

#### **NOTICE OF MEETING**

# There will be a meeting of the PROGRAM DEVELOPMENT COMMITTEE (PDC) Friday October 21, 2022 at 9:00am-11:00am Location: Room 209 Toldo AGENDA

#### **Formal Business**

- 1 Approval of Agenda
- 2 Minutes of Meeting of September 21, 2022
- 3 Business Arising from the Minutes
- 4 Outstanding Business

#### **5Reports/New Business**

5.1	Bachelor of Information Technology (BIT) – New Program Proposal (Form A)	Ziad Kobti- Approval
	5.1.1 BIT - New Course Proposals (Form Ds)	PDC221021-5.1-5.1.1
	5.1.1a External Reviewers Report, Responses (CONFIDENTIAL)	PDC221021-5.1.1a
	5.1.1b Appendices (Faculty CVs) (CONFIDENTIAL)	PDC221021-5.1.1b

\*5.2 Computer Science – Minor Program Change (Form C)

Ziad Kobti - Approval
PDC221021-5.2

\*5.3 Engineering (Graduate) - Clarification

Ali Abdulhussein -Information

PDC221021-5.3

\*5.4 Chemistry and Biochemistry - Summary of Minor Course and Calendar Changes (Form E)

Summary of Minor Course and PDC221021-5.4

\*5.5 Social Work - Summary of Minor Course and Calendar Changes (Form E) Robin Wright -Information PDC221021-5.5

#### 6 Question Period/Other Business

#### 7 Adjournment

Please carefully review the 'starred' (\*) agenda items. As per the June 3, 2004 Senate meeting, 'starred' item will not be discussed during a scheduled meeting unless a member specifically requests that a 'starred' agenda item be 'unstarred', and therefore open for discussion/debate. This can be done any time before (by forwarding the request to the secretary) or during the meeting. By the end of the meeting, agenda items which remain 'starred' (\*) will be deemed approved or received.

#### University of Windsor Program Development Committee

#### 5.1 Bachelor of Information Technology – New Program Proposal (Form A)

Item for: Approval

MOTION: That the Bachelor of Information Technology (BIT) new program proposal, which includes the stand-alone 4-year program, the degree completion pathways, and new course proposals (COMP-2087, COMP-2547, COMP-3037, COMP-3067, and COMP-3250) be approved in accordance with the program/course change forms. ^

^Subject to approval of the expenditures required.

#### Rationale/Approvals:

- This program has been approved by the School of Computer Science Council (September 24, 2021), the Science Program Development Committee (SPDC) (as delegated by the Faculty of Science Coordinating Council) (October 19, 2021), and the Provost (September 14, 2022). The program has been reviewed by the Office of Co-operative Education and Workplace.
- There will be three pathways to the Bachelor of IT degree:1) College to University Degree Completion; 2) College to University Degree Completion (for 3 year CAAT program at St. Clair College); and; 3) Four Year Direct entry pathway.
- The direct entry into the four-year program will be delayed for now and we will only admit students through the degree completion pathways initially.
- Once the viability of the program has been established, the four- year direct entry pathway will be made available to prospective students (expected to be in 2-3 years). This pathway will be available with and without co-op.
- According to the Quality Assurance Framework 2.9.1, "After a new program is approved to commence, the program will begin within 36 months of that date of approval; otherwise, the approval will lapse."
- See attached.

#### A. Basic Program Information

Faculty(ies)	Science
Department(s)/School(s)	Computer Science
Name of Program as it Will Appear on the Diploma (e.g., Bachelor of Arts Honours Psychology with thesis)	Bachelor of Information Technology (BIT)
<b>Proposed Year of Offering*</b> [Fall, Winter, Spring]: *(subject to timely and clear submission)	Fall 2023
Mode of Delivery:	Classroom
Planned steady-state Student Enrolment (per section B.4.2)	150
Normal Duration for Completion:	There are three pathways to achieving the Bachelor of IT degree:  1. '2+2' College-to-University Degree Completion Pathway  2. College-to-University Degree Completion Pathway for 3-year CAAT Programs at St. Clair College  3. 4-year Direct Entry Pathway  Degree completion pathways:  2 years (full time) following the completion of a recognized two-year College of Applied Arts and Technology (CAAT) diploma or equivalent in Web Development and Internet Applications and Computer Systems Technician  3-4 terms following the completion of a recognized three-year College of Applied Arts and Technology (CAAT) Advanced Diploma or equivalent in Computer Systems Technology-Networking and Mobile Applications Development from St. Clair College
Will the program run on a cost-recovery basis?	No

#### B. Overall Program Plan

#### B.1 Objectives of the Program/Summary of Proposal (QAF section 2.1.1; Ministry section 4)

**Relevance and Importance:** Information technology involves the development, maintenance and use of systems, software, and networks for processing and distributing data. Often these professionals are employed in information technology consulting firms, various public and private sectors, or may be self-employed (Ministry of Labour, Training and Skill Development, n.d). Information and Communication Technology contributes a significant amount to direct and indirect job creation, billions of dollars in revenues and to the Canadian GDP (Information Technology Association of Canada, n.d).

Technology advances are causing global economic growth that is straining Canada's ability to meet the demand for workers with information and technology skills (Information Technology Association of Canada, n.d.). The widespread growth in technology and vast array of sectors who require computer and information technology professionals suggests that the employment of these individuals is projected to grow significantly worldwide. Within Canada, similar trends exist whereby there are consistent projected job opportunities, job vacancies, and an average-to-above-average outlook for occupations that fall within the information technology sector (see Table 9 in Section B.4.1). Beyond the promising outlook for employment, strengths in mobile application development, natural language processing (e.g., Python), scientific computing, and computer graphics were some of the most needed skills described by employers in 2019 (Petrone, 2019) and are expected to continue being in demand (see Appendix C for employer letters of support which also support the need for these skills). As such, the University of Windsor is proposing a new program, **Bachelor of Information Technology (BIT)** that will cater to the growing need for individuals with expertise in programming, data management systems, software development, and web and mobile applications. For several years the School of Computer Science has offered a minor and certificate in Applied IT and the success and interest in this program suggests that it makes sense that we also offer a companion undergraduate program.

"Information Technology and computer science are all disciplines within the same realm of study. However, each specialty focuses on specific aspects of the field, and careers within the three areas vary greatly." (King University Online 2017). The IT focus of the proposed degree distinguishes it from existing CS degrees offered by the School of Computer Science. The School of Computer Science at the University of Windsor already offers a minor and certificate in Applied IT. By offering a formalized degree program in Information Technology (IT) using primarily existing resources, we believe this new program will attract students who specifically want a degree in IT, thus enhancing the overall enrolment within the School of Computer Science at the University of Windsor. This program will be attractive to college graduates given the opportunity to earn two credentials (e.g., diploma and degree) in a four-year time span. Many of the existing college-to-university degree completion pathways require students to complete more than two years to earn their degree. Compared to computer science undergraduate programs, there are fewer undergraduate programs in IT; therefore, the proposed program will address a gap in curricula, particularly given the projected needs of computer and information technology professionals. The School of Computer Science already has garnered support from a variety of sources including from St. Clair College. employers, and professional associations (see Appendix C), illustrating strong interest in this program.

#### Aim and Impact:

The proposed **Bachelor of IT** degree offers a unique degree structure that currently is structured to function as a degree completion pathway for two-and-three-year college programs. Specifically, College of Applied Arts and Technology (CAAT) graduates from *Web Development and Internet Applications* or *Computer Systems Technician* may be admitted to this program and complete their Bachelor of IT in two years (i.e., 20 courses or 60 credits), assuming full-time enrolment. Students from the following three-year CAAT Advanced Diplomas at **St. Clair College** *Computer Systems Technology-Networking and Mobile Applications Development* may also be admitted to this program and complete their Bachelor of IT after completing 15 courses at the University of Windsor (see

section C.1 Admission Requirements for more information on admission). All students in these college-to-degree pathways will complete the same core required courses (except where duplication in course content exists) at the University of Windsor as students in the four-year degree pathway (see C.2. Program Curriculum Structure/Program of Study). In offering this built-in college-to-university degree completion pathway we are offering a comprehensive and transparent credit transfer pathway to support students in their transfer between postsecondary institutions or programs, while ensuing minimal duplication of previous learning.

**Please note:** The direct entry into the four-year program will be delayed for now and we will only admit students through the degree completion pathways initially. Once the viability of the program has been established, the four-year direct entry pathway will be made available to prospective students (expected to be in 2-3 years). This pathway will be available with and without co-op. We believe both options will be of interest to students and have provided evidence of this throughout this application.

This program was intentionally designed to prepare students for careers in computer and information technology. This was accomplished through a detailed review of similar existing programs. As such, this program includes computer science, mathematics, statistics, and business courses which are representative of the field. Students who complete this program will have an understanding of basic hardware concepts and in-depth knowledge of software, programming, mobile applications, and networks. An added benefit of this program is the future opportunity to earn a specialization in various areas such as data analytics and cyber-security, as well as the opportunity to complete an internship through an elective course. This would permit work integrated learning and allow students to connect theoretical knowledge with the practical application of this knowledge and permit critical networking opportunities. Please see section 'C.4 Learning Outcomes' for a detailed description of the knowledge, skills, and abilities students will have gained upon successful completion of the degree program. Graduates of this program are well-prepared to seek professional certification in Information Technology Certificate Professional (ITCP), Associate Information Technology Professional (AITP), and/or Information Systems professional (ISP).

Consistency with Institutional Goals: The Bachelor of IT program aligns with 'Engineering, Science, and Computing' (point three within program areas of expansion) within the SMA by offering new science programming. The School of the Computer Science already teaches many of the courses needed to offer a program in information technology, including a minor and certificate in Applied IT. Creating this new program will permit growth and increased enrolment within an existing program area of expansion in the SMA by leveraging existing resources and faculty expertise.

Beyond contributing to this area of expansion, this new program will equip students with skills that companies have identified are in demand (e.g., UX design, mobile application development, customer services systems; Petrone, 2019) and significantly enhance employment opportunities, in a field with growing need for trained individuals (see Table 9 and Table 10 and Figures 1-10 for employment projections in B.4.1). As such, this program contributes to the University of Windsor's commitment to providing learning experiences that will prepare students for life after graduation and aligns with institutional initiatives focusing on enhancing the employability of STEM students through activities that integrate organizational, leadership, communication, and interpersonal skills with the transfer of scientific knowledge. This program will contribute to the University of Windsor's mission, goals and objectives through improving the student learning experience in the area of career preparation and innovations in teaching and learning excellence, through the provision of high impact learning experiences.

Offering degree completion pathways allows the School of Computer Science to maintain competitive with other institutions that have transfer/articulation agreements in place and provides accessible and transparent opportunities for movement between postsecondary institutions, thus aligning with the Ontario Government's "Policy Statement for Ontario's Credit Transfer System" (Ontario MTCU, 2011). This new program also facilitates partnership building with colleges and expands the University of Windsor's college-university pathway

development. It also facilitates partnership building with colleges which is identified as a priority in the SMA and expands the University of Windsor's college-university pathway development, thus increasing overall enrolment.

#### **B.2 Program Content (QAF Section 2.1.4)**

The program content is designed to provide students with a solid foundation in applied computing and IT, as well as exposure to important topics in related areas such as business and economics. Students will gain sought after skills in key areas, including programming, web applications and data analytics that will prepare them to make technical contributions in a business environment. The program consists of:

- a) Traditional lecture-based CS courses, which will cover the fundamental concepts and most important developments in the current state of Information Technology and include courses in computer science in relevant topics such as information security for IT, data analytics, social media marketing, etc.
- **b)** A 4xxx level project course, which will allow students an opportunity to integrate and apply the knowledge from previous courses to implement solutions for specific IT tasks.
- c) Courses from related areas such as business, economics and statistics, which will complement the students' technical knowledge to provide a broader perspective and insight into the business environment and equip students with foundational knowledge needed to be successful to work within IT. Across institutions offering programs in Information Technology (or similar programs), it is standard practice for the curriculum to consist of combination of computer science and business courses. In fact, some Information Technology (or related) programs are offered in business schools.
- **d)** Elective courses, which will develop breadth of knowledge and help provide a comprehensive program in Information Technology.

The BIT program requires the introduction of 5 new courses, in addition to courses already offered by the School of Computer Science. These new courses have been developed specifically and packaged with the existing courses to give students a comprehensive knowledge of IT topics and industry best practices. The course numbers and titles for the proposed new courses are given below. (Please see Appendix E for full course descriptions)

The new courses are:

- 1. COMP 2087: 'Programming for Beginners II'
- 2. COMP 2547: 'Applied Algorithms and Data Structures'
- 3. **COMP 3037**: 'Information Security for IT'
- 4. COMP 3067: 'Applied Databases'
- 5. COMP 3250: 'Data Analytics I'

The program facilitates multiple pathways and initially students will be admitted only to the degree-completion pathways. It is expected that a **four-year direct entry pathway** (with and without co-op) will be made available to students in 2-3 years.

There are three pathways to achieving the Bachelor of IT degree:

- 1. Pathway 1: '2+2' College-to-University Degree Completion Pathway
- 2. Pathway 2: College-to-University Degree Completion Pathway for 3-year CAAT Programs at St. Clair College
- 3. Pathway 3: 4-year Direct Entry Pathway

The Program's course content for each Pathway is briefly explained below. The specific course content and requirements are provided in detail in **Section C.2 Program Curriculum Structure**.

#### Pathway 1 has 2 options:

Option 1): for students from Web Development and Internet Applications and

Option 2): for students from Computer Systems Technician

The program content for the 2+2 College to University Degree Completion Pathway **Option 1** is:

- a) 9 traditional lecture-based CS courses (7 required + 2 electives)
- b) 1 6-credit project course at the 4xxx level (This course counts as 2 courses)
- c) 6 required courses from complementary areas such as business, economics and statistics
- d) 3 elective courses from any area of study

The program content for the 2+2 College to University Degree Completion Pathway Option 2 is:

- a) 11 traditional lecture-based CS courses (9 required + 2 elective)
- b) 1 6-credit project course at the 4xxx level (This course counts as 2 courses)
- c) 6 required courses from complementary areas such as business, economics and statistics
- d) 1 elective courses from any area of study

#### Pathway 2 has 2 options:

Option 1): for students from Computer Systems Technology – Networking at St. Clair College and

Option 2): for students from Mobile Application Development at St. Clair College

However, the program content for the College-to-University Degree Completion Pathway for 3-year CAAT Programs **Programs at St. Clair College** is the same for both options and is:

- a) 7 required traditional lecture-based CS courses
- b) 1 6-credit project course at the 4xxx level (This course counts as 2 courses)
- c) 6 required courses from complementary areas such as business, economics and statistics

The program content for the 4-year Direct Entry Pathway is:

- a) 13 traditional lecture-based CS courses (13 required + 2 elective)
- b) 1 6-credit project course at the 4xxx level (This course counts as 2 courses)
- c) 6 required courses from complementary areas such as business, economics and statistics
- d) 17 elective courses. 3 of these courses must be from Arts/Languages and Social Sciences (at least 1 from each area) and the rest can be from any area of study

# **B.2.1** Unique or Innovative Curriculum, Program Delivery, or Assessment Practices (QAF Section 2.1.4) Program delivery:

This program is unique, in part, because it is designed to support multiple pathways, including 2 **degree completion pathways and a direct-entry pathway.** The program will also foster a diverse learning opportunity as students will arrive from the *Web Development and Internet Applications, Computer Systems Technology-Networking, and Mobile Applications Development* CAAT programs and be integrated with other college students as well as UWindsor students in the BIT program allowing for multidisciplinary information sharing and varied perspectives. As part of the delivery of this program, students also have the option to complete an internship as an elective course.

#### **Program Delivery, Innovative Curriculum and Assessment Practices for:**

#### 1. '2+2' College-to-University Degree Completion Pathway

The 2+2 degree completion pathway was intentionally designed based upon the analysis of CAAT program standards set forth by the Ministry of College and Universities (MCU) and will benefit students by recognizing the value of career-oriented educational experiences learned at colleges, while complementing these applied experiences with scientific knowledge, theories, and principles gained through university courses. This was conducted to ensure minimal duplication in learning and that CAAT graduates would be prepared to meet the program learning outcomes. Program standards apply to all similar programs of instruction offered by publicly funded colleges across the province. The development of program standards by the Ministry first started in the 1990s to bring more consistency to college programming, broaden the skills of college graduates to include essential employability skills and provide accountability for the quality and relevance of college programs (MCU, 2017). Thus, by mapping these program standards against our curriculum and utilizing the information to develop a degree completion pathway, rather than targeting specific programs at specific CAATs, we are able to widen our recruitment scope to any CAAT program in Ontario that falls under these standards. In addition to working within the program standard framework set forth by MCU, these institutions are required to follow a rigorous quality review process at a program level basis on a regular frequency. Additionally, this pathway will streamline and harmonize the student experience by ensuring college course content is not duplicated and offering a transparent and consistent pathway to earning a university degree.

In most jurisdictions, the cost to the government and the student of a degree achieved through two years at the college followed by two year at the university is lower than a four-year university program (Trick, 2013.). As a result, our college-to-degree completion pathway allows students to gain applied educational experiences at the college, while also saving money compared to completing four years of full-time study at a university. There are also cost saving associated with ensuring minimal duplicated learning between the college and university. Moreover, our model will be an attractive option to students as articulation agreements often require students to complete more than two years at their institution.

#### 2. College-to-University Degree Completion Pathway for 3-year CAAT Programs at St. Clair College

This pathway(Pathway 2) was specifically designed to facilitate degree completion for students graduating <u>from St. Clair College</u> with an advanced diploma in either *Computer Systems Technology-Networking* or *Mobile Applications Development* diploma. The program delivery highlights are similar to those for Pathway 1; however, these students can get 5 *additional* course credits (compared to Pathway 1) and need to take only 15 courses at the University for graduation.

#### 3. 4-year Direct Entry Pathway

It is anticipated that in the future this program will include a 4-year direct entry option (Pathway 3). This will be of interest to students who want to pursue an IT degree from high school. The combination of courses included in this program and the flexibility offered through the 14 electives will allow a unique opportunity for students to earn various specializations such as in: data analytics and cyber-security, as additional elective courses are introduced. Since this is a 4-year program, it can be offered with a co-op option. We note that the co-op is available ONLY for the direct-entry pathway (Pathway 3) and is not available for the degree completion pathways.

#### **Curriculum Innovation:**

The curriculum within this program was intentionally designed to prepare students for careers in IT and upon graduation, students will be prepared to seek certification by Canada's Association of Information Technology Professionals (CIPS).

Another unique characteristic of this program is that all students (including those in the degree completion pathways) may choose to complete an internship course (SCIE-3990) as an elective course within the Faculty of Science. This will permit work integrated learning, allowing students to connect theoretical knowledge with the practical application of this knowledge, and may foster collaborative relationships with industry partners and networking opportunities for students.

#### B.2.2 Indigenous (First Nations, Métis, or Inuit) Content, Perspectives, or Material

The University of Windsor is committed to building and sustaining stronger, more meaningful inclusive partnerships with Indigenous students, scholars, and communities. Indigenization of curriculum takes place in a larger context, including a requirement to respond to the four Calls to Action in education of the <u>Truth and Reconciliation Report</u> (2015) (page 1), the unique legal requirements of the <u>Constitution Act 1982</u> (Sections 25, 35), the provincial legal requirements of the <u>Ontario Human Rights Code</u>, 1990, and provincial legislation <u>Bill Pr36</u> (1967).

In <u>revising this program</u>, **how** has consideration been given to incorporating Indigenous (First Nations, Métis, or Inuit) content, perspectives, or material into the curriculum?

Please consider these prompt questions and <u>additional Resources</u> including disciplinary examples:

- What process has your department/Faculty used to consider Indigenization?
- **How** have you considered the importance or relevance to the course/program?
- How has your department or faculty approached raising awareness for Indigenous knowledges in your area?
- What do the TRC and University Principles documents suggest relevant to your course?
- What have other similar courses/programs done that might be relevant to your course/program?
- In what ways could your course/program have flexibility to include new ways of learning, or content for Indigenous approaches or knowledges?
- What is your awareness of the history or background to approaches you are considering, such as the land acknowledgement? How have you developed your awareness?
- Which <u>literatures</u>, sources, or Indigenous Knowledge Holders have you consulted? (Please confirm you have permission to share any names, it may be helpful to have the person confirm the text if you will be submitting their name)
- Are you engaging in critical analysis of Settler Colonialism and/or Decolonization?
- Have you included the information in the other relevant areas in the PDC form such as learning outcomes and/or in the syllabus where appropriate?

The School of Computer Science recognizes the importance of engaging and collaborating with the Indigenous community in developing and implementing a suitable curriculum. The School works closely with the Faculty of Science that has recently recruited an expert in Indigenous-centred relationships who is a recognized Knowledge-Keeper in their community with the aim to build and develop new and innovative initiatives to further Indigenous-focused research co-production and lifelong learning. The Indigenous Knowledge Keeper will provide counsel to the Office of the Dean to create further space for Indigenous knowledge and partnerships in the Faculty of Science and across the University of Windsor. The Indigenous Knowledge Keeper will support the creation of an Indigenized space for Indigenous students, community members and allies to engage, learn and create. The School of Computer Science has taken the following steps toward this goal:

- a) A land acknowledgment statement is now included in the course syllabus template for every computer science (COMP-XXXX) course.
- b) The School is actively reaching out to Indigenous students and encouraging them to participate in the decision-making process, e.g., as student members in the curriculum committee and program representatives.
- c) The School has plans to work with the Knowledge Keeper to help reach out to the local Indigenous community

and their IT and digitization department in order to seek their input and engage them, e.g., through membership in advisory committees, collaboration on research and student projects which are relevant to this program.

- d) The School encourages instructors to include topics/discussions about indigenous issues where applicable. This for instance, includes course topics on Indigenous knowledge included in the ethics course required by this program and course projects related to IT/digitization relevant to local Indigenous cases brought out by the local community.
- e) The School is looking forward to engaging with an expert in Indigenous-centred relationships within the Faculty of Science to develop relevant aspects of its curriculum further.

#### B.3 Program Name and Degree Designation/Nomenclature (QAF Section 2.1.1; MINISTRY section 1)

The proposed name, **Bachelor of Information Technology**, emphasizes the business-oriented focus of this program. The name and degree designation are consistent with other institutions who offer degree programs in the area and is appropriate to serve as both a four year degree pathway and degree completion pathway. The degree name aligns with the program content.

#### **B.4 DEMAND FOR THE NEW PROGRAM**

#### **B.4.1 Student and Market Demand (MINISTRY section 5)**

A multifaceted approach relying on primary and secondary data sources was used to conduct the market assessment for the proposed degree program. This permitted triangulation of data sources and the conclusion that there is quantitative evidence of student and market demand for a new degree program in IT.

While this program will initially function as only a degree completion pathway, a four-year direct entry pathway is expected be made available to prospective students in 2-3 years. As such, we have presented data below that provides support for both the degree completion pathway and for a future direct entry pathway.

Primary data on student demand and interest for the program was collected through surveys. Specifically, prospective undergraduate students (primarily high school students) were surveyed about their interests in an IT program. To expand our sample and enhance the generalizability of our results, we also surveyed current students enrolled in Computer Science as well as those who have completed courses in IT at the University of Windsor about their interests in an IT program. Applicant data at other institutions was reviewed to gain insights into the quantity of applicants and the number of applicants who were offered admittance into programs that offer information technology programming. Lastly, employment data was gathered from Canadian and American labour market sources to determine the market demand for information technologists.

#### **Student Survey**

Twenty-eight future undergraduate students completed our survey which contained questions about a range of new science programming (beyond just IT). Students who expressed initial interest in IT were prompted with the following question: If a new program in Information Technology were to be offered, would you be interested in applying to this program? Three future undergraduate students responded, 'definitely yes' and three future undergraduates students responded 'probably yes'. Therefore, 6 of 28 (~21%) future undergraduate students indicating they would 'definitely' or 'probably' be interested in an IT program. These are promising figures, particularly when combined with the interest expressed by current undergraduate students. To gain a more indepth understanding of student interest, we conducted a second survey with computer science undergraduate students as well as undergraduate students who have completed courses in the Applied IT certificate at the University of Windsor as these individuals are more representative of the population who would be interested in a future IT degree program. 133 undergraduate students completed this survey. When asked "Please rate your level of interest in Applied Information Technology," 81% of students expressed high-to-moderate interest. Undergraduate students were also asked: "If a new program in Applied Information Technology were to be offered, would you be interested in applying to this program" and nearly 50% of students indicated that they would 'definitely' or 'probably' be interested in applying to this program. Below is a summary of students'

responses by question type.

Please rate your level of interest in Applied Information Technology

Rating	Number of Students
High	60 (45%)
Moderate	48 (36%)
Low	16 (12%)
None	9 (6.7%)

# If a new program in Applied Information Technology were to be offered, would you be interested in applying to this program

Response	Number of Students
Definitely yes	21 (15.8%)
Probably yes	44 (33%)
Maybe	40 (30%)
Probably not	14 (10.5%)
Definitely not	14 (10.5%)

#### **Program and Course Enrolment Data**

The Office of Institutional Analysis at the University of Windsor provided available enrolment data for information technology (or related) programs from other institutions. There are eight universities that offer similar IT-related programs; however, these data are not always reported under the "Computer/information technology administration and management" four-digit CIP code (CIP 11.10). In the Fall 2019, Carleton and York reported new student undergraduate intakes under this code. Specifically, there were 47 students (45 FT, 2 PT) and 91 (81 FT, 10 PT), students enrolled under this code. Table 1 includes a history of program enrolment for Carleton. York's total program enrolment can be found in Table 2. Table 3 includes first year undergraduate intake for the remaining institutions where data were available. Course enrolment data at the University of Windsor suggest interest among students for the courses that comprise the Bachelor of IT degree (see Table 4) and graduate rates for the Certificate in Applied IT can be found in Table 5. Tuition comparisons can be found in Table 6.

According to OUAC IT program admissions, there are several programs that offer IT or similar programs. There were 4862 applications in total and only 2694 offers (see Table 7). There are more students applying to these programs than admitted; therefore, we believe there will be interest from students for a 4-year direct entry pathway into the BIT program and that this pathway will help address this surplus of students. The location of these applicants can be found in Table 8.

