1].** Rationale: The current offering of one tutorial class every other week does not line up well with the course delivery as students are tasked to solve problems on the theory that has not yet been covered in the lectures. This creates challenges to the students and the teaching team. The total number of contact hours remains the same.
- **"Technical Electives" is replaced with "Electives".** Rationale: Approved electives may include courses that are not "technical electives". Students are advised to consult the School of Engineering Manufacturing Engineering Curriculum Map when choosing their electives.
- **The lab is removed from the ENGR 480 (Modern Control) vector.** Rationale: The lab periods in ENGR 480 are used by students to work on a term design project. These projects are MATLAB-based and do not require use of equipment or particular lab space. Most students have MATLAB installed on their personal computers using a campus license. Students can also use any computer on campus



to access MATLAB. Removing the lab component from the course vector will provide relief to student's schedules and allow them to be more flexible in when they work on their projects.

- **COSC 310 (Software Engineering) and the humanities elective are switched to different years in the MANF program.** Rationale: This change better balances the load for students and creates more flexibility in the program.

A number of minor changes are also needed as a result of the above major changes. For example, the description of the mechatronics option and some courses with MANF 386/ENGR 315/ENGR 481 listed as pre-requisites.

Proposed Academic Calendar Entry:

MANF 277 (3) Fundamentals of Design for Manufacturing

Engineering drawing for manufacturing, part and process drawings, quality control, metrology. Design for manufacturing and assembly. Integrated Manufacturing Systems. [3-2-0]

Prerequisite: APSC 171 and second-year B.A.Sc. standing

MANF 330 (6) Manufacturing Engineering Project

Project-based design and optimization of manufacturing processes (Casting, bulk deformation, sheet metal, polymer), metrology, measuring cutting forces in machining, CNC machining optimization. [1-4-0, 1-4-0]

Prerequisite: **MANF 277**

MANF 386 (3) Industrial Automation

Principle components of **manufacturing** automation systems, **industrial measurement needs, robotic programming, programmable logical control (PLC) systems and development of PLC programs.** [3-2-0]

Prerequisite: APSC 246.

MANF 378 (3) Advanced Manufacturing

Materials fabrication, forming, and joining: casting, rolling, forging, extrusion, and welding. Powder metallurgy and

Draft Academic Calendar URL:

<https://www.calendar.ubc.ca/okanagan/p roof/edit/courses.cfm?go=name&code=MANF>

Present Academic Calendar Entry:

MANF 330 (6) Manufacturing Engineering Project

Project-based design and optimization of manufacturing processes (Casting, bulk deformation, sheet metal, polymer), metrology, measuring cutting forces in machining, CNC machining optimization. [1-4-0, 1-4-0]

Prerequisite: MANF 230

MANF 386 (3) Industrial Automation

~~Linear system modelling, block diagrams, transient response, root locus, frequency response, Bode plots, and controller design.~~ Principles and components of industrial automation systems, programmable logic controllers (PLCs), controller programming languages. Credit will be granted for only one of MANF 386 or ENGR 315. [3-2-0]

Prerequisite: APSC 246.

ENGR 439 (3) Advanced Manufacturing

Materials fabrication, forming, and joining: casting, rolling, forging, extrusion, and welding. Powder metallurgy and



<p>manufacture of metal alloys, metal matrix composites, and ceramics. Effect of fabrication process on evolution of crystallographic texture, residual stress, mechanical and service properties of materials. Process selection and technology development. [3-0-0] <i>Prerequisite:</i> MANF 377.</p> <p>MANF 416 (3) CAD/CAM/CAE CNC machining, Rapid prototyping, G-code, Computer Aided: Design, Manufacturing and Engineering, parametric design and analysis for optimization. [3-2-0] <i>Prerequisite:</i> MANF 377.</p> <p>ENGR 480 (3) Modern Control State-space modelling and design. Review of linear and matrix algebra, highlights of classical control theory, state-space modelling, continuous and discrete state equations, stability, controllability and observability, design of feedback systems. Credit will be granted for only one of ENGR 480 or ENGR 580. [3-0-0] <i>Prerequisite:</i> ENGR 315.</p> <p>ENGR 481 (3) Mechatronics Operating principles, analysis, modelling, and performance specifications of sensors, actuators, and mechatronic systems. Sensor selection, actuator sizing, and integration. Programmable logic control (PLC) systems and control techniques pertaining to actuators. Control system implementation. Credit will be granted for only one of ENGR 481 or ENGR 581. [3-2*-0] <i>Prerequisite:</i> ENGR 315 and ENGR 320.</p> <p>ENGR 486 (3) Robot Modelling and Control Spatial description and homogeneous transformations, manipulator kinematics (forward and inverse), Jacobian, motion trajectories. Manipulator dynamics, Lagrange-Euler and Newton-Euler formulation. Linear and nonlinear control, force control. Industrial robotic system and programming. Credit will be granted for only one of ENGR 486 or ENGR 586. [3-0-0] <i>Prerequisite:</i> ENGR 315.</p> <p>ENGR 487 (3) Digital Control Digital control theory and a brief review of classical control and its relationship to</p>	<p>manufacture of metal alloys, metal matrix composites, and ceramics. Effect of fabrication process on evolution of crystallographic texture, residual stress, mechanical and service properties of materials. Process selection and technology development. [3-0-0] <i>Prerequisite:</i> Either (a) ENGR 377 or (b) MANF 230.</p> <p>ENGR 416 (3) CAD/CAM/CAE CNC machining, Rapid prototyping, G-code, Computer Aided: Design, Manufacturing and Engineering, parametric design and analysis for optimization. [3-2-0] <i>Prerequisite:</i> ENGR 377.</p> <p>ENGR 480 (3) Modern Control State-space modelling and design. Review of linear and matrix algebra, highlights of classical control theory, state-space modelling, continuous and discrete state equations, stability, controllability and observability, design of feedback systems. Credit will be granted for only one of ENGR 480 or ENGR 580. [3-2*-0] <i>Prerequisite:</i> One of ENGR 315, MANF 386.</p> <p>ENGR 481 (3) Mechatronics Operating principles, analysis, modelling, and performance specifications of sensors, actuators, and mechatronic systems. Sensor selection, actuator sizing, and integration. Programmable logic control (PLC) systems and control techniques pertaining to actuators. Control system implementation. Credit will be granted for only one of ENGR 481 or ENGR 581. [3-2*-0] <i>Prerequisite:</i> Either (a) all of ENGR 315, ENGR 320 or (b) all of MANF 386, ENGR 320.</p> <p>ENGR 486 (3) Robot Modelling and Control Spatial description and homogeneous transformations, manipulator kinematics (forward and inverse), Jacobian, motion trajectories. Manipulator dynamics, Lagrange-Euler and Newton-Euler formulation. Linear and nonlinear control, force control. Industrial robotic system and programming. Credit will be granted for only one of ENGR 486 or ENGR 586. [3-0-0] <i>Prerequisite:</i> One of ENGR 315, MANF 386.</p> <p>ENGR 487 (3) Digital Control Digital control theory and a brief review of classical control and its relationship to</p>
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<p>discrete systems. Discrete time systems, sampling, z-transform, pulse transfer function, stability in z-domain, pole-placement control design and state estimation, discrete linear quadratic optimal control, introduction to system identification and Kalman filter. Credit will be granted for only one of ENGR 487 or ENGR 587. [3-0-0] <i>Prerequisite:</i> ENGR 315.</p> <p>ENGR 315 (3) Systems and Control Dynamic systems, linear systems, control concepts, block diagrams, transient response, root locus, frequency response, Bode and Nyquist plots, and controller design. [3-2*-1] <i>Prerequisite:</i> APSC 246.</p> <p>MANF 486 (3) Mechatronic Systems Laboratory Smart sensors and actuators, electro-pneumatic actuators, automated control systems, industrial communication, smart maintenance, object detection, industrial robotics, modelling and simulation of mechatronic systems. Hands-on training on mechatronic system trainers in a laboratory scale [1-4-0] <i>Prerequisite:</i> MANF 386</p> <p>MANF 496 (3) Aerospace Materials and Manufacturing Processes Properties, behaviour, manufacturing, and advanced processes for materials used in aerospace applications. Materials include alloys, elastomers, composites, polymers, and ceramics. Special processes in the aerospace industry. Introduction to aerospace quality systems, inspection, and testing. [3-0-0] <i>Prerequisite:</i> MANF 377.</p> <p>MANF 377 (3) Manufacturing Processes Metrology, metal forming processes, plastic deformation, rolling, forging, drawing, extrusion, sheet metal forming. Machining processes and machine tools, turning, milling, drilling, grinding. Metal fabrication, welding, casting. [2 -3*-1] <i>Prerequisite:</i> All of APSC 259, APSC 260.</p> <p>MANF 475 (3) Welding and Joining: Processes and Metallurgy Welding and joining of metals: fusion and solid-state welding processes, brazing, and</p>	<p>discrete systems. Discrete time systems, sampling, z-transform, pulse transfer function, stability in z-domain, pole-placement control design and state estimation, discrete linear quadratic optimal control, introduction to system identification and Kalman filter. Credit will be granted for only one of ENGR 487 or ENGR 587. [3-0-0] <i>Prerequisite:</i> One of ENGR 315, MANF 386.</p> <p>ENGR 315 (3) Systems and Control Dynamic systems, linear systems, control concepts, block diagrams, transient response, root locus, frequency response, Bode and Nyquist plots, and controller design. Credit will be granted for only one of ENGR 315 or MANF 386. [3-2*-1] <i>Prerequisite:</i> APSC 246.</p> <p>MANF 486 (3) Mechatronic Systems Laboratory Smart sensors and actuators, electro-pneumatic actuators, automated control systems, industrial communication, smart maintenance, object detection, industrial robotics, modelling and simulation of mechatronic systems. Hands-on training on mechatronic system trainers in a laboratory scale [1-4-0] <i>Prerequisite:</i> One of MANF 386, ENGR 484.</p> <p>ENGR 496 (3) Aerospace Materials and Manufacturing Processes Properties, behaviour, manufacturing, and advanced processes for materials used in aerospace applications. Materials include alloys, elastomers, composites, polymers, and ceramics. Special processes in the aerospace industry. Introduction to aerospace quality systems, inspection, and testing. [3-0-0] <i>Prerequisite:</i> All of ENGR 376, ENGR 377.</p> <p>ENGR 377 (3) Manufacturing Processes Metrology, metal forming processes, plastic deformation, rolling, forging, drawing, extrusion, sheet metal forming. Machining processes and machine tools, turning, milling, drilling, grinding. Metal fabrication, welding, casting. [2 -3*-2*] <i>Prerequisite:</i> All of APSC 259, APSC 260.</p> <p>MANF 475 (3) Welding and Joining: Processes and Metallurgy Welding and joining of metals: fusion and solid-state welding processes, brazing, and soldering. Effect of process parameters on</p>
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soldering. Effect of process parameters on joint size and quality. Fusion, partially melted, and heat affected zones. Non-equilibrium solidification, grain structure, and defect formation. Non-destructive testing and evaluation methods for welded joints. [3-2*-0]

Prerequisite: **MANF 377.**

MANF 516 (3) Advanced Manufacturing

Product manufacturing, powder metallurgy, Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM), Computer Numeric Control (CNC) tools, process planning, micro and nano manufacturing, optical and electron measurement techniques.

[18348] Manufacturing Engineering

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[18353]

Second Year Manufacturing Engineering		Credits
APSC 201 Technical Communication		3
APSC 246 System Dynamics		3
APSC 248 Engineering Analysis III		3
APSC 252 Thermodynamics		3
APSC 253 Fluid Mechanics I		3
APSC 254 Instrumentation and Data Analysis		3
APSC 255 Electric Circuits and Power		3
APSC 259 Materials Science I		3
APSC 260 Mechanics of Materials I		3
COSC 210 Software Construction or COSC 222 Data Structures ¹		4
<u>MANF 277 Fundamentals of Manufacturing Engineering</u>		<u>3</u>
MANF 270 Production Systems Management I		3
Total Credits:		<u>37</u>
Third Year Manufacturing Engineering		Credits
ENGR 305 Engineering Economic Analysis		3
<u>ENGR 320 Electromechanical Devices or ENGR 310 Fluid Mechanics II²</u>		<u>3</u>
<u>ENGR 315 Systems and Control</u>		<u>3</u>

joint size and quality. Fusion, partially melted, and heat affected zones. Non-equilibrium solidification, grain structure, and defect formation. Non-destructive testing and evaluation methods for welded joints. [3-2*-0]

Prerequisite: ~~One of ENGR 377, MANF 230.~~

ENGR-516 (3) Advanced Manufacturing

Product manufacturing, powder metallurgy, Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM), Computer Numeric Control (CNC) tools, process planning, micro and nano manufacturing, optical and electron measurement techniques.

<https://www.calendar.ubc.ca/okanagan/prof/edit/index.cfm?tree=18,317,989,1418>

[18348] Manufacturing Engineering

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[18352] Program Requirements

[18353]

Second Year Manufacturing Engineering		Credits
APSC 201 Technical Communication		3
APSC 246 System Dynamics		3
APSC 248 Engineering Analysis III		3
APSC 252 Thermodynamics		3
APSC 253 Fluid Mechanics I		3
APSC 254 Instrumentation and Data Analysis		3
APSC 255 Electric Circuits and Power		3
APSC 259 Materials Science I		3
APSC 260 Mechanics of Materials I		3
COSC 210 Software Construction or COSC 222 Data Structures ¹		4
MANF 230 Manufacturing Engineering Laboratory		4
MANF 270 Production Systems Management I		3
Total Credits:		38
Third Year Manufacturing Engineering		Credits
ENGR 305 Engineering Economic Analysis		3
ENGR 320—Electromechanical Devices or ENGR 310 Fluid Mechanics II²		3



ENGR 376 Materials Science II	3	ENGR 376 Materials Science II	3
ENGR 387 Vibration of Mechanical Systems	3	ENGR 381 Kinematics and Dynamics of Machinery	3
MANF 330 Manufacturing Engineering Project I	6	ENGR 387 Vibration of Mechanical Systems	3
MANF 370 Production Systems Management II	3	ENGR 439 Manufacturing Processes II	3
<u>MANF 377 Manufacturing Processes</u>	<u>3</u>	ENGR 476 Mechanics of Materials II	3
<u>MANF 378 Advanced Manufacturing</u>	<u>3</u>	COSC 310 Software Engineering	3
MANF 386 Industrial Automation	3	MANF 330 Manufacturing Engineering Project I	6
<u>Humanities/Social Sciences Elective³</u>	<u>3</u>	MANF 368 Engineering Measurements and Instrumentation	3
Total Credits:	<u>36</u>	MANF 370 Production Systems Management II	3
		MANF 386 Industrial Automation	3
		Total Credits:	39
Fourth Year Manufacturing Engineering	Credits	Fourth Year Manufacturing Engineering	Credits
<u>COSC 310 Software Engineering</u>	<u>3</u>	ENGR 413 Law and Ethics for Engineers	3
ENGR 413 Law and Ethics for Engineers	3	ENGR 499 Engineering Capstone Design Project	6
ENGR 499 Engineering Capstone Design Project	6	MANF 450 Life Cycle Analysis and Sustainability	3
MANF 450 Life Cycle Analysis and Sustainability	3	MANF 455 Factory Planning	3
MANF 455 Factory Planning	3	MANF 460 Supply Chain Tactics and Strategies	3
MANF 460 Supply Chain Tactics and Strategies	3	MANF 465 Digital Enterprise	3
MANF 465 Digital Enterprise	3	MANF 470 Production Systems Management III	3
MANF 470 Production Systems Management III	3	Technical Electives³	9
Electives ³	9	Humanities/Social Sciences Elective⁴	3
Total Credits:	36	Total Credits:	36
¹ COSC 222 is accepted in lieu of COSC 210 but requires other prerequisites.		¹ COSC 222 is accepted in lieu of COSC 210 but requires other prerequisites.	
² Manufacturing Engineering students in the Aerospace option will take ENGR 310 instead of ENGR 320.		² Manufacturing Engineering students in the Aerospace option will take ENGR 310 instead of ENGR 320.	
<u>³ In general, scientific geography courses, statistical courses, and studio/performance courses in fine arts, music, and theatre will not satisfy this requirement. Courses that teach language skills are not acceptable. See Complementary Studies Courses</u>		<u>³ To be chosen from a list of Manufacturing Engineering elective courses provided by the School of Engineering.</u>	
<u>⁴ To be chosen from a list of Manufacturing Engineering elective courses provided by the School of Engineering.</u>		<u>⁴ In general, scientific geography courses, statistical courses, and studio/performance courses in fine arts, music, and theatre will not satisfy this requirement. Courses that teach language skills are not acceptable. See Complementary Studies Courses</u>	
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[20296] Aerospace Option

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[20300] Manufacturing Engineering students in the Aerospace option will take ENGR 310 instead of ENGR 320. In addition, the following **four (4)** elective courses are required for the Aerospace Option under **Manufacturing** Engineering:

- ENGR 449 Aircraft Structures
- **ENGR 476 Mechanics of Materials II**
- ENGR 493 Introductory Aerodynamics and Aircraft Design
- **MANF** 496 Aerospace Materials and Manufacturing Process

Mechanical Engineering

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[17719]

	Third Year Mechanical Engineering	Credits
ENGR 303	Engineering Project Management	3
ENGR 305	Engineering Economic Analysis	3
ENGR 310	Fluid Mechanics II	3
ENGR 315	Systems and Control	3
ENGR 320	Electromechanical Devices	3
ENGR 375	Energy System Design	3
ENGR 376	Materials Science II	3
MANF 377	Manufacturing Processes	3
ENGR 380	Design of Machine Elements	3
ENGR 381	Kinematics and Dynamics of Machinery	3
ENGR 385	Heat Transfer Applications	3

[20296] Aerospace Option

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[20300] Manufacturing Engineering students in the Aerospace option will take ENGR 310 instead of ENGR 320. In addition, the following ~~three (3)~~ elective courses are required for the Aerospace Option under ~~Manufacturing~~ Engineering:

- ENGR 493 Introductory Aerodynamics and Aircraft Design
- ENGR 449 Aircraft Structures
- ~~ENGR~~ 496 Aerospace Materials and Manufacturing Process

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Mechanical Engineering

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[17719]

	Third Year Mechanical Engineering	Credits
ENGR 303	Engineering Project Management	3
ENGR 305	Engineering Economic Analysis	3
ENGR 310	Fluid Mechanics II	3
ENGR 315	Systems and Control; OR MANF 386+ Industrial Automation	3
ENGR 320	Electromechanical Devices	3
ENGR 375	Energy System Design	3
ENGR 376	Materials Science II	3
ENGR 377	Manufacturing Processes	3
ENGR 380	Design of Machine Elements	3
ENGR 381	Kinematics and Dynamics of Machinery	3



ENGR 387	Vibration of Mechanical Systems	3	ENGR 385	Heat Transfer Applications	3
Total Credits		36	ENGR 387	Vibration of Mechanical Systems	3
			Total Credits		36
[17720]			[17720]		
	Fourth Year Mechanical Engineering	Credits		Fourth Year Mechanical Engineering	Credits
ENGR 413	Law and Ethics for Engineers	3	ENGR 413	Law and Ethics for Engineers	3
ENGR 476	Mechanics of Materials II	3	ENGR 476	Mechanics of Materials II	3
ENGR 499	Engineering Capstone Design Project	6	ENGR 499	Engineering Capstone Design Project	6
	Design Electives ^{1,3}	12		Design Electives ^{2,4}	12
	Technical Electives ^{1,3}	12		Technical Electives ^{3,4}	12
Total Credits		36	Total Credits		36
¹ To be chosen from a list of Mechanical Engineering design elective courses provided by the School of Engineering. ² To be chosen from a list of technical elective courses provided by the School of Engineering. Up to two third- or fourth-year courses offered outside the School of Engineering may qualify as technical electives with permission from the Mechanical Program Chair. ³ To meet graduation requirements, students must take at least one of ENGR 491: Computational Fluid Dynamics or ENGR 492: Finite Element Methods as part of the 4th year elective requirements.			⁴ Seats available in MANE 386 are limited, with priority given to Manufacturing Engineering students and students in the Mechatronics Option. ² To be chosen from a list of Mechanical Engineering design elective courses provided by the School of Engineering. ³ To be chosen from a list of technical elective courses provided by the School of Engineering. Up to two third- or fourth-year courses offered outside the School of Engineering may qualify as technical electives with permission from the Mechanical Program Chair. ⁴ To meet graduation requirements, students must take at least one of ENGR 491: Computational Fluid Dynamics or ENGR 492: Finite Element Methods as part of the 4th year elective requirements.		
...			...		
[20302] Aerospace Option			[20302] Aerospace Option		
...			...		
[20306] In addition to the Mechanical Program compulsory courses, the following eight (8) elective courses are required for the Aerospace Option under Mechanical Engineering: <ul style="list-style-type: none"> ENGR 449 Aircraft Structures ENGR 477 Aircraft Propulsion ENGR 479 Measurements in Thermo-Fluids 			[20306] In addition to the Mechanical Program compulsory courses, the following eight (8) elective courses are required for the Aerospace Option under Mechanical Engineering: <ul style="list-style-type: none"> ENGR 449 Aircraft Structures ENGR 477 Aircraft Propulsion ENGR 479 Measurements in Thermo-Fluids ENGR 480 Modern Control 		



<ul style="list-style-type: none"> • ENGR 480 Modern Control • ENGR 491 Computational Fluid Dynamics • ENGR 492 Finite Element Methods • ENGR 493 Introductory Aerodynamics and Aircraft Design • MANF 496 Aerospace Materials and Manufacturing Process <p>...</p> <p>[18058] Mechatronics Option</p> <p>...</p> <p>[18062] The Mechatronics Option under Mechanical Engineering requires the following courses: [18063]</p> <ul style="list-style-type: none"> • COSC 121 • COSC 222 OR COSC 210³ • Required 3rd and 4th year courses (as listed above) and Elective requirements: <ul style="list-style-type: none"> • 12 credits of Design Electives and 12 credits of Technical Electives from <u>the School of Engineering Mechatronics Option Curriculum Map</u>, including mandatory courses ENGR 359, 480, MANF <u>386</u>, 486.⁴ <p>Electrical Engineering for students who entered the B.A.Sc. program in 2020/2021 or earlier</p> <p>...</p> <p>[17716]</p>	<ul style="list-style-type: none"> • ENGR 491 Computational Fluid Dynamics • ENGR 492 Finite Element Methods • ENGR 493 Introductory Aerodynamics and Aircraft Design • ENGR 496 Aerospace Materials and Manufacturing Process <p>...</p> <p>[18058] Mechatronics Option</p> <p>...</p> <p>[18062] The Mechatronics Option under Mechanical Engineering requires the following courses: [18063]</p> <ul style="list-style-type: none"> • COSC 121 • COSC 222 OR COSC 210³ • MANF 386 • Required 3rd and 4th year courses (as listed above) and Elective requirements: <ul style="list-style-type: none"> • 12 credits of Design Electives and 12 credits of Technical Electives from a Mechatronics Elective choices, including mandatory courses ENGR 359, 480, MANF 486.⁴ <p><u>https://www.calendar.ubc.ca/okanagan/proof/edit/index.cfm?tree=18,317,989,1381</u></p> <p>Electrical Engineering for students who entered the B.A.Sc. program in 2020/2021 or earlier</p> <p>...</p> <p>[17716]</p>
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Year Three Electrical Engineering			Credits	Year Three Electrical Engineering			Credits
ENGR 303	Engineering Project Management		3	ENGR 303	Engineering Project Management		3
ENGR 305	Engineering Economic Analysis		3	ENGR 305	Engineering Economic Analysis		3
ENGR 315	Systems and Control		3	ENGR 315	Systems and Control / MANF 386¹ Industrial Automation		3
ENGR 320	Electromechanical Devices		3	ENGR 320	Electromechanical Devices		3
ENGR 350	Linear Circuit Theory		3	ENGR 350	Linear Circuit Theory		3
ENGR 351	Microelectronics I		3	ENGR 351	Microelectronics I		3
ENGR 353	Semiconductor Devices		3	ENGR 353	Semiconductor Devices		3
ENGR 359	Microcomputer Engineering		3	ENGR 359	Microcomputer Engineering		3
ENGR 360	Engineering Probability and Statistics		3	ENGR 360	Engineering Probability and Statistics		3
ENGR 361	Signals and Communication Systems		3	ENGR 361	Signals and Communication Systems		3
ENGR 362	Digital Signal Processing I		3	ENGR 362	Digital Signal Processing I		3
ENGR 365	Engineering Electromagnetics		3	ENGR 365	Engineering Electromagnetics		3
	Total Credits		36		Total Credits		36
[17717]				[17717]			
Year Four Electrical Engineering			Credits	Year Four Electrical Engineering			Credits
ENGR 413	Law and Ethics for Engineers		3	ENGR 413	Law and Ethics for Engineers		3
ENGR 451	Microelectronics II		3	ENGR 451	Microelectronics II		3
ENGR 499	Engineering Capstone Design Project		6	ENGR 499	Engineering Capstone Design Project		6
	Design Electives ¹		12		Design Electives ²		12
	Technical Electives ²		12		Technical Electives ³		12
	Total Credits		36		Total Credits		36
¹ To be chosen from a list of Electrical Engineering design elective courses provided by the School of Engineering.				¹ Seats available in MANF 386 are limited, with priority given to Manufacturing Engineering students and students in the Mechatronics Option. Students in the Mechatronics Option must take MANF 386.			
² To be chosen from a list of technical elective courses provided by the School of Engineering. Up to two third- or fourth-year courses offered outside the School of Engineering may qualify as technical electives with permission from the Electrical Program Chair.				² To be chosen from a list of Electrical Engineering design elective courses provided by the School of Engineering.			
				³ To be chosen from a list of technical elective courses provided by the School of Engineering. Up to two third- or fourth-year courses offered outside the School of Engineering may qualify as technical electives with permission from the Electrical Program Chair.			

**[18069] Mechatronics Option**

...

[18073] The Mechatronics Option under Electrical Engineering requires the following courses:
[18074]

- COSC 121
- COSC 222 OR COSC 210³
- Required 3rd and 4th year courses (as listed above) and Elective requirements:
 - 12 credits of Design Electives **and** 12 credits of Technical Electives from **the School of Engineering Mechatronics Option Curriculum Map**, including mandatory courses ENGR 480, MANF **386**, 486.⁴

Electrical Engineering for students who entered the B.A.Sc. program in 2021/2022 or later

...

[20380]

	Year Three Electrical Engineering	Credits
ENGR 303	Engineering Project Management	3
ENGR 305	Engineering Economic Analysis	3
ENGR 315	Systems and Control	3

[18069] Mechatronics Option

...

[18073] The Mechatronics Option under Electrical Engineering requires the following courses:
[18074]

- COSC 121
- COSC 222 OR COSC 210³
- ~~MANF 386~~
- Required 3rd and 4th year courses (as listed above) and Elective requirements:
 - 12 credits of Design Electives & 12 credits of Technical Electives from ~~a list Mechatronics Elective choices~~, including mandatory courses ENGR 480, MANF 486.⁴

...

~~**[20315]** ⁴Electives to be chosen from a list of approved Mechatronics Option courses provided by the School of Engineering.~~

<https://www.calendar.ubc.ca/okanagan/proof/edit/index.cfm?tree=18,317,989,1543>

Electrical Engineering for students who entered the B.A.Sc. program in 2021/2022 or later

...

[20380]

	Year Three Electrical Engineering	Credits
ENGR 303	Engineering Project Management	3
ENGR 305	Engineering Economic Analysis	3



ENGR 320	Electromechanical Devices	3	ENGR 315	Systems and Control ¹	3
ENGR 350	Linear Circuit Theory	3	MANF 386 ¹	Industrial Automation	
ENGR 351	Microelectronics I	3	ENGR 320	Electromechanical Devices	3
ENGR 352	Microelectronics II	3	ENGR 350	Linear Circuit Theory	3
ENGR 353	Semiconductor Devices	3	ENGR 351	Microelectronics I	3
ENGR 359	Microcomputer Engineering	3	ENGR 352	Microelectronics II	3
ENGR 360	Engineering Probability and Statistics	3	ENGR 353	Semiconductor Devices	3
ENGR 362	Digital Signal Processing I	3	ENGR 359	Microcomputer Engineering	3
ENGR 378	Electromagnetics for Engineers	3	ENGR 360	Engineering Probability and Statistics	3
	Total Credits	36	ENGR 362	Digital Signal Processing I	3
			ENGR 378	Electromagnetics for Engineers	3
				Total Credits	36
[20381]			[20381]		
	Year Four Electrical Engineering	Credits		Year Four Electrical Engineering	Credits
ENGR 413	Law and Ethics for Engineers	3	ENGR 413	Law and Ethics for Engineers	3
ENGR 499	Engineering Capstone Design Project	6	ENGR 499	Engineering Capstone Design Project	6
	Humanities Elective ¹	3		Humanities Elective ²	3
	Design Electives ²	12		Design Electives ³	12
	Technical Electives ³	12		Technical Electives ⁴	12
	Total Credits	36		Total Credits	36
[20383] ¹ In general, scientific geography courses, statistical courses, and studio/performance courses in fine arts, music, and theatre will not satisfy this requirement. Courses that teach language skills are not acceptable. See Complementary Studies Courses .			[20382] ¹ Seats available in MANF 386 are limited, with priority given to Manufacturing Engineering students and students in the Mechatronics Option. Students in the Mechatronics Option must take MANF 386.		
[20384] ² To be chosen from a list of Electrical Engineering design elective courses from the advising sheet provided by the School of Engineering.			[20383] ² In general, scientific geography courses, statistical courses, and studio/performance courses in fine arts, music, and theatre will not satisfy this requirement. Courses that teach language skills are not acceptable. See Complementary Studies Courses .		
[20385] ³ To be chosen from a list of technical elective courses provided by the School of Engineering. Up to two third or fourth year courses offered outside the School of Engineering may qualify as technical					



<p>electives with permission from the Electrical Program Chair.</p> <p>...</p> <p>[20658] Mechatronics Option</p> <p>...</p> <p>[20662] The Mechatronics Option under Electrical Engineering requires the following courses:</p> <p>[20663]</p> <ul style="list-style-type: none"> • COSC 121 • COSC 222 OR COSC 210¹ • Required 3rd and 4th year courses (as listed above) and Elective requirements: <ul style="list-style-type: none"> • 12 credits of Design Electives <u>and</u> 12 credits of Technical Electives from <u>the School of Engineering Mechatronics Option Curriculum Map</u>, including mandatory courses ENGR 480, MANF <u>386</u>, 486. 	<p>[20384] ¹To be chosen from a list of Electrical Engineering design elective courses from the advising sheet provided by the School of Engineering.</p> <p>[20385] ¹To be chosen from a list of technical elective courses provided by the School of Engineering. Up to two third or fourth year courses offered outside the School of Engineering may qualify as technical electives with permission from the Electrical Program Chair.</p> <p>[20658] Mechatronics Option</p> <p>...</p> <p>[20662] The Mechatronics Option under Electrical Engineering requires the following courses:</p> <p>[20663]</p> <ul style="list-style-type: none"> • COSC 121 • COSC 222 OR COSC 210¹ • MANF 386 • Required 3rd and 4th year courses (as listed above) and Elective requirements: <ul style="list-style-type: none"> • 12 credits of Design Electives & 12 credits of Technical Electives from a list Mechatronics Elective choices, including mandatory courses ENGR 480, MANF 486.² <p>...</p> <p>[20668] ²Electives to be chosen from a list of approved Mechatronics Option courses provided by the School of Engineering.</p>
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Curriculum Proposal Form

Change to Course – Okanagan campus

Category: 1	
School of Engineering Faculty of Applied Science Faculty Approval Date: 2023.02.28 Effective Session: 2023W	SOE Curriculum Date: 2023.02.01 Contact Person: Dr. Sabine Weyand Phone: 250.807.8068 Email: Sabine.Weyand@ubc.ca
Type of Action: Substantial Course Change	
Rationale: The proposed changes allow for a more streamlined delivery of the MANF program by reducing the overlap between MANF 386 and ENGR 315. Students will still receive this content by adding ENGR 315 to the MANF program. MANF 368 content is added to MANF 386 which provides a better flow pedagogically.	
Proposed Academic Calendar Entry: MANF 386 (3) Industrial Automation Principle components of <u>manufacturing</u> automation systems, <u>industrial measurement needs, robotic programming</u> , programmable <u>logical control (PLC) systems and development of PLC programs</u> . [3-2-0] <i>Prerequisite:</i> APSC 246.	Draft Academic Calendar URL: https://www.calendar.ubc.ca/okanagan/prof/edit/courses.cfm?go=name&code=ENGR Present Academic Calendar Entry: MANF 386 (3) Industrial Automation Linear system modelling, block diagrams, transient response, root locus, frequency response, Bode plots, and controller design. Principles and components of industrial automation systems, programmable logic controllers (PLCs), controller programming languages. Credit will be granted for only one of MANF 386 or ENGR 315. [3-2-0] <i>Prerequisite:</i> APSC 246.



Curriculum Proposal Form

New/Change to Course/Program – Okanagan campus

Category: 1	
Faculty/School: Faculty of Arts and Social Sciences (FASS) Dept./Unit: Community, Culture and Global Studies Faculty/School Approval Date: 20230322 Effective Session: 2023W	Date: 2023-01-13 Contact Person: Dr. Adeniyi Asiyebi Phone: 250.807. 8194 Email: a.asiyebi@ubc.ca
Type of Action: New Course	
Rationale: This is a new course which expands the range of Geography program offerings at the lower levels, by offering development geography to students, building on the first-year introductory geography courses. The course will introduce students to contemporary debates in development geography and the dynamics of the Global South in a changing world. This course introduces students to the concepts, theories, and contemporary debates in development geography. Using various area case studies, it will explore some of the major themes of development geography, highlighting the socio-economic, environmental, cultural and political dynamics shaping life experiences in the Global South. It will explore issues such as globalization, governance, markets, resources, state rule, livelihoods and grassroots development, and touch on crosscutting themes such as citizenship, gender, representation, poverty and power. The course will equip students to critically engage with the dynamics of the Global South in a changing world.	



<p>Proposed Academic Calendar Entry:</p> <p><u>GEOG 280 (3) Development Geography Concepts, theories, and contemporary debates in development geography. Examines the socio-economic, environmental, cultural and political dynamics shaping life experiences in the Global South [2-0-1].</u></p>	<p>Draft Academic Calendar URL: https://www.calendar.ubc.ca/okanagan/proof/edit/courses.cfm?go=name&code=GEOG</p> <p>Present Academic Calendar Entry: n/a</p>
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Curriculum Proposal Form

New or Revised Course/Program – Okanagan campus

Proponents are encouraged to review the [Curriculum Submission Guidelines](#) prior to drafting their proposals. Please contact Senate & Curriculum Services at okanagan.curriculum@ubc.ca for further assistance.

