Bachelor of Information Technology
Update on Unit Response to External Reviewers' Report & Action Plan
Programs Being Reviewed: Optical Systems and Sensors
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Approved by Dean: Larry Kostiuk/Jan. 7th, 2025

Note: This document is made available for public posting on the Vice- Provost's website.

***** Denotes items that SQAPC would like the unit to pay particular attention to based on their past review of the original action item.**

External Reviewer Recommendation	Original Action Item and Unit response	Owner & Timeline	Progress Update DATE	Have calendar changes been initiated or completed (Not applicable/Yes/No), if Yes, when
1. Diversify the Program Advisory Committee in terms of expertise, industrial sectors, and geographical representation. (Concern)	Discuss the recommendation of Diversity with the current Program Advisory Committee (PAC) members of the OSS program and put forward a plan to reach out to experts (from different sectors within the industry of photonics, optical systems and sensors, autonomous vehicles, ML/DL/AI, telecom and high-tech) to join the PAC	Applied Science & Environmental Technology (ASET), Algonquin College This will be included as an agenda item during the Fall 2021 PAC meeting and will be included as a follow-up action item to be completed no later than December 2021.	This has been discussed at PAC meetings. The PAC has been further strengthened with the addition of one OSS student alumni, including a female alumna, and the Director General of the Canada Photonics Fabrication Centre, NRC (CPFC). This new composition enhances diversity by incorporating different perspectives and backgrounds, enriching the program's strategic direction. The involvement of a female OSS student alumni ensures that former students' experiences and feedback, particularly from underrepresented groups, are integrated into decision-making processes. Meanwhile, the inclusion of the Research Director provides valuable expertise on current research trends and innovations, ensuring the program remains aligned with cutting-edge developments. This year, the PAC will also add new members from the Photonics, Sensors, and AI industries, further strengthening the diversity of industry representation.	Yes Female OSS Student alumni: September 9, 2022 Director General, CPFC, NRC: January 17, 2022

2. Review the course sequence relevant to the development of simulation and programming skills to ensure it stays current with emerging technologies and knowledge. (Concern)	1. The course OSS2009 will be replaced with a title/description to match NET2013 (however, OSS2009 will still taught at Algonquin as to not affect the transfer of funds) 2. The first sentence in NET2013 will be modified to better describe the course. 3. Python will be explicitly introduced into OSS3013 Software Design for OSS, as per the description. 4. BIT1204 Electromagnetism & Modern Physics will be transferred to be a course for OSS students only (rather than taught with other students) 5. Merging BIT2001 Introduction to Business and BIT2002 Marketing in the IT Sector to make one course. This will allow to have a space for a new 4th year level course OSS4xxx Machine Learning and Deep Learning; which will be a prerequisite to the current Computer Vision course.	BIT-OSS 2021-2022 academic year. D-CSIT	1. Based on the reviewers' comments, the course title and description for OSS 2009 have been updated. A calendar change reflecting these updates was approved in April 2024. Below are the details of the new course title and description as well as justification of this calendar change: ***OSS2009*** ***Microcontrollers for Sensing Applications*** *Optical Systems & Sensors* *Year 2 Fall (0.5 Credits) | Algonquin College* ***Course Description:*** *Introduction to microcontrollers emphasizing on their applications in sensing systems. Topics include foundational concepts of microcontroller architecture, instruction sets, sensor interfacing, and programming techniques including Python for embedded programming; brief introduction to assembly and machine language. Students gain practical experience for real-world applications in automation and embedded systems development.* ***Prerequisites:*** *BIT 2400* ***Justification****:* *The transition from the "Assembly and Machine Language" course to "Microcontrollers for Sensing Applications" course reflects a broader scope and contemporary relevance. While the Assembly and Machine Language course focus on low-level programming, the new course incorporates higher-level concepts and practical applications, particularly in sensing systems.* *The new course will touch briefly on assembly and machine language as an introduction since this would be relevant to the central processing unit of a microcontroller.* *This shift recognizes the growing importance of microcontrollers in various fields, offering*	1. Yes, May 2024