Table 1. Historical Carleton First Year Enrolment Across IT-Related Programs\*

	201 <sup>°</sup>	7/1	2016/ 7	1 2015 6	5/1	2014 <sub>5</sub>	/1	2013 <i>,</i> 14	/	2012 13	/	2011 12	/	2010 11	/	2009 10	/	2008 09	/	2007/ 08
Total	169	15	51	166	13	39	12	29	10	6	1:	15	97	7	9	7	1:	16	77	7
Undergradu ate	169	15	51	166	13	39	12	29	10	6	11	15	97	7	97	7	11	16	77	7
Bachelors	169	15	51	166	13	39	12	29	10	6	11	15	97	7	97	7	11	16	77	7

<sup>\*</sup>Note: Carleton offers multiple IT-related programs and therefore this enrolment information is by degree and aggregates the year one enrolments for all four programs into one data point.

**Table 2. York University Total Program Enrolment** 

	2019/20	2018/19	2017/18	2016/17	2015/16	2014/15	2013/14	2012/13
Undergraduate	921	813	696	570	483	429	418	362
Student								
Headcount								

Table 3. 2019 Fall First Year Intake for IT Programs

Institution	Program	Total Number of Students
Toronto Metropolitan Univeristy	Business Technology Mgt 2 year FT	21
	Business Technology Mgt 4 year FT	467
UOIT	Networking and Information	116
	Technology Security	
	Technology Management (IT)	38
	Technology Management	19
	(Commerce)	
Wilfred Laurier	Business Technology Management	71

Table 4. University of Windsor Course Enrolment Data for Core Courses within the Proposed Degree Program

Course	Student Enrolment Units (SEU) for 2018-	SEU for 2017-2018 Academic year	SEU for 2016-2017 Academic year		
	2019 Academic year				
COMP 1000	363	295	273		
COMP 1047	1,180	1092	966		
COMP 2057	685	616	547		
COMP 2067	150	122	103		
COMP 2087					
COMP 2097	686	703	658		
COMP 2547					
COMP 2707	93	72	52		
COMP 3037					
COMP 3057	143	122	123		
COMP 3067					
COMP 3077	27	19	16		

COMP 3250			
COMP 4990	92	84	77
STAT 2910	689	654	563
ECON 1100	1,011	920	904
MKTG 1310	460	415	548
MSCI 1000	341	331	317
STEN 1000	669	727	739
MGMT 2400	329	405	405s

<sup>\*</sup>These data were gathered from the Office of Institutional Analysis at the University of Windsor. Semester enrolment units (SEUs) are the numbers of students taking a course times the course value. Bolded courses are new courses and therefore have no current enrolment data available.

**Table 5. Graduation Rates for Certificate in Applied IT** 

<b>Completion Term</b>	Number of Students
2020	7
2019	5
2018	7
2017	3
2016	2

**Table 6. Bachelor of Information Technology Tuition Comparison** 

			Tuition (202	20-21) - Year 1
Institution	Program*	Degree Awarded	Domestic	Internationa
				1
	Networking and Information	Bachelor of Information		\$
UOIT	Technology Security	technology (Honours)	\$ 9,031.18	27,940.34
		Bachelor of		\$
UOIT	Technology Management (IT)	Information	\$ 9,031.18	27,940.
		technology		34
		(Honours)		
	Technology management	Bachelor of Commerce		\$
UOIT	(Commerce)	(Honours)	\$ 8,088.28	26,763.52
				\$
Toronto	Business Technology	Bachelor of Commerce	\$ 9,481.10	33,298.47
Metropolitan	Management			
Univeristy				
University				
		Bachelor of Business		\$
Wilfred Laurier	Business Technology	Technology	\$ 9,624.80	19,158.
	Management	Management		00
	Information Resource	Bachelor of Information		\$
Carleton	Management	Technology	\$ 9,080.57	36,156.57
	B.I.T			
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<sup>\*\*</sup> Course numbers in bold are new courses to be developed for the proposed program (details given in Appendix E).

	Interactive Multimedia and	Bachelor of Information		\$
Carleton	Design	Technology	\$ 9,080.57	36,156.57
	B.I.T			
		Bachelor of Information		\$
Carleton	Network Technology B.I.T	Technology	\$ 9,080.57	36,156.57
		Bachelor of		\$
Carleton	Optical Systems and Sensors	Information	\$ 9,080.57	36,156.
	B.I.T	Technology		57
				\$
York University	Information Technology	Bachelor of Arts	\$ 8,647.20	33,617.70
				\$
York University	Information Technology	Bachelor of Commerce	\$ 8,647.20	33,617.70
	Information Technology			\$
Waterloo	Management	Bachelor of Mathematics	\$ 8,544.00	41,850.00
University of	Management and	Bachelor of		\$
Toronto	Information Technology	Business	\$ 6,100.00	57,020.
(Scarborough)		Administration		00
				\$
Trent University	Information Systems	Bachelor of Arts	\$ 6,118.48	22,454.15
				\$
Trent University	Information Systems	Bachelor of Arts	\$ 6,118.48	22,454.15
		(Honours)		
				\$
Trent University	Information Systems	Bachelor of Science	\$ 6,118.48	22,454.
				15
		Bachelor of Science		\$
Trent University	Information Systems	(Honours)	\$ 6,118.48	22,454.15

\*These data were gathered from the Office of Institutional Analysis at the University of Windsor.

Table 7. Summary of Applicants, Offers, and Registrations by University

	Applications	Offers	Confirmed Offers	Registered
Full Time	4676	2637	819	686
Carleton-Information Resource Management	137	63	29	23
Carleton-IT-Network Tech	191	86	39	33
Ottawa-Mgmt Information Systems	261	160	37	34
Toronto Metropolitan Univeristy -Business Technology Management	2803	1415	421	407
Trent-Computing & Information System	195	155	34	19
UOIT-Networking & Info Tech Security	402	305	101	71
York-Information Tech (BA, BCOM)	687	453	158	99
Part Time	186	57	19	8
Carleton-IT-Network Tech	5	1	0	0
Ottawa-Mgmt Information Systems	20	4	3	1
Toronto Metropolitan Univeristy -Business Technology Management	93	24	4	3
Trent-Computing & Information System	10	9	2	0
UOIT-IT - Ntwk & Info Tech Sec	22	7	3	1
UOIT-Networking & Info Tech Security	9	0	0	0
York-Information Tech (BA, BCOM)	27	12	7	3
Grand Total	4862	2694	838	694

**Table 8. Applicant Residency** 

	Carleton-	Carlet	Ottawa-	Toronto	Trent-			York-	
	Informati	on-	Mgmt	Metropo	Comput	UOIT-IT -	UOIT-	Informa	Gra
	on	IT-	Informa	litan	ing &	Ntwk &	Networki	tion	nd
County	Resource	Netw	tion	Univerist	Informa	Info	ng & Info	Tech	Tot
of	Manage	ork	Systems	y -	tion	Tech	Tech Sec	(BA,	al
Reside	ment	Tech		Business	System	Sec		BCOM)	
nce				Technolo					
				gy					
				Manage					
				ment					
Metro	6	17	20	1048	38	5	114	250	1498
Toronto									
Peel Reg	3	16	12	671	28		47	162	939
Mun									
York Reg	3	10	18	546	17		72	123	789
Mun									
Not in	36	33	116	223	65	5	57	106	641
Ontario									
Ottawa									
Carleton	65	88	80	33	9		3	2	280
Durham									
Reg	2	4	3	78	11	6	74	12	190

Mun									
Halton Reg									
Mun	3	4	3	143	3	1	10	22	189
Hamilton/									
Wen	4	3	11	41	6		9	13	87
twh									
Waterloo	2		2	21	5		2	6	38
Simcoe	1	1	1	11	2		3	4	23
Middlesex	1	1	2	13		2	2	1	22
Niagara	1	2	2	10			2		17
Frontenac			4	5	2	1	2	2	16
Leeds &									
Grenvill	3	4	1	1	1		1		11
Wellington			1	6	2			1	10
Essex				5			1	4	10
Storm/Dun									
d/G	2	2		1		1	3		9
len									
Peterboro				2	5			2	9
ugh									
Hastings			1	4	2		1		8
Dufferin	1	2		2	1		1	1	8
Lanark		3	1	1	1				6
Thunder									
Bay			1	5					6
Reg									
Elgin	1	1		1	1		2		6
Victoria			1		3		1		5
Northumb									
erla				4		1			5
nd									
Haldimand									
/No	1	1		2			1		5
rfk		_							
Oxford		1		2	1		1		5
Huron				3			1		4
Brant				2			1	1	4
Sudbury									
Reg		1	1	1					3
Mun									
Algoma	1			1				1	3
Kent				1	1			1	3
Perth				1	1				2
Nipissing				2					2
Lennox &									
Addngtn				1					1

Prescott &									
Russl		1							1
Timiskamin				1					1
g									
Prince				1					1
Edward									
Cochrane	1								1
Grey				1					1
Renfrew				1					1
Lambton		1							1
Muskoka				1					1
Grand	137	196	281	2896	205	22	411	714	4862
Total									

#### **Labour Market:**

Information technology involves the development, maintenance and use of systems, software, and networks for processing and distributing data. Individuals working in this sector are often employed in information technology consulting firms, various public and private sectors, or may be self-employed (Ministry of Labour, Training and Skill Development, n.d). The widespread need for information technologists speaks to the potential for careers available in a number of fields. To assess labour market trends, secondary data from government sources were used.

According to results from the <u>CAAT survey</u>, the top three occupations for graduates of the <u>Web Development and Internet Applications</u> program are web designs and developers (NOC 2175<sup>1</sup>; 31%), computer programmers and interactive media developers (NOC 2174; 18%), and graphic designers and illustrators (NOC 5241; 6%). The top three occupations for graduates of the <u>Computer Systems Technician</u> program are user support technicians (NOC 2282; 19%), computer network technicians (NOC 2281; 15%), and Information systems analysts and consultants

(NOC 2171; 6%). These occupations as well as others in the field of information technology would be potential employment opportunities for students completing the Bachelor of IT program.

The employment of computer and information technology occupations is projected to grow by 11% from 2019 to 2029 within the United States-faster than the average for all occupations (See Figure 1-10; U.S. Department of Labor, 2020). Within Ontario, labour market information and statistics suggests that there are current and projected job opportunities in many of the sectors related to information technology (Ministry of Labour, Training and Skills Development, n.d.; see Table 9 for examples). The vast majority of these positions require a university degree or the completion of a college program, have low unemployment rates, and have a stable job outlook. Most notable, across job sectors, there are vacancies and projected job openings illustrating promising opportunities for employment following the completion of an IT degree. Therefore, there is evidence of market demand for students graduating with an IT degree. Please see Table 9 for examples of potential job profiles and employment statistics within Ontario and Table 10 for regional statistics for these job profiles from Workforce Windsor Essex.

As part of our analysis of the labour market, we examined current job postings in information technology (and related fields). This search was done on July 17th, 2020. The Government of Canada job bank listed 1,242

<sup>&</sup>lt;sup>1</sup> The National Occupational Classification (NOC) is a nationally recognized and standardized system that assigns a four-digit code and job description to every occupation in the Canadian labour market.

available jobs (236 in Ontario) for information technology-related positions (e.g., information systems analysts and consultants, computer network technicians, etc.; Government of Canada, 2020).

In 2014, Toronto Metropolitan University University launched Canada's Big Data Consortium as a means to connect industry, government, and academia to address issues related to big data and analytics. The Consortium led the first national multi-sector study on Canada's big data and analytics talent gap. This report indicated that there is a higher demand for talent in information technology that is not yet addressed by existing curriculum. Similarly, LinkedIn data indicates that because of the rise of the digital world, strengths in mobile application development, natural language processing (e.g., Python), scientific computing, and computer graphics are some of the most needed skills by employers in 2019 (Petrone, 2019). The design of the curriculum within this program as well as the college-to-university pathway will support students in their pursuit to become information technologists but also other types of careers.

**Table 9. Ontario Employment statistics** 

Job profile	Media n incom e	Projected number of job openings (2017-2021)	Job outlook (2017- 2021)^	Annual Number of job postings (2018)	Number of job vacancies	Unemployme nt rate
Information systems analysts and consultants	\$82,224	15,001- 20,000	Above averag e	10,652	1,814	3.4+
Computer and information systems managers	\$108, 297	9,001-10,000	Above averag e	4,264	939	2.7%
Computer programmers and interactive media developers	\$81,405	10,001- 15,000	Above averag e	1,141	2,328	3.6 <sup>+</sup>
Computer network technician	\$68,714	4,001-5,000	Above averag e	2,544	318	3.5+
Information systems testing technician	\$68,657	1,001-2,000	Average	2,618	Data on job vacancies suspended due to Covid 19	5.3 <sup>+</sup>
Graphic designers and illustrators	\$46,661	2,001-3,000	Average	1,180	542	5.3 <sup>+</sup>

**Note:** These data were gathered from the Ministry of Training, Colleges and Universities Ontario's labour market website for the aforementioned job profiles; Job posting data on this site is extracted by Burning Glass Technologies, Labour Insight™.

^Job outlook ratings can tell you how future demand for this job is expected to compare with other jobs across Ontario.

\*indicates this occupation was assessed as part of a broader group of similar occupations due to sample size restrictions.

https://www.iaccess.gov.on.ca/labourmarket/jobProfile/jobProfileFullView.xhtml?nocCode=0213 Computer programmers and interactive media developers:

https://www.iaccess.gov.on.ca/labourmarket/jobProfile/jobProfileFullView.xhtml?nocCode=2174 Graphic designers and illustrators:

https://www.iaccess.gov.on.ca/labourmarket/jobProfile/jobProfileFullView.xhtml?nocCode=5241

**Table 10. Windsor Essex Employment statistics** 

Job profile	Regional Employers	Active Job Posts	Total Job Posts
Information systems analysts and consultants	59	5	114
Computer and information systems managers	61	2	115
Computer programmers and interactive media developers	29	3	59
Computer network technician	65	5	146
Information systems testing technician	12	0	17
Graphic designers and illustrators	27	3	49

**Note:** These data were gathered from the Workforce Windsor Essex.

Figure 1: Summary

Quick Facts: Computer and Infor	mation Research Scientists
2019 Median Pay 🕡	\$122,840 per year \$59.06 per hour
Typical Entry-Level Education 🕡	Master's degree
Work Experience in a Related Occupation 🕡	None
On-the-job Training 🕜	None
Number of Jobs, 2019 🕡	32,700
Job Outlook, 2019-29 🕜	15% (Much faster than average)
Employment Change, 2019-29 ②	5,000

<sup>&</sup>lt;sup>+</sup>Unemployment rate is below the National unemployment rate (5.5% as of June 2019) within Canada: Computer and information systems managers:

### Figure 2:

## **Summary**

Quick Facts: Computer Ne	twork Architects
2019 Median Pay 🕡	\$112,690 per year \$54.18 per hour
Typical Entry-Level Education 🕝	Bachelor's degree
Work Experience in a Related Occupation 🕡	5 years or more
On-the-job Training 🕜	None
Number of Jobs, 2019 🕡	160,100
Job Outlook, 2019-29 🕡	5% (Faster than average)
Employment Change, 2019-29 🕜	8,000

# **Summary**

Quick Facts: Computer Pro	grammers
2019 Median Pay 🕜	\$86,550 per year \$41.61 per hour
Typical Entry-Level Education 🔞	Bachelor's degree
Work Experience in a Related Occupation 🕝	None
On-the-job Training 🕡	None
Number of Jobs, 2019 🕜	213,900
Job Outlook, 2019-29 🕡	-9% (Decline)
Employment Change, 2019-29 🕝	-20,100

### Figure 4:

# **Summary**

Quick Facts: Computer Systems Analysts		
2019 Median Pay 🕡	\$90,920 per year \$43.71 per hour	
Typical Entry-Level Education 🕜	Bachelor's degree	
Work Experience in a Related Occupation 🕡	None	
On-the-job Training 🕢	None	
Number of Jobs, 2019 🕜	632,400	
Job Outlook, 2019-29 🕜	7% (Faster than average)	
Employment Change, 2019-29 🕡	46,600	

## Figure 5:

Su	mmary

Quick Facts: Computer S	upport Specialists
2019 Median Pay 🕝	\$54,760 per year \$26.33 per hour
Typical Entry-Level Education 🕡	See How to Become One
Work Experience in a Related Occupation 🕡	None
On-the-job Training 🕡	None
Number of Jobs, 2019 🕜	882,300
Job Outlook, 2019-29 🕜	8% (Much faster than average)
Employment Change, 2019-29 🕜	67,300

Figure 6:

## **Summary**

Quick Facts: Database Administrators			
2019 Median Pay 🕡	\$93,750 per year \$45.07 per hour		
Typical Entry-Level Education 🕝	Bachelor's degree		
Work Experience in a Related Occupation 🕡	None		
On-the-job Training 🕡	None		
Number of Jobs, 2019 🕡	132,500		
Job Outlook, 2019-29 🕜	10% (Much faster than average)		
Employment Change, 2019-29 🕡	12,800		

Figure 7:

### **Summary**

Quick Facts: Information Security Analysts		
2019 Median Pay 🕜	\$99,730 per year \$47.95 per hour	
Typical Entry-Level Education 🕡	Bachelor's degree	
Work Experience in a Related Occupation 🕡	Less than 5 years	
On-the-job Training 🕡	None	
Number of Jobs, 2019 🕝	131,000	
Job Outlook, 2019-29 🕡	31% (Much faster than average)	
Employment Change, 2019-29 🕡	40,900	

# Figure 8: Summary

Quick Facts: Network and Computer Systems Administrators			
2019 Median Pay 🕝	\$83,510 per year \$40.15 per hour		
Typical Entry-Level Education 🕡	Bachelor's degree		
Work Experience in a Related Occupation 🕢	None		
On-the-job Training 🕡	None		
Number of Jobs, 2019 🕡	373,900		
Job Outlook, 2019-29 🕡	4% (As fast as average)		
Employment Change, 2019-29 🕜	16,000		

Figure 9:

### **Summary**

Quick Facts: Software Developers			
2019 Median Pay 🕜	\$107,510 per year \$51.69 per hour		
Typical Entry-Level Education 🕡	Bachelor's degree		
Work Experience in a Related Occupation 🕡	None		
On-the-job Training 🕡	None		
Number of Jobs, 2019 🕡	1,469,200		
Job Outlook, 2019-29 🕜	22% (Much faster than average)		
Employment Change, 2019-29 🕡	316,000		

Figure 10:

### Summary

Quick Facts: Web Developers			
2019 Median Pay 🕡	\$73,760 per year \$35.46 per hour		
Typical Entry-Level Education 🕡	Associate's degree		
Work Experience in a Related Occupation 🕡	None		
On-the-job Training 🕡	None		
Number of Jobs, 2019 🕝	174,300		
Job Outlook, 2019-29 🕜	8% (Much faster than average)		
Employment Change, 2019-29 ②	14,000		

**Student demand:** There is a large pool of CAAT graduates from *Web Development and Internet Applications, Computer Systems Technician, Mobile Applications Development, and Computer Systems Technology-Networking* to recruit from (see Table 11 for graduate rates). Research suggests that that the number of students seeking a baccalaureate education will increase from 50,000 to 104,000 from 2009 to 2025 (Trick, 2013) and each year 55,000 students switch institutions, and 40% of these students move from a college to a university (Brown, 2016). In particular, St. Clair College located in Windsor is expected to be one of the primary sources of students for this program. The Department Head within the School of Computer Science has discussed this degree completion pathway with St. Clair College and has received their support. St. Clair College will help advertise and promote this program to their students as well as advise students on how to successfully transfer into this new stream (see Appendix C for the letter of support). Upon approval of this program, additional recruitment efforts (e.g., site visits) will take place at other CAATs offering these diploma and advanced diploma programs in order to achieve the projected steady for this program.

Table 11. Number of graduates of full-time postsecondary college programs in Internet Applications and Web Development

Program	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Web Development and Internet Applications	63	93	65	74	74
Computer Systems Technician	663	727	831	950	1064
Computer Systems Technology	521	494	488	548	535
Mobile Applications	-	-	-	-	22

Data source: Ministry of Training, Colleges and Universities. (2018). Labour Market. Retrieved from <a href="https://www.app.tcu.gov.on.ca/eng/labourmarket/employmentprofiles/compare.asp">https://www.app.tcu.gov.on.ca/eng/labourmarket/employmentprofiles/compare.asp</a>

In summary, the curriculum offered by the proposed Bachelor of IT degree aligns well with similar programs and

<sup>\*</sup>Note: these data reflect all students enrolled in these programs, not just those at St. Clair College.

prepares students for careers in computer and information technology. Furthermore, there is strong interest among students for this type of degree program from current computer science students as well as prospective students. We believe that in the future there will also be a market for a four-year direct entry pathway in addition to the degree completion pathways that are currently being proposed. Within Canada and the United States, there is growing need for individuals with skills in information technology and related fields. As such, this program will prepare students for a wide range of job opportunities that require in-depth understanding of the development, maintenance and use of systems, software, and networks for processing and distributing data complemented by knowledge of business. Based upon the review of market demand and student interest, the proposed degree program will help to address a current gap for trained individuals in the labour market.

#### B.4.1.1 Percentage of Domestic and International Students (Ministry section 5)

The percentages of domestic and international students enrolling into the program are likely to be similar to those enrolled in any of the undergraduate Computer Science programs at the University of Windsor. That is, we expect most of the students to be non-visa students.

#### B.4.2 Estimated Enrolments (QAF section 2.1.9; Ministry section 5; Senate Co-op Policy)

Projected enrolment levels for the first five years of operation. (If the program is in operation, use actual and projected data.)	First Year	Second	Third Year	Fourth Year	Fifth Year of Operation
	of	Year of	of	of	(Steady-state enrolment
	Operation	Operation	Operation	Operation	overall)
In the regular program (non-co- op) In the co-op/experiential learning stream (if applicable) For co-op option: projected number of international students enrolled in the co-op stream	60	135	150	150	150

Yr 1: intake (60 domestic)

Yr 2: intake (60 domestic & 15 international) + flow through (60) = 135

Yr 3: intake (60 domestic & 15 international) + flow through (60+15) = 150

Yr 4: onwards: steady state. same as Yr3

#### **B.4.3** Collaborative Program (QAF section 1.6)

If this is a collaborative program with another college/university, identify partners and describe institutional arrangements for reporting eligible enrolments for funding purposes.

N/A

#### Societal Need (Ministry section 6)

Describe the tools and methodology used to assess societal need.

Elaborate on the

- 1) dimensions of (e.g., socio-cultural, economic, scientific, or technological),
- 2) geographic scope of (e.g., local, regional, provincial, or national), and
- 3) anticipated duration of, and trends in,

societal need for graduates of the new program

Evidence of societal need for the program will typically include a review of relevant industry and provincial survey and statistical data, as well as a review of the proposed program by relevant experts in the field.

#### Societal Need for the Bachelor of IT:

Technology advances are causing global economic growth that is straining Canada's ability to meet the demand for workers with information and technology skills (Information Technology Association of Canada, n.d.). A report from the Information and Communications Technology Council predicted that by 2019 there would be 182,000 unfilled jobs and 31% of employers surveyed expressed difficulty or delays in filling information and communication technology positions (as cited by Information Technology Association of Canada, n.d.). The Information Technology Association of Canada provided an industry snapshot. Although now dated, (there are no updated figures available), at the time when this summary was created, there were 1 million direct and indirect jobs in information and communication technology, \$159.9 billion in revenues, and 69.5 billion to the Canadian GDP.

Today, the societal need for information technology (and related) professionals exceeds the current supply. As detailed in the Labour Market analysis section above (B.4.1), the careers in computer and information technology are expected to grow by 11% over the next ten years-far faster than the average for other occupations in the United States (U.S. Department of Labor, 2020). Similar trends are present in Canada, whereby there are notable job vacancies and projected job openings (Ministry of Labour, Training and Skills Development, n.d.). The BIT program is designed to help fill this need by offering curriculum that will prepare students for career in information technology.

For information on anticipated labour and student market demand trends can be found in section B. 4.1.

The School of Computer Science has gathered letters of support from employers and professional associations who they have longstanding relationships with from other computer-science related programs (see Appendix C). These supports provide further

evidence for the need of highly trained IT personnel in the workforce.

#### Societal Need for Degree Completion Pathway within the Bachelor of IT:

Increasing the rate of college to university transfers has been a priority within Ontario (e.g., Kerr, McCloy, & Liu, 2010; Ontario MTCU, 2011). The Ontario government has committed to providing comprehensive and transparent credit transfer pathways to support students in their transfer between postsecondary institutions or programs. As part of this commitment the Ontario MTCU (2011) released a policy statement regarding credit transfer and encouraged institutions to develop transfer systems that support qualified students to move between postsecondary intuitions or programs:

Ontario will have a comprehensive, transparent and consistently applied credit transfer system that will improve student pathways and mobility, support student success and make Ontario a postsecondary education destination of choice. The credit transfer system will assist qualified students to move between

postsecondary institutions or programs without repeating prior, relevant learning (Ontario MTCU, 2011).

This new program functions as a college-to-degree completion pathway which aligns with the provincial call for visible credit transfers between colleges and universities by assisting qualified students to move between postsecondary intuitions or program without repeating prior learning (Ontario MTCU, 2011). Institutionally, building partnerships with colleges is noted as a priority within the 2017-2020 SMA. This new program will significantly enhance these partnerships by further engaging with college students. Most importantly, this program has been intentionally designed to offer college students a transparent way to earn a university degree by ensuring clear and consistently applied credit transfer. In doing so, the University of Windsor is streamlining and harmonizing the student experience for CAAT graduates wishing to earn a university degree.