Category: 1	
Faculty: Arts and Social Sciences & FCCS Dept./Unit: Dept./Unit Faculty Approval Date: 2023-03-24 Effective Session: 2023W	Date: 2023-02-15 Contact Person: Bernard Momer and Diana Carter Phone: 250.807.XXXX Email: fasscurriculum.ubco@ubc.ca
Type of Action: Other/Multiple (Please Specify) Update Program Requirements	
Rationale: - Update to include additions to the course categories.	
Proposed Academic Calendar Entry: <p style="color: #8B4513; font-weight: bold;">Degree Requirements for students entering the program in 2021/2022 or later</p> <p>[...]</p> <p>[19737] Communication [19738] Writing proficiency and other communication skills are fundamental to an undergraduate education. This requirement provides students with an opportunity to acquire and develop these skills, which are not only valuable in an academic context but will also assist students in their career paths. The study of additional languages helps to develop competence in structured thought and logic, problem solving, and critical thinking as well as promote a sense of global citizenship by increasing intercultural understanding and competence. Students must complete: [19739]</p>	Draft Academic Calendar URL: http://www.calendar.ubc.ca/okanagan/proof%20/edit/index.cfm?tree=18,282,857,1480 Present Academic Calendar Entry: <p style="color: #8B4513; font-weight: bold;">Degree Requirements for students entering the program in 2021/2022 or later</p> <p>[...]</p> <p>[19737] Communication [19738] Writing proficiency and other communication skills are fundamental to an undergraduate education. This requirement provides students with an opportunity to acquire and develop these skills, which are not only valuable in an academic context but will also assist students in their career paths. The study of additional languages helps to develop competence in structured thought and logic, problem solving, and critical thinking as well as promote a sense of global citizenship by increasing intercultural understanding and competence. Students must complete: [19739]</p>

<ul style="list-style-type: none"> • 3 credits from any of the following: DIHU 155¹ ENGL 109², 112, 114, 150, 151, 153, 154, 155¹, 156 • 3 credits from any of the following: CORH 203, 204, 205, 206, 216, 321, 331 CULT 230¹, CULT 250¹ DIHU 220 ENGL 203, 212, 213, 222, 224¹, 226, 231, 233, 234, 239, 270, 294B, 297 GWST 240 • 6 credits of language acquisition or language/linguistic appreciation requirement from any of the following: ANTH 170, 270, 277, 370, 377 CHIN 100, 101 ENGL 340 FREN 101, 102, 103, 104, 122, 123, 215, 222, 344, 345 GERM 100, 110, 200, 210 JPST 100, 101, 200, 201 KORN 100, 101 SPAN 101, 102, 201, 202, 301, 302 WRLD 150, 151, 152, 153, 154, 155, 156, 157, 158, <u>159</u>, 382 <p>[...]</p> <p><i>[19741] Critical Thinking</i> [19742] Critical thinking is the ability to engage in reflective and independent thinking; it is at the root of a democratic society. This requirement provides students with the skills they need to separate facts from opinions, to examine issues from all sides, and to think independently. Critical thinking is essential to make connections across disciplines and understand content on a deeper level. It therefore enhances overall academic performance.</p> <p>[19743] Students must complete 3 credits chosen from:</p> <p>[19744] CULT 100, 101, 215 <u>HIST 145</u> PHIL 120, 121, 240 POLI 223 PSYO 270 SOCI 209</p> <p>[...]</p>	<ul style="list-style-type: none"> • 3 credits from any of the following: DIHU 155¹ ENGL 109², 112, 114, 150, 151, 153, 154, 155¹, 156 • 3 credits from any of the following: CORH 203, 204, 205, 206, 216, 321, 331 CULT 230¹, CULT 250¹ DIHU 220 ENGL 203, 212, 213, 222, 224¹, 226, 231, 233, 234, 239, 270, 294B, 297 GWST 240 • 6 credits of language acquisition or language/linguistic appreciation requirement from any of the following: ANTH 170, 270, 277, 370, 377 CHIN 100, 101 ENGL 340 FREN 101, 102, 103, 104, 122, 123, 215, 222, 344, 345 GERM 100, 110, 200, 210 JPST 100, 101, 200, 201 KORN 100, 101 SPAN 101, 102, 201, 202, 301, 302 WRLD 150, 151, 152, 153, 154, 155, 156, 157, 158, 382 <p>[...]</p> <p><i>[19741] Critical Thinking</i> [19742] Critical thinking is the ability to engage in reflective and independent thinking; it is at the root of a democratic society. This requirement provides students with the skills they need to separate facts from opinions, to examine issues from all sides, and to think independently. Critical thinking is essential to make connections across disciplines and understand content on a deeper level. It therefore enhances overall academic performance.</p> <p>[19743] Students must complete 3 credits chosen from:</p> <p>[19744] CULT 100, 101, 215 PHIL 120, 121, 240 POLI 223 PSYO 270 SOCI 209</p> <p>[...]</p>
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<p><i>[19749] Scientific Literacy or Numeracy</i></p> <p>[19750] Along with the Critical Thinking requirement, the Scientific Literacy or Numeracy requirement ensures graduates develop a habit of mind that enables them to think critically and independently while providing them with the mathematical or scientific concepts needed to navigate their workplace and life in general.</p> <p>[19751] Students must complete 3 credits chosen from:</p> <p>[19752] All 1st-year ASTR, BIOL, CHEM, PHYS, or MATH¹ DATA 101, 301² COSC 301² EESC 101, 104, 106, 111, 121 GEOG 108, 109 PSYO 271 SOCI 271, 291 STAT 121, 124, 230</p> <p>[...]</p> <p><i>[19761] Digital Literacy</i></p> <p>[19762] Digital literacy includes the broader capacity to participate in, and reflect upon, the use of digital communication technology in various spheres (education, work, leisure, etc.). The fulfillment of this requirement will enable students to build meaningful knowledge through the interaction with digital resources and understand human, as well as, cultural and societal issues related to the use of technology.</p> <p>[19763] Students must complete 3 credits chosen from:</p> <p>[19764] ARTH 370¹, 375¹, 411¹ COSC 122 CULT 312¹, 315¹, 316¹, 317¹</p>	<p><i>[19749] Scientific Literacy or Numeracy</i></p> <p>[19750] Along with the Critical Thinking requirement, the Scientific Literacy or Numeracy requirement ensures graduates develop a habit of mind that enables them to think critically and independently while providing them with the mathematical or scientific concepts needed to navigate their workplace and life in general.</p> <p>[19751] Students must complete 3 credits chosen from:</p> <p>[19752] All 1st-year BIOL, CHEM, PHYS, or MATH¹ DATA 101, 301² COSC 301² EESC 101, 104, 106, 111, 121 GEOG 108, 109 PSYO 271 SOCI 271 STAT 121, 124</p> <p>[...]</p> <p><i>[19761] Digital Literacy</i></p> <p>[19762] Digital literacy includes the broader capacity to participate in, and reflect upon, the use of digital communication technology in various spheres (education, work, leisure, etc.). The fulfillment of this requirement will enable students to build meaningful knowledge through the interaction with digital resources and understand human, as well as, cultural and societal issues related to the use of technology.</p> <p>[19763] Students must complete 3 credits chosen from:</p> <p>[19764] ARTH 370¹, 375¹ COSC 122 CULT 316¹, 317¹</p>
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<p>DIHU 155¹, 220, 301¹, 302¹, <u>312¹</u>, 370¹, 375¹, <u>407¹</u>, <u>411¹</u> ENGL 155¹, 305¹, 306¹, <u>387¹</u>, <u>407¹</u> FILM 100, 103¹, 303¹, 371¹ <u>GEOG 257</u> MDST 110, 120, 210, 220 SOCI 492 THTR 303¹ VISA 106 WRLD 370¹, 375¹</p> <p>[20391] ¹Check cross-listings.</p> <p><i>[19765] Power, Diversity, and Cultures</i></p> <p>[19766] The notions of equality, universal respect, and justice are the basis of the Universal Declaration of Human Rights. To fulfill UBC's commitment of advancing the inclusion of all those who have been excluded historically based on gender, race, religion, sexuality, age, physical ability, or economic circumstances, these notions are at the root of this requirement. The Power, Diversity, and Cultures requirement will ensure that students can reflect upon their experiences to rethink what is normal or acceptable about the lives they live, as well as providing an opportunity for them to question their unexamined assumptions about society.</p> <p>[19767] Students must complete 3 credits chosen from:</p> <p>[19768] ANTH 100, 218 ARTH 309¹, 370¹, 375¹ CULT 100, 101, 215, 230¹, 340¹, 346¹, 380¹, 480¹ DIHU 370¹, 375¹ ENGL 224¹, 379¹, 384¹ GEOG 255 GWST 100, 110, 215 HIST 317</p>	<p>DIHU 155¹, 220, 301¹, 302¹, 370¹, 375¹ ENGL 155¹, 305¹, 306¹ FILM 100, 103¹, 303¹, 371¹ MDST 110, 120, 210, 220 SOCI 492 THTR 303¹ VISA 106 WRLD 370¹, 375¹</p> <p>[20391] ¹Check cross-listings.</p> <p><i>[19765] Power, Diversity, and Cultures</i></p> <p>[19766] The notions of equality, universal respect, and justice are the basis of the Universal Declaration of Human Rights. To fulfill UBC's commitment of advancing the inclusion of all those who have been excluded historically based on gender, race, religion, sexuality, age, physical ability, or economic circumstances, these notions are at the root of this requirement. The Power, Diversity, and Cultures requirement will ensure that students can reflect upon their experiences to rethink what is normal or acceptable about the lives they live, as well as providing an opportunity for them to question their unexamined assumptions about society.</p> <p>[19767] Students must complete 3 credits chosen from:</p> <p>[19768] ANTH 100, 218 ARTH 309¹, 370¹, 375¹ CULT 100, 101, 215, 230¹, 340¹, 346¹, 380¹, 480¹ DIHU 370¹, 375¹ ENGL 224¹, 379¹, 384¹ GEOG 255 GWST 100, 110, 215 HIST 317</p>
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<p>POLI 100, <u>220, 314</u></p> <p>SOCI 121, 429</p> <p>THTR 304¹, 309¹, 411¹</p> <p>WRLD 100, 304¹, 310, 330, 331, 332, 340 360, 370¹, 375¹, 382, 388, 480, 482</p> <p>[20392] ¹Check cross-listings.</p> <p>[...]</p>	<p>POLI 100</p> <p>SOCI 121, 429</p> <p>THTR 304¹, 309¹, 411¹</p> <p>WRLD 100, 304¹, 310, 330, 331, 332, 340 360, 370¹, 375¹, 382, 388, 480, 482</p> <p>[20392] ¹Check cross-listings.</p> <p>[...]</p>
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Curriculum Proposal Form New/Change to Course/Program – Okanagan campus

Category: 1	
Faculty/School: Faculty of Science Dept./Unit: CMPS Faculty/School Approval Date: 20230314 Effective Session: 2023W	Date: 2022-2-15 Contact Person: Alex Hill Phone: 250.807.8719 Email: alex.hill@ubc.ca
Type of Action: New Course	
<p>Rationale: ASTR 501 and ASTR 511 will serve graduate students in other disciplines working on astrophysical problems. They could count as electives in the Mathematics MSc and PhD programs with permission of the Graduate Program Advisory Committee. ASTR 511 will serve engineering students working on radio telescope design. Both courses would be useful for computer science MSc and PhD students working on applications to astronomy. Graduate students in the chemistry program working on astrochemistry may also be interested in both courses.</p> <p>In the longer term, these courses will be the foundation of the curriculum of an astronomy or astrophysics graduate program.</p> <p>ASTR 511 will be taught in conjunction with Dominion Radio Astrophysical Observatory colleagues. The course will include observing time on DRAO telescopes, a unique opportunity made possible by our collaboration between UBCO and DRAO.</p> <p>Upper-level undergraduate cross-listed versions of the two courses (ASTR 401 and ASTR 411) will provide an opportunity for physics students interested in astrophysics to work directly with DRAO telescopes, which will be beneficial for those pursuing astrophysics graduate studies.</p>	



<p>Proposed Academic Calendar Entry:</p> <p>ASTR 401 (3): Astrophysical Processes</p> <p>Thermodynamics, atomic and molecular spectra, ionization and excitation, radiative transport, line and continuum opacities. Basic particle and fluid dynamics of stellar and gaseous systems in astrophysics. Gravitational dynamics. Credit will be granted for only one of ASTR 401 or ASTR 501. [3-0-0] <i>Prerequisites:</i> PHYS 301; ASTR 321 or PHYS 321. PHYS 324 is recommended.</p> <p>ASTR 501 (3): Astrophysical Processes</p> <p>Thermodynamics, atomic and molecular spectra, ionization and excitation, radiative transport, line and continuum opacities. Basic particle and fluid dynamics of stellar and gaseous systems in astrophysics. Gravitational dynamics. Credit will be granted for only one of ASTR 401 or ASTR 501.</p> <p>ASTR 411 (3): Radio Astronomy</p> <p>Astronomical observation and data visualization with emphasis on radio astronomy techniques. Single dish and radio interferometry. Radio telescope design considerations. Radio frequency interference mitigation. Planning and reducing astronomical observations. Involves visits to Dominion Radio Astrophysical Observatory. Credit will be granted for only one of ASTR 411 or ASTR 511. [3-1-0] <i>Corequisites:</i> ASTR 321 or PHYS 321.</p> <p>ASTR 511 (3): Radio Astronomy</p> <p>Astronomical observation and data visualization with emphasis on radio astronomy techniques. Single dish and radio interferometry. Radio telescope design considerations. Radio frequency interference mitigation. Proposing, planning, reducing, and interpreting astronomical observations. Involves visits to Dominion Radio Astrophysical Observatory. Credit will be granted for only one of ASTR 411 or ASTR 511.</p>	<p>Draft Academic Calendar URL:https://www.calendar.ubc.ca/okanagan/proof/edit/courses.cfm?go=name&code=ASTR</p> <p>Present Academic Calendar Entry:</p> <p>n/a</p>
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Curriculum Proposal Form

New/Change to Course/Program – Okanagan campus

Category: 1	
Faculty/School: Faculty of Arts and Social Sciences Dept./Unit: EPP Faculty/School Approval Date: 20230321 Effective Session: 2023W	Date: 2023-01-05 Contact Person: Julien Picault Phone: 250.807.9227 Email: Julien.picault@ubc.ca
Type of Action: Revision to Calendar Description	
<p>Rationale: This proposal updates the BSc Econ program to align with recent changes to the BSc degree requirements and changes to STAT course offerings.</p> <p>This proposal includes:</p> <ul style="list-style-type: none"> Replacing STAT 230 with the combination of STAT 203 (Introduction to Probability) and STAT 205 (Introduction to Mathematical Statistics); this will enable students to acquire solid statistic foundations which will help them succeed in upper-level courses. Adding DATA 101, which is the prerequisite for STAT 203. Adding STAT 324 as an option. STAT 324 is a mathematics of finance course and fits well with the major. Adding MATH 222, a new linear algebra course. It is a prerequisite for MATH 307 (Applied Linear Algebra). This allows students to choose one of three sequences of MATH courses: MATH 220 and MATH 327, MATH 222 and MATH 307, or MATH 225 and MATH 319, thereby adding more flexibility to their course selections. Adding DATA 315 Applied Time Series and Forecasting. This course is of particular interest to students who seek a job in the financial sector. This course also appeals other ECON major students because time-series analysis is the most common research method in all fields of economics. Reducing the first-year science requirements in alignment with the new BSc Adding CORH 205 Communication in the Social Science to update the list of courses that satisfy the English requirements for the BSc. Adding ECON 225 Data and Statistics for Economics. This course was added to the 2022W Calendar and is one of the prerequisites for ECON 327, which is a required course for the BSc Econ Major. Adding ECON 347 to the list of the upper-level monetary/macroeconomics. 	

**Proposed Academic Calendar Entry:****Economics (B.Sc.)****B.Sc. Major in Economics**

The B.Sc. Major in Economics emphasizes the mathematical and quantitative nature of modern economic inquiry that is increasingly required for progress on to graduate studies in economics or to careers in quantitative economic and financial analysis in the public and private sectors. The Major combines courses in Economics, Mathematics, and Statistics along with other Arts and Social Sciences requirements and electives. For students registered in the B.Sc. program in Economics, courses in Economics (ECON) taken to complete the requirements for the major are considered Science courses. Otherwise, Economics courses count as Arts credit.

[19519] – [19521]

First Year

ECON 101, 102	6
MATH 100, 101	6
3 credits from the following courses: BIOL 116 or 117, 122 or 125, 131, 133; CHEM 111 or 121, 113 or 123; EESC 111, 121; PHYS 111 or 112, 121 or 122	3
ENGL 109, or two of ENGL 112 ¹ , 113, 114 ¹ , 150, 151, 153, 154, 155, 156, CORH 205	6
DATA 101	3
Electives ²	6
Total Credits	30

Second Year

ECON 204, 205, 225	9
MATH 200, 221	6
One of MATH 220, 222 , 225	3
STAT 203, 205	6

Draft Academic Calendar URL:

<https://www.calendar.ubc.ca/okanagan/index.cfm?tree=18,360,1102,1451>

Present Academic Calendar Entry:**Economics (B.Sc.)****B.Sc. Major in Economics**

The B.Sc. Major in Economics emphasizes the mathematical and quantitative nature of modern economic inquiry that is increasingly required for progress on to graduate studies in economics or to careers in quantitative economic and financial analysis in the public and private sectors. The Major combines courses in Economics, Mathematics, and Statistics along with other Arts and Social Sciences requirements and electives. For students registered in the B.Sc. program in Economics, courses in Economics (ECON) taken to complete the requirements for the major are considered Science courses. Otherwise, Economics courses count as Arts credit.