			students a more comprehensive understanding and practical skills applicable to real-world scenarios, such as automation and embedded systems development. 2. The requested modification is not applicable since we did not replace OSS2009 with NET 3013 and instead we modified the course outline. 3. The course description is updated and included the python programming language. The modified course description is as follow: ***OSS 3013 [0.5 credit]*** ***Software Design for Optical Systems and Sensors*** *Provides students with knowledge and expertise to design and develop complex software systems and programs for common optical systems and sensors using Python. Topics include system and requirement analysis, algorithms, component identification, common design patterns, and working with reusable components.* *Includes: Experiential Learning Activity* *Precludes additional credit for PLT 3013 (no longer offered).* *Prerequisite(s): BIT 2400.* *Lectures three hours a week, tutorial two hours a week.* 4. BIT1204: This has been implemented, and the course is now exclusively available to OSS students. **5.** The requested changes have been implemented. OSS 2001 has been retained, while BIT 2002 has been removed.	2. Not Applicable 3. Yes, May 2022 4. Yes 5. Yes, May 2022

			Additionally, a new course, **OSS 4005: Introduction to Deep Learning** has been added. The course description for OSS 4005 is as follows: ***OSS 4005: Introduction to Deep Learning*** *Introduction to classification and regression. Optimization, vectorization, gradient descent, cost, loss and activation functions. Introduction and basics to AI, Artificial Neural Networks, forward and backward propagation, Multi Layer Perceptron, and other types of Deep Neural Network models, their applications in multimedia, networks, finance, etc.* *Includes: Experiential Learning Activity* *Also listed as IRM 4005.* *Prerequisite(s): BIT 2000 and BIT 2400.* *Lectures three hours a week.* *It should be noted that other calendar changes have been made in 2021, 2022, and 2023 for some course descriptions, requests and prerequisites of some courses, and modification of titles of some course.	
6. Examine the opportunity to include training in professional skills in general, and Ethics in particular. (Opportunity)	These skills will be added as learning outcomes where possible to the course OSS3009 Project Management. Rename the course to: Project Management and Professional Skills	D-CSIT	This opportunity has not been made yet. However, we will discuss this opportunity with the faculty teaching OSS3009 to explore the inclusion of ethical aspects in project management within the course. The suggestion to rename the course to "Project Management and Professional Skills" will also be considered as part of this discussion to ensure the course adequately addresses both professional skills and ethics as key learning outcomes.	No, we plan to implement the calendar change during the 2025–2026 academic year.
7. Establish a program committee involving program coordinators from Carleton University and Algonquin College, and student representatives to perform program monitoring and establish a systematic feedback mechanism. (Weakness)	The OSS has already a Program Council which consists of Student Representatives (1st y, 2nd y, 3rd y, and 4th y) OSS Coordinator (AC), and ASET Department Chair.	Applied Science & Environmental Technology (ASET), Algonquin College	The OSS Coordinator (AC), the OSS Coordinator (CU), the ASET Department Chair, and the CSIT Director (CU) have been members of the Program Advisory Committee (PAC) since the inception of the OSS program (formerly Photonics and Laser Technology - PLT) in 2012.	Yes academic years: 2021/22, 2022/23, 2023/24, & 2024/25, and will be in 2025/26.

	During the first half of every semester, the BIT-OSS class representative attends a Program Council meeting (attended by the Chair, ASET and Program Coordinator, BIT-OSS) to provide feedback regarding their experience in courses To meet this recommendation, the OSS Coordinator and CSIT-Director (CU) can be added to the Program Council. The minutes of the meetings will also be provided	Fall 2021	In addition, the OSS program has had a Program Council since 2012, which is composed of elected student representatives from the 1st, 2nd, 3rd, and 4th years, the Academic Chair, and the Program Coordinator. During Program Council meetings, students provide feedback, raise concerns, and suggest improvements regarding their experiences in the program. These discussions are aimed at resolving any issues and improving the overall student experience. Meeting minutes, along with any issues raised, are shared with the OSS Coordinator (CU), the ASET Department Chair, and the CSIT Director (CU) for further review and resolution. To strengthen this process and address the recommendation, it is suggested that the OSS Coordinator (AC) and the CSIT Director (CU) attend the Program Council meetings. This will promote a more comprehensive and integrated approach to program monitoring, feedback collection, and continuous improvement.	
8. Experimental training must adapt quickly within this rapidly evolving high technology field. A plan should be developed for the periodic renewal of laboratory equipment and course material to support this key advantage of the program. (Concern)	. BIT-OSS course outlines delivered by AC are regularly reviewed by the Program Advisory Committee (PAC) and the Joint Advisory Committee (JAC) and updated to ensure relevance to emerging industry trends. Some of the lab equipment and tools in the photonics labs (room T329, T332, T129) are at various states in their operational lifecycle and several pieces of equipment are in need of maintenance. The plan is to: 1. Continue to foster industry partnerships in order to receive equipment donations and upgrades.	Applied Science & Environmental Technology (ASET), Algonquin College •2021-2022 academic year (Action items 2,3) •Ongoing (Action item 1)	**Curriculum and course materials:** On annual basis, the Program Advisory Committee (PAC) is involved in helping and ensuring the OSS program is providing high-quality curriculum and equipping learners and graduates with the skills and training the marketplace requires. As the formal five-year program quality assurance process, PAC provides regular program evaluation, review, and feedback to OSS Curriculum. PAC also provides review to identify necessary changes for program courses, course descriptions or outlines that serve the needs of students, employers, and the community. Example of course changes, refer to item #2 in this document, see above.	Yes academic years: 2021/22, 2022/23, 2023/24, & 2024/25, and will be in 2025/26.