An added benefit of the built-in degree completion pathways within the proposed Bachelor of IT is that it provides students an opportunity to earn two credentials within approximately a four-year time period and facilitates potential cost savings by eliminating credit duplication across institutions. Cost projections also suggest '2+2' pathways offer a less expensive route to earning a university degree compared to students pursuing a four-year direct entry into university (Trick, 2013). Furthermore, for some students, the transition period in college also offers an important time for students to develop study skills and familiarity with a subject area. This degree completion pathway responds to the demand for hybrid higher education in Ontario. For example, each year 55,000 students switch institutions, and 40% of these students move from a college to a university (Brown, 2016) and the number of students seeking a baccalaureate education will increase from 50,000 to 104,000 from 2009 to 2025 (Trick, 2013). Beyond these added benefits, the degree completion pathway also provides an opportunity for students to pursue post-graduate education (e.g., graduate degrees) which they would have been otherwise ineligible for following the completion of the CAAT diploma.

#### B.4.3.1 Societal Need – Letters, Surveys, Statistics

•	The development of this proposal included consideration of comments or letters solicited from potential employers regarding the need for graduates of the proposed program within their organization and field of endeavour.	X_Yes	No, explain below
•	The development of this proposal included consideration of comments or letters solicited from relevant professional societies or associations about the need for graduates of the proposed program.	_X_Yes	No, explain below
•	The development of this proposal included a review of industry employment surveys for evidence of societal need (indicating numbers of positions in the field, numbers of anticipated new positions in the field, number of positions in the field current being advertised, etc.)?	_X_Yes	No, explain below
•	The development of this proposal included a review of statistical evidence of the number of Ontario students leaving the province to study the field elsewhere in Canada or abroad?	Yes	_X No, explain below

#### If yes, append letters, survey or statistics to proposal.

#### If no, explain:

Statistical evidence of the number of Ontario students leaving the province to study the field are not readily available. However, some institutional enrolment data can be found in B.4.1. These data suggest there are more applicants than those admitted into programs which speaks to the potential for the BIT program to successfully recruit students.

#### **Duplication** (Ministry section 7)

List similar programs offered by other institutions in the Ontario university system. Resources to identify similar programs offered in Ontario include <a href="www.electronicinfo.ca">www.electronicinfo.ca</a>, <a href="www.electronicinfo.ca/einfo.php">www.electronicinfo.ca/einfo.php</a>, and <a href="www.oraweb.aucc.ca/showdcu.html">www.oraweb.aucc.ca/showdcu.html</a>. Also, list similars program in the geographically contiguous area, e.g., Michigan/Detroit.

Computer science degree programs are available at most Ontario universities; however, there are comparatively fewer institutions that offer Information Technology (or related) degrees. Of these programs that exist, there is mix of programs with a sole focus on Information Technology and others that have a focus on business technology management. Institutions within Ontario offering these programs have been noted below:

Institution	Program*	Degree Awarded	Other
UOIT	Networking and Information	Bachelor of Information	
	Technology Security	technology (Honours)	
UOIT	Technology Management (IT)	Bachelor of Information	
		technology (Honours)	
UOIT	Technology management	Bachelor of Commerce	BComm Technology
	(Commerce)	(Honours)	Management major
			Technology
			Management minor
Toronto	<u>Business Technology</u>	Bachelor of Commerce	
Metropolitan	<u>Management</u>		
Univeristy			
University			
Wilfred Laurier	Business Technology	Bachelor of Business Technology	
	Management	Management	
Carleton	Information Resource	Bachelor of Information	
	Management B.I.T	Technology	
	Interactive Multimedia and	Bachelor of Information	
	Design B.I.T	Technology	
	Network Technology B.I.T	Bachelor of Information	
		Technology	
	Optical Systems and Sensors	Bachelor of Information	
	<u>B.I.T</u>	Technology	
University of	Business Technology	Bachelor of Commerce	
Ottawa	Management		
York University	Information Technology	Bachelor of Arts	
		Bachelor of Commerce	
Waterloo	Information Technology	Bachelor of Mathematics	
	Management		
University of	Management and Information	Bachelor of Business	
Toronto	Technology	Administration	
(Scarborough)			

Trent University	Information Systems	Bachelor of Arts Bachelor of Arts (Honours) Bachelor of Science Bachelor of Science (Honours)	
Centennial College	Computer Communication Networks	Bachelor of Information Technology (Honours)	
Seneca College	Informatics and Security	Bachelor of Technology (Honours)	
Seneca	Business Technology Management	Bachelor of Commerce (Honours)	

<sup>\*</sup>Programs are hyperlinked

Within Michigan, the following institutions offer information technology (or related) programming, include though are not limited to:

- Oakland University Bachelor of Science Degree in Information Technology
- Central Michigan Information Technology major
- Ferris State University Computer Information Technology
- Lawrence Technological University Bachelor of Science in Information Technology
- Wayne State Bachelor of Science in Information Technology

The relatively small number of Ontario programs in this field, combined with the growing demand for individuals with skills in information technology in Canada and student interest within this field speaks to the potential for the Bachelor of IT program to successfully attract students. Further, the proposed program is unique in that it housed in the School of Computer Science where students will acquire a more sophisticated background in computer science compared to the vast majority of arts and commerce programs.

#### **CAAT Programs:**

Within Ontario, the following CAATs offer a diploma in *Web Development and Internet Applications, Computer Systems Technician, Mobile Applications Development*, and/or *Computer Systems Technology-Networking* 

- St. Clair College
- Algonquin College
- Canadore
- Centennial
- Durham
- Fanshawe College
- George Brown
- Georgian
- La Cite
- Mohawk
- Niagara
- Sheridan

#### **College Transfer:**

Within Ontario there are a number of diploma-to-degree pathways as well as transfer and articulation agreements between universities and colleges. Some of the institutions that offer transfer credit for students enrolled in Web Development and Internet Applications, Computer Systems Technician, Mobile Applications Development, or Computer Systems Technology-Networking include, though are not limited to\*:

Nipissing University

- Lakehead University
- York University
- University of Guelph

Additional transfer pathways exist for similar CAAT diplopia programs. Despite the possible similarities that exist in these degree completion pathways, it is important for the School of Computer Science to offer comparable pathways for college students in order to stay competitive with other institutions' programming. Furthermore, we believe our degree completion pathways will be more appealing to students as it allows them to earn their diploma and degree within four years (assuming full time study) compared to other institutions whose pathways require longer for students to earn their degree.

\*Note: for a comprehensive list of all transfer options, please see: <a href="https://www.ontransfer.ca/index\_en.php">https://www.ontransfer.ca/index\_en.php</a>

#### **B.4.3.2** Demonstrate that Societal Need and Student Demand Justify Duplication (Ministry section 7)

If the proposed program is similar to others in the system, demonstrate that societal need and student demand justify the duplication. Identify innovative and distinguishing features of proposed program in comparison to similar programs.

The proposed program is like other institutional programming. We believe our program will be attractive to students for the following reasons:

- Unlike most of the existing IT programs, the proposed program is housed in the School of Computer Science
  where students will acquire a more sophisticated and comprehensive background in computer science which
  will make them attractive candidates for computer and information technology related positions.
- The program is designed to facilitate a '2+2' college-to-university degree completion pathway.
- Opportunity to complete an internship (by choosing to enrol in the internship course offered through the Faculty of Science) that is available to all students in all pathways.
- Curriculum was designed to develop the necessary technical skills that prepare students to seek professional certification in Information Technology Certificate Professional (ITCP), Associate Information Technology Professional (AITP), and/or Information Systems professional (ISP).
- Potential for high-demand specializations (e.g., in data analytics and cyber-security) as part of future curriculum development initiatives being examined within the School of Computer Science.
- Special features of the city (i.e., inexpensive housing, easy access to train/car/plane transportation, next to international border; neighbour city of metropolitan Detroit).

As reported in B.4.1 and B.4.4, we anticipate student interest to be high for this program. Lastly, labour data illustrates that there continues to be a growing need for computer science and information technology professionals. Therefore, we believe there is societal need for this program.

#### **B.5 RESOURCES**

[The resource impact of a proposal is almost never neutral. Note: Proposers must also complete and submit the **Budget Summary** (Appendix B) with the new program proposal.]

#### **B.5.1** Resources Available

#### B.5.1.1 Available Faculty and Staff Resources (QAF sections 2.1.7, 2.1.8, 2.1.9 and 2.1.10)

Describe, in general terms, all faculty and staff resources (e.g., administrative, teaching, supervision) from all affected areas/departments currently available and actively committed to support the proposed program. Please do not name specific individuals in this section.

Science already offers a minor and certificate in Applied IT further illustrating that there is a strong commitment and sufficient faculty expertise to deliver an undergraduate program in Information Technology. Complete details of each professor's research fields, publications, awards and achievements can be found in their attached CV's, Appendix A.

The average teaching load for faculty members in the School of Computer Science includes four courses. All but five courses within the proposed program are currently being offered on a regular basis so there is active commitment to support the proposed program. The BIT program houses all the Computer Science courses that were part of the Certificate of Applied IT (CAIT) and were also offered as service courses for other departments across the university. These courses were commonly taught by sessional instructors due to lack of faculty resources. As the BIT enrolment grows it will be necessary to hire full-time faculty to teach and maintain these courses along with the newly introduced courses.. The Dean of Science has approved funding for 3 faculty positions, along with lab technician and part-time secretary positions in support of the BIT program.

This program includes a small number of required courses from other departments in the Faculty of Science (i.e., Department of Mathematics and Statistics and Economics), four courses from the Odette School of Business, three elective courses from FAHSS (any course), and 13 elective courses from any area of study. Given that these courses are already taught on a regular basis there is sufficient faculty expertise and we have received a letter of support from the Head of Department for Mathematics and Statistics, Head of Economics, and the Dean of Business confirming that students in this program will have access to the required business courses (see Appendix D).

Administrative tracking will be provided within the UWinsite system. UWinsite is the University's campus-wide enterprise resource planning (ERP) system, which is used to support tracking of student engagement and learning. The Undergraduate Counselors and the Department Head will advise students interested in this degree program.

#### **B.5.1.1a Faculty Members Involved in the Delivery of the Program**

Faculty Name and Rank (alphabetical)	Program Affiliation: indicate faculty affiliation to the EXISTING program(s)	Program Affiliation: indicate faculty affiliation to the NEW program
Category 1: Tenured Professors teaching exclusively in the AAU offering the program		
Dr. Imran Ahmad, Associate Professor, School of Computer Science	Computer Science	Computer Science
Dr. Scott Goodwin, Professor, School of Computer Science	Computer Science	Computer Science
Dr. Arunita Jaekel, Professor, School of Computer Science	Computer Science	Computer Science
Dr. Ziad Kobti, Professor, Director, School of Computer Science	Computer Science	Computer Science
Dr. Saeed Samet, Associate Professor, School of Computer Science	Computer Science	Computer Science
Category 2: Tenure-track Professors teaching exclusively in this AAU		
Dr. Hossein Fani, Assistant Professor, School of Computer Science	Computer Science	Computer Science
Dr. Pooya Moradian Zadeh, Assistant Professor, School of Computer Science	Computer Science	Computer Science
Dr. Sherif Saad Ahmed, Assistant Professor, School of Computer Science	Computer Science	Computer Science
Category 3: Ancillary Academic Staff such as Learning Specialists Positions		
Mr. Ali Abdulhussein, Learning Specialist, AAS II, Odette School of Business	Odette School of Business	Odette School of Business
Category 4: Limited-term Appointments teaching exclusively in this AAU		
Dr. Chenyang Xu, Assistant Professor, Department of Economics	Economics	Economics
Category 5: Tenure or tenure-track or LTA professors involved in teaching and/or supervision in other AAUs, in addition to being a member of this AAU		
Dr. Mohamed Belalia, Assistant Professor, Department of Mathematics and Statistics	Mathematics and Statistics	Mathematics and Statistics
Dr. Yash Aneja, Professor, Odette School of Business	Odette School of Business	Odette School of Business

Dr. Martha Reavley, Professor, Odette School of Business	Odette School of Business	Odette School of Business
Dr. Karen Robson, Assistant Professor, Odette School of Business	Odette School of Business	Odette School of Business

#### B.5.1.1b Faculty Expertise Available and Committed to Supporting the New Program

The School of Computer Science already offers a minor and certificate in Applied IT, illustrating that there is a strong commitment and sufficient faculty expertise to deliver an undergraduate program in IT. Faculty members who will teach courses in this program are considered experts in the subjects that are central to this program and are well connected with industry professionals. These expert faculty have active research program and publish in high quality peer-reviewed journals. Complete details of each professor's research fields, publications, awards and achievements can be found in their attached CV's, Appendix A.

Below is a brief description of the *key* faculty members involved in this program who will teach the majority of courses in the program:

**Dr. Imran Ahmad** primarily works in Multimedia Systems. His research interests are in image retrieval systems, especially involving content-based image retrieval. On the application side, he works in the areas of 3D modeling and both 2D and 3D animation. He has been involved in teaching both graduate and undergraduate levels.

**Dr. Arunita Jaekel** works in the area of network design and optimization. Her research interests include design of fault tolerant networks and secure communication strategies for vehicular and wireless networks. She has been involved in teaching a variety of courses in both graduate and undergraduate levels.

**Dr. Ziad Kobti** is a Professor and current Director of the School of Computer Science. Dr. Kobti has taught a large number and variety of undergraduate and graduate courses since 2001. Dr. Kobti was the recipient of several teaching awards including the Alumni Award for Distinguished Contributions to University Teaching. Dr. Kobti leads his own NSERC funded research program in theoretical and evolutionary computation as well a principal investigator on a number of present and past collaborative industry projects funded by various government agencies. He is the past president of the Canadian Artificial Intelligence Association.

**Dr. Hossein Fani** has worked in the broad area of Social Network Analytics with special attention to content-based and temporal user community detection. His research concerns user community detection, user interest modeling, social network analysis, text mining, information retrieval, and machine learning. He has been involved in teaching both graduate and undergraduate levels.

**Dr. Scott Goodwin** is a Professor in the School of Computer Science. His primary interest is in Artificial Intelligence for Computer Games.

**Dr. Pooya Moradian Zadeh** is an assistant professor in the School of Computer Science. His research interests focus on data analytics and the modeling and optimization of complex social systems such as healthcare using computational intelligence and social network analysis techniques. He has also led several software development teams successfully in data analytics, applied AI, and health informatics. He is the recipient of the 2020 Roger Thibert Teaching Excellence Award and the 2019 Student Engagement Award for excellence in teaching achievements and educational leadership from the faculty of science at the University of Windsor.

**Dr. Saeed Samet** is an associate professor at the School of Computer Science since 2017. He teaches var undergraduate and graduate courses since 2012. His research interests are in the security/privacy of data analytics and Big Data, as well as health informatics. Along with the graduate and undergraduate students under his Page 31 of 100

supervision, he has developed secure health applications for web and mobile environment, as well as using Blockchain technology in terms of data privacy and scalability.

**Dr. Sherif Saad** is an assistant professor with the school of computer science. His research interests include cybersecurity, software engineering and applied machine learning.

#### B.5.1.1c Extent of Reliance on Adjunct, Limited-term, and Sessional Faculty in Delivering the New Program

Describe the area's expected reliance on, and the role of adjunct, limited-term, and sessional faculty in delivering the proposed program.

All but 5 of the required courses in the proposed degree program have been and will continue to be part of the regular course offerings of the School of Computer Science, Department of Mathematics and Statistic, Department of Economics, and Odette School of Business.

Most COMPxxx0 courses are offered by tenured and tenure track professors. Exceptions occur at times in the multisection year one courses with high enrolments and broad audiences. In some cases, qualified sessional instructors are engaged to deliver a course, if needed. Most COMPxxx7 courses are offered by sessional instructors and should be supported by more permanent teaching resources in the long term.

In addition to the existing expertise within the department, the Dean of Science has approved funding for 3 additional faculty positions in support of the BIT program.

#### B.5.1.1 d Other Available Resources (Ministry sections 3 and 4)

Most of the courses within the proposed degree program are offered on a regular basis and can accommodate the projected number of new students from this degree program. All other courses from departments within the Faculty of Science can also accommodate the enrolment growth associated with this new program. The Odette School of Business has been consulted and they are in support of this new program and have guaranteed students in the program reserved seating in MKTG 1310, MSCI 1000, STEN 1000, MGMT 2400 (see Appendix D for their letter of support). The Department of Mathematics and Statistics and Department of Economics have also expressed their support (appendix D).

To accommodate the growth in enrolment that is anticipated from this program, we are requesting additional support including one part-time secretary (20 hours/week), technical support staff (20 hours/week), one lab space with PC support for 30 students (shared with other courses), annual PC upgrade budget for the maintenance and increase of hardware/software licences and online resources (e.g., LinkedIn learning) to accommodate the increased number of students, and potentially more tutors should need arise based upon the increase in enrolment. Additional GAs/TAs at a ratio of one GA/TA (140 hours) for every 30 students will be required for the eight new courses, with additional GAs/TAs potentially being need as enrolment in these courses scales up.

The Co-operative Education and Workplace Partnerships office at the University of Windsor will be tasked to support the co-op program, including providing administrative support to help facilitate the admissions process and placements for students. The co-op option will be available only for students in the 4-year direct entry pathway (Pathway 3). Student intake in this pathway is expected to begin about 2-3 years after the program starts.

#### B.5.1.2 Resource Implications for Other Campus Units (Ministry sections 3 and 4)

The vast majority of required courses are offered through the School of Computer Science. There are a small number of courses (2 courses) offered from other departments within the Faculty of Science (i.e., Department of Mathematics and Statistics and Economics). These courses have the capacity to accommodate students from the new degree program without additional resource expenditure. Four required courses will be completed within the Odette School of Business. The Odette School of Business has been consulted and they are in support of this new program (see Appendix D for letters of support).

Three courses from FAHSS; however, students have considerable flexibility in the courses they choose to complete so reliance is minimal.

This program will rely on the Co-operative Education and Workplace Partnerships office at the University of Windsor to help support co-op. The co-op option will be available only for students in the 4-year direct entry pathway (Pathway 3). Student intake in this pathway is expected to begin about 2-3 years after the program starts.

The program does not require equipment or facilities from other campus units nor maintenance/upgrading of any resources from other campus units.

#### B.5.1.3 Anticipated New Resources (QAF sections 2.1.7, 2.1.8 and 2.1.9; Ministry section 4)

List all **anticipated new resources** originating from within the area, department or faculty (external grants, donations, government grants, etc.) and committed to supporting the proposed program.

N/A

#### B.5.1.4 Planned Reallocation of Resources and Cost-Savings (QAF section 2.1.7 and 2.1.9; Ministry section 4)

Describe all opportunities for <u>internal reallocation of resources and cost savings</u> identified and pursued by the area/department in preparing this proposal. (e.g., streamlining existing programs and courses, deleting courses, etc.)

N/A

#### B.5.1.5 a Additional Resources Required – Resources Requested (QAF section 2.1.7 and 2.1.9)

Describe all **additional faculty, staff and GA/TA resources** (in all affected areas and departments) required to run the proposed program.

Faculty:	Three faculty positions will be needed to meet the increased teaching needs for this program and have
	been approved by the Dean of Science.
Staff:	One part-time (20 hours/week) secretary
	Technical support staff (20 hours/week)
GA/TAs:	A ratio of one GA/TA (140 hours) for every 30 students will be required for the eight new courses

#### B.5.1.5b Additional Institutional Resources and Services Required by all Affected Areas or Departments

Describe all **additional institutional resources and services** required by <u>all affected</u> areas or departments to run the proposed program, including library, teaching and learning support services, student support services, space and facilities, and equipment and its maintenance.

<b>Library Resources and Services:</b>	N/A
<b>Teaching and Learning Support:</b>	N/A
Student Support Services:	Additional CS tutors should need arise because of the increase in enrolment
Space and Facilities:	
Equipment (and Maintenance):	Annual PC update budget for the maintenance and increase of hardware/software licences and online resources (e.g., LinkedIn learning) to accommodate the increased number of students; estimated cost \$25,000 every year.

#### C. Program Details

#### C.1 Admission Requirements (QAF section 2.1.2)

#### **General Admission Requirements:**

- 1. '2+2' College-to-University Degree Completion Pathway
- 40 courses (120 credits); 60 credits earned from the University of Windsor; 60 credits earned from a recognized two-year CAAT program.
- 1. Graduates of a two-year Ontario College Diploma from *Web Development and Internet Applications or Computer Systems Technician* from a qualifying Ontario or equivalent College of Applied Arts and Technology (CAAT), with a cumulative average of a least a B (3.0 or 73%) grade), are eligible for admission to Bachelor of Information Technology degree program offered by the School of Computer Science at the University of Windsor under the provisions of this agreement. The Dean of Science or their designate has the authority to admit students from qualifying colleges in equivalent diploma programs within Canada pending that they meet all other admission requirements.
- 2. In addition to the appropriate two-year Diploma and grade point average, applicants to the Bachelor of Information Technology are required to have successfully completed 1 of MDM4U, MHF4U, or MCV4U or the equivalent course. Students who have not completed this course or its equivalents will be required to complete the equivalent course within the UWindsor Prep Program.
- 3. Students are required to complete twenty (20) courses at the University of Windsor in fulfillment of the requirements of the Bachelor of Information Technology.

#### Recognized programs include:

- Web Development and Internet Applications (MCU Code 50513)
- Computer Systems Technician (MCU Code 50505)
- Any program from a qualifying Ontario CAAT or other Canadian College deemed equivalent by the Dean of Science or their designate.

#### 2. College-to-University Degree Completion Pathway for 3-year CAAT Programs at St. Clair College

- 40 courses (120 credits); 45 credits earned from the University of Windsor; 75 credits earned from a recognized three-year CAAT program.
- 1. Graduates of a three-year Ontario College Advanced Diploma from *Computer Systems Technology Networking* and *Mobile Applications Development* from St. Clair College, with a cumulative average of a least a B (3.0 or 73%) grade), are eligible for admission to Bachelor of Information Technology degree program offered by the School of Computer Science at the University of Windsor under the provisions of this agreement. The Dean of Science or their designate

has the authority to admit students from qualifying colleges in equivalent diploma programs within Canada pending that they meet all other admission requirements.

- 2. In addition to the appropriate three-year Advanced Diploma and grade point average, applicants to the Bachelor of Information Technology are required to have successfully completed 1 of MDM4U, MHF4U, or MCV4U or the equivalent course. Students who have not completed this course or its equivalents will be required to complete the equivalent course within the UWindsor Prep Program.
- 3. Students are required to complete fifteen (15) courses at the University of Windsor in fulfillment of the requirements of the Bachelor of Information Technology.

Recognized programs include:

- Computer Systems Technology-Networking at St. Clair College
- Mobile Applications Development at St. Clair College

#### 3. 4-year Direct Entry Pathway

• ENG4U, and 1 of MDM4U, MHF4U, or MCV4U. A minimum 70% average of math courses is also required.

#### C.1.1 Admission Requirements and Attainment of Learning Outcomes (QAF section 2.1.2)

Demonstrate that admission requirements are sufficient to prepare students for successful attainment of the intended learning outcomes (degree level expectations) established for completion of the program.

The curriculum within this program has been scaffolded to ensure students' progress from introductory to mastery of the program learning outcomes. The required grade 12 math courses and minimum average of 70% in all attempted math courses will ensure students are prepared to be successful in all first-year mathematics and statistics courses and math-intensive computer science courses. These first-year courses will serve as the foundation for the upper year computer science courses. The requirement of grade 12 English will ensure students are prepared for writing intensive courses that they may complete as part of their electives or arts and humanities courses. These admission requirements are consistent with the requirements for Information Technology program offered at other institutions.

Admission requirements for the degree completion pathway ensure that students entering the Bachelor of IT meet an equivalent basis of admission. Generally, students transferring from the college will complete the same core courses as those students required for direct entry (excluding courses that are deemed equivalent to the material covered in the CAAT programs and where the degree program permits choice). Essentially, the college courses will fulfill the elective requirements for the Bachelor of IT. As such, students will be prepared to successfully meet the intended learning outcomes for this program. Additionally, prior research suggests that students transferring from college to university are satisfied with their academic preparation (Decock, McCloy, Liu, & Hu, 2011).

#### C.2 Program Curriculum Structure/Program of Study (QAF sections 2.1.4 and 2.1.10)

The proposed BIT program has 3 possible pathways as follows:

- 1. '2+2' College-to-University Degree Completion Pathway
- 2. College-to-University Degree Completion Pathway for 3-year CAAT Programs at St. Clair College
- 3. 4-year Direct Entry Pathway

Initially, students will only be admitted through Pathways 1 and 2, and there will be no admissions through the 4-year direct entry route (i.e. Pathway 3). However, it is anticipated that a four-year direct entry pathway will be made available to prospective students in the future. We expect this to occur 2-3 years after the program starts. This direct-entry pathway will be available with and without co-op We believe both pathways will be of interest to students and have provided evidence of this throughout this application

# Pathway 1: '2+2' College-to-University Degree Completion Pathway Option 1: for students from Web Development and Internet Applications

#### Courses to complete at the University of Windsor (Total 20)

- (a) COMP 1000, COMP 2067, **COMP 2087**, COMP 2097, **COMP 2547**, **COMP 3037**, **COMP 3250**, COMP 4990 (6 credit course).
- (b) 2 additional CS courses at the 2xxx 4xxx level\*
- (c) ECON 1100 and STAT 2910
- (d) MKTG 1310, MSCI 1000, STEN 1000, MGMT 2400
- (e) 3 courses from any area of study\*.

\*The following courses cannot be used to fulfill the degree completion pathway requirements: COMP 1047, COMP 2057, COMP 2707, COMP 3057, COMP 3067 and COMP 3077. The topics in these courses are expected to be covered in courses taken for the CAAT programs.

Courses in category (a) are used to calculate the major average.

# Pathway 1: '2+2' College-to-University Degree Completion Pathway Option 2: for students from *Computer Systems Technician*

#### Courses to complete at the University of Windsor (Total 20)

- (a) COMP 1000, COMP2057, COMP2067, **COMP 2087**, COMP 2097, **COMP 2547**, COMP 2707, COMP 3077, **COMP 3250**, COMP 4990 (6 credit course).
- (b) 2 additional CS courses at the 2xxx 4xxx level\*\*
- (c) ECON 1100 and STAT 2910
- (d) MKTG 1310, MSCI 1000, STEN 1000, MGMT 2400
- (e) 1 course from any area of study\*\*.

Courses in category (a) are used to calculate the major average.