[19519] – [19521]

First and Second Years

ECON 101, 102	6
MATH 100, 101	6
CHEM 111 or CHEM 121; and CHEM 113 or CHEM 123	6
PHYS 111 or 112	3
PHYS 121 or 122	3
ENGL 109, or two of ENGL 112 ¹ , 113, 114 ¹ , 150, 151, 153, 154, 155, or 156	6
Two of ASTR 110, 120, 111, 121; BIOL 116, 125; COSC 111, 121, 122, 123; EESC 111, 121; GEOG 108, 109	6
ECON 204, 205	6
MATH 200, 221	6
One of MATH 220, 225	3
STAT 230	3
Electives ²	6
Total Credits	60



Electives ²	<u>6</u>		
Total Credits	<u>30</u>		
Third and Fourth Years		Third and Fourth Years	
ECON 327, 328	6	ECON 327, 328	6
Four of ECON 320, 427; MATH 303, 307, 317, 319, 327, 339, 340, 409, 441; STAT 303, <u>324</u> , 401; DATA 301, 311, <u>315</u> , 410	12	Four of ECON 320, 427; MATH 303, 307, 317, 319, 327, 339, 340, 409, 441; STAT 303, 401; DATA 301, 311, 410	12
<u>One of ECON 308, 386, 401</u>	<u>3</u>	ECON courses numbered 300 or higher ³	18
<u>One of ECON 309, 345, 347, 356, 402, 409</u>	<u>3</u>	ECON courses at any level ²	6
ECON courses numbered 300 or higher	<u>12</u>	Electives ²	48
ECON courses at any level ²	6	Total Credits	60
<u>Upper-level electives</u>	<u>6</u>	Minimum credits for degree	
Electives ²	<u>12</u>		120
Total Credits	60	[20512] ¹ Credit will only be granted for one of ENGL 112 OR 114.	
Minimum credits for degree		[19524] ² In order to meet the degree requirements for the B.Sc., at least 42 of the 120 credits must be upper-level courses (numbered 300 or higher) and at least 48 of the 120 credits must be Arts course credits (including the 6 required credits of first-year English and at least 12 other credits in Arts courses).	
[20512] ¹ Credit will only be granted for one of ENGL 112 OR 114.		[19525] ³ At least one course must be upper-level microeconomics (ECON 308, 386, or 401) and at least one course must be in upper-level monetary/macroeconomics (ECON 309, 345, 356, 402, or 409).	
[19524] ² At least <u>12</u> of the 120 credits must be <u>non-science designated courses (in addition to the 6 required credits of ENGL under First Year).</u>			



Curriculum Proposal Form

New/Change to Course/Program – Okanagan campus

Category: 1	
Faculty/School: FASS Dept./Unit: Psychology Faculty/School Approval Date: 2023021 Effective Session: 2023W	Date: 20221212 Contact Person: Jan Cioe Phone: 250.807.8732 Email: jan.cioe@ubc.ca
Type of Action: Revision to Calendar Description	
<p>Rationale:</p> <p>This proposal will require that students wanting to join the Psychology Honours Program (i.e., registering in PSYO 490) must complete both of our upper-level research methods and statistics courses [i.e., PSYO 372 Research Methods and Statistics & PSYO 373 Advanced Research Methods and Statistics] before admission, as opposed to the current academic calendar language of requiring just PSYO 372. The requirements of permission of the Department Head and a minimum grade average of 76% in all attempted Psychology courses will remain.</p> <p>Currently, some students are entering the PSYO 490 Undergraduate Honours Thesis course in January after completing PSYO 372. This has created complications since the PSYO 490 attached seminar starts in Term 1; students entering PSYO 490 in January must make up the missed material since 20% of the grade for PSYO 490 comes from the work of the seminar component. These students also need to take PSYO 490 across both Term 2 and the Summer Term given that that this is a 6-credit course.</p> <p>By requiring both PSYO 372 and 373 prior to entering PSYO 490 this complication is avoided and, more importantly, our students will be better prepared to design and execute their Honours Thesis independent research project.</p> <p>For context, FASS is concurrently updating the prerequisites for PSYO 490 to include PSYO 373.</p>	



<p>Proposed Academic Calendar Entry:</p> <p>[19361] B.Sc. Psychology Honours Program</p> <p>[19363] <i>Admission Requirements</i></p> <p>[19364]</p> <ul style="list-style-type: none"> • Fourth-year standing; • Minimum weighted average of 76% from all courses taken in Psychology; • Minimum weighted average of 76% over the last 60 credits; • Preliminary thesis topic approved by a thesis supervisor. Note: the department head must approve the thesis supervisor; and • Completion of PSYO 372 & PSYO 373. <p>[19365] <i>Graduation Requirements</i></p> <p>[19366]</p> <ul style="list-style-type: none"> • All general program requirements for the Bachelor of Science; • All requirements for the Psychology Major, including the breadth requirement; • Completion of PSYO 372 (Research Methods and Statistics), PSYO 373 (Advanced Research Methods and Statistics), and 6 credits of PSYO 490 (Undergraduate Honours Thesis and associated seminar), with a minimum of 76% in each of these courses; • A minimum of 54 credits of Psychology, of which 42 must be upper-level Psychology; • Minimum weighted average of 76% from all courses in Psychology; • Minimum weighted average of 76% over the last 60 credits; and • Public presentation of the thesis. 	<p>Draft Academic Calendar URL: https://www.calendar.ubc.ca/okanagan/prof/edit/index.cfm?tree=18,360,1102,1460</p> <p>Present Academic Calendar Entry:</p> <p>[19361] B.Sc. Psychology Honours Program</p> <p>[19363] <i>Admission Requirements</i></p> <p>[19364]</p> <ul style="list-style-type: none"> • Fourth-year standing; • Minimum weighted average of 76% from all courses taken in Psychology; • Minimum weighted average of 76% over the last 60 credits; • Preliminary thesis topic approved by a thesis supervisor. Note: the department head must approve the thesis supervisor; and • Completion of PSYO 372. <p>[19365] <i>Graduation Requirements</i></p> <p>[19366]</p> <ul style="list-style-type: none"> • All general program requirements for the Bachelor of Science; • All requirements for the Psychology Major, including the breadth requirement; • Completion of PSYO 372 (Research Methods and Statistics), PSYO 373 (Advanced Research Methods and Statistics), and 6 credits of PSYO 490 (Undergraduate Honours Thesis), with a minimum of 76% in each of these courses; • A minimum of 54 credits of Psychology, of which 42 must be upper-level Psychology; • Minimum weighted average of 76% from all courses in Psychology; • Minimum weighted average of 76% over the last 60 credits; and • Public presentation of the thesis.
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Curriculum Proposal Form

New/Change to Course/Program – Okanagan campus

Category: 1	
Faculty/School: Faculty of Science Dept./Unit: All Faculty/School Approval Date: 20230321 Effective Session: 2023W	Date: 20221006 Contact Person: Trudy Kavanagh Phone: Email: trudy.kavanagh@ubc.ca
Type of Action: Revision to the Requirements of an Annotation of a Second or Subsequent Major or Honours Designation on a Baccalaureate Degree Previously Conferred.	
<p>Rationale: Currently the Faculty of Science allows students who have graduated with a BSc degree to return to complete a second or subsequent major, or honours, without going through the standard readmission process. We would like to limit this opportunity to students who have left UBCO, gained work/life experience, and then subsequently identified a need to upgrade their degree. Student requests will be considered after a minimum of six months since degree conferral.</p> <p>With this proposal, students would no longer be able to graduate in June and return in September. In the past 10 years, 57% of students who applied for the 2nd major or honours fit into this category. The proposed change would encourage students to complete their desired program before graduating.</p> <p>The number of students who successfully complete a second major or honours through this pathway is minimal: between 2017 and 2021, 23 students pursued this pathway – 8 completed, 10 did not complete, and 5 are in progress. If we remove the 13 who returned to studies immediately after graduating we are left with 10 students – 1 did not start, 1 completed, 3 did not complete, and in February 2022, 5 were in progress.</p> <p>Additionally, we are providing further details and clarification regarding the options and the process for returning to UBCO.</p>	
Proposed Academic Calendar Entry: [19495] Requirements of an Annotation of a Second or Subsequent Major or Honours Designation on a Baccalaureate Degree Previously Conferred <u>Students who have previously been granted a B.Sc. at UBC's Okanagan campus may return via two pathways:</u>	Draft Academic Calendar URL: Introduction - Faculty of Science - Faculties, Schools, and Colleges - Okanagan Academic Calendar 2021/22 - UBC Student Services Present Academic Calendar Entry: [19495] Requirements of an Annotation of a Second or Subsequent Major or Honours Designation on a Baccalaureate Degree Previously Conferred [19496] Students who have previously been granted a UBC Okanagan campus B.A. or B.Sc. may



<p>1. <u>Students Returning for a Second Degree:</u> <u>Students may apply for readmission by following applicable application timelines. With this pathway, students are required to pursue a different bachelor's degree and must meet all the requirements. Students will receive a second degree and parchment upon completion. Students pursuing this path should consult with an academic advisor prior to application.</u></p> <p>2. <u>Students Returning to Complete a Second Major or Honours in an Existing Degree:</u> <u>Students may apply to complete the requirements for an additional major or honours designation relevant to and within the same B.Sc. degree. This path is intended for students who have gained some real world/work experience, or have recognized a need to upgrade their degree (e.g. honours); students may apply for this path no earlier than six months after their degree conferral date. Students apply to the Faculty of Science Dean's Office.</u></p> <p>a. <u>Students seeking to complete an honours degree must meet all prerequisites and have a Department-approved honours thesis application before the re-entry application will be reviewed.</u></p> <p>b. <u>Once a student has been approved for re-entry, they will register for the next academic period.</u></p> <p>c. <u>Upon completion of their subsequent program, students will surrender their existing parchment. Senate will then confer the new degree, a new parchment</u></p>	<p>subsequently return and complete the requirements for a first or an additional major or honours designation relevant to and within the same baccalaureate degree. The student will then be issued an updated parchment of the baccalaureate degree if the major or honours program requirements have been fully met. The updated degree parchment will include an annotation specific to the majors or honours designation. The student will be required to surrender the degree parchment previously conferred upon the issuance of the updated parchment for the baccalaureate degree. The official transcript of the student will be updated to indicate that the requirements of a subsequent major or honours have been met.</p> <p>[19497] Returning students must receive the approval of the relevant department head before the student may enter either the second major or the honours program. The department head will ensure that the student's prior work is sufficiently current to progress within the proposed program of study.</p>
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Commented [LM1]: Link to here: [Readmission - Admissions - Okanagan Academic Calendar 2022/23 - UBC Student Services](#)



THE UNIVERSITY OF BRITISH COLUMBIA

will be printed, and the official transcript
updated.



Curriculum Proposal Form

New or Revised Course/Program – Okanagan campus

Proponents are encouraged to review the [Curriculum Submission Guidelines](#) prior to drafting their proposals. Please contact Senate & Curriculum Services at okanagan.curriculum@ubc.ca for further assistance.

Category: 1	
Faculty: Science Dept./Unit: CMPS Faculty Approval Date: 2023-03-21 Effective Session: 2023 W	Date: 2022-10-15 Contact Person: Sylvie Desjardins Phone: 250-807-8767 Email: sylvie.desjardins@ubc.ca
Type of Action: Other/Multiple (Please Specify)	
<p>Rationale: We propose to update the course requirements for the Environmental Analytics Concentration of the BSust degree to increase flexibility and align with core courses required in the other concentrations of the BSust. This would include:</p> <ol style="list-style-type: none">1) Replace GEOG 128 with SUST 201. This aligns the concentration with others in the BSust.2) Replace PHIL 125 with PHIL 331. PHIL 125 is not offered consistently and the content of PHIL 331 (Computer Ethics) is more aligned with the concentration. Additionally, removing PHIL 125 creates the space in year two for MATH 221.3) Add MATH 221 which is a prerequisite for the upper-level DATA courses.4) Replace DATA 410 with DATA 310. The department has added a new course, DATA 310, as an introduction to applied regression analysis. DATA 310 is a prerequisite to DATA 410.5) Move DATA 311 from year 3 to year 4 and add the option of completing either DATA 311 or 410. DATA 310 is a pre-requisite for DATA 311 and this provides additional course choice/flexibility.6) Remove GEOG 431. This provides added flexibility so students can choose their own interest area and possibly complete a minor.	

**Proposed Academic Calendar Entry:****Environmental Analytics Concentration**

Upon successful completion of this Concentration, the notation "Concentration in Environmental Analytics" will be placed on the student's transcript and degree parchment.

First Year	Credits
ENGL 112	3
INDG 102	3
SUST 100	3
SUST 104	3
COSC 111	3
DATA 101	3
ECON 101	3
ECON 102	3
MATH 100	3
MATH 101	3
Total Credits (minimum)	30

Second Year	Credits
STAT 230	3
SUST 200	3
<u>SUST 201</u>	<u>3</u>
SUST 202	1
SUST 204	3
SUST 205	3
DATA 301	3
<u>MATH 221</u>	<u>3</u>
Electives	9
Total Credits (minimum)	31

Third Year	Credits
SUST 300	3
SUST 301	3

Draft Academic Calendar URL:

<https://www.calendar.ubc.ca/okanagan/prof/edit/index.cfm?tree=18,360,1104,1472>

Present Academic Calendar Entry:**Environmental Analytics Concentration**

Upon successful completion of this Concentration, the notation "Concentration in Environmental Analytics" will be placed on the student's transcript and degree parchment.

First Year	Credits
ENGL 112	3
INDG 102	3
SUST 100	3
SUST 104	3
COSC 111	3
DATA 101	3
ECON 101	3
ECON 102	3
MATH 100	3
MATH 101	3
Total Credits (minimum)	30

Second Year	Credits
STAT 230	3
SUST 200	3
SUST 202	1
SUST 204	3
SUST 205	3
DATA 301	3
GEOG 128	3
PHIL 125	3
Electives	9
Total Credits (minimum)	31

Third Year	Credits
SUST 300	3
SUST 301	3



SUST 302	1	SUST 302	1
COSC 304	3	COSC 304	3
<u>DATA 310</u>	<u>3</u>	DATA 311	3
DATA 315	3	DATA 315	3
ECON 371 ¹	3	ECON 371	3
<u>PHIL 331¹</u>	<u>3</u>	GISC 380	3
GISC 380	3	Electives	9
<u>Electives</u>	<u>6</u>	Total Credits (minimum)	31
Total Credits (minimum)	31		
Fourth Year	Credits	Fourth Year	Credits
SUST 400	6	SUST 400	6
SUST 402	1	SUST 402	1
BIOL 401 or another approved upper-level BIOL course	3	BIOL 401 or another approved upper-level BIOL course	3
<u>DATA 311 or 410</u>	<u>3</u>	DATA 407	3
DATA 407	3	DATA 410	3
PHIL 435	3	GEOG 431	3
STAT 406	3	PHIL 435	3
<u>Electives</u>	<u>9</u>	STAT 406	3
Total Credits (minimum)	31	Electives	6
Overall Total Credits (minimum)		Total Credits (minimum)	31
¹ ECON 371 AND PHIL 331 can be taken in either third year or fourth year.		Overall Total Credits (minimum)	



Curriculum Proposal Form

New or Revised Course/Program – Okanagan campus

Proponents are encouraged to review the [Curriculum Submission Guidelines](#) prior to drafting their proposals. Please contact Senate & Curriculum Services at okanagan.curriculum@ubc.ca for further assistance.

Category: 1	
Faculty: Science FOS/FASS/FCCS Dept./Unit: Bachelor of Sustainability Faculty Approval Date: 2023-03-21 Effective Session: 2023W	Date: 2023-02-16 Contact Person: Astrida Neimanis Phone: 250.807.XXXX Email: astrida.neimanis@ubc.ca
Type of Action: Other/Multiple (Please Specify)	Update program requirements
Rationale: <p>HIST 215 is listed as a required course in the Bachelor of Sustainability Environmental Humanities Concentration, but is no longer offered. As there are students in this concentration entering their second year of the program, this course needs to be removed and replaced with existing course options.</p> <p>Some new courses have been added because of their strong alignment with the concentration's program learning outcomes. Most of these new courses were developed after the concentration was designed, and reflects many new faculty who have been hired by FASS and FCCS in response to UBCO's sustainability-related strategic priorities.</p> <p>There are category 2 proposals currently going through FASS and FCCS curriculum approvals to update prerequisites to accept SUST 104 as an alternative prerequisite. This will ensure students do not have any prerequisite challenges in Third and Fourth Year.</p>	

**Proposed Academic Calendar Entry:****Environmental Humanities Concentration**

[20269] Upon successful completion of this Concentration, the notation "Concentration in Environmental Humanities" will be placed on the student's transcript and degree parchment.

[19469]

First Year	Credits
ENGL 112	3
INDG 102	3
SUST 100	3
SUST 104	3
ENGL 156	3
GEOG 108	3
HIST 106	3
INDG 100	3
Electives	6
Total Credits (minimum)	30

[19470]

Second Year	Credits
SUST 201	3
SUST 200	3
SUST 202	1
One of <u>SUST 204², CORH 203</u>	3
SUST 205	3
One of ANTH 245, <u>GEOG 233, HIST 218, SOCI 228</u>	3
One of <u>ENGL 234², CULT 272², GEOG 257, GWST 272²</u>	3
One of <u>INDG 201</u> , INDG 202	3
Electives ¹	9
Total Credits (minimum)	31

Draft Academic Calendar URL:

<https://www.calendar.ubc.ca/okanagan/proof%20/edit/index.cfm?tree=18,360,1104,1474>

Present Academic Calendar Entry:**Environmental Humanities Concentration**

[20269] Upon successful completion of this Concentration, the notation "Concentration in Environmental Humanities" will be placed on the student's transcript and degree parchment.

[19469]

First Year	Credits
ENGL 112	3
INDG 102	3
SUST 100	3
SUST 104	3
ENGL 156	3
GEOG 108	3
HIST 106	3
INDG 100	3
Electives	6
Total Credits (minimum)	30

[19470]

Second Year	Credits
SUST 201	3
SUST 200	3
SUST 202	1
SUST 204	3
SUST 205	3
One of ANTH 245, ENG 234, ENGL 297, INDG 201, INDG 203	3
HIST 215	3
INDG 202	3
Electives	9
Total Credits (minimum)	31

**[19471]**

Third Year	Credits
SUST 300	3
SUST 301	3
SUST 302	1
One of CULT 317, ENGL 387, ENGL 388, ENGL 397	3
One of GEOG 304, GEOG 318, GEOG 365	3
One of HIST 300, HIST 301, HIST 309, HIST 395	3
INDG 307	3
Electives	12
Total Credits (minimum)	31

[19472]

Fourth Year	Credits
SUST 400	6
SUST 402	1
One of ANTH 445, GEOG 423, INDG 420	3
One of ENGL 457, ENGL 458, GWST 400	3
PHIL 435	3
Electives	15
Total Credits (minimum)	31

[19473]

Overall Total Credits (minimum)	123
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¹ When deciding on electives for first and second year, it is recommended that students speak to their program advisor about which 300/400-level courses they may want to take.