# Pathway 2: College-to-University Degree Completion Pathway Option 1: for students from *Computer Systems Technology – Networking* at St. Clair College

#### Courses to complete at the University of Windsor (Total 15)

- (a) COMP 1000, COMP2067, **COMP 2087**, COMP 2097, **COMP 2547**, COMP 3077, **COMP 3250**, COMP 4990 (6 credit course).
- (b) ECON 1100 and STAT 2910
- (c) MKTG 1310, MSCI 1000, STEN 1000, MGMT 2400

Courses in category (a) are used to calculate the major average.

# Pathway 2: College-to-University Degree Completion Pathway Option 2: for students from *Mobile Application Development* at St. Clair College

<sup>\*\*</sup>The following courses cannot be used to fulfill the degree completion pathway requirements: COMP 1047, COMP 3037, COMP 3057, and COMP 3067. The topics in these courses are expected to be covered in courses taken for the CAAT programs.

# Courses to complete at the University of Windsor (Total 15)

- (a) COMP 1000, COMP2067, **COMP 2087**, COMP 2097, **COMP 2547**, **COMP 3037**, **COMP 3250**, COMP 4990 (6 credit course).
- (b) ECON 1100 and STAT 2910
- (c) MKTG 1310, MSCI 1000, STEN 1000, MGMT 2400

Courses in category (a) are used to calculate the major average.

Pathway 3: Direct Entry Pathway Degree Structure (with and without co-op)

**Total courses:** 

40 (120 credits)

### **Degree requirements:**

- (a) COMP 1000, COMP 1047, COMP 2057, COMP 2067, COMP 2087 COMP 2097, COMP 2547, COMP 2707, COMP 3037, COMP 3057, COMP 3067, COMP 306
- (b) 2 additional CS courses at the 2xxx 4xxx level
- (c) ECON 1100 and STAT 2910
- (d) 3 courses from Arts/Languages and Social Sciences (at least 1 from each area)
- (e) MKTG 1310, MSCI 1000, STEN 1000, MGMT 2400 (**NOTE**: These are the only business courses they can take without needing extra prereqs. Also, these will be needed for any other business courses they might want to take, e.g. for completing a minor in business.)
- (f) 14 other courses from any area of study
  - Taking ACCT 1510, ACCT 2550, FINA 2700 will meet requirements for minor in Business.

Students in the co-op stream will also be required to complete COMP-2980, COMP-3980 and COMP-4970, which correspond to the required work term placements.

## Courses used to calculate the major average are:

COMP 1000, COMP 1047, COMP 2057, COMP2067, COMP 2087 COMP 2097, COMP 2547, COMP 2707, COMP 3037, COMP 3057, COMP 3067, COMP 3077, COMP 3250, COMP 4990

### Description of thesis option (if applicable):

N/A

Provide requirements for the Co-op/Experiential Learning Component AND a description of how the program requirements differ for students who complete the experiential learning option and those who opt not to (if applicable). [If the co-op/experiential learning component is new (not part of the existing stand-alone program), a PDC Form B is required]:

At this time, this program will not have a direct entry (four-year) route. However, a four-year direct entry pathway is expected to be made available to prospective students in 2-3 years. This pathway will be available with and without co-op. As such, we have described the structure of co-op below.

**Co-op:** Student who are enrolled in the four-year degree completion pathway may choose to complete their Bachelor of IT with or without co-op. There is no difference in program requirements for students who complete co-op or not. Co-op gives students the opportunity to exercise their academic knowledge and skills and learn from work-integrated practice. It does not change the (academic) program requirements. We note that the co-op option is available *only* for students in Pathway 3. We do not expect any student admissions through this pathway until 2-3 years after the program starts.

Internship: Students may choose to complete an internship course (SCIE-3990) as an elective.

Explain how credit will be awarded for the experiential learning component (length of component, credit weighting, etc.):

**Co-op:** Students completing the Bachelor of IT must successfully complete at least three paid work experiences interspersed throughout the four-year Honours program. Student enrol in three co-op work term placements where they are required to complete a minimum of 420 hours/term. Students register for each co-op work term and these are offered on a pass/fail basis.

**Internship:** Students will participate a 12-week work placement, complete bi-weekly assignments, and write a final internship report on their experience. This course is graded on a pass/fail basis where the pass level is set at 70%. To pass students must complete 108 hours (~9 hours/week over 12 weeks) at their placement, complete and submit the bi-weekly assignments and final internship report (detailed below), and receive a pass on their final evaluation from their employer. Students will earn three credits for competing this internship. Since there is no set class time, assignments are submitted via Blackboard. Specific details and weighting of the assignments can be seen in 'guidelines for experiential learning reports'.

### Guidelines for experiential learning/co-op work term reports:

**Co-op:** The co-op work term reports will be administered by the Co-op office at the university level with detailed guidelines. As in the other co-op-enabled Computer Science programmes, the work term reports are categorized into junior, intermediate, and senior levels. Junior and Intermediate assignments are reflective in nature and are evaluated by the Co-op Education and Workplace Partnerships office. Senior level work term assignments are technical in nature and are evaluated by a faculty member of the School of Computer Science. All employers are requested to submit an on-line final evaluation of workplace performance at the end of the work term.

#### Internship:

As part of the course, students will submit the following documents to the course instructor. These documents are also considered assignments within the course:

- 1) Internship Learning Goals Document and Safety Checklist (worth 4%)
- 2) Mid-term Performance Appraisal (worth 15%)
- 3) Bi-Weekly Assignments (weekly time logs, along with a written reflection, the topic of which will be posted on Blackboard) (worth 4% each; 16% total)
- 4) Final Performance Appraisal (mid-term and final Employer Performance Appraisal) (worth 35%)
- 5) Final Reflective Report (meaningful and deep reflection on internship experience which will contain: job description, knowledge gained, skills learned, attitudes/values, learning outcomes) (worth 30%)

#### General length of experiential learning/co-op work term:

**Co-op:** Students enrol in three co-op work term placements where they are required to complete a minimum of 420 hours/term. The work term courses include: COMP-2980/COMP-3980/COMP-4970/COMP-4980.

#### Internship:

The internship is a 12-week work placement, where students complete 108 hours (~9 hours/week over 12 weeks) at their placement. Of the 9 hours/week students devote to their placement, six of these hours must be spent working at the placement, with their internship supervisor (or designate), or on placement related duties, and the remaining three hours can be spent on completing assignments, research, or preparations for the course and/or placement. The internship course will be completed over one academic semester. Due to the experiential nature of the course, there is no set class time and all assignments are submitted via Blackboard.

# Is the completion of the experiential learning/co-op component a requirement of the program?

Students in the four-year degree completion pathway may choose to complete the Bachelor of IT with or without co-op. Co-op is not a requirement of the four-year program.

The internship is not a requirement of the program.

# C.3.1 For Graduate Program ONLY (QAF sections 2.1.3 and 3; Senate Co-op Policy)

# **C.3.1.1** Normal Duration for Completion

Provide a clear rationale for program length that ensures that the program requirements can be reasonably completed within the proposed time period.

N/A

#### C.3.1.2 Program Research Requirements

For research-focused graduate programs, provide a clear indication of the nature and suitability of the major research requirements for completion of the degree.

N/A

# C.3.1.3 Fields in a Graduate Program (optional)

Where fields are contemplated, provide the following information: The master's program comprises the following fields: ...[list, as applicable] The PhD program comprises the following fields: ...[list, as applicable]

N/A

# C.3.2 For All Program Proposals (FOR CO-OP – add)

### C.3.2.1 Standing Required for Continuation in Program

A cumulative average of 60% and a major average of 70%.

#### C.3.2.2 Standing Required for Graduation

A cumulative average of 60% and a major average of 70%.

#### C.3.2.3 Suggested Program Sequencing

'2+2' College-to-University Degree Completion Pathway (2 options)
College-to-University Degree Completion Pathway for 3-year CAAT Programs at St. Clair College
4-year Direct Entry Pathway

# Pathway 1: '2+2' College-to-University Degree Completion Pathway Option 1: for students from Web Development and Internet Applications

**First Year:** ten courses, including COMP 1000, COMP 2067, COMP 2087, COMP 2097, ECON 1100, MKTG 1310, MSCI 1000, STEN 1000.

Second Year: ten courses, including COMP 2547, COMP 3037, COMP 3250, COMP 4990, MGMT 2400, and STAT-2910

# Pathway 1: '2+2' College-to-University Degree Completion Pathway Option 2: for students from *Computer Systems Technician*

**First Year:** ten courses, including COMP 1000, COMP 2057, COMP 2067, COMP 2087, COMP 2097, COMP 2707, ECON 1100, MKTG 1310, MSCI 1000, STEN 1000.

Second Year: ten courses, including COMP 2547, COMP 3077, COMP 3250, COMP 4990, MGMT 2400, and STAT-2910

# Pathway 2: College-to-University Degree Completion Pathway Option 1: for students from *Computer Systems Technology – Networking* (3-year CAAT program from SCC)

# Tentative Course Sequence (may vary depending on course offering schedule)

**First Year:** ten courses COMP 1000, COMP 2067, COMP 2087, COMP 2097, COMP 4990A, ECON 1100, MKTG 1310, MSCI 1000, STEN 1000, and STAT-2910.

Second Year: five courses COMP 2547, COMP 3077, COMP 3250, COMP 4990B, MGMT 2400,

# Pathway 2: College-to-University Degree Completion Pathway Option 2: for students from *Mobile Application Development* (3-year CAAT program from SCC)

#### Tentative Course Sequence (may vary depending on course offering schedule)

**First Year:** ten courses COMP 1000, COMP 2067, COMP 2087, COMP 2097, COMP 4990A, ECON 1100, MKTG 1310, MSCI 1000, STEN 1000, and STAT-2910.

Second Year: five courses, including COMP 2547, COMP 3037, COMP 3250, COMP 4990B, MGMT 2400

# Pathway 3: Direct Entry Degree Structure

First Year: ten courses, including COMP 1000, COMP 1047, ECON 1100, MKTG 1310, MSCI 1000, STEN 1000.

Second Year: ten courses, including COMP 2057, COMP 2067, COMP 2087, COMP 2097, COMP 2547, COMP 2707,

MGMT 2400, and STAT-2910

Third Year: ten courses, including COMP 3037, COMP 3057, COMP 3067, COMP 3077, COMP 3250.

**Fourth Year:** ten courses, including COMP 4990 (a 6.0 credit hour course).

# C.4 LEARNING OUTCOMES (Degree Level Expectations) (QAF section 2.1.1, 2.1.3, and 2.1.6)

Program Learning Outcomes (Degree Level Expectations) This is a sentence completion exercise. Please provide a minimum of 1 learning outcome for each of the boxes associated with a graduate attribute.  At the end of this program, the successful student will know and be able to:	Characteristics of a University of Windsor Graduate  A UWindsor graduate will have the ability to demonstrate:	COU-approved Undergraduate Degree Level Expectations
A. Integrate and utilize concepts and techniques of computer science, including but not limited to: programming, computing concepts and data structures, database management, networks, and web development (also relevant to D).  Explain the underlying technologies, including hardware and software and the development life cycle of computer systems, the Internet, social media and mobile applications.  Construct and assess algorithms and programs in light of industry-standard programming practices.  For Co-op: Solve computational problems in industry settings.	A. the acquisition, application and integration of knowledge	<ol> <li>Depth and Breadth of Knowledge</li> <li>Knowledge of Methodologies</li> <li>Application of Knowledge</li> <li>Awareness of Limits of Knowledge</li> </ol>
B. Solve real-world IT problems using top-down approaches and relevant research (also relevant to C, D, H and I).  Research and review project-related business and management issues and policies.	B. research skills, including the ability to define problems and access, retrieve and evaluate information (information literacy)	<ol> <li>Depth and Breadth of Knowledge</li> <li>Knowledge of Methodologies</li> <li>Application of Knowledge</li> <li>Awareness of Limits Knowledge</li> </ol>
C. Design and construct well-structured, user-friendly, and accessible web sites and complex webbased data management systems (also relevant to H).  Implement and maintain business applications that involve data retrieval using DBMS.	C. critical thinking and problem-solving skills	1. Depth and Breadth of Knowledge 2. Knowledge of Methodologies 3. Application of Knowledge 5. Awareness of Limits of Knowledge
D. See items in sections A and B above.	D. literacy and numeracy skills	Communication Skills     Awareness of Limits of     Knowledge
E. Adhere to ethical standards, privacy and intellectual property rights when developing solutions to programming problems.	E. responsible behaviour to self, others and society	5. Awareness of Limits of Knowledge

Program Learning Outcomes (Degree Level Expectations) This is a sentence completion exercise. Please provide a minimum of 1 learning outcome for each of the boxes associated with a graduate attribute.  At the end of this program, the successful student will know and be able to:	Characteristics of a University of Windsor Graduate  A UWindsor graduate will have the ability to demonstrate:	COU-approved Undergraduate Degree Level Expectations
Respond to end-user needs by using best programming practices and creating program documentation and manuals.		6. Autonomy and Professional Capacity
F. Communicate technical subject matters to general audiences effectively, in written and/or oral form.  For Co-op: Receive, incorporate, and act on feedback in professional settings.	F. interpersonal and communications skills	4. Communication Skills 6. Autonomy and Professional Capacity
G. Interact constructively with others to solve practical problems and design functional web sites.	G. teamwork, and personal and group leadership skills	Communication Skills     Autonomy and Professional     Capacity
H. See items in sections B and C above.	H. creativity and aesthetic appreciation	<ul><li>2. Knowledge of Methodologies</li><li>3. Application of Knowledge</li><li>6. Autonomy and Professional Capacity</li></ul>
I. Revise and expand solutions of IT problems to include new hardware and software developments Identify trends, new techniques, and developments in information technology, social media applications, and mobile technology.	I. the ability and desire for continuous learning	6. Autonomy and Professional Capacity

# C.4.1 Program Structure and Regulations Ensure Learning Outcomes Can be Met

Describe how the program's structure and regulations ensure that its specified learning outcomes can be met by successful students.

Through the completion of the Bachelor of IT, students will graduate with skills to integrate and utilize concepts and techniques of computer science, solve IT problems, and design accessible websites and documents. The School of Computer Science will ensure that program requirements are being met and students are achieving the learning outcomes.

Course specific assessments will be used to evaluate students' mastery of the program learning outcomes. These assessments may include, though are not limited to: examinations (e.g., tests, quizzes, and midterms), assignments, and lab exercises. The structure of the degree program is scaffolded to ensure students can meet the learning outcomes as well as progress from 'introduction' to 'mastery'. There will also be many opportunities for students to practice and reinforce these skills through their elective courses.

Within Appendix F are the curriculum maps for the Bachelor of IT with and without co-op. Generally, within the first-and second-year courses, students will be introduced the key concepts that underly the program learning outcomes. These concepts are re-reintroduced and reinforced through continued development in multiple upper-year courses. Student mastery of the program learning outcomes in COMP-3057, COMP-3077, COMP-3250, COMP-4990, and COMP-4970 (for co-op) through repeated experiences with sufficient depth and breadth of both the theory and practice. Elective courses provide students will additional opportunities to introduce, reinforce, and potentially master the program learning outcomes. Regardless of the specific electives chosen, students will progress from 'introduction' to 'mastery' of the learning outcomes.

The Bachelor of IT 4-year direct entry pathway includes flexibility (through electives) that helps to facilitate the degree completion pathways. In most cases, the CAAT programs fulfill these elective courses. While the three recognized CAAT programs are different, they have certain common elements within their Ministry Program Standards that have been captured in the Bachelor of IT learning outcomes. Curriculum maps were not made for each degree completion pathway given that these pathways are minor derivatives of the four-year degree program (i.e., in cases where students do not complete a specific course at UWindsor this is because the content was covered through the CAAT program). The Table in Section D. Monitoring and Evaluation includes a detailed breakdown of how course specific assessments align with the program learning outcomes.

#### C.4.2 Impact of Experiential Learning Component on Attainment of Learning Outcomes

**For programs with an experiential learning or co-op component:** describe how the experiential learning/co-op component changes the emphasis or the means of achieving the intended learning outcomes for the program.

Experiential learning opportunities are intended to ensure students integrate learning from multiple on-campus opportunities in applied settings and that they master the program learning outcomes.

Only students admitted through Pathway 3 – Direct Entry will have a co-op option (discussed in detail in Section E). However, all students in the program have the option of taking the Science Internship course (SCIE 3990). This course is typically one semester in length and may be taken as an elective. The internships may or may not be paid. The course will provide students with hands-on work experience where they can demonstrate connections between their academic learning and the information technology industry. Emphasis will be placed on students' capacity to analyze, solve problems, and reflecting on outcomes in real time. There are some learning outcomes that are only relevant to students in the co-op program. Through their placements, students will achieve these specific learning outcomes.

### C.4.3 Mode of Delivery (QAF section 2.1.5)

Demonstrate that the proposed modes of delivery are appropriate to meet the program learning outcomes. Discuss online vs. face-to-face (e.g., lecture, seminar, tutorial, lab) modes of delivery, as well as specialized approaches intended to facilitate the acquisition of specific skills, knowledge, and attitudes.

The program consists of required computer science courses as well as related business courses that will provide them with the required technical knowledge, and associated problem solving, communication and interpersonal skills. Courses primarily rely on face-to-face offerings and delivery may vary according to instructor. Approaches may include, though are not limited to: standard lectures with active learning techniques embedded (e.g., problem-based learning, case studies), tutorials, and laboratories. Generally, the computer science courses will consist of lectures, and will be augmented by hands-on training in a computer lab. Students will be given assignments and projects where they have to apply their knowledge to analyze a problem and develop appropriate solutions, together with other team members, and communicate the results.

#### Student Workload

Expected Workload per 3.0 Course Credit/Week	Average Time <i>per week</i> the Student is Expected to Devote to Each Component Over the Course of the Program
Lectures	3
Tutorials	0-1.5
Practical experience	
Service or experiential learning	Internship 9 hours/week for students who complete the internship course as an elective Co-operative Education work terms are 420 hours each with three terms required for graduation
Independent study	2-3
Reading and work for assessment, including meeting classmates for group work/project assignments (essays, papers, projects, laboratory work, etc.)	2-3
Studying for tests/examinations	1
Other: [specify]	

# Compare the student workload for this program with other similar programs in the AAU:

All of the courses in the proposed degree program are comparable to those within the Honours Computer Science and the workload is consistent with the level of efforts required in any of the programs in Computer Science.

#### D. MONITORING AND EVALUATION (QAF section 2.1.6)

Describe and explain the appropriateness of the proposed methods of assessing student achievement given the intended learning outcomes and degree level expectations.

Student achievement in the program will be evaluated using course-embedded assessments that are linked to both course learning outcomes and program learning outcomes. Planned assessment activities are intended to focus on achievement of knowledge and skills in actuarial Science (e.g., mathematical and statistical theories, risk management, solving complex applied problems etc.). These assessments are designed to evaluate the development of learning throughout the program. Ultimately through course-based assessments students will have progressed from introduction to mastery of program learning outcomes. Key courses for mastery include COMP-3057, COMP-3077, COMP-3250, COMP-4990, and COMP-4970 (for co-op)

Curriculum mapping was undertaken to ensure assessments were sufficiently measuring students' ability to meet the intended learning outcomes. These planned assessment activities are intended to focus on achievement of knowledge, skills, and methods in economics. This is consistent with the stream learning outcomes. examinations (e.g., quizzes, midterms, final exams), assignments of various formats related to course content (e.g., data analysis, characterization of economic equilibrium and its stability, etc.) papers (e.g., research papers), and presentations. Following the completion of curriculum mapping, it is evident that assessments adequately align with, and measure students' achievement of the program learning outcomes (see Appendix F for copies of the curriculum maps).

For an overview of assessment methods that may be used to evaluate students' achievement of the learning outcomes please see Table 12. Alignment of assessments and learning outcomes. Here you will see the connections between course assessments and program learning outcomes

The academic advisor within the School of Computer Science will be responsible for overseeing that requirements are being met as well as how student progress through the program. As questions arise students can consult the academic advisor.

Table 12. Alignment of assessments & learning outcomes

Course	Assessments*	Alignment with Program Learning Outcomes (PLO)^	Sequenc e
COMP-1000	Examinations, lab assignments	PLO1, PLO3, PLO14	Y1
COMP-1047	Examinations, assignments	PLO1, PLO2, PLO5, PLO15	Y1
COMP-2057	Examinations, assignments	PLO1, PLO2, PLO5, PLO7, PLO8, PLO10, PLO11, PLO13, PLO14, PLO15	Y2
COMP-2067	Examinations, assignments, practice question sets	PLO1, PLO2, PLO3, PLO5, PLO9, PLO10, PLO11	Y2
COMP-2087	Examinations, assignments, practice question sets	PLO1, PLO3, PLO5, PLO9, PLO10, PLO11	Y2
COMP-2097	Examinations, modules, discussion boards, group project	PLO2, PLO6, PLO9, PLO13, PLO15	Y2
COMP-2547	Examinations, lab assignments	PLO1, PLO2, PLO3, PLO10	Y2
COMP-2707	Examinations, lab assignments, project	PLO1, PLO2, PLO5, PLO7, PLO11, PLO13, PLO15	Y2
COMP-3037	Examinations, assignments, project	PLO1, PLO3, PLO5, PLO9, PLO10, PLO11, PLO14, PLO15	Y3
COMP-3057	Examinations, assignments	PLO9, PLO11	Y3
COMP-3067	Examinations, assignments, reports	PLO1, PLO8, PLO11	Y3
COMP-3077	Assignments, group projects	PLO1, PLO2, PLO3, PLO5, PLO6, PLO7, PLO8, PLO9, PLO10, PLO11, PLO13, PLO15	Y3
COMP-3250	Examinations, assignments, reports	PLO1, PLO3, PLO5, PLO9, PLO11, PLO14, PLO15	
COMP-4990	Assignments, project, reports, presentations	PLO1, PLO2, PLO3, PLO5, PLO6, PLO7, PLO8, PLO9, PLO10, PLO11, PLO13, PLO14, PLO15	
COMP-2980	Co-op term	PLO1, PLO3, PLO4, PLO5, PLO6, PLO8, PLO9, PLO10, PLO11, PLO13, PLO14, PLO5	Y2
COMP-3980	Co-op term	PLO1, PLO3, PLO4, PLO5, PLO6, PLO8, PLO9, PLO10, PLO11, PLO13, PLO14, PLO5	Y3
COMP-4970	Co-op term	PLO1, PLO3, PLO4, PLO5, PLO6, PLO8, PLO9, PLO10, PLO11, PLO13, PLO14, PLO5	Y4
ECON-1100	Examinations	PLO6	Y1

STAT-2910	Examinations	PLO1	Y2
MKTG-1310	Examinations, projects	PLO6, PLO11	Y1
MSCI-1000	Examinations, assignments	PLO6, PLO7, PLO8	Y1
STEN-1000	Examinations, team project	PLO6, PLO9, PLO11, PLO13	Y1
MGMT-2400	Examinations, assignments, team projects, team evaluation	PLO6, PLO13	Y2

**Note:** Students are required to take several elective courses. These were not included in the curriculum map or Table 12 given the variety of courses students are able to choose from. However, regardless of the elective chosen, they will provide additional opportunities for reinforcement and mastery of the stream learning outcomes.

# D.1 Plan for Documenting And Demonstrating Student Performance Consistent with Learning Outcomes

Describe the plan for documenting and demonstrating student performance level and demonstrate its consistency with the stated learning outcomes and degree level expectations.

As the program evolves student success will be tracked through consultation, student feedback, and grade achievement data. Each course instructor will be responsible for determining and assigning grades in the courses assessment activities and for a student's overall course performance. Student performance will be documented by comparison with similar-level students in the same course or within other graduate programs within our department.

Records will be kept, with the help of the graduates, of the ability of the graduates to find relevant employment on completion of the degree. Other indicators of the quality of the program will be used including input, flow through, and output metrics (e.g., admission indicators, retention, GPA, etc.), post-graduation activities, employment status, satisfaction surveys, and employer satisfaction surveys.

#### E. EXPERIENTIAL LEARNING/CO-OP COMPONENT ONLY (Senate Co-op Policy)

[Complete this section ONLY if the proposed program includes an experiential learning or co-op component involving paid or unpaid placements.]

#### **E.1 Experiential Learning Component and Nature of Experience**

Describe the experiential learning component and the nature of the experience (field placement, required professional practice, service-learning, internship, etc.)

At this time, this program will not have a 4-year direct entry route (Pathway 3). However, upon the availability of sufficient resources, a four-year direct entry pathway is expected to be made available to prospective students in 2-3 years. This pathway will be available with and without co-op. As such, we have described the structure of co-op below.

#### Co-op:

Students may choose to complete the Bachelor of IT with co-op. All co-op positions must be full-time, paid, related to the information technology or a similar field and approved by the University. Students who apply and are accepted into the Co-operative Education Program must successfully complete at least three paid work experiences interspersed throughout the four-year Honours program. The process of securing a co-op position is competitive. Co-op students will apply for work opportunities as advertised by Co-operative Education and Workplace Partnerships using an Internet-based software program and employers will make interview and hiring decisions.

<sup>\*</sup>This is not a comprehensive list of assessments as there may be additional assessments used within courses that test students' achievement of certificate LOs.

<sup>^</sup>Learning outcome numbering aligns with the Bachelor of IT with co-op curriculum map

Fall: StudyWinter: StudySummer: Off

YEAR 2:

Fall: StudyWinter: StudySummer: Work

YEAR 3:

Fall: StudyWinter: WorkSummer: Study

YEAR 4:

Fall: WorkWinter: StudySummer: Work\*

YEAR 5:

Fall: Study

Note: The fourth work term is optional

Each work term must be a minimum of 12 weeks at 35 hours a week (420 hours) or more ideally 16 weeks at 35 to 40 hrs/week.

#### **Direct Admission High School Requirements:**

• ENG4U, and 1 of MDM4U, MHF4U, or MCV4U. A minimum 70% average of math courses is also required.

# **Year 2 Application Requirements:**

• Year 1 cumulative average of 60%, major average of 65% and no more than one outstanding grade below 50%.

#### **Continuation Requirement:**

- Stay in good standing. To maintain eligibility for the co-op option, students must be registered in a full-time course load (a minimum of four courses) during study semesters.
- Students will need to apply for admission to the co-op stream in fall of second year since the first work term is scheduled for the summer following second year. Students who wish to enter the co-op stream later than this point will need to follow the established processes for appealing for late admission and meet the established criteria.

#### Internship:

Please note, the internship course is not a degree requirement and students can choose to complete it as one of their electives. The internship course consists of a 12-week work placement within a related field. Students would complete a total of 108 hours at their placement (~9 hours/week for 12 weeks). Of the nine hours devoted to their placement, six of these hours must be spent working at the placement, with their internship supervisor (or designate), or on placement related duties, and the remaining three hours can be spent on completing assignments, research, or preparations for the course and/or placement.

# E.2 Knowledge and Skills Brought to the Workplace

Provide a description of the knowledge and skills that students will be bringing to the workplace/placement based on the curriculum.

Students the Bachelor of IT will bring a range of skills to their co-op or internship placement. This includes technical and scientific knowledge as well as interpersonal skills (e.g., teamwork, collaboration, etc.). Through completing course courses in this program as well as progressing through the learning outcomes, students will gain an in-depth understanding on topics related to programming, information security, data analytics, cloud computing, mobile technology, website design, cyber ethics, web data management, business etc. This foundational knowledge will ensure students are well equipped to complete the tasks assigned by their co-op or internship supervisor. These experiences will ensure students have adequate technical skills which they can apply to the information technology (and related) industry. Many of courses in this program have research components, written assessments, oral assignments (e.g., research paper, presentation) and require students to work collaboratively. Therefore, students will develop skills related to communication, critical thinking, problem solving, and the ability to collaborate with others. These skills can be directly translated and used during their co-op or internship placement.

# E.3 Evidence of Availability of Placements Co-op:

Currently co-op opportunities exist for computer science students. This is facilitated through the Co-operative Education and Workplace Partnerships office. They will assist with placement development. Co-op students will apply for work opportunities as advertised by Co-operative Education and Workplace Partnerships using an Internet-based software program and employers will make interview and hiring decisions. Students are also encouraged to seek co-op employment outside of the advertised postings by completing a guided job search process facilitated by the Co-operative Education and Workplace Partnerships office.

We anticipate there being a number of available placements given the well-established co-op programs in computer science and business.

Types of suitable positions include: Programmer, Web Developer, Database Administrator, IT Support/Helpdesk

# Internship:

The co-op option is not available for students in the degree-completion pathways (Pathways 1&2). However, the Faculty of Science offers a 12-week internship course (SCIE-3990) that all BIT students can take as an elective. The internship course is not required and therefore we anticipate requiring only a small number of placements each year. The Faculty of Science has an experiential learning specialist (Ms. Michelle Bondy) who will help develop internship opportunities for students. Ms. Michelle Bondy teaches (SCIE-3990) and will facilitate and coordinate the development of placements for students in BIT. This will include liaising with employers and industry representatives to coordinate placements. Previous students in computer science have completed internship placements at large tech companies such as Google and IBM, various tech startups such as FetchMoto, conducting research with a professor, and working with Public Affairs on web development. Through other experiential learning courses within Science (i.e., Service Learning) students mentored local FIRST Robotic Teams, organized the Canadian Undergraduate Computer Science Conference in 2018, and multiple community organizations to develop apps/websites. As such, these represent possible companies and organizations where students can complete internships given the pre-existing relationship with the Faculty of Science.

#### E.4 Mechanism for Supervision of Placements (QAF section 2.1.9)

Describe the mechanism that will be established for the supervision of experiential learning placements.

**Co-op:** During each work term, a Coordinator from Co-op Education and Workplace Partnerships is responsible for coaching and guiding the student. The Coordinator will reach out to the student and the employer either by e-mail, phone or in-person to complete an evaluation approximately mid-way through the four-month work term. In addition, students must complete assignments during each placement. Junior and Intermediate assignments are reflective in nature and are evaluated by the Co-op Education and Workplace Partnerships office. Senior level work

term assignments are technical in nature and are evaluated by a faculty member of the School of Computer Science. All employers are requested to submit an on-line final evaluation of workplace performance at the end of the work term.

### Internships:

The internship course instructor will supervise students' progression through the course and attainment of course learning outcomes. Placement supervisors will be established and documented in the internship application form. Placement supervisors will complete a safety orientation checklist with students prior to commencing the internship. Students are required to create learning goals in collaboration with their placement supervisor. These will be documented as part of the course requirements. Weekly time logs will be maintained by the student and confirmed by the placement supervisor. There will be a mid-term and final performance appraisal completed by the supervisor and sent to the course instructor.

# **APPENDIX A – BUDGET SUMMARY SHEET**

Projections of Enrolment, Expenditures and Revenues (enrolments over 5 years)								
Year	2022-23	2023-24	2024-25 Steady stream	2025-26	2026-27	Total		
Revenue								
Tuition income*1	541,440	1,581,745	2,090,586	2,132,398	2,175,046	\$8,521,216		
Potential Provincial funding*2	541,440	1,104,538	1,126,628	1,149,161	1,172,144	\$5,093,911		
Other sources of funding (please list)								
	0	0	0	0	0	0		
Total Revenue	1,082,880	2,686,282	3,217,215	3,281,559	3,347,190	13,615,127		
Expenses								
Additional Faculty*3	\$137,500	\$418,000	\$434,720	\$452,109	\$470,193	\$1,912,522		
Additional PT Secretary & Lab Tech*4	\$90,532	\$93,248	\$96,045	\$98,927	\$101,895	\$480,647		
GA/TA & Tutors*5	49,140	99,019	99,946	98,927	101,895	\$448,927		
Additional Computer budget*6	5,000	10,000	10,000	10,000	10,000	\$45,000		
Cost to Create new Lab*7	\$350,000					\$350,000		
Total Expenses	632,172	620,267	\$640,712	\$659,962	\$683,982	\$3,237,096		
Net Income	\$450,708	\$2,066,015	\$2,576,503	\$2,621,597	\$2,663,208	\$10,378,031		

These calculations are for Pathway 1&2 only.

<sup>\*1</sup> Estimate \$9,024 per full-time equivalent domestic undergraduate student and \$31,190 for full-time international student per year in 2022-23, with a 2% increase in each future year tuition rates.

<sup>\*2</sup> Estimate same amount as tuition per full-time equivalent domestic undergraduate student

<sup>\*3</sup> Estimate FT Faculty costs of \$110,000 per year in 2022-23 and a 4% annual increase

<sup>\*4</sup> Estimate Secretary at Level 7 and Tech at level V with 3% annual increase

<sup>\*5</sup> Estimate \$5,475 per GA/TA allocation in 2022-23 and a 1% annual increase

<sup>\*6</sup> Estimate annual computer expense budget. Yr 1 has only 1 cohort and yrs 2+ has 2 cohorts

<sup>\*7</sup> Estimate a one-time lab set up cost.

#### **LETTERS OF SUPPORT**



November 5, 2020

401 Sunset Ave., Windsor, Ontario N9B 3P4

Attention: Dr. Ziad Kobti

Director, School of Computer Science

Dear Ziad,

Proposed Honours Bachelor of Applied Information Technology (with coop option)

Further to our discussion on the University of Windsor's proposed new Bachelor of Applied Information Technology (with coop option) we at the Zekelman School of Business and Information Technology are very much in favour of the launch of this degree. We look forward to sending our students from a number of programs to complete their degree in this program. These students would be coming from our Web Development and Internet Applications Diploma program, Mobile Applications Development Advanced Diploma program and our Computer Systems Technician – Networking Diploma program.

The prospect of doing two years at St. Clair College and two years at the University of Windsor resulting in a four year Honours Bachelor of Applied Information Technology degree will be a attractive pathway to many students.

We look forward to recommending this new degree to our students.

(X)./

Jim Marsh, L.L. B., MBA, MA

Dean, Zekelman School of Business and Information Technology

2000 Talbot Road W. | Windsor, ON N9A 6S4 | 519-972-2727 | stclaircollege.ca



2072 Riverside Drive Windsor, Ontario N8Y 4S5

#### To Whom It May Concern:

Hiram Walker & Sons Limited and Pernod Ricard has worked closely and in partnership with the University of Windsor for decades to provide a talent pipeline for our diverse range of hiring needs. Applied Computing and IT support is an area of growth in every operation including at Pernod and I am writing in support of the newly proposed Bachelor of Applied Information Technology program.

Hiram Walker & Sons Limited and Pernod Ricard look to recruit current and post-graduate students with both Python and full-stack web development technology skillsets including real-life experience with RESTful APIs, microservices, and Cloud architecture. Additionally, we require students who are well-versed in data management and data warehousing (coming in with practical and intermediate-level SQL/ETL experience). We require students who have a broad range of solution-focused skills in the IT realm. This program appears to build that foundation and we would be excited to see outcomes from students who were interested in applying to our roles with this background.

We look forward to a continued partnership with the University of Windsor for years to come.

If you have any questions please don't hesitate to reach out.

Regards,

Dante Pecile

IT Director, Solutions Architecture & BI Pernod Ricard North America

dante.pecile@pernod-ricard.com

519-567-6836



#### To Whom It May Concern:

Geotab has worked closely and in partnership with the University of Windsor to provide a talent pipeline for our diverse range of hiring needs ranging from Business to technical positions in IT, Engineering and Software. Applied Computing and IT support is an area of growth in every operation including, especially in a growing technology company such as Geotab and I am writing in support of the newly proposed Bachelor of Applied Information Technology program, as we have had major success working with the University of Windsor with other Masters programs.

Geotab looks to recruit post-graduate students with all sorts of technology skill sets which include but are not limited to Python, Java, C#, SQL, Javascript and more. We require students who have a broad range of solution-focused skills, and smart people with a keen passion for technology. This program appears to build that foundation and everything that would support the growth that students need in order to get their careers started, but also one that would be incredibly beneficial form employers to take on great talent, and we are in full support of this program.

We look forward to a continued partnership with the University of Windsor for years to come.



JOYCE ENTREPRENEURSHIP CENTRE

2455 WYANDOTTE ST. W. | WINDSOR, ON N9B OC1 LOCATED INSIDE EPICENTRE, 2ND FLOOR

To:

Date: February 18, 2021

Letter of Support: Bachelor of Applied IT (BAIT) Honours Program (University of Windsor

Proposal)

To Whom It May Concern,

As President and CEO of WEtech Alliance in Windsor, Ontario, I am writing to confirm our support of the University of Windsor's School of Computer Science Bachelor of Applied IT (BAIT) Honours Program.

Data and information are the primary assets in all organizations. The new BAIT program will provide graduates with extensive programming experience in high-level languages such as Python as well as full-stack web development technologies. Graduates of this program will develop skills and knowledge in the latest business data analytics strategies, database management and fundamental principles of networking and security.

With an exponentially growing global and local community around data science, machine learning, AI, web development and more, this program will provide the needed language skills to open graduates up to in-demand career opportunities.

WEtech Alliance continues to value our partnership with University of Windsor's School of Computer Science, and supports their proposal to build a world-class and in-demand academic program to support and power not only our local, but national tech community.

Sincerely,

Warmest Regards,

Yvonne Pilon

President and CEO, WEtech Alliance

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# **BIT DEGREE CURRICULUM MAP**

# **BIT (without Co-op)**

Courses to Program Outcomes: Bachelor of Information Technology (all courses)

Course	A D PLO 1	PLO 2	PLO 3	B C DHI PLO 4	PLO 5	С Н PLO 6	PLO 7	PLO 8	PLO 9	F PLO 10	G PLO 11	PLO 12	PLO 13
COMP-1000	I		1									I	
COMP-1047	1	T		1									T
COMP-2057	1	T		1		T	I		I	1	T	T	T
COMP-2067	1	I	I	1				I	I	1			
COMP-2087	R		R	R				T	R	I			
COMP-2097		R			I			ı			T		T
COMP-2547	R	R	R						R				
COMP-2707	R	R		R		R				R	R		R
COMP-3037	R		R	R				R	R	R		R	R
COMP-3057								M		R			
COMP-3067	R						R			R			
COMP-3077	M	M	M	В	R	M	M	M	M	R	R		R
COMP-3250	M		M	M				R		R		R	R
COMP-4990	M	M	M	M	М	M	M	M	M	М	M	M	M
ECON-1100					_								
STAT-2910	1												
MKTG-1310					I					I			
MSCI-1000					I	1	I						
STEN-1000					I			I		I	T		
MGMT-2400					-						I		

#### Legends

Courses	_					
	c	0	п	r	2/	20
	v	v	u		31	, 0

COMP-1000 Key Concepts in Computer Science COMP-1047 Computer Concepts for End-Users COMP-2057 Introduction to the Internet COMP-2067 Programming for Beginners COMP-2087 Programming for Beginners Programming for Beginners II

COMP-2097 Social Media and Mobile Technology for End Users

COMP-2547 Applied Algorithms and Data Structures
COMP-2707 Advanced Web Design, Construction, and Deployment

COMP-3037 Information Security for IT

COMP-3057	Cyber-Ethics
COMP-3067	Applied Databases
COMP-3077	Web-Based Data Management
COMP-3250	Data Analytics I
COMP-4990	Project Management: Techniques and Tools
ECON-1100	Introduction to Economics I
STAT-2910	Statistics for the Sciences
MKTG-1310	Principles of Marketing
MSCI-1000	Introduction to Business Data Analysis using Spreadsheets
STEN-1000	Introduction to Business
MGMT-2400	Management and Organizational Life

#### Program Learning Outcomes (PLOs)

PLO 1	integrate and utilize concepts and techniques of computer science, including but not limited to: programming, computing concepts and data structures, database
	management, networks, and web development (also relevant to D).
PLO 2	Explain the underlying technologies, including hardware and software and the development life cycle of computer systems, the Internet, social media and mobile
	applications.
PLO 3	Construct and assess algorithms and programs in light of industry-standard programming practices.
PLO 4	Solve real-world IT problems using top-down approaches and relevant research (also relevant to C. D. H and I).

PLO 5 Research and review project-related business and management issues and policies.

PLO 6 Design and construct well-structured, user-friendly, and accessible web sites and complex web-based data management systems (also relevant to H).

PLO 7 Implement and maintain business applications that involve data retrieval using DBMS.

PLO 8 Adhere to ethical standards, privacy and intellectual property rights when developing solutions to programming problems.

PLO 9 Respond to end-user needs by using best programming practices and creating program documentation and manuals.

PLO 10 Communicate technical subject matters to general audiences effectively, in written and/or oral form.

PLO 11 Interact constructively with others to solve practical problems and design functional web sites.

PLO 12 Revise and expand solutions of IT problems to include new hardware and software developments

PLO 13 Identify trends, new techniques, and developments in information technology, social media applications, and mobile technology.

#### **Cell Values**

- I Introduction
- R Reinforcement
- M Mastery
- A (superscript) assessments indicated
- $\ensuremath{\blacksquare^H}$  (superscript) high-impact assessments indicated

### University Graduate Attributes

- A the acquisition, application and integration of knowledge
- B research skills, including the ability to define problems and access, retrieve and evaluate information (information literacy)
- C critical thinking and problem-solving skills
- D literacy and numeracy skills
- E responsible behaviour to self, others and society
- F interpersonal and communications skills
- G teamwork, and personal and group leadership skills
- H creativity and aesthetic appreciation
- I the ability and desire for continuous learning

# Page 1

#### Courses to Program Outcomes: Bachelor of Information Technology with Co-op (all courses)

Course	PLO 1	PLO 2	PLO 3	PLO 4	B C DHI PLO 5	PLO 6	C H PLO 7	PLO 8	E PLO 9	E PLO 10	F PLO 11	PLO 12	G PLO 13	PLO 14	PLO 15
COMP-1000	_		1											_	
COMP-1047	_	_			1										_
COMP-2057	1	1			1		1	_		1	1		1	1	1
COMP-2067	1	1	_		1				1	1	1				
COMP-2087	R		R		R				1	R	1				
COMP-2097		R				1			1				1		1
COMP-2547	R	R	œ							R					
COMP-2707	R	R			R		R				R		R		R
COMP-3037	R		R		R				R	R	R			R	R
COMP-3057									M		R				
COMP-3067	R							R			R				
COMP-3077	M	M	×		R	R	M	≥	M	M	R		R		R
COMP-3250	M		M		M				R		R			R	R
COMP-4990	M	M	M		M	M	M	M	М	M	M		M	M	M
COMP-2980	1		1	1	1	1		1	1	1	1	1	1	1	
COMP-3980	R		R	R	R	R		R	R	R	R	R	R	R	1
COMP-4970	M		М	М	M	M		M	М	M	M	M	M	M	R
ECON-1100						1									
STAT-2910	1														
MKTG-1310						1					1				
MSCI-1000						1	1	1							
STEN-1000						1			1		1		_		
MGMT-2400						1							1		

# Legends

# Courses

COMP-1000 Key Concepts in Computer Science
COMP-1047 Computer Concepts for End-Users
COMP-2057 Introduction to the Internet
COMP-2067 Programming for Beginners
COMP-2087 Programming for Beginners II

COMP-2087 Programming for Beginners II
COMP-2097 Social Media and Mobile Technology for End Users

COMP-2547	Applied Algorithms and Data Structures
COMP-2707	Advanced Web Design, Construction, and Deployment
COMP-3037	Information Security for IT
COMP-3057	Cyber-Ethics
COMP-3067	Applied Databases
COMP-3077	Web-Based Data Management
COMP-3250	Data Analytics I
COMP-4990	Project Management: Techniques and Tools
COMP-2980	Co-op Work Term I
COMP-3980	Co-op Work Term II
COMP-4970	Co-op Work Term III
ECON-1100	Introduction to Economics I
STAT-2910	Statistics for the Sciences
MKTG-1310	Principles of Marketing
MSCI-1000	Introduction to Business Data Analysis using Spreadsheets
STEN-1000	Introduction to Business
MGMT-2400	Management and Organizational Life

#### Program Learning Outcomes (PLOs)

PLO 1	Integrate and utilize concepts and techniques of computer science, including but not limited to: programming, computing concepts and data structures, database management, networks, and web development
PLO 2	Explain the underlying technologies, including hardware and software and the development life cycle of computer systems, the Internet, social media and mobile applications.
PLO 3	Construct and assess algorithms and programs in light of industry-standard programming practices.
PLO 4	For Co-op: Solve computational problems in industry settings.
PLO 5	Solve real-world IT problems using top-down approaches and relevant research
PLO 6	Research and review project-related business and management issues and policies.

PLO 7 Design and construct well-structured, user-friendly, and accessible web sites and complex web-based data management systems
PLO 8 Implement and maintain business applications that involve data retrieval using DBMS.

PLO 9 Adhere to ethical standards, privacy and intellectual property rights when developing solutions to programming problems.

PLO 10 Respond to end-user needs by using best programming practices and creating program documentation and manuals.

PLO 11 Communicate technical subject matters to general audiences effectively, in written and/or oral form.

PLO 12 For Co-op: Receive, incorporate, and act on feedback in professional settings.

PLO 13 Interact constructively with others to solve practical problems and design functional web sites.

PLO 14 Revise and expand solutions of IT problems to include new hardware and software developments

PLO 15 Identify trends, new techniques, and developments in information technology, social media applications, and mobile technology.

#### Cell Values

I Introduction

R Reinforcement

M Mastery

A (superscript) assessments indicated

 $\ensuremath{\blacksquare^H}$  (superscript) high-impact assessments indicated

#### **REFERENCES**

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# University of Windsor Program Development Committee

5.1.1: Computer Science - New Course Proposals (Form Ds)

Item for: Approval

MOTION: That the following courses be approved:^

**COMP-2087. Programming for Beginners II** 

**COMP-2547. Applied Algorithms and Data Structures** 

**COMP-3037. Information Security for IT** 

COMP-3067. Applied Databases COMP-3250. Data Analytics I

^Subject to approval of the expenditures required.

# **Approvals:**

- These courses have been approved by the Computer Science Council and the Science Program Development Committee (SPDC) (as delegated by the Faculty of Science Coordinating Council).
- See attached.

TITLE OF PROGRAM(S)/CERTIFICATE(S):	Bachelor of IT
DEPARTMENT(S)/SCHOOL(S):	School of Computer Science
FACULTY(IES):	Science

Proposed change(s) effective as of* [Fall, Winter, Spring]:	Fall 2022
*(subject to timely and clear submission)	

#### A. NEW COURSE PROFILE

Course # and Title: COMP-2087 Programming for Beginners II

# A.1 Calendar Description

Calendar descriptions should be written in the third person and should provide a general outline of the course material. Where appropriate, examples of topics or themes, which might be covered in the course, should also be provided.

This course is the continuation of COMP-2067 that introduces students to more advanced algorithm design and programming using Python. The main objectives of the course are to develop the ability to identify, understand, and design solutions to a wide variety of problems. Topics covered include: lists, dictionaries and files, functions and modules, testing and exception handling and object oriented approach. (Prerequisite: COMP-2067) (3 lecture hours a week).

#### A.2 Other Course Information

Please complete the following tables.

Credit	Total	Delivery format			Breakdown of contact hours/week				
weight	contact hours	In-class	e-learning	Distance	Other flexible learning delivery [please specify]	Lecture	Lab/ Tutorial		Co-op/ practicum/ experientia I learning
3	36	3				3			

Pre-requisites	Co-requisites	Anti-requisites	Cross-listed with:	· ·	Replacing old course*** [provide old course number]
COMP 2067				Х	-

\*\*\*Replacing Old Course: this does not mean that the former course will be deleted from the calendar. If it is to be deleted, a Form E must be completed.

Will students be able to obtain credit for the new course and the course(s) that it is replacing? N/A

#### **B. RATIONALE**

# **B.1** Course Goal(s)

Please provide a statement about the purpose of the course within the program of study or as an option.

This will be a required course for students in the proposed BIT program. It will develop the necessary programming skills needed for senior level courses.

# B.2 Indigenous (First Nations, Métis, or Inuit) Content, Perspectives, or Material

The University of Windsor is committed to building and sustaining stronger, more meaningful inclusive partnerships with Indigenous students, scholars, and communities. Indigenization of curriculum takes place in a larger context, including a requirement to respond to the four Calls to Action in education of the <u>Truth and Reconciliation Report</u> (2015) (page 1), the unique legal requirements of the <u>Constitution Act 1982</u> (Sections 25, 35), the provincial legal requirements of the <u>Ontario Human Rights Code</u>, 1990, and provincial legislation <u>Bill Pr36</u> (1967). In <u>developing this new course</u>, **how** has consideration been given to incorporating Indigenous (First Nations, Métis, or Inuit) content, perspectives, or material into the curriculum?

Please consider these prompt questions and <u>additional Resources</u> including disciplinary examples:

- What **process** has your department/Faculty used to consider Indigenization?
- How have you considered the importance or relevance to the course/program?
- How has your department or faculty approached raising awareness for Indigenous knowledges in your area?
- What do the TRC and University Principles documents suggest relevant to your course?
- What have other similar courses/programs done that might be relevant to your course/program?
- In what ways could your course/program have flexibility to include new ways of learning, or content for Indigenous approaches or knowledges?
- What is your awareness of the history or background to approaches you are considering, such as the land acknowledgement? How have you developed your awareness?
- Which <u>literatures</u>, sources, or Indigenous Knowledge Holders have you consulted? (Please confirm you have permission to share any names, it may be helpful to have the person confirm the text if you will be submitting their name)
- Are you engaging in critical analysis of Settler Colonialism and/or Decolonization?
- Have you included the information in the other relevant areas in the PDC form (such as learning outcomes) or in the course syllabus where appropriate?

The School of Computer Science recognizes the importance of engaging and collaborating with the Indigenous community in developing and implementing a suitable curriculum. The School works closely with the Faculty of Science that has recently recruited an expert in Indigenous-centred relationships who is a recognized Knowledge-Keeper in their community with the aim to build and develop new and innovative initiatives to further Indigenous-focused research co-production and lifelong learning. The Indigenous Knowledge Keeper will provide counsel to the Office of the Dean to create further space for Indigenous knowledge and partnerships in the Faculty of Science and across the University of Windsor. The Indigenous Knowledge Keeper will support the creation of an Indigenized space for Indigenous students, community members and allies to engage, learn and create.

The School of Computer Science has taken the following steps toward this goal:

- a) A land acknowledgment statement is now included in the course syllabus template for every Computer Science course.
- b) The School is actively reaching out to Indigenous students and encouraging them to participate in the decision-making process, e.g., as student members in the curriculum committee and program representatives.
- c) The School has plans to work with the Knowledge Keeper to help reach out to the local Indigenous community and their IT and digitization department in order to seek their input and engage them, e.g., through membership in advisory committees, collaboration on research and student projects which are relevant to this program.
- d) The School encourages instructors to include topics/discussions about Indigenous issues where applicable. This for instance, includes course topics on Indigenous knowledge included in the ethics course required by this program and course projects related to IT/digitization relevant to local Indigenous cases brought out by the local community.

e) The School is looking forward to engaging with an expert in Indigenous-centred relationships within the Faculty of Science to develop relevant aspects of its curriculum further.

# B.3 LEARNING OUTCOMES (QAF section 2.1.1, 2.1.3, and 2.1.6)

Please complete the following table. State the specific learning outcomes that make up the goal of the course (what will students know and be able to do at the end of this course?) and link the learning outcomes to the Characteristics of a University of Windsor Graduate outlined in "To Greater Heights" by listing them in the appropriate rows.

Please note that a learning outcome may link to more than one of the specified Characteristics of a University of Windsor Graduate, and that a single course might not touch on each of the Characteristics. If a specific learning outcome is not applicable for the course, please enter N/A or not applicable.

Information on learning outcomes is appended to this form (Appendix A). Proposers are also strongly encouraged to contact the Centre for Teaching and Learning for assistance with the articulation of learning outcomes.