In addition to any of the course options listed in this concentration's requirements, other suggested electives are: GEOG 109, HIST 112, HIST 118, GEOG 217, HIST 222, INDG 205, CULT 317, ECON 371, ECON 372, GEOG 304, GEOG 314, GEOG 367, CRWR 473, GWST 440, INDG 450, POLI 432.

² Check course equivalencies.

[19471]

Third Year	Credits
SUST 300	3
SUST 301	3
SUST 302	1
One of CULT 317, ENGL 387, ENGL 388, ENGL 397	3
One of GEOG 304, GEOG 318, GEOG 365	3
One of HIST 300, HIST 301, HIST 309, HIST 395	3
INDG 307	3
Electives	12
Total Credits (minimum)	31

[19472]

Fourth Year
SUST 400
SUST 402
One of ANTH 445, GEOG 423, INDG 420
One of ENGL 457, ENGL 458, GWST 400
PHIL 435
Electives
Total Credits (minimum)

[19473]

Overall Total Credits (minimum)



Curriculum Proposal Form

New/Change to Course/Program – Okanagan campus

Category: 1	
Faculty/School: Faculty of Science Dept./Unit: CMPS Faculty/School Approval Date: 20230321 Effective Session: 2023W	Date: 2022-11-14 Contact Person: Sylvie Desjardins Phone: 250.807.8767 Email: sylvie.desjardins@ubc.ca
Type of Action: Revision to Data Science Program	
<p>Rationale: We are changing the requirements for the first two years of the program so that they are equivalent to those in the major in Mathematics program. There are two reasons to do this. First, data science careers require students to have a strong foundation in mathematics whether they wish to work in the industry or pursue a post-graduate program. The stronger mathematical background allows us to cover material and techniques in upper-level courses that would otherwise not be accessible to the students. Second, this also provides our students with the flexibility to switch between any of the quantitative science majors (Data Science, Mathematics, and Physics) as they advance in their degree. In the early stages of their training, students often lack sufficient knowledge to determine a priori which of these majors is best suited for them. With this in mind, we have redesigned the three majors so that a student entering any of these can easily transition between majors in their third year. This proposal includes:</p> <ul style="list-style-type: none"> - Updating the list of courses that satisfy the English requirements for the BSc. - We are changing the lab science requirements so that students can choose 6 credits among the recognized lab science courses rather than complete two physics and one chemistry lab. - Adding MATH 220, 222, and 225. - Replacing STAT 230 with the combination of STAT 203 (Introduction to Probability) and STAT 205 (Introduction to Statistics); this will provide a stronger foundation for our students. And eliminating COSC 221 (Introduction to Discrete Structure) from the list of required courses; some of the material contained in COSC 221 is now included in STAT 203. - Adding MATH 327 (Analysis I), and 310 (Applied Regression Analysis). - Eliminating DATA 301 from the core courses. This is a service course for students from outside the quantitative sciences. - Eliminating COSC 407 from the list of electives; this course is not relevant to the degree. 	
Data Science Major in Data Science	Draft Academic Calendar URL: Data Science - Bachelor of Science Programs - Faculty of Science - Faculties, Schools, and Colleges - Okanagan Academic Calendar 2022/23 - UBC Student Services Present Academic Calendar Entry: Data Science Major in Data Science



Note: The UBC Okanagan campus also offers a B.Sc. Minor in Data Science.

This program provides students with a thorough training in Data Science, which focuses on making decisions supported by data. It is grounded in Statistics (to formulate relevant questions and determine the answer based on data) and Computer Science (to manipulate and visualize data efficiently).

Data Science graduates have an impact on society by supporting evidence-based decisions grounded in our ever-growing collection of data. They are in very high demand and are called Statisticians, Quantitative Analysts, Decision Support Engineering Analysts, or Data Scientists.

First Year

MATH 100, 101	6
<u>Two of BIOL 116 or 117, 122 or 125, 131, 133; CHEM 111 or 121, 113 or 123; EESC 111, 121; PHYS 111 or 112, 121 or 122</u>	6
COSC 111, 121	6
DATA 101	3
ENGL 109, or two of <u>112¹</u> , 113, <u>114¹</u> , 150, 151, 153, 154, 155, 156, <u>or CORH 203</u>	6
Electives	3
Total Credits	30

Second Year

MATH 200, <u>220</u> , 221 ² , <u>222</u> , <u>225</u>	<u>15</u>
<u>STAT 203, 205</u>	<u>6</u>
COSC 222	<u>3</u>
Electives ³	6
Total Credits	30

Third and Fourth Years

<u>DATA 310</u> , 311, <u>315</u>	<u>9</u>
STAT 303	3
COSC 304	3
PHIL 331	3
24 credits from the following:	
• upper-level DATA electives;	

Note: The UBC Okanagan campus also offers a B.Sc. Minor in Data Science.

This program provides students with a thorough training in Data Science, which focuses on making decisions supported by data. It is grounded in Statistics (to formulate relevant questions and determine the answer based on data) and Computer Science (to manipulate and visualize data efficiently).

Data Science graduates have an impact on society by supporting evidence-based decisions grounded in our ever-growing collection of data. They are in very high demand and are called Statisticians, Quantitative Analysts, Decision Support Engineering Analysts, or Data Scientists.

First Year

DATA 101	3
CHEM 111 or 121;	3
MATH 100, 101	6
ENGL 109, or two of ENGL 112, 113, 114, 150, 151, 153, 154, 155, or 156	6
PHYS 111 or 112	3
PHYS 121 or 122	3
COSC 111, 121	6
Total Credits	30

Second Year

MATH 200, 221 ¹	6
STAT 230	3
COSC 221 , 222	6
Electives ²	15
Total Credits	30

Third and Fourth Years

DATA 304	3
DATA 311	3
COSC 304	3
STAT 303	3
PHIL 331	3
24 credits from the following:	
• upper-level DATA electives;	



- a maximum of 6 credits from: STAT 400, 401, 403, 406;

- a maximum of 6 credits from: COSC 322, 329, 344, 421; PHYS 420

- **a maximum of 6 credits from:** MATH 303, 307, **327**, 409.

Electives³ 18

Total Credits 60

Minimum credits for degree 120

⁴Credit will only be granted for one of ENGL 112 or 114.

²Math 221 may be taken in the second term of the first year.

³Students must complete at least 12 credits of non-science designated courses. Students are strongly encouraged to take 3 credits of an Indigenous content course to partially fulfill this requirement. Students entering the B.Sc. in 2024 and later will have to successfully complete an Indigenous content course.

Minor in Data Science

The Minor in Data Science provides advanced numeracy skills to majors in disciplines where new discoveries rely increasingly on the creation, management, and understanding of large data sets such as biology, chemistry, economics, and psychology. Due to the similarity of the content areas, students majoring in Statistics are not permitted to pursue a Minor in Data Science.

Students may earn a minor in data science by completing 30 credits^{1,2} as follows:

3 credits of DATA 101

3 credits of STAT 230

Up to 6 credits from: MATH 100, 101, 200, 221; COSC 111, 121, 221, 222; ECON 102; APSC 177; BIOL 202; PSYO 373; APSC 254

3 credits of DATA 301

3 credits of DATA 311

12 upper-level credits from the following¹:

- upper-level DATA courses;
- a maximum of 3 credits from: COSC 304, 322, 329, 344, 421;
- a maximum of 6 credits from: STAT 303, 401.

- a maximum of 6 credits from: STAT 400, 401, 403, 406;
- a maximum of 6 credits from: ~~COSC 303~~, 322, 329, 344, ~~407~~, 421; MATH 303, 307, 409; PHYS 420.

~~Upper-level electives~~ 3

Electives² 18

Total Credits 60

Minimum credits for degree 120

¹Math 221 may be taken in the second term of the first year.

²Students must complete at least 12 credits of non-science designated courses. Students are strongly encouraged to take 3 credits of an Indigenous content course to partially fulfill this requirement. Students entering the B.Sc. in 2024 and later will have to successfully complete an Indigenous content course.

Minor in Data Science

The Minor in Data Science provides advanced numeracy skills to majors in disciplines where new discoveries rely increasingly on the creation, management, and understanding of large data sets such as biology, chemistry, economics, and psychology. ~~The minor is open to all majors in the B.Sc. program except Statistics.~~ Due to the similarity of the content areas, students majoring in Statistics are not permitted to pursue a Minor in Data Science.

Students may earn a minor in data science by completing 30 credits as follows:

3 credits of DATA 101

3 credits of STAT 230

Up to 6 credits from: MATH 100, 101, 200, 221; COSC 111, 121, 221, 222; ECON 102; APSC 177; BIOL 202; PSYO 373; APSC 254

3 credits of DATA 301

3 credits of DATA 311

12 upper-level credits from the following¹:

- upper-level DATA courses;



¹ Students in a major/minor are permitted to double count a limited number of credits between the two fields of study (see [Double Counting of Credits in Honours, Majors, and Minors](#)).

² The 18 upper-level credits must be in a discipline different from the student's major.

Any query related to the data science minor should be addressed to the data science minor program coordinator at datascience.advisor@ubc.ca

- a maximum of 3 credits from²: COSC 304, 322, 329, 344, 421;
- a maximum of 6 credits from: STAT 303, 401.

¹ Students in a major/minor are permitted to double count a limited number of credits between the two fields of study (see [Double Counting of Credits in Honours, Majors, and Minors](#)).

~~² Students majoring in Computer Science cannot count COSC courses towards the DATA minor.~~

Any query related to the data science minor should be addressed to the data science minor program coordinator at datascience.advisor@ubc.ca



Curriculum Proposal Form

New or Revised Course/Program – Okanagan campus

Proponents are encouraged to review the [Curriculum Submission Guidelines](#) prior to drafting their proposals. Please contact Senate & Curriculum Services at okanagan.curriculum@ubc.ca for further assistance.

Category:1	
Faculty: Science Dept./Unit: EESG Faculty Approval Date: 2023-03-21 Effective Session: 2023W	Date: 2023-02-07 Contact Person: Craig Nichol Phone: 250-807-8087 Email: craig.nichol@ubc.ca
Type of Action: New Course, Update degree requirements, update calendar entry Other/Multiple (Please Specify)	
<p>Rationale: The EESC program has undergone a program review and a curriculum renewal project is underway. A new course is proposed at the 100 level for Sept 2023 as the first step of introducing the new curriculum. Further changes to the program at the 200 level and above are anticipated to follow.</p> <p>The Earth and Environmental Sciences degree currently has 3 options for 100 level courses:</p> <ul style="list-style-type: none"> • EESC 111 Earth Science with labs, • EESC 121 Earth History with labs, • EESC 101 Environmental Science with no labs. <p>Up until now, the wider variety of course materials have been successful in increasing recruitment to the program by allowing students to pursue their interests. However, the option to have 3 courses has led to difficulties at the 2nd year level in having a common set of knowledge and competencies for majors. In addition, UBC Vancouver, the University of Victoria, and SFU have all moved away from having historical geology (EESC 121 Earth History) as a required course in first year. This course is now commonly offered at the 200 or 300 level for majors only where content can be covered in a more advanced way.</p> <p>EESC 112 is being introduced to form the second course in a required set of courses for the EESC program. “Two of EESC 101, 111, 121” will be replaced with “EESC 111 and EESC 112”. This is similar to the two course 100 level offerings by Math, Physics, Chemistry, Biology The primary focus of the course is to serve those intending to pursue the EESC or FWSC majors.</p> <p>EESC 101 will continue in its current form. It will no longer be a required course for the majors. It is anticipated that it will primarily become a course for non-majors. It is anticipated that EESC 121 will be removed from the list of 100 level courses and a new course for majors will be proposed in 2023/2024, for first offering in 2024/2025.</p> <p>EESC 112 builds upon the introduction to the Earth side of Earth and Environmental Sciences provided in EESC 111. It will engage students with content from environmental geoscience and</p>	



environmental science. This course is intended to give students scientific foundations in the branches of science that are the most important towards using science as one of the mechanisms to explore our environment, and particularly, how to improve its current state and projected future.

The laboratory portion of the course will build upon competencies developed in EESC 111 in a dry lab environment. It will also draw upon basic wet laboratory competencies developed in Chem 111. The focus is on developing the technical knowledge and competencies needed to succeed in the EESC program.

The course is also intended to formally expose students to group work skills. The lecture portion of the course will engage students with some specific lecture and classroom material to begin to develop communication, teamwork and time management competencies. The laboratory portion will engage the students in group work in a structured environment.

Updates to Degree Description:

There has been confusion among students regarding the nature of the professions within geoscience and agrology. The term registration implies the requirements are optional, whereas practice in the relevant areas of geoscience or agrology legally requires a license to practice. There is a national professional association for environmental workers which does register members and this permits them to use the title Environmental Professional.



<p>Proposed Academic Calendar Entry:</p> <p><u>EESC 112 Environmental Earth Science</u> <u>Earth systems and environment: atmosphere, climate, water cycle, oceans, surface water, groundwater, earth surface processes, soils, and biogeochemical cycling. Applications of environmental science to solving modern environmental problems. [3-3-0]</u> <u>Prerequisite: EESC 111 and one of CHEM 111, CHEM 121.</u></p> <p>Proposed Academic Calendar Entry:</p> <p>Earth and Environmental Sciences [19129] Major in Earth and Environmental Sciences [19130] The Earth and Environmental Sciences B.Sc. program provides an education reflecting the multi-disciplinary nature of the field. Students will acquire a fundamental understanding of past and present relationships among air, water, rocks and minerals, and biota. Flexible program requirements allow students to acquire a degree that meets their personal objectives. Students can highlight the environment or the solid earth and enhance their program with related elective courses from Biochemistry, Biology, Chemistry, Geography, Mathematics, and Statistics. Programs can also be designed to meet curriculum guidelines required for professional licensure¹. For example, students are</p>	<p>Draft Academic Calendar URL: https://www.calendar.ubc.ca/okanagan/prof/edit/courses.cfm?go=name&code=EESC</p> <p>Present Academic Calendar Entry:</p> <p>None</p> <p>Draft Academic Calendar URL: https://www.calendar.ubc.ca/okanagan/prof/edit/index.cfm?tree=18,360,1102,1449</p> <p>Present Academic Calendar Entry:</p> <p>Earth and Environmental Sciences [19129] Major in Earth and Environmental Sciences [19130] The Earth and Environmental Sciences B.Sc. program provides an education reflecting the multi-disciplinary nature of the field. Students will acquire a fundamental understanding of past and present relationships among air, water, rocks and minerals, and biota. Flexible program requirements allow students to acquire a degree that meets their personal objectives. Students can highlight the environment or the solid earth and enhance their program with related elective courses from Biochemistry, Biology, Chemistry, Geography, Mathematics, and Statistics. Programs can also be designed to meet curriculum guidelines required by</p>
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referred to the Geoscientists Canada and the Engineers and Geoscientists British Columbia websites for syllabus requirements for **licensure** as a Professional Geoscientist. **Licensure or registration** with other national and provincial bodies may be possible with careful course selection.

[19131] Licensure as a professional in geoscience and other related fields is managed by organizations external to UBC. Efforts are made to ensure that the relevant UBC courses meet provincial and national requirements, but students are reminded that the final decision on course acceptance rests with these external organizations.

[19132]

First and Second Years ¹	Credits
EESC 111, 112	6
Two of BIOL 116, 125, COSC 101, 111, 114, 121, DATA 101	6
CHEM 111 or CHEM 121	3
CHEM 113 or CHEM 123	3
MATH 100	3
MATH 101 or 103	3
PHYS 111 or 112	3
PHYS 121 or 122	3
Communication Requirement ²	6
One of BIOL 202; GEOG 271, STAT 121, 230	3
EESC 200-level courses	9
EESC or other Science 200-level courses ³	6
Non-Science electives	6
Total Credits	60

[19133]

Third and Fourth Years ¹
EESC 300- and 400-level courses ⁴
EESC or GISC 300- or 400-level courses
EESC, GISC or other Science 300- and 400-level courses

professional organizations¹. For example, students are referred to the Geoscientists Canada and the Engineers and Geoscientists British Columbia websites for syllabus requirements for **registration** as a Professional Geoscientist. **Registration** with other national and provincial bodies may be possible with careful course selection.

[19131] Professional registration in geoscience and other related fields is managed by organizations external to UBC. Efforts are made to ensure that the relevant UBC courses meet provincial and national **registration** requirements, but students are reminded that the final decision on course acceptance **and registration** rests with these external organizations.