Course Learning Outcomes	Characteristics of a University of
This is a sentence completion exercise.	Windsor Graduate
At the end of this course, the successful student will know and be able to:	A U of Windsor graduate will have the ability to demonstrate:
A. Define and implement Python program solutions to problems involving different collection data	A. the acquisition, application and integration of knowledge
Use Python library functions and modules to design new functions with different parameter passing mechanisms.	
Create programs using object-oriented programming.	
B. Access necessary information to learn new programming languages and techniques	B. research skills, including the ability to define problems and access, retrieve and evaluate information (information literacy)
C. Prepare and create algorithmic and Python program solutions to a wide variety of problems (also relevant to I).	C. critical thinking and problem-solving skills
D. Interact with computers and work within standard modern operating systems	D. literacy and numeracy skills
Use and explain the interactions between editors, interpreters, and runtime debugging tools.	
Document and comment (add explanatory non-computational comments) on programs for future maintenance	
E. Use appropriate citation and acknowledgement for open source software	E. responsible behaviour to self, others and society

Course Learning Outcomes This is a sentence completion exercise.	Characteristics of a University of Windsor Graduate
At the end of this course, the successful student will know and be able to:	A U of Windsor graduate will have the ability to demonstrate:
F. Create and explain effective documentation of programs for use by others.	F. interpersonal and communications skills
G.	G. teamwork, and personal and group leadership skills
H. Create simple and efficient program solutions for real-world problems (also relevant to I).	H. creativity and aesthetic appreciation
I.	I. the ability and desire for continuous learning

#### **B.4 Demand for Course**

Please provide as much information on projected enrolment as possible.

Projected enrolment levels for the first 5 years of the	Year 1	Year 2	Year 3	Year 4	Year 5
new course.	30	30	30	30	30

# **B.4.1 Impact of New Course on Enrolment in Existing Courses**

What will be the impact of offering the new course on enrolments in existing courses in the program or Department?

This course is part of the proposed new BIT degree and is not expected to affect enrolment in existing CS courses.

## **B.5 Student Workload**

Provide information on the expected workload per week of a student enrolled in this course. NOTE: Student workload should be consistent with the credit weight assigned to the course.

Aver	age number of hours per week that the student will be expected to devote to:						
3	Lectures						
	Tutorials						
	Labs						
	Practical experience						
	Independent Study						
1	Reading for the course						
1-2	Work for assessment (essays, papers, projects, laboratory work)						
	Meeting with others for group work/project assignments						
1-2	Studying for tests/examinations						
	Other: [specify]						
How	How does the student workload for this course compare with other similar Similar						
cour	ses in the department/program area?						

#### C. RESOURCES

C.1 Available Faculty Expertise and Staff Resources (QAF sections 2.1.7, 2.1.8, 2.1.9 and 2.1.10)

Describe all faculty expertise and staff resources (e.g., administrative, teaching, supervision) from all affected areas/departments currently available and actively committed to support the new course. Please <u>do not</u> name specific individuals.

Faculty members in SCS with applied computing background will be able to teach this course.

### C.1.1 Extent of Reliance on Adjunct, Limited-term, and Sessional Faculty in Delivering the Revised Program

Describe the area's expected reliance on, and the role of adjunct, limited-term, and sessional faculty in delivering the new course.

The course may be one of the courses assigned to new limited term faculty (see C.3).

### C.2 Resource Implications for Other Campus Units (Ministry sections 3 and 4)

Describe the reliance of the proposed new course on existing resources from <u>other</u> campus units, including for example: faculty teaching, equipment or facilities outside the proposer's control, external resources requiring maintenance or upgrading using external resources. Provide relevant details.

N/A

# C.3 Anticipated New Resources (QAF sections 2.1.7, 2.1.8 and 2.1.9; Ministry section 4)

List all **anticipated new resources** originating from within the area, department or faculty (external grants, donations, government grants, etc.) and committed to supporting the new course.

The School will work with the Dean of Science on a human resource plan over time in order to cover the teaching needs of all the courses in the BIT program.

#### C.4 Planned Reallocation of Resources and Cost-Savings (QAF section 2.1.7 and 2.1.9; Ministry section 4)

Describe all opportunities for <u>internal reallocation of resources and cost savings</u> identified and pursued by the area/department in support of the new course. (e.g., streamlining existing programs and courses, deleting courses, etc.).

N/A

# C.5 Additional Resources Required – Resources Requested (QAF section 2.1.7 and 2.1.9)

Describe all **additional faculty, staff and GA/TA resources** (in all affected areas and departments) required to offer the new course. If not applicable, write n/a.

Faculty:	n/a
Staff:	n/a
GA/TAs:	1 needed GA/TA for 30 students

#### C.6.1 Additional Institutional Resources and Services Required by all Affected Areas or Departments

Describe all **additional institutional resources and services** required by <u>all affected</u> areas or departments to offer the new course, including library, teaching and learning support services, student support services, space and facilities, and equipment and its maintenance. If not applicable, write n/a.

<b>Library Resources and Services:</b>	n/a
Teaching and Learning Support:	n/a
Student Support Services:	May need additional tutors based on enrolment
Space and Facilities:	Lab with 30 seats (shared with other CS courses)
Equipment (and Maintenance):	n/a

#### A. NEW COURSE PROFILE

Course # and Title: COMP-2547 Applied Algorithms and Data Structures

#### A.1 Calendar Description

Calendar descriptions should be written in the third person and should provide a general outline of the course material. Where appropriate, examples of topics or themes, which might be covered in the course, should also be provided.

An introduction to the programming and analysis of linear and non-linear internal (main store) data structures and associated algorithms. Topics include linear lists (such as stacks, queues, linked structures.); non-linear lists (trees, binary trees); recursion; sorting techniques (such as heap sort, quick sort, merge sort, shell sort.); searching techniques (such as binary search, binary search trees, red-black trees, hashing.); algorithm design approaches such as divide-and-conquer, dynamic programming, greedy algorithms; and applications (Prerequisite: COMP-1000 and COMP-2087. Antirequisite: COMP-2540) (3 lecture hours a week).

#### **A.2 Other Course Information**

Please complete the following tables.

Credit	Total	Delivery format			Breakdown of contact hours/week				
weight	contact hours	In-class	e-learning	Distance	Other flexible learning delivery [please specify]	Lecture	Lab/ Tutorial	Online	Co-op/ practicum/ experientia I learning
3	36	3				3			

Pre-requisites	Co-requisites	Anti-requisites	Cross-listed with:	· ·	Replacing old course*** [provide old course number]
COMP-1000 and COMP-2087				Х	N/A

\*\*\*Replacing Old Course: this does not mean that the former course will be deleted from the calendar. If it is to be deleted, a Form E must be completed.

Will students be able to obtain credit for the new course and the course(s) that it is replacing? N/A

# B. RATIONALE

#### **B.1** Course Goal(s)

Please provide a statement about the purpose of the course within the program of study or as an option.

This will be a required course for students in the proposed BIT program. Students will learn the concepts of data structures and algorithm design, which provide a foundation for senior level courses.

# B.2 Indigenous (First Nations, Métis, or Inuit) Content, Perspectives, or Material

The University of Windsor is committed to building and sustaining stronger, more meaningful inclusive partnerships with Indigenous students, scholars, and communities. Indigenization of curriculum takes place in a larger context, including a requirement to respond to the four Calls to Action in education of the <a href="Truth and Reconciliation Report">Truth and Reconciliation Report</a> (2015) (page 1), the unique legal requirements of the <a href="Constitution Act 1982">Constitution Act 1982</a> (Sections 25,

35), the provincial legal requirements of the <u>Ontario Human Rights Code</u>, 1990, and provincial legislation <u>Bill Pr36</u> (1967).

In <u>developing this new course</u>, **how** has consideration been given to incorporating Indigenous (First Nations, Métis, or Inuit) content, perspectives, or material into the curriculum?

Please consider these prompt questions and additional Resources including disciplinary examples:

- What **process** has your department/Faculty used to consider Indigenization?
- How have you considered the importance or relevance to the course/program?
- How has your department or faculty approached raising awareness for Indigenous knowledges in your area?
- What do the TRC and University Principles documents suggest relevant to your course?
- What have other similar courses/programs done that might be relevant to your course/program?
- In what ways could your course/program have flexibility to include new ways of learning, or content for Indigenous approaches or knowledges?
- What is your awareness of the history or background to approaches you are considering, such as the land acknowledgement? How have you developed your awareness?
- Which <u>literatures</u>, sources, or Indigenous Knowledge Holders have you consulted? (Please confirm you have permission to share any names, it may be helpful to have the person confirm the text if you will be submitting their name)
- Are you engaging in critical analysis of Settler Colonialism and/or Decolonization?
- Have you included the information in the other relevant areas in the PDC form (such as learning outcomes) or in the course syllabus where appropriate?

The School of Computer Science recognizes the importance of engaging and collaborating with the Indigenous community in developing and implementing a suitable curriculum. The School works closely with the Faculty of Science that has recently recruited an expert in Indigenous-centred relationships who is a recognized Knowledge-Keeper in their community with the aim to build and develop new and innovative initiatives to further Indigenous-focused research co-production and lifelong learning. The Indigenous Knowledge Keeper will provide counsel to the Office of the Dean to create further space for Indigenous knowledge and partnerships in the Faculty of Science and across the University of Windsor. The Indigenous Knowledge Keeper will support the creation of an Indigenized space for Indigenous students, community members and allies to engage, learn and create.

The School of Computer Science has taken the following steps toward this goal:

- a) A land acknowledgment statement is now included in the course syllabus template for every Computer Science course.
- b) The School is actively reaching out to Indigenous students and encouraging them to participate in the decision-making process, e.g., as student members in the curriculum committee and program representatives.
- c) The School has plans to work with the Knowledge Keeper to help reach out to the local Indigenous community and their IT and digitization department in order to seek their input and engage them, e.g., through membership in advisory committees, collaboration on research and student projects which are relevant to this program.
- d) The School encourages instructors to include topics/discussions about Indigenous issues where applicable. This for instance, includes course topics on Indigenous knowledge included in the ethics course required by this program and course projects related to IT/digitization relevant to local Indigenous cases brought out by the local community.
- e) The School is looking forward to engaging with an expert in Indigenous-centred relationships within the Faculty of Science to develop relevant aspects of its curriculum further.

#### B.3 LEARNING OUTCOMES (QAF section 2.1.1, 2.1.3, and 2.1.6)

Please complete the following table. State the specific learning outcomes that make up the goal of the course (what will students know and be able to do at the end of this course?) and link the learning outcomes to the

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Characteristics of a University of Windsor Graduate outlined in "To Greater Heights" by listing them in the appropriate rows. Please note that a learning outcome may link to more than one of the specified Characteristics of a University of Windsor Graduate, and that a single course might not touch on each of the Characteristics. If a specific learning outcome is not applicable for the course, please enter N/A or not applicable.

Information on learning outcomes is appended to this form (Appendix A). Proposers are also strongly encouraged to contact the Centre for Teaching and Learning for assistance with the articulation of learning outcomes.

Course Learning Outcomes	Characteristics of a University of Windsor
At the end of the course, the successful student will know and	Graduate
be able to:	A U of Windsor graduate will have the ability to demonstrate:
Define and explain the notion of an algorithm Explain what is meant by an efficient algorithm	A. the acquisition, application and integration of knowledge
Apply different design paradigms and data structures to create efficient algorithms (also relevant to H)	B. research skills, including the ability to define problems and access, retrieve and evaluate information (information literacy)
Choose appropriate data structures, such as lists, queues, linked structures, etc, to solve computational problems  Assess different concepts and select appropriate techniques, such as divide-and-conquer, dynamic programming, etc, for solving computational problems in specific problem domains	C. critical thinking and problem-solving skills
	D. literacy and numeracy skills
	E. responsible behaviour to self, others and society
	F. interpersonal and communications skills
	G. teamwork, and personal and group leadership skills
Design efficient algorithms to solve new problems	H. creativity and aesthetic appreciation
	I. the ability and desire for continuous learning

#### **B.4 Demand for Course**

Please provide as much information on projected enrolment as possible.

Projected enrolment levels for the first 5 years of the	Year 1	Year 2	Year 3	Year 4	Year 5
new course.	30	30	30	30	30

#### **B.4.1 Impact of New Course on Enrolment in Existing Courses**

What will be the impact of offering the new course on enrolments in existing courses in the program or Department?

This course is part of the proposed new BSIT degree and is not expected to affect enrolment in existing CS courses.

#### **B.5 Student Workload**

Provide information on the expected workload per week of a student enrolled in this course. NOTE: Student workload should be consistent with the credit weight assigned to the course.

Aver	age number of hours per week that the student will be expected to devote to:					
3	Lectures					
	Tutorials					
	Labs					
	Practical experience					
	Independent Study					
1	Reading for the course					
1-2	Work for assessment (essays, papers, projects, laboratory work)					
	Meeting with others for group work/project assignments					
1-2	Studying for tests/examinations					
	Other: [specify]					
How	does the student workload for this course compare with Similar					
othe	similar courses in the department/program area?					

#### C. RESOURCES

# C.1 Available Faculty Expertise and Staff Resources (QAF sections 2.1.7, 2.1.8, 2.1.9 and 2.1.10)

Describe all faculty expertise and staff resources (e.g., administrative, teaching, supervision) from all affected areas/departments currently available and actively committed to support the new course. Please <u>do not</u> name specific individuals.

Faculty members in SCS with applied computing background will be able to teach this course.

# C.1.1 Extent of Reliance on Adjunct, Limited-term, and Sessional Faculty in Delivering the Revised Program

Describe the area's expected reliance on, and the role of adjunct, limited-term, and sessional faculty in delivering the new course.

The course may be one of the courses assigned to new limited term faculty (see C.3).

# C.2 Resource Implications for Other Campus Units (Ministry sections 3 and 4)

Describe the reliance of the proposed new course on existing resources from <u>other</u> campus units, including for example: faculty teaching, equipment or facilities outside the proposer's control, external resources requiring maintenance or upgrading using external resources. Provide relevant details.

N/A

# C.3 Anticipated New Resources (QAF sections 2.1.7, 2.1.8 and 2.1.9; Ministry section 4)

List all **anticipated new resources** originating from within the area, department or faculty (external grants, donations, government grants, etc.) and committed to supporting the new course.

The School of Computer Science will work with the Dean of Science on a human resource plan over time in order to cover the teaching needs of all the courses in the BIT program.

#### C.4 Planned Reallocation of Resources and Cost-Savings (QAF section 2.1.7 and 2.1.9; Ministry section 4)

Describe all opportunities for <u>internal reallocation of resources and cost savings</u> identified and pursued by the area/department in support of the new course. (e.g., streamlining existing programs and courses, deleting courses, etc.).

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N/A

# C.5 Additional Resources Required – Resources Requested (QAF section 2.1.7 and 2.1.9)

Describe all **additional faculty, staff and GA/TA resources** (in all affected areas and departments) required to offer the new course. If not applicable, write n/a.

Faculty:	n/a
Staff:	n/a
GA/TAs:	1 needed GA/TA for 30 students

# C.6.1 Additional Institutional Resources and Services Required by all Affected Areas or Departments

Describe all **additional institutional resources and services** required by <u>all affected</u> areas or departments to offer the new course, including library, teaching and learning support services, student support services, space and facilities, and equipment and its maintenance. If not applicable, write n/a.

Library Resources and Services:	n/a
Teaching and Learning Support:	n/a
Student Support Services:	May need additional tutors based on enrolment
Space and Facilities:	Lab with 30 seats (shared with other CS courses)
Equipment (and Maintenance):	n/a

# **D.1 Form History** (Leave blank if there have been no changes. Changes can also be noted directly in the Workflow)

Date of Modification	Approval Body Modifying	Reason for Modification		

#### A. NEW COURSE PROFILE

Course # and Title: COMP-3037 Information Security for IT

### A.1 Calendar Description

Calendar descriptions should be written in the third person and should provide a general outline of the course material. Where appropriate, examples of topics or themes, which might be covered in the course, should also be provided.

The course focuses on practical topics in information security that are encountered on a regular basis in the information technology ecosystem. The course discusses practical security problems and guidelines to help the user of information technology to make sound security decisions. Topics covered in this course include security policies, access controls, e-mail security, database security, WWW security, social network security, computer virus, and wireless network security. (Prerequisite: COMP-2057 or COMP-2067) (3 lecture hours).

#### A.2 Other Course Information

Please complete the following tables.

Credit	Total	Delivery format			Breakdown of contact hours/week				
weight	contact hours	In-class	e-learning	Distance	Other flexible learning delivery [please specify]	Lecture	Lab/ Tutorial		Co-op/ practicum/ experientia I learning
3	36					3			

Pre-requisites	Co-requisites	Anti-requisites	Cross-listed with:		Replacing old course*** [provide old course number]	
COMP-2057 or COMP-2067				Х	N/A	

\*\*\*Replacing Old Course: this does not mean that the former course will be deleted from the calendar. If it is to be deleted, a Form E must be completed.

Will students be able to obtain credit for the new course and the course(s) that it is replacing? N/A

#### **B. RATIONALE**

# **B.1** Course Goal(s)

Please provide a statement about the purpose of the course within the program of study or as an option.

This will be a required course for students in the proposed BIT program. Students gain knowledge of information security fundamentals needed to protect computers for personal use and in a business environment.

## B.2 Indigenous (First Nations, Métis, or Inuit) Content, Perspectives, or Material

The University of Windsor is committed to building and sustaining stronger, more meaningful inclusive partnerships with Indigenous students, scholars, and communities. Indigenization of curriculum takes place in a larger context, including a requirement to respond to the four Calls to Action in education of the <u>Truth and Reconciliation Report</u> (2015) (page 1), the unique legal requirements of the <u>Constitution Act 1982</u> (Sections 25, 35), the provincial legal requirements of the <u>Ontario Human Rights Code</u>, 1990, and provincial legislation <u>Bill Pr36</u>

(1967). In <u>developing this new course</u>, **how** has consideration been given to incorporating Indigenous (First Nations, Métis, or Inuit) content, perspectives, or material into the curriculum?

Please consider these prompt questions and additional Resources including disciplinary examples:

- What **process** has your department/Faculty used to consider Indigenization?
- **How** have you considered the importance or relevance to the course/program?
- How has your department or faculty approached raising awareness for Indigenous knowledges in your area?
- What do the <u>TRC</u> and <u>University Principles</u> documents suggest relevant to your course?
- What have other similar courses/programs done that might be relevant to your course/program?
- In what ways could your course/program have flexibility to include new ways of learning, or content for Indigenous approaches or knowledges?
- What is your awareness of the history or background to approaches you are considering, such as the land acknowledgement? How have you developed your awareness?
- Which <u>literatures</u>, sources, or Indigenous Knowledge Holders have you consulted? (Please confirm you have permission to share any names, it may be helpful to have the person confirm the text if you will be submitting their name)
- Are you engaging in critical analysis of Settler Colonialism and/or Decolonization?
- Have you included the information in the other relevant areas in the PDC form (such as learning outcomes) or in the course syllabus where appropriate?

The School of Computer Science recognizes the importance of engaging and collaborating with the Indigenous community in developing and implementing a suitable curriculum. The School works closely with the Faculty of Science that has recently recruited an expert in Indigenous-centred relationships who is a recognized Knowledge-Keeper in their community with the aim to build and develop new and innovative initiatives to further Indigenous-focused research co-production and lifelong learning. The Indigenous Knowledge Keeper will provide counsel to the Office of the Dean to create further space for Indigenous knowledge and partnerships in the Faculty of Science and across the University of Windsor. The Indigenous Knowledge Keeper will support the creation of an Indigenized space for Indigenous students, community members and allies to engage, learn and create.

The School of Computer Science has taken the following steps toward this goal:

- a) A land acknowledgment statement is now included in the course syllabus template for every Computer Science course.
- b) The School is actively reaching out to Indigenous students and encouraging them to participate in the decision-making process, e.g., as student members in the curriculum committee and program representatives.
- c) The School has plans to work with the Knowledge Keeper to help reach out to the local Indigenous community and their IT and digitization department in order to seek their input and engage them, e.g., through membership in advisory committees, collaboration on research and student projects which are relevant to this program.
- d) The School encourages instructors to include topics/discussions about Indigenous issues where applicable. This for instance, includes course topics on Indigenous knowledge included in the ethics course required by this program and course projects related to IT/digitization relevant to local Indigenous cases brought out by the local community.
- e) The School is looking forward to engaging with an expert in Indigenous-centred relationships within the Faculty of Science to develop relevant aspects of its curriculum further.

# B.3 LEARNING OUTCOMES (QAF section 2.1.1, 2.1.3, and 2.1.6)

Please complete the following table. State the specific learning outcomes that make up the goal of the course (what will students know and be able to do at the end of this course?) and link the learning outcomes to the Characteristics of a University of Windsor Graduate outlined in "To Greater Heights" by listing them in the appropriate rows. Please note that a learning outcome may link to more than one of the specified Characteristics of a University of Windsor Graduate, and that a single course might not touch on each of the Characteristics. If a specific learning outcome is not applicable for the course, please enter N/A or not applicable.

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Information on learning outcomes is appended to this form (Appendix A). Proposers are also strongly encouraged to contact the Centre for Teaching and Learning for assistance with the articulation of learning outcomes.

Course Learning Outcomes This is a sentence completion exercise.	Characteristics of a University of Windsor Graduate
At the end of this course, the successful student will know and be able to:	A U of Windsor graduate will have the ability to demonstrate:
A.  Define computer security terms and mechanisms (e.g security in depth, security policies, cryptography)	B. the acquisition, application and integration of knowledge
Describe fundamental security concepts (e.g authentication, authorization, non-repudiation)	
B. Categorize common security threats, threat sources, and threat motivations	B. research skills, including the ability to define problems and access, retrieve and evaluate information (information literacy)
Select appropriate strategies to protect computers against different security threats (Also relevant to H)	
C. Analyze the strengths, weaknesses, and limitations of security mechanisms	C. critical thinking and problem-solving skills
Evaluate and apply computer security best practices.	
D. Prepare technical reports identifying security risks and potential mitigation approaches. (also relevant to F)	D. literacy and numeracy skills
E. Explain the importance of protecting the computing environment and personal and confidential information.	E. responsible behaviour to self, others and society
F.	F. interpersonal and communications skills
G.	G. teamwork, and personal and group leadership skills
H.	H. creativity and aesthetic appreciation
I. Review and discuss security-related current events and articles in the popular press	I. the ability and desire for continuous learning

#### **B.4 Demand for Course**

Please provide as much information on projected enrolment as possible.

Projected enrolment levels for the first 5 years of the	Year 1	Year 2	Year 3	Year 4	Year 5
new course.	30	30	30	30	30

#### **B.4.1 Impact of New Course on Enrolment in Existing Courses**

What will be the impact of offering the new course on enrolments in existing courses in the program or Department?

This course is part of the proposed new BIT degree and is not expected to affect enrolment in existing CS courses.

#### **B.5 Student Workload**

Provide information on the expected workload per week of a student enrolled in this course. NOTE: Student workload should be consistent with the credit weight assigned to the course.

Aver	age number of hours per week that the student will be expected to devote to:		
3	Lectures		
	Tutorials		
	Labs		
	Practical experience		
1-2	Independent Study		
1	Reading for the course		
1-2	Work for assessment (essays, papers, projects, laboratory work)		
	Meeting with others for group work/project assignments		
1-2	Studying for tests/examinations		
	Other: [specify]		
How	does the student workload for this course compare with Similar		
othe	r similar courses in the department/program area?		

#### C. RESOURCES

#### C.1 Available Faculty Expertise and Staff Resources (QAF sections 2.1.7, 2.1.8, 2.1.9 and 2.1.10)

Describe all faculty expertise and staff resources (e.g., administrative, teaching, supervision) from all affected areas/departments currently available and actively committed to support the new course. Please <u>do not</u> name specific individuals.

Several faculty members in SCS with background in networking and security will be able to teach this course.

### C.1.1 Extent of Reliance on Adjunct, Limited-term, and Sessional Faculty in Delivering the Revised Program

Describe the area's expected reliance on, and the role of adjunct, limited-term, and sessional faculty in delivering the new course.

The course may be one of the courses assigned to new limited term faculty (see C.3).

#### C.2 Resource Implications for Other Campus Units (Ministry sections 3 and 4)

Describe the reliance of the proposed new course on existing resources from <u>other</u> campus units, including for example:

- faculty teaching,
- equipment or facilities outside the proposer's control,
- external resources requiring maintenance or upgrading using external resources Provide relevant details.

N/A

#### C.3 Anticipated New Resources (QAF sections 2.1.7, 2.1.8 and 2.1.9; Ministry section 4)

List all **anticipated new resources** originating from within the area, department or faculty (external grants, donations, government grants, etc.) and committed to supporting the new course.

The School will work with the Dean of Science on a human resource plan over time in order to cover the teaching needs of all the courses in the BIT program.

### C.4 Planned Reallocation of Resources and Cost-Savings (QAF section 2.1.7 and 2.1.9; Ministry section 4)

Describe all opportunities for <u>internal reallocation of resources and cost savings</u> identified and pursued by the area/department in support of the new course. (e.g., streamlining existing programs and courses, deleting courses, etc.).

N/A

## C.5 Additional Resources Required – Resources Requested (QAF section 2.1.7 and 2.1.9)

Describe all **additional faculty, staff and GA/TA resources** (in all affected areas and departments) required to offer the new course. If not applicable, write n/a.

Faculty:	n/a
Staff:	n/a
GA/TAs:	1 needed GA/TA for 30 students

### C.6.1 Additional Institutional Resources and Services Required by all Affected Areas or Departments

Describe all **additional institutional resources and services** required by <u>all affected</u> areas or departments to offer the new course, including library, teaching and learning support services, student support services, space and facilities, and equipment and its maintenance. If not applicable, write n/a.

Library Resources and Services:	n/a
Teaching and Learning Support:	n/a
Student Support Services:	May need additional tutors based on enrolment
Space and Facilities:	Lab with 30 seats (shared with other CS courses)
Equipment (and Maintenance):	n/a

#### **D.1 Form History** (Leave blank if there have been no changes. Changes can also be noted directly in the Workflow)

Date of Modification	Approval Body Modifying	Reason for Modification

#### A. NEW COURSE PROFILE

Course # and Title: COMP-3067 Applied Databases

#### A.1 Calendar Description

Calendar descriptions should be written in the third person and should provide a general outline of the course material. Where appropriate, examples of topics or themes, which might be covered in the course, should also be provided.

This course will acquaint students with the basic concepts and application of relational database systems. The topic covered will include 3-level architecture, relational bases, Structured Query Language (SQL) and query formulation, and normalization concepts. (Prerequisite: COMP-2547) (3 lecture hours a week).