[19132]

First and Second Years ¹	Credits
Two of EESC 101, 111, 121	6
Two of BIOL 116, 125, COSC 101, 111, 114, 121, DATA 101	6
CHEM 111 or CHEM 121	3
CHEM 113 or CHEM 123	3
MATH 100	3
MATH 101 or 103	3
PHYS 111 or 112	3
PHYS 121 or 122	3
Communication Requirement ²	6
One of BIOL 202; GEOG 271, STAT 121, 230	3
EESC 200-level courses	9
EESC or other Science 200-level courses ³	6
Non-Science electives	6
Total Credits	60

[19133]

Third and Fourth Years ¹
EESC 300- and 400-level courses ⁴
EESC or GISC 300- or 400-level courses



<p>Non-Science electives^{6,7}</p> <p>Electives⁷</p> <p>Minimum total credits for degree</p> <p>[19134] ¹Students are advised to consult a departmental program advisor or the program website for guidance on which courses to take in first and second year. The choice of courses, and the order to take them in, may vary depending on student interests. Careful selection of courses at all levels may be required to meet the requirements of <u>licensure as a professional</u>. Consultation with a departmental program advisor is recommended at the end of 1st-year or in the first weeks of 2nd year if a student is aiming to meet requirements of professional <u>licensure</u>.</p> <p>[20056] ²Communication Requirement: This may be fulfilled by 6 credits from: APSC 176, 201, CORH 203, ENGL 109,112, 113, 114, 150, 151, 153, 154, 155, 156, BIOL 313, EESC 398. In exceptional circumstances, such as transfer students, other courses may be permitted by the program advisor. Students who have not completed the Communication Requirement by the time they enter fourth year will not be permitted to enrol in any courses other than courses that satisfy the requirement.</p> <p>[19135] ³Students may choose 200-level courses from Earth and Environmental Sciences courses, Geography courses accepted as science courses, or from across the sciences. Students should consult with a program advisor to select courses to match their intended program of study and professional <u>licensure</u> intentions.</p> <p>[19136] ⁴A few upper-level Earth and Environmental Sciences courses are offered in alternate years. Planning with a department advisor is recommended.</p> <p>[19137] ⁵Students may choose from Earth and Environmental Sciences courses, Geospatial</p>	<p>EESC, GISC or other Science 300- and 400-level courses⁵</p> <p>Non-Science electives^{6,7} 18</p> <p>Electives⁷ 120</p> <p>Minimum total credits for degree</p> <p>[19134] ¹Students are advised to consult a departmental program advisor or the program website for guidance on which courses to take in first and second year. The choice of courses, and the order to take them in, may vary depending on student interests. Careful selection of courses at all levels may be required to meet the requirements of registration in some professional organizations. Consultation with a departmental program advisor is recommended at the end of 1st-year or in the first weeks of 2nd year if a student is aiming to meet requirements of professional registration.</p> <p>[20056] ²Communication Requirement: This may be fulfilled by 6 credits from: APSC 176, 201, CORH 203, ENGL 109,112, 113, 114, 150, 151, 153, 154, 155, 156, BIOL 313, EESC 398. In exceptional circumstances, such as transfer students, other courses may be permitted by the program advisor. Students who have not completed the Communication Requirement by the time they enter fourth year will not be permitted to enrol in any courses other than courses that satisfy the requirement.</p> <p>[19135] ³Students may choose 200-level courses from Earth and Environmental Sciences courses, Geography courses accepted as science courses, or from across the sciences. Students should consult with a program advisor to select courses to match their intended program of study and professional registration intentions.</p>
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<p>Information Science courses, Geography courses accepted as science courses, or from across the sciences. Students should consult with a program advisor to select courses to match their intended program of study and professional licensure intentions.</p> <p>[19138] ⁶Those Geography courses regarded as Science courses cannot be used for Non-Science credit. See the Bachelor of Science Degree Requirements for a list.</p> <p>[19139] ⁷At least 6 credits of these electives must be at upper-level.</p>	<p>[19136] ⁴A few upper-level Earth and Environmental Sciences courses are offered in alternate years. Planning with a department advisor is recommended.</p> <p>[19137] ⁵Students may choose from Earth and Environmental Sciences courses, Geospatial Information Science courses, Geography courses accepted as science courses, or from across the sciences. Students should consult with a program advisor to select courses to match their intended program of study and professional registration intentions.</p> <p>[19138] ⁶Those Geography courses regarded as Science courses cannot be used for Non-Science credit. See the Bachelor of Science Degree Requirements for a list.</p> <p>[19139] ⁷At least 6 credits of these electives must be at upper-level.</p>
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Curriculum Proposal Form

New or Revised Course/Program – Okanagan campus

Proponents are encouraged to review the [Curriculum Submission Guidelines](#) prior to drafting their proposals. Please contact Senate & Curriculum Services at okanagan.curriculum@ubc.ca for further assistance.

Category: 1	
Faculty: Science Dept./Unit: EESC Faculty Approval Date: 2023-03-21 Effective Session: 2023W	Date: 2023-02-07 Contact Person: Craig Nichol Phone: 250-807-8087 Email: craig.nichol@ubc.ca
Type of Action: Revision to Calendar Description	
<p>Rationale: Addition of CHEM 210 to FWSC major requirements - The Chemistry department stopped offering the course ~10 years ago because it was not needed at the department level. It has been determined that this course is needed again and it will be offered in 2023W Term 2. This option was part of the FWSC major in the past, and is now being restored.</p> <p>Addition of FWSC 375 - The Biology and EECG departments have proposed to cross list the BIOL 375 course as FWSC 375.</p>	

**Proposed Academic Calendar Entry:****[19204] Major in Freshwater Science**

[19205] The Freshwater Science program integrates and synthesizes aquatic aspects of biology, chemistry, geography, and earth and environmental sciences. Students will study water quality and quantity, aquatic organisms, and the health of aquatic ecosystems

[19206] This program prepares students for careers related to inland aquatic ecosystems. Graduates of this program will acquire the skills and knowledge necessary to deal with future national and international freshwater environmental problems - both in water quality and quantity. In addition to employment in freshwater and environmental sectors, graduates will be prepared for graduate study and research in freshwater science.

[19207]

First Year	Credits
BIOL 116, 125	6
CHEM 111 or CHEM 121	3
CHEM 113 or CHEM 123	3
EESC 101, 111	6
MATH 100	3
MATH 101 or 103	3
PHYS 111 or 112	3
PHYS 121 or 122	3
Total Credits	30

[19208]

Second Year	Credits
BIOL 201	3
One of BIOL 202, GEOG 271, STAT 121, 230	3
<u>One of</u> CHEM 201, <u>210</u>	3

Draft Academic Calendar URL:

<https://www.calendar.ubc.ca/okanagan/prof/edit/index.cfm?tree=18,360,1102,1453>

[19204] Major in Freshwater Science

[19205] The Freshwater Science program integrates and synthesizes aquatic aspects of biology, chemistry, geography, and earth and environmental sciences. Students will study water quality and quantity, aquatic organisms, and the health of aquatic ecosystems

[19206] This program prepares students for careers related to inland aquatic ecosystems. Graduates of this program will acquire the skills and knowledge necessary to deal with future national and international freshwater environmental problems - both in water quality and quantity. In addition to employment in freshwater and environmental sectors, graduates will be prepared for graduate study and research in freshwater science.

[19207]

First Year	Credits
BIOL 116, 125	6
CHEM 111 or CHEM 121	3
CHEM 113 or CHEM 123	3
EESC 101, 111	6
MATH 100	3
MATH 101 or 103	3
PHYS 111 or 112	3
PHYS 121 or 122	3
Total Credits	30

[19208]

Second Year	Credits
BIOL 201	3
One of BIOL 202, GEOG 271, STAT 121, 230	3



CHEM 211	3	CHEM 201	3
EESC 205, 222	6	CHEM 211	3
Communication Requirement ¹	6	EESC 205, 222	6
Non-science electives	6	Communication Requirement ¹	6
Total Credits	30	Non-science electives	6
		Total Credits	30
Third and Fourth Years		Third and Fourth Years	
BIOL 308	3	BIOL 308, 375 ²	6
<u>FWSC 375²</u>	3	CHEM 301	3
CHEM 301	3	EESC 212	3
EESC 212	3	EESC 301	3
EESC 301	3	EESC 402	3
EESC 402	3	One of EESC 305, 342, 413, 435	3
One of EESC 305, 342, 413, 435	3	Two of EESC 309, EESC 323, EESC 423	6
Two of EESC 309, EESC 323, EESC 423	6	One of EESC 313, EESC 314, EESC 315, GEOG 310, GEOG 314	3
One of EESC 313, EESC 314, EESC 315, GEOG 310, GEOG 314	3	Upper-level Science electives	9
Upper-level Science electives	9	Non-Science electives ³	6
Non-Science electives ³	6	Electives ³	15
Electives ³	15	Total Credits	60
Total Credits	60	Minimum Credits for Degree	120
Minimum Credits for Degree	120		
¹ Communication Requirement: This may be fulfilled by 6 credits from: APSC 176, 201, CORH 203, ENGL 109, 112, 113, 114, 150, 151, 153, 154, 155, 156, BIOL 313, EESC 398. In exceptional circumstances, such as transfer students, other courses may be permitted by the program advisor. Students who have not completed the Communication Requirement by the time they enter fourth year will not be permitted to enrol in any courses other than courses that satisfy the requirement.		¹ Communication Requirement: This may be fulfilled by 6 credits from: APSC 176, 201, CORH 203, ENGL 109, 112, 113, 114, 150, 151, 153, 154, 155, 156, BIOL 313, EESC 398. In exceptional circumstances, such as transfer students, other courses may be permitted by the program advisor. Students who have not completed the Communication Requirement by the time they enter fourth year will not be permitted to enrol in any courses other than courses that satisfy the requirement.	
² In lieu of <u>FWC 375</u> , two of BIOL 204, 205, 209, 210 will be accepted.		² In lieu of BIOL 375, two of BIOL 204, 205, 209, 210 will be accepted.	
³ At least 6 credits of these electives must be at upper-level.		³ At least 6 credits of these electives must be at upper-level.	



Curriculum Proposal Form

New/Change to Course/Program – Okanagan campus

Category: 1	
Faculty/School: Faculty of Science Dept./Unit: CMPS Faculty/School Approval Date: 20230321 Effective Session: 2023W	Date: 2022-11-15 Contact Person: Sylvie Desjardins Phone: 250.807.8767 Email: sylvie.desjardins@ubc.ca
Type of Action: Revision to Calendar Description	
<p>Rationale: We would like to change the requirements for the first two years of the program so that they are interchangeable with Data Science and Physics. This provides our students with the flexibility to switch between any of the quantitative science majors (Data Science, Mathematics, and Physics) as they advance in their degree. In the early stages of their training, students often lack sufficient knowledge to determine a priori which of these majors is best suited for them. With this in mind, we have redesigned the three majors so that a student entering any of these can easily transition between majors in their third year. This proposal includes:</p> <ul style="list-style-type: none"> - Updating the list of courses that satisfy the English requirements for the BSc. - Updating the wording for the non-science elective to include the upcoming requirement for indigenous content. - Including a 2nd-year Linear Algebra (MATH 222) course to provide students with a foundation of abstract linear algebra and prepare them better for the transition to upper-level mathematics courses. - Including STAT 203 (Introduction to Probability) and STAT 205 (Introduction to Statistics) as these new courses provide a stronger foundation for students in the quantitative sciences and ease the transition to STAT 303. - Eliminating COSC 221 (Introduction to Discrete Structure) from the list of required courses; some of the basic material contained in COSC 221 is now covered in other courses (STAT 203). - Adding DATA 310 as a required course; this ensures that mathematics majors are introduced to the basic concepts in data analysis. - Moving MATH 307 (Applied Linear Algebra) from the list of required courses and adding it as an option for the applied mathematics concentration. This lowers the number of credits for required courses from 15 to 12. This will provide more flexibility at the upper-level for our students. - Deleting the Data Science concentration; the changes made in the Data Science program have resulted in no discernable differences between the major in data science and the major in mathematics with a data science concentration. - Introducing a new concentration in Mathematical Finance combining the expertise from faculty in data science, mathematics, and statistics. 	

**Proposed Academic Calendar Entry:****B.Sc. Major in Mathematics**

Note: The UBC Okanagan campus also offers a B.A. Major in Mathematics, and a B.Sc. Combined Major in Physics and Mathematics.

Graduates of this program are prepared for direct entry into careers in actuarial science, government, or finance. Many graduates go on to graduate studies, professional secondary teaching programs, or other professional programs.

[19251]

First Year	Credits
MATH 100, 101	6
6 credits from the following courses: BIOL 116 or 117, 122 or 125, 131, 133; CHEM 111 or 121, 113 or 123; EESC 111, 121; PHYS 111 or 112, 121 or 122	6
COSC 111 ¹ , 121 ²	6
DATA 101	3
ENGL 109, or two of 112 ³ , 113, 114 ³ , 150, 151, 153, 154, 155, 156, <u>or CORH 203</u>	6
Electives ⁴	3
Total Credits	30

[19252]

Second Year	
MATH 200, 220, 221 ⁵ , 222 , 225	15
STAT 203, 205	6
Electives ⁴	9
Total Credits	30

[19253]**Third and Fourth Years****Draft Academic Calendar URL:**

[Mathematics \(B.Sc.\) - Bachelor of Science Programs - Faculty of Science - Faculties, Schools, and Colleges - Okanagan Academic Calendar 2022/23 - UBC Student Services](#)

Present Academic Calendar Entry:**B.Sc. Major in Mathematics**

Note: The UBC Okanagan campus also offers a B.A. Major in Mathematics, and a B.Sc. Combined Major in Physics and Mathematics.

Graduates of this program are prepared for direct entry into careers in actuarial science, government, or finance. Many graduates go on to graduate studies, professional secondary teaching programs, or other professional programs.

[19251]

First Year	Credits
MATH 100, 101	6
6 credits from the following courses: BIOL 116 or 117, 122 or 125, 131, 133; CHEM 111 or 121, 113 or 123; EESC 111, 121; PHYS 111 or 112, 121 or 122	6
COSC 111 ¹ , 121 ²	6
DATA 101 or STAT 124 ³	3
ENGL 109, or two of 112, 113, 114, 150, 151, 153, 154, 155, or 156	6
Electives	3
Total Credits	30

[19252]

Second Year	
MATH 200, 220, 221 ⁴ , 225	12
STAT 230 ³	3
COSC 221	3
Non Science electives	6
Electives	6
Total Credits	30

[19253]**Third and Fourth Years**



DATA 310	3	MATH 307 , 311, 319, 327, 350	15
MATH 311, 319, 327, 350	12	STAT 303	3
STAT 303	3	A student in this program may choose to specialize further by completing a concentration in Applied Mathematics, Data Science , or Pure Mathematics, or may choose not to pursue a concentration . The student must choose upper-level electives as specified in one of the four options below.	
A student in this program may choose to specialize further by completing a concentration in Applied Mathematics, Pure Mathematics, or Mathematical Finance , or may choose to remain in the General Program. Students must choose upper-level electives as specified in one of the four options below.		General Program Upper-level Mathematics and Statistics electives. No more than 6 credits may be DATA/STAT courses.	12
General Program Upper-level Mathematics and Statistics electives. No more than 6 credits may be DATA/STAT courses.	12	Applied Mathematics Concentration Electives chosen from MATH 303 , 317, 323, 339, 340, 409, 441, 442, 459, 461, 462 or other approved electives in applied mathematics	12
Applied Mathematics Concentration Electives chosen from MATH 307 , 317, 323, 339, 340, 409, 441, 442, 459, 461, 462 or other approved electives in applied mathematics.	12	Data Science Concentration Electives chosen from: DATA 301, 311, 407, 410, 421; STAT 401, 403, 406, 449, or other approved electives in statistics, data science, or computer science	12
Pure Mathematics Concentration Electives chosen from MATH 308, 312, 313, 328, 330, 408, 410, 429, 443, 461, or other approved electives in pure mathematics	12	Pure Mathematics Concentration Electives chosen from MATH 308, 312, 313, 328, 330, 408, 410, 429, 443, 461, or other approved electives in pure mathematics	12
Mathematical Finance Concentration STAT 324, DATA 315, and MATH 409, and one of MATH 303, 328, 461; STAT 400, 406; DATA 405 or other approved electives in data science, mathematics, or statistics	12	Upper-level Science electives	6
Upper-level Science electives	6	Upper-level electives	6
Upper-level electives	6	Science elective	3
Electives ⁴	18	Non-Science electives	6
Total Credits	60	Electives	9
Minimum credits for degree	120	Total Credits	60
		Minimum credits for degree	120
¹ COSC 111 may be replaced by COSC 122 and 123.		¹ COSC 111 may be replaced by COSC 122 and 123.	
² COSC 111 and 121 may be taken in 2nd year		² COSC 111 and 121 may be taken in 2nd year	
³ Credit will only be granted for one of ENGL 112 or 114.		³ Pre-reqs for STAT 230 are DATA 101 or COSC 221. Therefore, students who take STAT 121 instead of DATA 101 in first year will need to take COSC 221 before enrolling in STAT 230.	
⁴ Students must complete at least 12 credits of non-science designated courses. Students are strongly encouraged to take 3 credits of an Indigenous content course to partially fulfill this requirement. Students entering the B.Sc. in 2024 and later will have to successfully complete an Indigenous content course. ⁵ Students are strongly encouraged to take MATH 221 in the second term of the 1st year		⁴ MATH 221 may be taken in the second term of the 1st year	



Curriculum Proposal Form

New or Revised Course/Program – Okanagan campus

Proponents are encouraged to review the [Curriculum Submission Guidelines](#) prior to drafting their proposals. Please contact Senate & Curriculum Services at okanagan.curriculum@ubc.ca for further assistance.

Category: 1	
Faculty: Science Dept./Unit: CMPS Faculty Approval Date: 2023-03-21 Effective Session: 2023W	Date: 2022-11-01 Contact Person: Sylvie Desjardins Phone: 250.807.8767 Email: sylvie.desjardins@ubc.ca
Type of Action: Discontinuation of Program	
<p>Rationale: This program dates back to OUC, and its original purpose has now been completely superseded by (for example) the Major programs in Computer Science, Statistics, and Data Science.</p> <p>Given the strong options for both major and minor programs in Mathematics, Statistics, Computer Science, and Data Science offered by the department, the Major in Mathematical Science is no longer relevant.</p>	
Proposed Academic Calendar Entry: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Program Overview Admission Requirements Academic Regulations Degree Requirements for students who entered the program in 2019/2020 or earlier Degree Requirements for students entering the program in 2020/2021 or later Program Requirements Co-operative Education Program Dual Degree Program Option: Bachelor of Science and Master of Management Biochemistry and Molecular Biology Biology Chemistry </div> <div style="width: 10%; text-align: center;"> → → → → → → → → → → → </div> <div style="width: 45%;"> Program Overview Admission Requirements Academic Regulations Degree Requirements for students who entered the program in 2019/2020 or earlier Degree Requirements for students entering the program in 2020/2021 or later Program Requirements Co-operative Education Program Dual Degree Program Option: Bachelor of Science and Master of Management Biochemistry and Molecular Biology Biology Chemistry </div> <div style="width: 10%; text-align: center;"> → → → → → → → → → → → </div> </div>	Draft Academic Calendar URL: https://www.calendar.ubc.ca/okanagan/prof/edit/index.cfm?tree=18,360,1102,0 Present Academic Calendar Entry:



<u>Communications and Rhetoric (Undergraduate Certificate)</u>	→	<u>Communications and Rhetoric (Undergraduate Certificate)</u>	→
<u>Computer Science (B.Sc.)</u>	→	<u>Computer Science (B.Sc.)</u>	→
<u>Data Science</u>	→	<u>Data Science</u>	→
<u>Earth and Environmental Sciences</u>	→	<u>Earth and Environmental Sciences</u>	→
<u>Ecology, Evolution, and Conservation Biology</u>	→	<u>Ecology, Evolution, and Conservation Biology</u>	→
<u>Economics (B.Sc.)</u>	→	<u>Economics (B.Sc.)</u>	→
<u>Environmental Chemistry</u>	→	<u>Environmental Chemistry</u>	→
<u>Freshwater Science</u>	→	<u>Freshwater Science</u>	→
<u>General Studies</u>	→	<u>General Studies</u>	→
<u>Geospatial Information Science Minor</u>	→	<u>Geospatial Information Science Minor</u>	→
<u>Management (Minor)</u>	→	<u>Management (Minor)</u>	→
<u>Mathematics (B.Sc.)</u>	→	<u>Mathematical Sciences</u>	→
<u>Microbiology</u>	→	<u>Mathematics (B.Sc.)</u>	→
<u>Physics and Astronomy</u>	→	<u>Microbiology</u>	→
<u>Psychology (B.Sc.)</u>	→	<u>Physics and Astronomy</u>	→
<u>Statistics</u>	→	<u>Psychology (B.Sc.)</u>	→
<u>Zoology</u>	→	<u>Statistics</u>	→
		<u>Zoology</u>	→
Proposed Academic Calendar Entry:		Draft Academic Calendar URL:	
		https://www.calendar.ubc.ca/okanagan/prof/edit/index.cfm?tree=18,360,1102,1456	
		Present Academic Calendar Entry:	
		Mathematical Sciences	
		This program is currently under review.	
		Admissions into the program has been	
		suspended for 2021. Students wishing to enrol in	
		this program must contact the Mathematical	
		Sciences undergraduate program advisor.	
		Major in Mathematical Sciences	
		Note: The UBC Okanagan campus also offers	
		a <u>B.A. Major in Computer Science</u>, a <u>B.Sc. Major</u>	
		<u>in Computer Science</u>, a <u>B.Sc. Major in Data</u>	



	<p><u>Science</u>, a <u>B.A. Major in Mathematics</u>, a <u>B.Sc. Major in Mathematics</u>, and a <u>B.Sc. Combined Major in Physics and Mathematics</u>.</p> <p>This program provides students with a solid grounding in the mathematical sciences including mathematics, statistics, and computer science. While maintaining a strong core in mathematics, the program allows students to emphasize mathematics, statistics, computer science, or any combination of the three. Computer science and statistics are extensively integrated throughout the program.</p> <p>A graduate of this program is prepared for further study in the mathematical sciences, or to enter into a career in business, education, government, industry, and financial institutions. Each student must consult with the department head in his or her first or second year for advice in planning his or her third and fourth year courses. Students planning to enter this program must include the course sequence COSC 111/121 in their 30 credits of required first-year courses.</p> <p>First Year</p> <p>CHEM 111 or CHEM 121; and CHEM 113 or CHEM 114</p> <p>COSC 111, 121</p> <p>ENGL 109, or two of ENGL 112, 113, 114, 150, 151</p> <p>MATH 100, 101</p> <p>PHYS 111 or 112</p> <p>PHYS 102, 121 or 122</p> <p>Total Credits</p> <p>Second Year</p> <p>COSC 221, 222</p> <p>DATA 314</p> <p>MATH 200, 220, 221, 225</p>
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	<p>STAT 230</p> <p>Arts electives¹</p> <p>Total Credits</p> <p>Third and Fourth Years</p> <p>COSC 310, 320</p> <p>MATH 307</p> <p>One of MATH 311, 327</p> <p>One of MATH 319, 340</p> <p>STAT 303</p> <p>One of STAT 401, 410</p> <p>Arts electives¹</p> <p>Upper-level Computer Science elective</p> <p>Upper-level Mathematics elective</p> <p>Upper-level Science elective</p> <p>Upper-level Statistics elective</p> <p>Upper-level electives selected from Mathematics, Statistics, Data Science, Computer Science</p> <p>Upper-level electives</p> <p>Elective</p> <p>Total Credits</p> <p>Minimum credits for degree</p> <p>¹At least 18 credits (including the 6 credits in first-year English) must be in Arts courses.</p> <p>Draft Academic Calendar URL: https://www.calendar.ubc.ca/okanagan/prof/edit/index.cfm?tree=18,360,1102,1437</p>
<p>Proposed Academic Calendar Entry:</p> <p>[18940] B.Sc. Major Program</p> <p>[18941] The Faculty of Science currently offers Major programs in Biochemistry and Molecular Biology; Biology; Chemistry; Computer Science¹; Earth and Environmental Sciences; Ecology, Evolution, and Conservation Biology.; Economics²; Environmental Chemistry; Freshwater Science; Mathematics³; Microbiology; Physics and Astronomy; Psychology⁴; Statistics; and, Zoology. Completion of a Major program prepares students for career-entry</p>	<p>Present Academic Calendar Entry:</p> <p>[18940] B.Sc. Major Program</p> <p>[18941] The Faculty of Science currently offers Major programs in Biochemistry and Molecular Biology; Biology; Chemistry; Computer Science¹; Earth and Environmental Sciences; Ecology, Evolution, and Conservation Biology.; Economics²; Environmental Chemistry; Freshwater Science; Mathematical Sciences; Mathematics³; Microbiology; Physics and Astronomy; Psychology⁴;</p>



positions, graduate study, or admission to post-baccalaureate professional programs. Students entering a Major program should note the courses listed in years one, two, three, and four as indicated under each discipline.

[18942] ¹Computer Science is also offered as a B.A. program. ²Economics is also offered as a B.A. program. ³Mathematics is also offered as a B.A. program. ⁴Psychology is also offered as a B.A. program.

Proposed Academic Calendar Entry:

[19490] Program Offerings

Program	Cred ential	Subject Areas
Bachelor of Science	B.Sc.	Biology; Chemistry; Computer Science; Data Science; Earth and Environmental Sciences; Ecology and Evolutionary Biology; Economics; Environmental Chemistry; Freshwater Science; Mathematics; Microbiology; Physics and Astronomy; Psychology, Statistics, Zoology.

Statistics; and, Zoology. Completion of a Major program prepares students for career-entry positions, graduate study, or admission to post-baccalaureate professional programs. Students entering a Major program should note the courses listed in years one, two, three, and four as indicated under each discipline.

[18942] ¹Computer Science is also offered as a B.A. program. ²Economics is also offered as a B.A. program. ³Mathematics is also offered as a B.A. program. ⁴Psychology is also offered as a B.A. program.

Draft Academic Calendar URL:

[Introduction - Faculty of Science - Faculties, Schools, and Colleges - Okanagan Academic Calendar 2022/23 - UBC Student Services](#)

Present Academic Calendar Entry:

[19490] Program Offerings

Program	Cred ential	Subject Areas
Bachelor of Science	B.Sc.	Biology; Chemistry; Computer Science; Data Science; Earth and Environmental Sciences; Ecology and Evolutionary Biology; Economics; Environmental Chemistry; Freshwater Science; Mathematical Sciences ; Mathematics; Microbiology; Physics and Astronomy; Psychology, Statistics, Zoology.



Curriculum Proposal Form

New/Change to Course/Program – Okanagan campus

Category: 2	
Faculty/School: Faculty of Science Dept./Unit: CMPS Faculty/School Approval Date: 20230321 Effective Session: 2023W	Date: 2022-09-01 Contact Person: Jake Bobowski Phone: 250.807.9506 Email: jake.bobowski@ubc.ca
Type of Action: Revision to the Major	
Rationale: Physics and Astronomy has undergone a review of its programs. We are revising the Physics Major to allow students more flexibility to customize their degree. In addition, we have increased the number of electives in the degree from 30 to 36 which will make it easier for students to pursue a Minor in another discipline.	
Proposed Academic Calendar Entry: [19283] Major in Physics [19284] This program aims to provide a comprehensive physics education with considerable emphasis on both theoretical foundations and laboratory practice. The theoretical and mathematical components develop the intellectual skills and versatility needed either to pursue physics professionally at the post-graduate level, or to cross over into other professions such as medicine, actuarial science, meteorology, and secondary education, in which a physics background is strongly preferred. The senior laboratory components consist of long-range projects rather than prescribed exercises, to encourage initiative on the part of the student and to prepare them for the inventive atmosphere of modern high-tech industry. Graduates of this program have attained success in high-tech industry, computer software development, secondary education, and post-graduate studies.	Draft Academic Calendar URL: https://www.calendar.ubc.ca/okanagan/proof/edit/index.cfm?tree=18,360,1102,1459 [19283] Major in Physics [19284] This program aims to provide a comprehensive physics education with considerable emphasis on both theoretical foundations and laboratory practice. The theoretical and mathematical components develop the intellectual skills and versatility needed either to pursue physics professionally at the post-graduate level, or to cross over into other professions such as medicine, actuarial science, meteorology, and secondary education, in which a physics background is strongly preferred. The senior laboratory components consist of long-range projects rather than prescribed exercises, to encourage initiative on the part of the student and to prepare him or her for the inventive atmosphere of modern high-tech industry. Graduates of this program have attained success in high-tech industry, computer software development, secondary education, and post-graduate studies.

**[19285]**

First Year	Credits
CHEM 111 or CHEM 121; and CHEM 113 or CHEM 123	6
ENGL 109, or two of ENGL 112 ¹ , 113, 114 ¹ , 150, 151, 153, 154, 155, 156, CORH 203	6
MATH 100 or 116	3
MATH 101 or 103	3
PHYS 111 or 112	3
PHYS 121 or 122	3
Electives ²	6
Total Credits	30

[19286]

Second Year	
ASTR 210, or one of PHYS 225, 305, 314 , 320	3
MATH 200, 221 ³ , 225, 317 ⁴	12
PHYS 200, 215, 216, 231, 232	15
Total Credits	30

[19287]

Third and Fourth Years	
MATH 319	3
PHYS 301, 304, 328, 331	12
One of PHYS 401, 402, 403	3
400-level Physics and Astronomy elective	3
Upper-level Physics and Astronomy electives⁵	9
Upper level science electives	3
Upper level electives	6
Non-science electives	12
Electives ²	9
Total Credits	60
Minimum credits for degree	120

¹Credit will only be granted for one of ENGL 112 or 114.

[19289] ²COSC 111 and 121 are strongly recommended.

Students considering a career in geosciences should take EESC 111, 121, and 350. Students considering a career in astronomy should take ASTR **110, 120, 210 and 321**.

[19285]

First Year	Credits
CHEM 111 or CHEM 121; and CHEM 113 or CHEM 123	6
ENGL 109, or two of ENGL 112, 113, 114, 150, 151, 153, 154, 155, or 156	6
MATH 100, 101	6
PHYS 111 or 112 ¹	3
PHYS 121 or 122 ¹	3
Electives ²	6
Total Credits	30

[19286]

Second Year	
ASTR 210, or one of PHYS 225, 305, 320	3
MATH 200, 221 ³ , 225, 317 ⁴	12
PHYS 200, 215, 216, 231, 232	15
Total Credits	30

[19287]

Third and Fourth Years	
MATH 319	3
PHYS 301, 304, 331, 328, 403, 441	18
9 credits chosen from: PHYS 314, 324, 400, 401, 402, 407, 408, 413, 418, 420, 431, 474	9
6 credits chosen from: PHYS 305, 310, 314, 320, 321, 324, 360, 400, 401⁵, 402⁵, 407, 408, 413, 418, 420, 425, 431, 448⁶, 474	6
Electives ^{2, 7, 8}	24
Total Credits	60
Minimum credits for degree	120

~~**[19288]** ¹Minimum grade of 68% is required in each of PHYS 112 and PHYS 122.~~

[19289] ²COSC 111 and 121 are strongly recommended.

Students considering a career in geosciences should take EESC 111, 121, and 350. Students considering a career in astronomy should take ASTR ~~111 and 124~~. ~~At least 18~~



[19290] ³MATH 221 may be taken in the second term of the first year.

[19291] ⁴MATH 317 may be taken in the third year.

[19293] ⁵**PHYS 335 cannot be used as upper-level**

Physics electives. Capable students are advised to consider selecting the directed studies course PHYS 448, which grants either 2, 3, 4, or 6 upper-level credits in Physics.

~~credits (including the 6 credits in first-year English) must be Arts courses.~~

[19290] ³MATH 221 may be taken in the second term of the first year.

[19291] ⁴MATH 317 may be taken in the third year.

~~[19292] ⁵Students in the Physics Honours Program (PHYS 449) must use PHYS 401 and PHYS 402 to fulfill the Major requirements. Further information can be obtained from the Physics and Astronomy program advisor.~~

[19293] ⁶Capable students are advised to consider selecting the directed studies course PHYS 448, which grants either 2, 3, 4, or 6 upper-level credits in Physics.

~~[19294] ⁷PHYS 448 may not be applied toward the Major requirements for Honours students, except as elective credit.~~

~~[19295] ⁸At least 36 of 120 credits must be Science course credits from courses numbered 300 or higher (upper-level courses), and at least an additional 6 upper-level courses which may be from Arts or Social Sciences.~~



Curriculum Proposal Form

New/Change to Course/Program – Okanagan campus

Category: 1																			
Faculty/School: Faculty of Science Dept./Unit: CMPS Faculty/School Approval Date: 20230321 Effective Session: 2023W	Date: 2022-09-01 Contact Person: Jake Bobowski Phone: 250.807.9506 Email: jake.bobowski@ubc.ca																		
Type of Action: Revision to the Physics Honours program																			
Rationale: Physics and Astronomy has undergone a review of its programs. We are revising the Physics Honours to allow students more flexibility to customize their degree. In addition, we have increased the number of electives in the degree from 24 to 30. We are also proposing to update the requirements to apply to enter the honours program.																			
Proposed Academic Calendar Entry: <p style="color: #8B872F;">[19307] Physics Honours Program</p> <p>[19308] This program enables high-achieving Physics Major students to gain research experience through the completion of an Honours Thesis. It is particularly recommended to those students intending to pursue post-graduate studies.</p> <p style="color: red;"><u>The course requirements for first and second year are the same as in the Major in Physics program.</u></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="background-color: #A8C8A8; padding: 5px;">Third and Fourth Years</th> </tr> <tr> <td style="padding: 2px 5px;"><u>MATH 319</u></td> <td style="text-align: right; padding: 2px 5px;"><u>3</u></td> </tr> <tr> <td style="padding: 2px 5px;"><u>PHYS 301, 304, 328, 331, 401, 402, 403, 441</u></td> <td style="text-align: right; padding: 2px 5px;"><u>24</u></td> </tr> <tr> <td style="padding: 2px 5px;"><u>PHYS 449</u></td> <td style="text-align: right; padding: 2px 5px;"><u>6</u></td> </tr> <tr> <td style="padding: 2px 5px;"><u>Upper-level Physics and Astronomy electives⁵</u></td> <td style="text-align: right; padding: 2px 5px;"><u>3</u></td> </tr> <tr> <td style="padding: 2px 5px;"><u>Non-science electives</u></td> <td style="text-align: right; padding: 2px 5px;"><u>12</u></td> </tr> <tr> <td style="padding: 2px 5px;"><u>Electives²</u></td> <td style="text-align: right; padding: 2px 5px;"><u>12</u></td> </tr> <tr> <td style="padding: 2px 5px;"><u>Total Credits</u></td> <td style="text-align: right; padding: 2px 5px;"><u>60</u></td> </tr> <tr> <td style="padding: 2px 5px;"><u>Minimum credits for degree</u></td> <td style="text-align: right; padding: 2px 5px;"><u>120</u></td> </tr> </table>	Third and Fourth Years		<u>MATH 319</u>	<u>3</u>	<u>PHYS 301, 304, 328, 331, 401, 402, 403, 441</u>	<u>24</u>	<u>PHYS 449</u>	<u>6</u>	<u>Upper-level Physics and Astronomy electives⁵</u>	<u>3</u>	<u>Non-science electives</u>	<u>12</u>	<u>Electives²</u>	<u>12</u>	<u>Total Credits</u>	<u>60</u>	<u>Minimum credits for degree</u>	<u>120</u>	Draft Academic Calendar URL: https://www.calendar.ubc.ca/okanagan/proof/edit/index.cfm?tree=18,360,1102,1459 Present Academic Calendar Entry: <p style="color: #8B872F;">[19307] Physics Honours Program</p> <p>[19308] This program enables high-achieving Physics Major students to gain research experience through the completion of an Honours Thesis. It is particularly recommended to those students intending to pursue post-graduate studies.</p>
Third and Fourth Years																			
<u>MATH 319</u>	<u>3</u>																		
<u>PHYS 301, 304, 328, 331, 401, 402, 403, 441</u>	<u>24</u>																		
<u>PHYS 449</u>	<u>6</u>																		
<u>Upper-level Physics and Astronomy electives⁵</u>	<u>3</u>																		
<u>Non-science electives</u>	<u>12</u>																		
<u>Electives²</u>	<u>12</u>																		
<u>Total Credits</u>	<u>60</u>																		
<u>Minimum credits for degree</u>	<u>120</u>																		



¹Credit will only be granted for one of ENGL 112 or 114.