#### A.2 Other Course Information

Please complete the following tables.

Credit	Total		Delivery format				down of cor	ntact ho	urs/week
weight	contact hours	In-class	e-learning	Distance	Other flexible learning delivery [please specify]	Lecture	Lab/ Tutorial		Co-op/ practicum/ experientia I learning
3	36	Yes				3			

Pre-requisites	Co-requisites	Anti-requisites	Cross-listed	Required	Replacing old course***
			with:	course?	[provide old course number]
COMP-2547					

\*\*\*Replacing Old Course: this does not mean that the former course will be deleted from the calendar. If it is to be deleted, a Form E must be completed.

Will students be able to obtain credit for the new course and the course(s) that it is replacing? | N/A

#### **B. RATIONALE**

### **B.1** Course Goal(s)

Please provide a statement about the purpose of the course within the program of study or as an option.

This will be a required course for students in the proposed BIT program. Students will learn to use industrially relevant tools to manage data and integrate with other applications.

#### B.2 Indigenous (First Nations, Métis, or Inuit) Content, Perspectives, or Material

The University of Windsor is committed to building stronger, more meaningful partnerships with Indigenous students, scholars and communities. In developing this course, how has consideration been given to incorporating Indigenous (First Nations, Métis, or Inuit) content, perspectives, or material into the curriculum?

The AAU, in partnership with the members of the university's Aboriginal Education Council, will seek to create a knowledge base to adopt to the Computer Science courses concerning appropriate content/curriculum changes or recommendations related to indigenous content.

### B.3 LEARNING OUTCOMES (QAF section 2.1.1, 2.1.3, and 2.1.6)

Please complete the following table. State the specific learning outcomes that make up the goal of the course (what will students know and be able to do at the end of this course?) and link the learning outcomes to the Characteristics of a University of Windsor Graduate outlined in "To Greater Heights" by listing them in the appropriate rows. Please note that a learning outcome may link to more than one of the specified Characteristics of a University of Windsor Graduate, and that a single course might not touch on each of the Characteristics. If a specific learning outcome is not applicable for the course, please enter N/A or not applicable. Information on learning outcomes is appended to this form (Appendix A). Proposers are also strongly encouraged to contact the Centre for Teaching and Learning for assistance with the articulation of learning outcomes.

Course Learning Outcomes This is a sentence completion exercise.	Characteristics of a University of Windsor Graduate
At the end of this course, the successful student will know and be able to:	A U of Windsor graduate will have the ability to demonstrate:
A. Describe key principals of database systems and 3-level database architecture. Explain the basic concepts of relational data models and SQL language. Apply and recognize the benefits of database systems and normalization. Design basic database systems for real-world database problems (also relevant to B)	C. the acquisition, application and integration of knowledge
B. Formulate and develop queries in SQL language to retrieve data from databases. (Also applicable to C)	B. research skills, including the ability to define problems and access, retrieve and evaluate information (information literacy)
C. Use the Entity Relationship (ER) model to represent connections between entities in real-world scenarios.	C. critical thinking and problem-solving skills
D. Prepare technical reports identifying security risks and potential mitigation approaches (also relevant to E and F)	D. literacy and numeracy skills
E.	E. responsible behaviour to self, others and society
F. Analyze and explain the logical structure of database projects using Entity Relationship (ER) diagrams	F. interpersonal and communications skills
G.	G. teamwork, and personal and group leadership skills

Course Learning Outcomes This is a sentence completion exercise.	Characteristics of a University of Windsor Graduate
At the end of this course, the successful student will know and be able to:	A U of Windsor graduate will have the ability to demonstrate:
H. Choose appropriate translations of English queries into SQL queries against real databases.	H. creativity and aesthetic appreciation
I. Relate database concepts to other areas of computer science.	the ability and desire for continuous     learning

#### **B.4 Demand for Course**

Please provide as much information on projected enrolment as possible.

Projected enrolment levels for the first 5 years of the	Year 1	Year 2	Year 3	Year 4	Year 5
new course.	30	30	30	30	30

#### **B.4.1 Impact of New Course on Enrolment in Existing Courses**

What will be the impact of offering the new course on enrolments in existing courses in the program or Department?

This course is part of the proposed new BIT degree and is not expected to affect enrolment in existing CS courses.

#### **B.5 Student Workload**

Provide information on the expected workload per week of a student enrolled in this course. NOTE: Student workload should be consistent with the credit weight assigned to the course.

Aver	age number of hours per week that the student will be expected to devote to:			
3	Lectures			
	Tutorials			
	Labs			
	Practical experience			
1-2	Independent Study			
1	Reading for the course			
1-2	Work for assessment (essays, papers, projects, laboratory work)			
	Meeting with others for group work/project assignments			
1-2	Studying for tests/examinations			
	Other: [specify]			
How	does the student workload for this course compare with Similar			
othe	r similar courses in the department/program area?			

#### C. RESOURCES

#### C.1 Available Faculty Expertise and Staff Resources (QAF sections 2.1.7, 2.1.8, 2.1.9 and 2.1.10)

Describe all faculty expertise and staff resources (e.g., administrative, teaching, supervision) from all affected areas/departments currently available and actively committed to support the new course. Please <u>do not</u> name specific individuals.

Several faculty members in SCS with background database management will be able to teach this course.

#### C.1.1 Extent of Reliance on Adjunct, Limited-term, and Sessional Faculty in Delivering the Revised Program

Describe the area's expected reliance on, and the role of adjunct, limited-term, and sessional faculty in delivering the new course.

The course may be one of the courses assigned to new limited term faculty (see C.3).

#### C.2 Resource Implications for Other Campus Units (Ministry sections 3 and 4)

Describe the reliance of the proposed new course on existing resources from <u>other</u> campus units, including for example: faculty teaching, equipment or facilities outside the proposer's control, external resources requiring maintenance or upgrading using external resources. Provide relevant details.

N/A

#### C.3 Anticipated New Resources (QAF sections 2.1.7, 2.1.8 and 2.1.9; Ministry section 4)

List all **anticipated new resources** originating from within the area, department or faculty (external grants, donations, government grants, etc.) and committed to supporting the new course.

The School will work with the Dean of Science on a human resource plan over time in order to cover the teaching needs of all the courses in the BIT program.

### C.4 Planned Reallocation of Resources and Cost-Savings (QAF section 2.1.7 and 2.1.9; Ministry section 4)

Describe all opportunities for <u>internal reallocation of resources and cost savings</u> identified and pursued by the area/department in support of the new course. (e.g., streamlining existing programs and courses, deleting courses, etc.).

N/A

#### C.5 Additional Resources Required – Resources Requested (QAF section 2.1.7 and 2.1.9)

Describe all **additional faculty, staff and GA/TA resources** (in all affected areas and departments) required to offer the new course.

If not applicable, write n/a.

Faculty:	n/a
Staff:	n/a
GA/TAs:	1 needed GA/TA for 30 students

#### C.6.1 Additional Institutional Resources and Services Required by all Affected Areas or Departments

Describe all **additional institutional resources and services** required by <u>all affected</u> areas or departments to offer the new course, including library, teaching and learning support services, student support services, space and facilities, and equipment and its maintenance. If not applicable, write n/a.

Library Resources and Services:	n/a
Teaching and Learning Support:	n/a
Student Support Services:	May need additional tutors based on enrolment
Space and Facilities:	Lab with 30 seats (shared with other CS courses)
Equipment (and Maintenance):	

#### A. NEW COURSE PROFILE

Course # and Title: COMP-3250 Data Analytics I

#### A.1 Calendar Description

Calendar descriptions should be written in the third person and should provide a general outline of the course material. Where appropriate, examples of topics or themes, which might be covered in the course, should also be provided.

This course covers techniques for quantitative and qualitative data analysis and visualization of big data. It focuses on statistics for model building and evaluation. Topics include experimental research, correlation analysis, regression, and group comparisons. Students will learn how to utilize real datasets with graphs and numerical measures and work with unstructured data like texts and images. (Prerequisite: COMP-2547 (or COMP-2540) and STAT-2910) (3 lecture hours)

#### A.2 Other Course Information

Please complete the following tables.

Credit	Total	Delivery format			Breakdown of contact hours/week				
weight	contact hours	In-class	e-learning	Distance	Other flexible learning delivery [please specify]	Lecture	Lab/ Tutorial		Co-op/ practicum/ experientia I learning
3	36	3				3			

Pre-requisites		Co-requisites	Anti-requisites	Cross-listed with:		Replacing old course*** [provide old course number]
COMP-2547 (d	r				Х	lir
COMP-2540) an	d					
STAT-2910						

\*\*\*Replacing Old Course: this does not mean that the former course will be deleted from the calendar. If it is to be deleted, a Form E must be completed.

Will students be able to obtain credit for the new course and the course(s) that it is replacing? N/A

## B. RATIONALE

#### **B.1** Course Goal(s)

Please provide a statement about the purpose of the course within the program of study or as an option.

This will be a required course for students in the proposed BIT program. Students will learn the fundamentals of data analysis and its application for business.

#### B.2 Indigenous (First Nations, Métis, or Inuit) Content, Perspectives, or Material

The University of Windsor is committed to building and sustaining stronger, more meaningful inclusive partnerships with Indigenous students, scholars, and communities. Indigenization of curriculum takes place in a larger context, including a requirement to respond to the four Calls to Action in education of the <u>Truth and Reconciliation Report</u> (2015) (page 1), the unique legal requirements of the <u>Constitution Act 1982</u> (Sections 25, 35), the provincial legal requirements of the <u>Ontario Human Rights Code</u>, 1990, and provincial legislation <u>Bill Pr36</u> (1967).

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In <u>developing this new course</u>, **how** has consideration been given to incorporating Indigenous (First Nations, Métis, or Inuit) content, perspectives, or material into the curriculum?

Please consider these prompt questions and additional Resources including disciplinary examples:

- What process has your department/Faculty used to consider Indigenization?
- How have you considered the importance or relevance to the course/program?
- How has your department or faculty approached raising awareness for Indigenous knowledges in your area?
- What do the TRC and University Principles documents suggest relevant to your course?
- What have other similar courses/programs done that might be relevant to your course/program?
- In what ways could your course/program have flexibility to include new ways of learning, or content for Indigenous approaches or knowledges?
- What is your awareness of the history or background to approaches you are considering, such as the land acknowledgement? How have you developed your awareness?
- Which <u>literatures</u>, sources, or Indigenous Knowledge Holders have you consulted? (Please confirm you have permission to share any names, it may be helpful to have the person confirm the text if you will be submitting their name)
- Are you engaging in critical analysis of Settler Colonialism and/or Decolonization?
- Have you included the information in the other relevant areas in the PDC form (such as learning outcomes)
  or in the course syllabus where appropriate?

The School of Computer Science recognizes the importance of engaging and collaborating with the Indigenous community in developing and implementing a suitable curriculum. The School works closely with the Faculty of Science that has recently recruited an expert in Indigenous-centred relationships who is a recognized Knowledge-Keeper in their community with the aim to build and develop new and innovative initiatives to further Indigenous-focused research co-production and lifelong learning. The Indigenous Knowledge Keeper will provide counsel to the Office of the Dean to create further space for Indigenous knowledge and partnerships in the Faculty of Science and across the University of Windsor. The Indigenous Knowledge Keeper will support the creation of an Indigenized space for Indigenous students, community members and allies to engage, learn and create.

The School of Computer Science has taken the following steps toward this goal:

- a) A land acknowledgment statement is now included in the course syllabus template for every Computer Science course.
- b) The School is actively reaching out to Indigenous students and encouraging them to participate in the decision-making process, e.g., as student members in the curriculum committee and program representatives.
- c) The School has plans to work with the Knowledge Keeper to help reach out to the local Indigenous community and their IT and digitization department in order to seek their input and engage them, e.g., through membership in advisory committees, collaboration on research and student projects which are relevant to this program.
- d) The School encourages instructors to include topics/discussions about Indigenous issues where applicable. This for instance, includes course topics on Indigenous knowledge included in the ethics course required by this program and course projects related to IT/digitization relevant to local Indigenous cases brought out by the local community.
- e) The School is looking forward to engaging with an expert in Indigenous-centred relationships within the Faculty of Science to develop relevant aspects of its curriculum further.

### B.3 LEARNING OUTCOMES (QAF section 2.1.1, 2.1.3, and 2.1.6)

Please complete the following table. State the specific learning outcomes that make up the goal of the course (what will students know and be able to do at the end of this course?) and link the learning outcomes to the Characteristics of a University of Windsor Graduate outlined in "To Greater Heights" by listing them in the appropriate rows.

Please note that a learning outcome may link to more than one of the specified Characteristics of a University of Windsor Graduate, and that a single course might not touch on each of the Characteristics. If a specific learning outcome is not applicable for the course, please enter N/A or not applicable.

Information on learning outcomes is appended to this form (Appendix A). Proposers are also strongly encouraged to contact the Centre for Teaching and Learning for assistance with the articulation of learning outcomes.

Course Learning Outcomes	Characteristics of a University of Windsor
At the end of the course, the successful student will know and be	Graduate
able to:	A U of Windsor graduate will have the ability to demonstrate:
Describe and explain what missing and outlier data are.  Describe and explain statistical measures, statistical distributions and the statistical hypothesis test.	A. the acquisition, application and integration of knowledge
Examine datasets and identify missing values and outliers.  Describe and analyze summaries of data using statistical measures like mean and standard deviation.  Analyse data distribution by probability distributions and apply the statistical hypothesis test. (also relevant to C)	B. research skills, including the ability to define problems and access, retrieve and evaluate information (information literacy)
Assess summaries of data using statistical measures for decision-making support. Assess the results of hypothesis tests and predictive models.	C. critical thinking and problem-solving skills
Illustrate data using data visualization graphs. (also relevant to F)	D. literacy and numeracy skills
	E. responsible behaviour to self, others and society
	F. interpersonal and communications skills
	G. teamwork, and personal and group leadership skills
	H. creativity and aesthetic appreciation
	the ability and desire for continuous     learning

#### **B.4 Demand for Course**

Please provide as much information on projected enrolment as possible.

Projected enrolment levels for the first 5 years of the	Year 1	Year 2	Year 3	Year 4	Year 5
new course.	30	30	30	30	30

#### **B.4.1 Impact of New Course on Enrolment in Existing Courses**

What will be the impact of offering the new course on enrolments in existing courses in the program or Department?

#### **B.5 Student Workload**

Provide information on the expected workload per week of a student enrolled in this course. NOTE: Student workload should be consistent with the credit weight assigned to the course.

Aver	Average number of hours per week that the student will be expected to devote to:				
3	Lectures				
	Tutorials				
	Labs				
	Practical experience				
1-2	Independent Study				
1	Reading for the course				
1-2	Work for assessment (essays, papers, projects, laboratory work)				
	Meeting with others for group work/project assignments				
1-2	Studying for tests/examinations				
	Other: [specify]				
How	does the student workload for this course compare with Similar				
othe	r similar courses in the department/program area?				

#### C. RESOURCES

#### C.1 Available Faculty Expertise and Staff Resources (QAF sections 2.1.7, 2.1.8, 2.1.9 and 2.1.10)

Describe all faculty expertise and staff resources (e.g., administrative, teaching, supervision) from all affected areas/departments currently available and actively committed to support the new course. Please <u>do not</u> name specific individuals.

Several faculty members in SCS with background in big data and data analytics will be able to teach this course.

#### C.1.1 Extent of Reliance on Adjunct, Limited-term, and Sessional Faculty in Delivering the Revised Program

Describe the area's expected reliance on, and the role of adjunct, limited-term, and sessional faculty in delivering the new course.

The course may be one of the courses assigned to new limited term faculty (see C.3).

#### C.2 Resource Implications for Other Campus Units (Ministry sections 3 and 4)

Describe the reliance of the proposed new course on existing resources from <u>other</u> campus units, including for example:

- faculty teaching,
- equipment or facilities outside the proposer's control,
- external resources requiring maintenance or upgrading using external resources

Provide relevant details.

N/A

#### C.3 Anticipated New Resources (QAF sections 2.1.7, 2.1.8 and 2.1.9; Ministry section 4)

List all **anticipated new resources** originating from within the area, department or faculty (external grants, donations, government grants, etc.) and committed to supporting the new course.

The School will work with the Dean of Science on a human resource plan over time in order to cover the teaching needs of all the courses in the BIT program.

#### C.4 Planned Reallocation of Resources and Cost-Savings (QAF section 2.1.7 and 2.1.9; Ministry section 4)

Describe all opportunities for <u>internal reallocation of resources and cost savings</u> identified and pursued by the area/department in support of the new course. (e.g., streamlining existing programs and courses, deleting courses, etc.).

N/A

#### C.5 Additional Resources Required – Resources Requested (QAF section 2.1.7 and 2.1.9)

Describe all **additional faculty, staff and GA/TA resources** (in all affected areas and departments) required to offer the new course.

If not applicable, write n/a.

Faculty:	n/a
Staff:	n/a
GA/TAs:	1 needed GA/TA for 30 students

#### C.6.1 Additional Institutional Resources and Services Required by all Affected Areas or Departments

Describe all **additional institutional resources and services** required by <u>all affected</u> areas or departments to offer the new course, including library, teaching and learning support services, student support services, space and facilities, and equipment and its maintenance. If not applicable, write n/a.

Library Resources and Services:	n/a
Teaching and Learning Support:	n/a
Student Support Services:	May need additional tutors based on enrolment
Space and Facilities:	Lab with 30 seats (shared with other CS courses)
Equipment (and Maintenance):	n/a

#### **D.1 Form History** (Leave blank if there have been no changes. Changes can also be noted directly in the Workflow)

Date of Modification	Approval Body Modifying	Reason for Modification

## University of Windsor Program Development Committee

\*5.2: Computer Science – Minor Program Changes (Form C)

Item for: Approval

MOTION: That the degree requirements for the Bachelor of Computer Science (Honours), Bachelor of Computer

Science (Honours Applied Computing) and, Bachelor of Science (Honours Computer Science with Software Engineering Specialization)be changed in accordance with the program/course change

forms.^

^Subject to approval of the expenditures required.

#### **Approvals:**

- The changes have been approved by the Department of of Computer Science and SPDC (as delegated by the Faculty of Science Coordinating Council).
- See attached.

TITLE OF PROGRAM(S)/CERTIFICATE(S):	<ul> <li>Bachelor of Computer Science (Honours)</li> <li>Bachelor of Computer Science (Honours Applied Computing)</li> <li>Bachelor of Science (Honours Computer Science with Software Engineering Specialization)</li> </ul>
DEPARTMENT(S)/SCHOOL(S):	Computer Science
FACULTY(IES):	Science

Proposed change(s) effective as of* [Fall, Winter, Spring]:	Winter 2023
*(subject to timely and clear submission)	

#### A.1 PROGRAM REQUIREMENT CHANGES

Please provide the current program requirements and the proposed new program requirements by cutting and pasting from the current undergraduate or graduate web calendar (<a href="www.uwindsor.ca/secretariat/calendars">www.uwindsor.ca/secretariat/calendars</a>) and clearly marking deletions with strikethrough (<a href="strikethrough">strikethrough</a>) and additions/new information with <a href="mailto:bolding and underlining">bolding and underlining</a>. Example: Degree requirements: WXYZ-1000, <a href="wxxyz-1010">wxxyz-1010</a>, WXYZ-1100, WXYZ-1100, WXYZ-3100, WXYZ-4100, plus three additional courses at the **3000-level or** 4000-level.

#### **Bachelor of Computer Science (Honours)**

**Degree Requirements** 

Total courses: forty.

- (a) COMP-1000, COMP-1400, COMP-1410, COMP-2120, COMP-2140, COMP-2310, COMP-2540, COMP-2560, COMP-2650, COMP-3110, COMP-3150, COMP-3220, COMP-3300, COMP-3540, COMP-3670, COMP-4400, COMP-4540, COMP-4960 or COMP-4990 (both 6.0 credit hour courses), plus one additional Computer Science course at the COMP-3XX0 or COMP-4XX0 level.
- (b) MATH-1020, MATH-1250 (or MATH-1260), MATH-1720 (or MATH-1760), MATH-1730, MATH-3940 (or MATH-3800) and STAT-2910 (or STAT-2920);
- (c) three courses from Arts, Languages or Social Sciences, with at least one from Arts/Languages and one from Social Sciences;
- (d) three courses at the 2XXX-4XXX level from Mathematics/Statistics or Computer Science (excluding **COMP-XXX7** COMP-2057, COMP-2077, COMP-2707, COMP-3057, COMP-3057);\*
- (e) seven other courses from any area of study, including Computer Science.

It is recommended that students pursuing a Multi-media specialization should pick 6 courses (in consultation with an academic advisor) from Visual Arts and Communication, Media and Film.
[...]

# Bachelor of Computer Science (Honours Applied Computing) (with and without Co-op) for Qualifying Ontario and Other College Diploma Holders

[....]

**Degree Requirements** 

Total courses: 25 courses

- (a) COMP-1000, COMP-1410, COMP-2120, COMP-2540, COMP-2560, COMP-2650, COMP-2660, COMP-3150, COMP-3220, COMP-3300, COMP-3340, COMP-3400, COMP-4150, COMP-4200, COMP-4220, COMP-4250 and COMP-4990 (6 credit course).\*
- (a) MATH-1250 (or MATH-1260), MATH-1720 (or MATH-1760), and STAT-2910

- (b) One course from Arts/Languages
- (c) Three other courses from any area of study, including Computer Science\*

No more than 7 courses can be at the 1000 level.

\*Excluding **COMP-XXX7**courses COMP-1047, COMP-1400, COMP-2057, COMP-2707, COMP-2750, COMP-3057, COMP-3670.

[...]

### **Bachelor of Science (Honours Computer Science with Software Engineering Specialization)**

[....]

**Degree Requirements** 

Total courses: forty.

- (a) COMP-1000, COMP-1400, COMP-1410, COMP-2120, COMP-2140, COMP-2310, COMP-2540, COMP-2560, COMP-2650, COMP-2660, COMP-2800, COMP-3110, COMP-3150, COMP-3220, COMP-3300, COMP-3540, COMP-3670, COMP-4110, COMP-4400, COMP-4540, COMP-4800, COMP-4960 or COMP-4990 (both 6.0 credit hour courses), plus one additional Computer Science course (excluding COMP-XXX7).
- (b) MATH-1250 (or MATH-1260), MATH-1720 (or MATH-1760), MATH-1730, MATH-1020, and STAT-2920 (or STAT-2910).
- (c) four courses, one from each category: (i) Dynamics and Psychology: PSYC-1150, PSYC-2180, PHIL-2280, PHIL-1290, (ii) Communication skills: CMAF-2210, DRAM-2100, ENGL-1001, (iii) Professionalism: PHIL-2210, PHIL-2240, GART-2090, ENGL-1005, and (iv) Business and Management: MKTG-1310, MGMT-2400, STEN-1000.
- (d) two courses from Arts, Languages or Social Sciences, including one from Arts/Languages and one from Social Sciences;
- (e) four additional courses from any area of study, including Computer Science.
- (f) one course at the 2XXX-4XXX level from Mathematics/Statistics or Computer Science (excluding **COMP-XXX7** COMP-2057, COMP-2077, COMP-2097, COMP-2097, COMP-3057, COMP-3077).

[....]

#### A.2 MINOR COURSE CHANGES REQUIRING ADDITIONAL RESOURCES OR AFFECTING DEGREE REQUIREMENTS

If this is a minor course and calendar change (usually noted on a Form E) requiring additional resources or affecting degree requirements, please provide the current course information and the proposed new course information by cutting and pasting from the current undergraduate or graduate web calendar and clearly marking deletions with strikethrough (strikethrough) and additions/new information with bolding and underlining. Examples of minor course changes include: deleting courses, course description changes, pre/anti/co- requisite changes, contact hour/lab requirement changes, course title changes, renumbering courses, and/or cross-listing courses. Minor course calendar changes, which do not require additional resources or do not affect degree requirements, should be submitted on a Form E.

N/A

#### **B. RATIONALE**

Please provide a rationale for the proposed change(s).

In all of our programs, all of the courses with last digit '7' are excluded from being counted as CS courses by using the wording COMP-XXX7. However, these two programs provide a list of courses and do not include COMP-2067 which should have been excluded as well.

#### B.1 Indigenous (First Nations, Métis, or Inuit) Content, Perspectives, or Material

The University of Windsor is committed to building and sustaining stronger, more meaningful inclusive partnerships with Indigenous students, scholars, and communities. Indigenization of curriculum takes place in a larger context, including a requirement to respond to the four Calls to Action in education of the Truth and

<u>Reconciliation Report</u> (2015) (page 1), the unique legal requirements of the <u>Constitution Act 1982</u> (Sections 25, 35), the provincial legal requirements of the <u>Ontario Human Rights Code</u>, 1990, and provincial legislation <u>Bill Pr36</u> (1967). In <u>revising this program</u>, **how** has consideration been given to incorporating Indigenous (First Nations, Métis, or Inuit) content, perspectives, or material into the curriculum?

Please consider these prompt questions and additional Resources including disciplinary examples:

- What **process** has your department/Faculty used to consider Indigenization?
- How have you considered the importance or relevance to the course/program?
- How has your department or faculty approached raising awareness for Indigenous knowledges in your area?
- What do the <u>TRC</u> and <u>University Principles</u> documents suggest relevant to your course?
- What have other similar courses/programs done that might be relevant to your course/program?
- In what ways could your course/program have flexibility to include new ways of learning, or content for Indigenous approaches or knowledges?
- What is your awareness of the history or background to approaches you are considering, such as the land acknowledgement? How have you developed your awareness?
- Which <u>literatures</u>, sources, or Indigenous Knowledge Holders have you consulted? (Please confirm you have permission to share any names, it may be helpful to have the person confirm the text if you will be submitting their name)
- Are you engaging in critical analysis of Settler Colonialism and/or Decolonization?
- Have you included the information in the other relevant areas in the PDC form such as learning outcomes and/or in the syllabus where appropriate?