²COSC 111 and 121 are strongly recommended. Students considering a career in geosciences should take EESC 111, 121, and 350. Students considering a career in astronomy should take ASTR 110, 120, 210 and 321.

³MATH 221 may be taken in the second term of the first year.

⁴MATH 317 may be taken in the third year.

⁵PHYS 335 cannot be used as upper-level Physics electives.

[19309] Admission Requirements

[19310]

- Fourth-year standing in the Physics Major program;
- Students with a minimum grade average of 76% **in all** courses taken to date may apply to be considered for the Honours program. Admission is at the discretion of the Department Head, and may be subject to a ranking of those students applying; ~~and~~
- Enrollment in PHYS 449 (Honours Thesis). The thesis proposal and research supervisor must be approved by the Academic Department.

[19311] In exceptional cases, such as transferees from another institution, a student may be admitted by permission of the Academic Department notwithstanding the above criteria.

[19312] Graduation Requirements

[19313]

- Minimum **cumulative** grade average of 76% for all second-, third-, and fourth-year **non-elective** science courses taken to fulfill the requirements of the Physics **Honours Program**; and

[19309] Admission Requirements

[19310]

- Fourth-year standing in the Physics Major program;
- Students with a minimum grade average of 76% ~~for all second-, third- and fourth-year science courses taken to date that are applicable to the~~ Physics Major may apply to be considered for the Honours program. Admission is at the



- Completion of PHYS 449 with a minimum grade of 76%. A written thesis is required, with a public seminar presentation of the thesis research.

discretion of the Department Head, and may be subject to a ranking of those students applying.

- Enrolment in PHYS 449 (Honours Thesis). The thesis proposal and research supervisor must be approved by the Academic Department.

[19311] In exceptional cases, such as transferees from another institution, a student may be admitted by permission of the Academic Department notwithstanding the above criteria.

[19312] Graduation Requirements

[19313]

- ~~Completion of the course requirements for the Physics major¹, including PHYS 401² and 402²;~~
- Minimum grade average of 76% for all second-, third-, and fourth-year science courses taken to fulfill the requirements of the Physics Major; and
- Completion of PHYS 449 with a minimum grade of 76%. A written thesis is required, with a public seminar presentation of the thesis research.

~~**[19314]** ¹PHYS 448 and 449 may not be applied toward the Major requirements for Honours students, except as elective credit.~~

~~**[19315]** ²Students in the Physics Honours Program (PHYS 449) must use PHYS 401 and PHYS 402 to fulfill the Major requirements.~~



Curriculum Proposal Form

New/Change to Course/Program – Okanagan campus

Category: 1	
Faculty/School: Faculty of Science Dept./Unit: CMPS Faculty/School Approval Date: 20230321 Effective Session: 2023W	Date: 2022-11-01 Contact Person: Sylvie Desjardins Phone: 250.807.9506 Email: sylvie.desjardins@ubc.ca
Type of Action: Revision to the Combined Major in Physics and Mathematics	
<p>Rationale: Mathematics, Physics and Astronomy have undergone a review of their programs. We are revising the Combined Major in Physics and Mathematics to reflect these changes. The goal is to allow students to choose from a wider variety of courses from selected disciplines, while tailoring the course requirements in Mathematics, Statistics, and Data to strengthen the Combined Major. The changes should make the major more attractive to students interested in Mathematical Physics or Theoretical Physics.</p> <p>We propose to:</p> <ul style="list-style-type: none">• Expand the list of first-year writing courses and added the relatively new MATH 103 courses as an alternative to MATH 101.• Replace COSC 121 with DATA 101; DATA 101 is a prerequisite for STAT 203.• Add ASTR 210 as a second-year option so that students with an interest in astrophysics can complete our sequence of core ASTR courses.• Add STAT 203 and move MATH 220 to 3rd-year; STAT 203 is a prerequisite for STAT 303.• Remove PHYS 314 from the list of upper-year physics electives. Given the nature of the combined degree, the number of physics courses that a student can take is small so it makes sense to restrict the list to those courses that are viewed as more fundamental to the discipline.• Remove PHYS 431 from the list of upper-year courses as it no longer exists.• Add ASTR 321, PHYS 400, and PHYS 425 to the list of upper-year courses that students can choose from.• Add MATH 350 in the required list of upper-level courses and MATH 303 and STAT 403 in the option for upper-level courses. Delete MATH 307, and 311 from the required list, and 461 from the list of options.	

**Proposed Academic Calendar Entry:****[19296] Combined Major in Physics and Mathematics**

[19297] Provides students with a rich background in both theoretical physics and mathematics. The program consists of core training in both disciplines and electives that highlight common ground between the two fields. Graduates of the program will be well prepared for post-graduate studies in theoretical physics or applied mathematics. The combined major will also prepare students for further training and careers in education, finance, computer software development, or industrial research.

[19298]

First Year	Credits
CHEM 111 or CHEM 121; and CHEM 113 or CHEM 123	6
MATH 100	<u>3</u>
MATH 101 <u>or 103</u>	3
<u>ENGL 109, or two of ENGL 112¹, 113, 114¹, 150, 151, 153, 154, 155, 156, CORH 203</u>	6
PHYS 111 or 112	3
PHYS 121 or 122	3
COSC 111	<u>3</u>
<u>DATA 101</u>	<u>3</u>
Total Credits	30

[19299]

Second Year	
PHYS 200, 215, 216	<u>9</u>
<u>Two of ASTR 210; PHYS 231, 232</u>	<u>6</u>
MATH 200, 221, 225, 317 ² <u>and STAT 203</u>	15
Total Credits	30

[19300]

Third and Fourth Years	
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Draft Academic Calendar URL:

<https://www.calendar.ubc.ca/okanagan/proof/edit/index.cfm?tree=18,360,1102,1459>

Present Academic Calendar Entry:**[19296] Combined Major in Physics and Mathematics**

[19297] Provides students with a rich background in both theoretical physics and mathematics. The program consists of core training in both disciplines and electives that highlight common ground between the two fields. Graduates of the program will be well prepared for post-graduate studies in theoretical physics or applied mathematics. The combined major will also prepare students for further training and careers in education, finance, computer software development, or industrial research.

[19298]

First Year	Credits
CHEM 111 or CHEM 121; and CHEM 113 or CHEM 123	6
MATH 100, 101	6
Two of ENGL 112 or 114, 113, 150, 151, 153	6
PHYS 111 or 112	3
PHYS 121 or 122 ⁴	3
COSC 111, 121	6
Total Credits	30

[19299]

Second Year	
PHYS 200, 215, 216, 231, 232	45
MATH 200, 220 , 221, 225, 317 ²	15
Total Credits	30

[19300]

Third and Fourth Years	
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MATH 220 , 319, 327, 350 , STAT 303	15	MATH 307, 311 , 319, 327; STAT 303	15
PHYS 301, 304, 328	9	PHYS 301, 304, 328	9
One of PHYS 401 ³ , 402 ³ , 418 ³	3	One of PHYS 401 ³ , 402 ³ , 418 ³	3
Two of MATH 303 , 408, 459; STAT 403	6	6 credits chosen from: MATH 350, 408, 459, 461	6
Three of ASTR 321 ; PHYS, 331, 400 , 401 ³ , 402 ³ , 403, 407, 408, 418 ³ , 420, 425 , 441, 474	9	9 credits chosen from: PHYS 344, 331, 401³, 402, 403, 407, 408, 418³, 420, 431, 441, 474	9
Non-science electives	12	Electives ⁴	48
Electives ⁴	6	Total Credits	60
Total Credits	60	Minimum credits for degree	120
Minimum credits for degree	120		
<u>¹Credit will only be granted for one of ENGL 112 or 114.</u>		[19301] ¹Minimum grade of 68% is required in each of PHYS 412 and PHYS 122.	
[19302] ² MATH 317 may be taken in the third year but is a requirement for PHYS 301.		[19302] ² MATH 317 may be taken in the third year but is a requirement for PHYS 301.	
[19303] ³ Each of PHYS 401, 402, 418 may only fulfill one requirement.		[19303] ³ Each of PHYS 401, 402, 418 may only fulfill one requirement.	
[19304] ⁴ <u>Students are strongly encouraged to take 3 credits of an Indigenous content course to partially fulfill this requirement. Students entering the B.Sc. in 2024 and later will have to successfully complete an Indigenous content course.</u>		[19304] ⁴At least 12 credits of electives must be from Arts	



Curriculum Proposal Form

New/Change to Course/Program – Okanagan campus

Category: 1	
Faculty/School: Faculty of Science Dept./Unit: CMPS Faculty/School Approval Date: 20230321 Effective Session: 2023W	Date: 2022-11-14 Contact Person: Sylvie Desjardins Phone: 250.807.8767 Email: sylvie.desjardins@ubc.ca
Type of Action: Revision to Calendar Description	
<p>Rationale: We are changing the requirements for the first two years of the program so that they are equivalent to those in the major in mathematics program. There are two reasons to do this. First, careers in statistics require students to have a strong foundation in mathematics whether they wish to work in the industry or pursue a post-graduate program. Second, this provides students with the flexibility to switch between any of the quantitative science majors (Data Science, Mathematics, and Physics) as they advanced in their degree. Students often lack sufficient knowledge to determine a priori which of these majors is best suited for them in the early stages of their training. We have redesigned the three majors so that a student entering any of these can easily transition between majors in their third year. This proposal includes:</p> <ul style="list-style-type: none"> - Updating the list of courses that satisfy the English requirements for the BSc. - Updating the wording for the non-science elective to include the upcoming requirement for Indigenous content. - Adding COSC 121 to the list of required courses. We are changing the lab science requirements so that students can choose 6 credits among the recognized lab science courses. - Adding MATH 220, 222, and 225. - Replacing STAT 230 with the combination of STAT 203 (Introduction to Probability) and STAT 205 (Introduction to Statistics); this will provide a stronger foundation for our students. - Eliminating COSC 221 (Introduction to Discrete Structure) from the list of required courses; some of the material contained in COSC 221 is now included in STAT 203. - Adding MATH 327 (Analysis I), DATA 310 (Applied Regression Analysis), and PHIL 331 (Computer Ethics). 	
<p>Proposed Academic Calendar Entry:</p> <p>Statistics</p> <p>Major in Statistics</p> <p>This program provides students with a solid grounding in the theoretical, computational, and applied aspects of statistical science. Students also specialize in an area of application through upper-level electives and fulfilling stream requirements</p>	<p>Draft Academic Calendar URL: Statistics - Bachelor of Science Programs - Faculty of Science - Faculties, Schools, and Colleges - Okanagan Academic Calendar 2022/23 - UBC Student Services</p> <p>Present Academic Calendar Entry:</p> <p>Statistics</p> <p>Major in Statistics</p> <p>This program provides students with a solid grounding in the theoretical, computational, and applied aspects of statistical science. Students also specialize in an area of application through upper-level electives and fulfilling stream requirements</p>



in another discipline. A graduate of this program is prepared for further study in statistical science, or to enter into a career in Statistics Canada, health sciences, business, government, industry, or an actuarial/financial institution. Each student must consult with the program advisor in his or her first or second year for advice in planning third- and fourth-year courses.

First Year

MATH 100, 101	6
<u>Two of BIOL 116 or 117, 122 or 125, 131, 133; CHEM 111 or 121, 113 or 123; EESC 111, 121; PHYS 111 or 112, 121 or 122</u>	<u>6</u>
COSC 111, <u>121</u>	<u>6</u>
DATA 101	3
ENGL 109, or two of ENGL 112 ¹ , 113, 114 ¹ , 150, 151, 153, 154, 155, 156, <u>or CORH 203</u>	6
<u>Electives²</u>	<u>3</u>
Total Credits	<u>30</u>

Second Year

MATH 200, <u>220</u> , 221 ³ , <u>222, 225</u>	<u>15</u>
STAT <u>203, 205</u>	<u>6</u>
<u>Electives²</u>	<u>9</u>
<u>Total Credits</u>	<u>30</u>

Third and Fourth Years

STAT 303	<u>3</u>
Three of STAT 400, 401, 403, 406	<u>9</u>
<u>MATH 327</u>	<u>3</u>
Two of MATH 303, 307, 409, COSC 304, PHYS 420	6
<u>DATA 310</u>	<u>3</u>
<u>Two of</u> DATA 311, 315, 405, 407, 410	<u>6</u>
<u>PHIL 331</u>	<u>3</u>
<u>6 credits upper level science electives</u>	<u>6</u>
<u>3 credits upper level electives</u>	<u>3</u>
<u>Electives</u>	<u>18</u>
Total Credits	60
Minimum credits for degree	120

¹Credit will only be granted for one of ENGL 112 or 114.

in another discipline. A graduate of this program is prepared for further study in statistical science, or to enter into a career in Statistics Canada, health sciences, business, government, industry, or an actuarial/financial institution. Each student must consult with the program advisor in his or her first or second year for advice in planning third- and fourth-year courses.

First and Second Years

CHEM 111 or CHEM 121; and CHEM 113 or CHEM 123	6
MATH 100, 101	6
ENGL 109, or two of ENGL 112, 113, 114, 150, 151, 153, 154, 155, or 156	6
PHYS 111 or 112; and PHYS 121, or 122	6
COSC 111	3
DATA 101	3
MATH 200, 221 ⁴	6
STAT 230	3
Arts electives	6
2nd Year Science Electives	6
Stream requirements ²	9
Total Credits	60

Third and Fourth Years

STAT 303	12
Three of STAT 400, 401, 403, 406	
Four of DATA 311, 315, 405, 407, 410, 421	12
Two of MATH 303, 307, COSC 303, 304, DATA 304, PHYS 420	6
Arts electives	6
Electives, of which at least 3 credits must be upper level	15
Stream requirements ²	9
Total Credits	60
Minimum credits for degree	120

¹Math 221 may be taken in the second term of the first year.

²Stream requirements: Students must complete one of the following options. The program advisor maintains a list of suggested courses for which within-stream students will gain the pre-requisites for upper-level requirements.

Biology Stream:



²Students must complete at least 12 credits of non-science designated courses. Students are strongly encouraged to take 3 credits of an Indigenous content course to partially fulfill this requirement. Students entering the B.Sc. in 2024 and later will have to successfully complete an Indigenous content course.

³Math 221 may be taken in the second term of the first year.

Minor in Statistics

A student must successfully complete **STAT 203, 205**, and 18 credits in courses selected from **STAT or DATA courses numbered 300 and above of which at least 9 credits must be from STAT courses. Due to the similarity of the content areas, students majoring in Data Science are not permitted to pursue a Minor in Statistics.**

All of: BIOL 116, 125, 201

All of: 9 credits upper-level BIOL

Biochemistry Stream:

All of: BIOL 116, 125, 200:

All of: 9 credits upper-level BIOL or BIOG

Physical Geography Stream:

One of: GEOG 108, 109

Two of: GEOG 108, 109, 200, 207, 213, 222, 272

All of: 9 credits upper-level Science GEOG courses*

Earth and Environmental Sciences Stream:

All of: EESC 111 and 6 credits 2nd-year EESC

All of: 9 credits upper-level EESC

*See BSc requirement page and program advisor.

Minor in Statistics

A student must successfully complete MATH 100, 101, 200, 221, ~~STAT 230~~ and DATA 101, and 18 credits in courses selected from ~~STAT 303, 400, 401, 403, 406, 448, 449, DATA 311, 405, 407, 410.~~



Curriculum Proposal Form

New/Change to Course/Program – Okanagan campus

Category: 1	
Faculty/School: FHSD Dept./Unit: School of Nursing Faculty/School Approval Date: Effective Session: Winter I 2023	Date: March 1, 2023 Contact Person: Lisa Moralejo Phone: 250-317-9929 Email: lisa.moralejo@ubc.ca
Type of Action: Amalgamate both Global Health courses (NRSG 320 and HEAL 307) into HINT 320	
Rationale: Nursing 320 is currently taught by a nursing instructor as a mandatory course to all Year 3 nursing students in Winter Term 2 and HEAL 307 is currently taught by a nursing instructor as an elective course to HES students in Winter Term 2 We want to amalgamate both courses into an interdisciplinary global health course - HINT 320, to be offered in both Winter Terms 1 & 2 to both Nursing (mandatory course) and HES students (elective course). NRSG 320 and HESL 307 will no longer be offered.	
Proposed Academic Calendar Entry: <u>HINT 320 (3) Global Health</u> <u>Emerging health issues and trends, evidence-informed approaches and ethical concerns within the context of the global health and global healthcare. Credit will be granted for only one of HINT 320 and NRSG 320 or HEAL 307. [3-0-0]</u> Prerequisites: Third Year standing	Present Academic Calendar Entry: NRSG 320 (3) Global Health Explores the role of the nurse within the context of the global society and the changing health care environment. Develops knowledge of emerging health issues and trends, evidence-informed approaches and ethical concerns for nursing practice at the global level. [3-0-0] Prerequisite: Third-Year BSN-Q Standing HEAL 307 (3) Global Health Trends and Local Impacts Global health trends within and across countries and regions and how these global realities affect health and health care locally. [3-0-0]



	<p><i>Prerequisite: HEAL 200 and one of HMKN 105, HEAL 201.</i></p>
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Appendix C: Candidates for Emeritus Status

Last Name	First Name	Current Rank	Emeritus Title	UBCO Faculty	Effective Date
Schulz-Cruz	Bernard	Associate Professor	Associate Professor Emeritus	Faculty of Creative and Critical Studies	July 1, 2022
Jones	Melanie	Professor	Professor Emerita	I.K. Barber Faculty of Science	July 1, 2023
Klassen	Wendy	Associate Professor	Associate Professor Emeritus	Faculty of Education, Okanagan School of Education	July 1, 2023
Krank	Marvin	Professor	Professor Emeritus	I.K. Barber Faculty of Arts and Social Sciences	July 1, 2023
Perry	Karen	Associate Professor	Associate Professor Emerita	I.K. Barber Faculty of Science	July 1, 2023