The School of Computer Science recognizes the importance of engaging and collaborating with the Indigenous community in developing and implementing a suitable curriculum. The School works closely with the Faculty of Science that has recently recruited an expert in Indigenous-centred relationships who is a recognized Knowledge-Keeper in their community with the aim to build and develop new and innovative initiatives to further Indigenous-focused research co-production and lifelong learning. The Indigenous Knowledge Keeper will provide counsel to the Office of the Dean to create further space for Indigenous knowledge and partnerships in the Faculty of Science and across the University of Windsor. The Indigenous Knowledge Keeper will support the creation of an Indigenized space for Indigenous students, community members and allies to engage, learn and create.

The School of Computer Science has taken the following steps toward this goal:

- a) A land acknowledgment statement is now included in the course syllabus template for every Computer Science (COMP-XXXX) course.
- b) The School is actively reaching out to indigenous students and encouraging them to participate in the decision-making process, e.g., as student members in the curriculum committee and program representatives.
- c) The School has plans to work with the Knowledge Keeper to help reach out to the local indigenous community and their IT and digitization department in order to seek their input and engage them, e.g., through membership in advisory committees, collaboration on research and student projects which are relevant to this program.
- d) The School encourages instructors to include topics/discussions about indigenous issues where applicable. This for instance, includes course topics on indigenous knowledge included in the ethics course required by this program and course projects related to IT/digitization relevant to local Indigenous cases brought out by the local community.
- e) The School is looking forward to engaging with an expert in Indigenous-centred relationships within the Faculty of Science to develop relevant aspects of its curriculum further.

#### C. RESOURCES

# C.1 Resources In Support of the Revised Program and Resource Implications for Other Campus Units or Programs (QAF section 2.1.2.6)

Describe, in general terms, all faculty and staff resources (e.g., administrative, teaching, supervision) from all affected areas/departments currently available and actively committed to support the revised program. Please do not name specific individuals in this section. Describe the impact of the planned utilization of existing human, physical and financial resources (within and outside the unit) on other existing programs in the department or at the university. Provide an assessment of the reliance of the revised program on existing resources from other campus units and include evidence that there are adequate resources available and committed to the revised program to sustain the quality of scholarship produced by undergraduate students as well as graduate students' scholarship and research activities. Consider, for example: faculty resources (within and outside the unit), existing courses (within and outside the unit), equipment or facilities outside the proposer's control, external resources requiring maintenance or upgrading using external resources, staff support, library, teaching and learning support, information technology support, laboratory access, student support services, space, equipment, facilities, GA/TA

N/A

# C.1.1 Extent of Reliance on Adjunct, Limited-term, and Sessional Faculty in Delivering the Revised Program (QAF section 2.1.2.6)

Describe the area's expected reliance on, and the role of adjunct, limited-term, and sessional faculty in delivering the revised program and the associate plans to ensure the sustainability of the revised program and quality of the student experience.

N/A

# C.2 Graduate Faculty Qualifications and Supervisory Loads (FOR GRADUATE PROGRAMS ONLY) (QAF section 2.1.2.7)

Explain how supervisory loads will be distributed, and describe the qualifications and appointment status of faculty who will provide instruction and supervision in the revised program.

N/A

# C.3 Financial Assistance for Graduate Students (where appropriate) (FOR GRADUATE PROGRAMS ONLY) (QAF section 2.1.2.7)

Where appropriate to the revised program, provide evidence that financial assistance for graduate students will be sufficient to ensure adequate quality and numbers of students.

N/A

#### <u>C.4 Anticipated New Resources</u> (QAF sections 2.1.2.6)

List all **anticipated new resources** originating from within the area, department or faculty (external grants, donations, government grants, etc.) and committed to supporting the revised program.

N/A

#### **C.5 Planned Reallocation of Resources and Cost-Savings**

Describe all opportunities for <u>internal reallocation of resources and cost savings</u> identified and pursued by the area/department in support of the revised program. (e.g., streamlining existing programs and courses, deleting courses, etc.)

N/A

### C.6 Additional Resources Required - Resources Requested (QAF section 2.1.2.6f)

Describe all **additional faculty, staff and GA/TA resources** (in all affected areas and departments) required to run the revised program. If not applicable, write n/a.

Faculty:	N/A
Staff:	N/A
GA/TAs:	N/A

# <u>C.6.1 Additional Institutional Resources and Services Required by all Affected Areas or Departments (QAF section 2.1.2.6f)</u>

Describe all **additional institutional resources and services** required by <u>all affected</u> areas or departments to run the revised program, including library, teaching and learning support services, student support services, space and facilities, and equipment and its maintenance. If not applicable, write n/a.

Library Resources and Services:	N/A
Teaching and Learning Support:	N/A
Student Support Services:	N/A
Space and Facilities:	N/A
Equipment (and Maintenance):	N/A

#### **D.1 Form History** (Leave blank if there have been no changes. Changes can also be noted directly in the Workflow)

Date of Modification	Approval Body Modifying	Reason for Modification

## University of Windsor Program Development Committee

### \*5.3: Master of Engineering Management Program

Item for: **Information** 

#### Background:

In May 2022 a new course was added to the Master of Engineering Management program.

However, at that time it was not clarified in the proposal that the new course GENG-8060 will be replacing ELEC-8900 (Section 40) Technology Entrepreneurship as a non-core course elective in the Master of Engineering Management Program.

Master of Engineering Management Program

[...]

**Non-core Courses** 

Students select 1 non-core course from each of the following course groups: C. Non-core Engineering Courses Choose One:

INDE-8390. Work Organization: Analysis and Design INDE-8420. Supply Chain Management and Logistics ENVE-8500. Sustainability: Principles and Practice

ELEC-8900 (2). Electronic Commerce

ELEC 8900 (40). Technology Entrepreneurship GENG 8060: Strategic Entrepreneurial Management

## University of Windsor Program Development Committee

\*5.4 Chemistry and Biochemistry - Summary of Minor Course and Calendar Changes (Form E)

Item for: Information

Forwarded by: Faculty of Science

**Form History** (Leave blank if there have been no changes. Changes can also be noted directly in the Workflow)

Date of Modification	Approval Body Modifying	Reason for Modification
June 10, 2022		Updates to course content to include state-of-the-art methods and adapt the content to address real-world, contemporary problem-solving techniques better. Updates to add missing learning outcomes and remove learning outcomes that are not evaluated in the course.

#### INSTRUCTIONS ARE PROVIDED IN SHADED AREAS. DO NOT WRITE IN SHADED AREAS.

ALL SECTIONS OF THIS FORM <u>MUST</u> BE COMPLETED. **LEARNING OUTCOMES MUST BE PROVIDED FOR LISTED COURSES WHERE**:

I. THERE ARE **NO OFFICIAL LEARNING OUTCOMES FOR THE COURSE** IN THE PDC/SENATE RECORD (check the CuMA database at <a href="https://ctl2.uwindsor.ca/cuma/public/">https://ctl2.uwindsor.ca/cuma/public/</a>)

OR

II. THERE ARE CHANGES TO THE COURSE LEARNING OUTCOMES

OR

III. IT HAS BEEN 5 YEARS SINCE LEARNING OUTCOMES FOR THE COURSE WERE LAST SUBMITTED TO PDC/SENATE (check the CuMA database for the date of last submission at https://ctl2.uwindsor.ca/cuma/public/)

### Confirmation of Consultation with AAUs That Will Be Affected, in Major Ways, by the Changes

				Supportive	
AAU Consulted	AAU Head/Directors	Date Consulted		Yes	No
Chemistry & Biochemistry	Dr. James Gauld	November 26, 2021	_	Х	
Please specify to which calendar [Undergraduate or Graduate] the changes will be made. Include the effective date* [Fall, Winter, Spring, 20XX].  *(subject to timely and clear submission) These changes require no new resources.				2023	

#### A. Proposed Course Calendar Revisions

Please provide the current and the proposed new course information by cutting and pasting from the current undergraduate or graduate online calendar (<u>www.uwindsor.ca/secretariat/calendars</u>) and clearly marking deletions with strikethrough (<u>strikethrough</u>) and additions/new information with bolding and underlining.

For contact hour/laboratory requirement changes which do not always appear in the calendar, please type in the current information and clearly mark deletions with strikethrough (strikethrough) and additions/new information with bolding and underlining.

**Example:** CHEM-1001. University Senates — Role and Power—This course explores the history, role, and power of Senates in Canadian universities. (Also offered as BIOC-1001.) (Prerequisite: CHEM-1000.) 2 lecture hours and 1 tutorial hour per week 3 lecture hours/week

#### BIOC-4010- Bioinformatics/Genomics/Proteomics.

Introduction to informatics, flow of genetic information from nucleic acid sequence to amino acid sequence, gene expression profiling at the mRNA level, gene micro arrays, application of genomic database (Swissprot, gene bank). Introduction to functional genomics, proteomics, protein profiling, 2D gel electrophoresis, mass spectrometry of proteins eluted from 2D gels, peptide mass fingerprinting, comparative proteome analysis, application of 2D protein database and MS peptide database, high throughput analysis of protein-protein interactions, antibodies and phage-display technologies for protein micro array analysis, application of the biomolecular interaction network database (BIND) to find and predict protein protein interactions. Bioinformatics is an interdisciplinary research area that uses computer science technology to efficiently store, retrieve, and analyze information related to biomacromolecules, such as nucleic acids and proteins. This course provides an introductory overview of essential bioinformatics algorithms and hands-on experience with bioinformatics software. It will discuss the organization of biomolecular data, and the interpretation of the data through evidence-based reasoning. The course is designed for students in biochemistry and biology-related programs who do not have a computer science background but have an interest in pursuing a bioinformatics-related career or will be working on a research project involving the functions of genes, proteins, and cells. (Prerequisite: BIOC-3130 BIOC-2010/2015 or BIOM-3500 BIOM-2131/2033.) (2 lecture hours and 1.5 computer lab hours per week.)

#### A.1 Indigenous (First Nations, Métis, or Inuit) Content, Perspectives, or Material

The University of Windsor is committed to building and sustaining stronger, more meaningful inclusive partnerships with Indigenous students, scholars, and communities. Indigenization of curriculum takes place in a larger context, including a requirement to respond to the four Calls to Action in education of the <u>Truth and Reconciliation Report</u> (2015) (page 1), the unique legal requirements of the <u>Constitution Act 1982</u> (Sections 25, 35), the provincial legal requirements of the <u>Ontario Human Rights Code</u>, 1990, and provincial legislation <u>Bill Pr36</u> (1967). In In revising this/these course(s), **how** has consideration been given to incorporating Indigenous (First Nations, Métis, or Inuit) content, perspectives, or material into the curriculum?

Please consider these prompt questions and additional Resources including disciplinary examples:

- What process has your department/Faculty used to consider Indigenization?
- **How** have you considered the importance or relevance to the course/program?
- How has your department or faculty approached raising awareness for Indigenous knowledges in your area?
- What do the TRC and University Principles documents suggest relevant to your course?
- What have other similar courses/programs done that might be relevant to your course/program?
- In what ways could your course/program have flexibility to include new ways of learning, or content for Indigenous approaches or knowledges?
- What is your awareness of the history or background to approaches you are considering, such as the land acknowledgement? How have you developed your awareness?
- Which <u>literatures</u>, sources, or Indigenous Knowledge Holders have you consulted? (Please confirm you have permission to share any names, it may be helpful to have the person confirm the text if you will be submitting their name)
- Are you engaging in critical analysis of Settler Colonialism and/or Decolonization?
- Have you included the information in the other relevant areas in the PDC form (such as learning outcomes)
  or in the course syllabus where appropriate?

The Department of Chemistry and Biochemistry, led by the current Head of Department, has started conversations with members of the University's Aboriginal Education Council (AEC) to create a knowledge base that can support not only appropriate curriculum changes but also identify indigenous examples which faculty can implement to contextualize course content. The Department, in partnership with the members of the University's AEC, will critically review its programs to identify aspects of various courses which have direct application or relevance to our indigenous Page 93 of 100

communities. These might include examples drawn from historical indigenous knowledge of the natural world and/or material relevant to contemporary indigenous societies. Appropriate examples will first be discussed with the AEC prior to integration into the curriculum to ensure the topic and content are incorporated in a fashion appropriate to our indigenous cultures. The Department is actively striving to increase the participation of indigenous peoples as part of a process of engaging with all under-represented groups.

#### A.2 Experiential Learning Categories

Does the proposed course revision inc	lude the addition or de	eletion of an experiential	learning component? For
definitions go to: https://www.uwindso	or.ca/cces/1423/experied	ntial-learning-definitions	

Experiential Learning Categories	Addition	Deletion
applied research		
capstone		
Clinic		
со-ор		
community service learning		
creative performance or exhibit (for visual and performing arts)		
entrepreneurship		
field experience or site visit		
field work		
industry/community consulting project		
interactive simulations		
internship – full-time		
internship – part-time		
professional practicum		

#### B. Learning Outcomes for the Courses Listed Above

Labs

Please complete the following table. State the specific learning outcomes that make up the goal of the course (what will students know and be able to do at the end of this course?) and link the learning outcomes to the Characteristics of a University of Windsor Graduate outlined in "To Greater Heights" by listing them in the appropriate rows. Please note that a learning outcome may link to more than one of the specified Characteristics of a University of Windsor Graduate, and that a single course might not touch on each of the Characteristics. If a specific learning outcome is not applicable for the course, please enter N/A or not applicable. Proposers are strongly encouraged to contact the Centre for Teaching and Learning for assistance with the articulation of learning outcomes. Where there are changes to the learning outcomes, please clearly mark deletions with strikethrough (strikethrough) and additions/new information with bolding and underlining. COPY AND PASTE THE FOLLOWING ROW and TABLE, AND COMPLETE THEM FOR EACH COURSE LISTED ABOVE.

CC	COMPLETE THIS TABLE FOR EACH COURSE LISTED IN SECTION "A" ABOVE.				
СС	OURSE NUMBER AND TITLE:  BIOC-4010- Bioinformatics/Genomics/Proteomics  (Last updated October 21, 2020 . These are revised learning outcomes)				
SE	LECT ONE OF THE FOLLOWING:				
I.	There are no official learning o in the PDC/Senate record. (che at https://ctl2.uwindsor.ca/cu	eck the CuMA database	The provide learning outcomes for the course by		
II.	There are changes to the cour	se learning outcomes	x Provide learning outcomes for the course by completing the Learning Outcomes Table below.		
III.	It has been 5 years since lear course were last submitted t the CuMA database for the da https://ctl2.uwindsor.ca/cuma	co PDC/Senate. (check te of last submission at	Provide learning outcomes for the course by completing the Learning Outcomes Table		
IV.	Learning Outcomes have been years and no revisions are bein	•	Learning outcomes need not be submitted. PROVIDE DATE LAST REVIEWED BY PDC/SENATE then go to the next course:		
			(check CUMA database at: https://ctl2.uwindsor.ca/cuma/public/)		

## **LEARNING OUTCOMES TABLE**

Course Learning Outcomes	Characteristics of a University of Windsor
This is a sentence completion exercise.	Graduate
At the end of the course, the successful student will know and be able	A U of Windsor graduate will have the
<u>to:</u>	ability to demonstrate:
A.	A. the acquisition, application and
Research and gather information about new genes or diseases from	integration of knowledge
online bioinformatics databases to determine what data is readily	
available. (Also applies to B, C, and I)	
• Formulate plans to study the functions of genes or their products	
based on bioinformatics analysis. (Also applies to B and H)	
Explain flow of information in building a living system from	
DNA to protein to organelle and organs.	
Discuss the control of gene expression at the RNA and	
protein level.	
B.	B. research skills, including the ability to
• Carry out sequence and structure analyses using bioinformatics	define problems and access, retrieve
software with appropriate parameters and settings.	and evaluate information (information
• Retrieve information and carry out comprehensive analyses of	literacy)
genes or sets of genes and their products using online	
bioinformatics databases or servers. (Also applies to C and D).	
Use DNA sequence information to identify source of	
unknown contaminations, pathogens as well as species	
	Page 95 of 100

Course Learning Outcomes	Characteristics of a University of Windsor
This is a sentence completion exercise.	Graduate
At the end of the course, the successful student will know and be able to:	A U of Windsor graduate will have the ability to demonstrate:
identification.	asincy to demonstrates
Use bioinformatics methods to gain information of diseases	
and personalized therapies.	
and personalized enerapies.	
C.	C. critical thinking and problem-solving
Formulate the strategies to tackle new outbreaks of	skills
diseases-develop novel vaccines and antibiotics. (Also applies to H).	
Propose novel method(s) for the detection and treatment of	
various systemic diseases. (Also applies to H).	
D.	D. literacy and numeracy skills
Utilize version control systems to keep track of changes and share	Dr meraey and nameraey skins
data	
Write simple script for processing biological data and	
bioinformatics analysis	
Critically analyze how biological data are efficiently organized and	
retrieved	
<ul> <li>Identify trends in the latest algorithms and software development</li> </ul>	
for bioinformatics. (Also applies to I).	
E.	E. responsible behaviour to self, others
	and society
Critically analyze issues involving ethics, challenges in personal modified data regions and data regressively.	and society
medical data privacy, open science, and data reproducibility in	
bioinformatics. (Also applies to C).	
F.	F. interpersonal and communications
Discuss and respectfully respond to questions of their peers.	skills
G.	G. teamwork, and personal and group leadership skills
11	·
H.	H. creativity and aesthetic appreciation
Analyze data in a concise approach that can be automated using	
scripts (also applies to C and D).	
Organize biological data efficiently using computer database	
principles. (Also applies to A).	
	La discalation and the second
	I. the ability and desire for continuous
Articulate the importance of genomics and proteomics information	learning
in health_related problems such as cancer, obesity, cardiovascular	
diseases and/or infectious diseases. (Also applies to A).	

## University of Windsor Program Development Committee

\*5.5 Social Work - Summary of Minor Course and Calendar Changes (Form E)

Item for: Information

Forwarded by: Faculty of Arts Humanities and Social Sciences

**Form History** (Leave blank if there have been no changes. Changes can also be noted directly in the Workflow)

Date of Modification	Approval Body Modifying	Reason for Modification
Prior to June 2022	FAHSS council	The field of substance abuse has moved past just working with "addictions" to more broadly work with substance misuse. This way of framing the issue allows for a broader range of intervention approaches, including harm reduction.

Please specify to which calendar [Undergraduate or Graduate] the changes will be made.	Undergraduate
Include the effective date* [Fall, Winter, Spring, 20XX].	Fall 2022
*(subject to timely and clear submission) These changes require no new resources.	

#### A. Proposed Course Calendar Revisions

Please provide the current and the proposed new course information by cutting and pasting from the current undergraduate or graduate online calendar (<a href="www.uwindsor.ca/secretariat/calendars">www.uwindsor.ca/secretariat/calendars</a>) and clearly marking deletions with strikethrough (<a href="strikethrough">strikethrough</a>) and additions/new information with <a href="bolding and underlining">bolding and underlining</a>.

For contact hour/laboratory requirement changes which do not always appear in the calendar, please type in the current information and clearly mark deletions with strikethrough (<a href="strikethrough">strikethrough</a>) and additions/new information with <a href="bolding and underlining">bolding and underlining</a>. Example: 03-101. University Senates — Role and Power This course explores the history, role, and power of Senates in Canadian universities. (<a href="Also offered as 04-101.">Also offered as 04-101.</a>) (Prerequisite: 03-100.) 2 lecture hours and 1 tutorial hour per week 3 lecture hours/week

#### SWRK-3600. Social Work and Addictions-Substance Misuse

Provides social work students with practice knowledge concerning the etiology, implications, and treatment issues related to addictions and substance abuse. Topics will include the history and consequences of addictions and substance abuse, addictions and the family, special at-risk groups, social policy and legal issues, medical and social-psychological aspects, and current research issues as well as the implications for intervention. (Open to senior students. Social Work Majors and Combined Majors in Social Work will be given registration priority.)

#### A.1 Indigenous (First Nations, Métis, or Inuit) Content, Perspectives, or Material

The University of Windsor is committed to building and sustaining stronger, more meaningful inclusive partnerships with Indigenous students, scholars, and communities. Indigenization of curriculum takes place in a larger context, including a requirement to respond to the four Calls to Action in education of the <u>Truth and Reconciliation Report</u> (2015) (page 1), the unique legal requirements of the <u>Constitution Act 1982</u> (Sections 25, 35), the provincial legal requirements of the <u>Ontario Human Rights Code</u>, 1990, and provincial legislation <u>Bill Pr36</u> (1967).

In In revising this/these course(s), **how** has consideration been given to incorporating Indigenous (First Nations, Métis, or Inuit) content, perspectives, or material into the curriculum?

Please consider these prompt questions and additional Resources including disciplinary examples:

• What **process** has your department/Faculty used to consider Indigenization?

- How have you considered the importance or relevance to the course/program?
- How has your department or faculty approached raising awareness for Indigenous knowledges in your area?
- What do the TRC and University Principles documents suggest relevant to your course?
- What have other similar courses/programs done that might be relevant to your course/program?
- In what ways could your course/program have flexibility to include new ways of learning, or content for Indigenous approaches or knowledges?
- What is your awareness of the history or background to approaches you are considering, such as the land acknowledgement? How have you developed your awareness?
- Which literatures, sources, or Indigenous Knowledge Holders have you consulted? (Please confirm you have permission to share any names, it may be helpful to have the person confirm the text if you will be submitting their name)
- Are you engaging in critical analysis of Settler Colonialism and/or Decolonization?
- Have you included the information in the other relevant areas in the PDC form (such as learning outcomes) or in the course syllabus where appropriate?

The BSW program is required, by our accreditors, to analyze and envision ways to decrease barriers for equity deserving groups, including Indigenous communities and individuals. We have undertaken a process to change our learning outcomes for all courses (including this one) to ensure they reflect this commitment. The School as a whole had a workshop on indigenization from the Centre for Indigegogy at Wilfrid Laurier University Faculty of Social Work. Additionally, we are creating a resource list for instructors.

### A.2 Experiential Learning Categories

apply:

Does the proposed course revision include the addition or deletion of an experiential learning component? For definitions go to: https://www.uwindsor.ca/cces/1423/experiential-learning-definitions

No - the revision(s) does (do) not include the addition or deletion of experiential learning component(s).

Experiential Learning Categories	Addition	Deletion
applied research		
capstone		
Clinic		
со-ор		
community service learning		
creative performance or exhibit (for visual and performing arts)		
entrepreneurship		
field experience or site visit		
field work		
industry/community consulting project		
interactive simulations		
internship – full-time		
internship – part-time		
professional practicum		

research project	
study abroad	
Labs	

#### B. Learning Outcomes for the Courses Listed Above

Please complete the following table. State the specific learning outcomes that make up the goal of the course (what will students know and be able to do at the end of this course?) and link the learning outcomes to the Characteristics of a University of Windsor Graduate outlined in "To Greater Heights" by listing them in the appropriate rows. Please note that a learning outcome may link to more than one of the specified Characteristics of a University of Windsor Graduate, and that a single course might not touch on each of the Characteristics. If a specific learning outcome is not applicable for the course, please enter N/A or not applicable. Proposers are strongly encouraged to contact the Centre for Teaching and Learning for assistance with the articulation of learning outcomes. Where there are changes to the learning outcomes, please clearly mark deletions with strikethrough (strikethrough) and additions/new information with bolding and underlining. COPY AND PASTE THE FOLLOWING ROW and TABLE, AND COMPLETE THEM FOR EACH COURSE LISTED ABOVE.

	COMPLETE THIS TABLE FOR EACH COURSE LISTED IN SECTION "A" ABOVE.				
СС	COURSE NUMBER AND TITLE: SWRK- 3600. Social Work and Addictions				
	(Note: These are new learning outcomes.)				
SE	SELECT ONE OF THE FOLLOWING:				
I.	There are no official learning of course in the PDC/Senate recordatabase at <a href="https://ctl2.uwing.nc">https://ctl2.uwing.nc</a>	ord. (check the CuMA	Provide learning outcomes for the course by completing the Learning Outcomes Table below.		
II.	There are changes to the cour	se learning outcomes	x Provide learning outcomes for the course by completing the Learning Outcomes Table below.		
III.	It has been 5 years since learn course were last submitted to the CuMA database for the da at <a href="https://ctl2.uwindsor.ca/cu">https://ctl2.uwindsor.ca/cu</a>	PDC/Senate. (check te of last submission	Provide learning outcomes for the course by completing the Learning Outcomes Table below.		
IV.	Learning Outcomes have been years and no revisions are bein	•	Learning outcomes need not be submitted. PROVIDE DATE LAST REVIEWED BY PDC/SENATE then go to the next course: (check CUMA database at: <a href="https://ctl2.uwindsor.ca/cuma/public/">https://ctl2.uwindsor.ca/cuma/public/</a> )		

#### **SWRK-3600.Social Work and Addictions**

Learning Outcomes	Characteristics of a University of Windsor
This is a sentence completion exercise. At the end of this	Graduate
program, the successful student will know and be able to:	A UWindsor graduate will have the ability to
	demonstrate:
A.	A. the acquisition, application and integration of
Articulate the theories that guide our understanding of those	knowledge
who misuse substances.	
Identify models of intervention relevant to support of those	
who misuse substances.	

Learning Outcomes	Characteristics of a University of Windsor
This is a sentence completion exercise. At the end of this	Graduate
program, the successful student will know and be able to:	A UWindsor graduate will have the ability to
	demonstrate:
B. Identify the service needs, access issues, gaps, and policy issues related to people affected by substance misuse, with particular attention to individuals and groups facing barriers, including but not limited to Francophone, Black and Indigenous individuals and communities.	B. research skills, including the ability to define problems and access, retrieve and evaluate information (information literacy)
C. Recommend and describe multi-level intervention and support strategies relevant to an assessed situation of substance misuse (also relevant to H).	C. critical thinking and problem-solving skills
D.	D. literacy and numeracy skills
E. Create strategies to address inequities facing those affected by substance misuse in relation to gaps, access, and barriers to service.	E. responsible behaviour to self, others and society
F. Apply a Person In Environment lens to assess a situation of substance misuse.	F. interpersonal and communications skills
G. Apply a social justice lens to identify support strategies for an individual facing substance misuse	G. teamwork, and personal and group leadership skills
Н.	H. creativity and aesthetic appreciation
I.	I. the ability and desire for continuous learning