	2. Create a 5-year capital equipment management plan to forecast capital expenditures. 3. Create an ongoing preventative maintenance schedule in order to keep existing equipment in working order.		Laboratory equipment: Our labs are equipped with cutting-edge technology with continuous annual investments in maintenance, renewal, and upgrade. These efforts are part of our ongoing commitment to providing students with access to the best resources and maintaining a world-class learning environment. 1. **Ciena Optophotonics Lab (room T139)**: we are particularly proud of this Lab which houses approximately $6M worth of Optical Communication Networks equipment. This lab is the only one of its kind in any educational institution. Ciena not only supports the lab but also upgrades and maintains it on a regular basis each year. In addition, Algonquin College continues to invest in purchasing additional equipment to enhance the lab, ensuring it remains at the forefront of optical communication technology. 2. **Advanced Optics & Laser Lab (room T329)**: provide students hands-on experience to a wide range of lasers, light, laser interaction, and associated measurement equipment. It is worth of $2M system equipment. 3. **Optics & Imaging Lab/Optical Fiber Devices Lab /Physics Lab (room T332)**: 12+10 working on stations equipped with high quality optical components, tools, and lasers devices. It is worth of $1.5M system equipment. To maintain the update and the quality of the OSS curriculum, and upgrading the lab equipment, we have taken several proactive steps, which include:	

			• Strengthening our industry partnerships, which have led to equipment donations and upgrades, helping to maintain the high standard of our state-of-the-art labs. • Creating a comprehensive 5-year capital equipment management plan to forecast future capital expenditures and prioritize necessary equipment updates. • Implementing an ongoing preventative maintenance schedule to ensure all equipment is kept in optimal working condition. • The College put additional money $231,347.00 allocated for upgrading the lab equipment during the last 4 academic years (2021/22, 2022/23, 2023/24, and 2024/25). For 2025/26 academic year, the estimated amount will be around $70,000-$100,000.00. ,	
9. Include one or two elective technical courses in the final year to allow students deeper learning in one aspect, e.g., hardware vs software, or to acquire a specialization in an application area. (Opportunity)	Currently the curriculum is too packed to support electives; students wishing to specialize can do so in capstone project.	N/A	No changes have been made in this regard. There is no space in the program, and it is not financially efficiency in this regard.	No
10. Establish a plan to ensure that students who have seen their curriculum most affected by the pandemic are able to catch up on practical training with hands-on experiments. (Concern)	Algonquin College initially created a plan to host students at a lab Bootcamp in the month of May 2021 for the 1st year students to come in groups to the lab in person and conduct hands-on lab experiments for the courses: OSS1003 and OSS1005. Similarly, for the 2nd year students to conduct hands-on lab experiments for the courses: OSS2002 OSS2003 and OSS2006. Due to the Ontario Government stay-at-home order, there is a plan to hold the	Applied Science & Environmental Technology (ASET), Algonquin College	Due to COVID and no in-person classes, decision has been made at OSS PAC meeting on Feb 22, 2021, to organize labs bootcamp. Algonquin put together a skills bootcamp. A condensed hands-on training was provided to the students will be ready to continue their studies in the fall 2021 and winter 2022. **Labs bootcamp:** **In-class Labs for 1st Year (current 2nd year) OSS Students:**	Yes January 6 and January 7, 2022 (8:30 -5:00 pm)

	Bootcamp in the Fall or Winter term 2021/2022. Currently Algonquin will hold labs in person.		- 2 labs (OSS1003 Optics/Optical Fibers I (Principles)), every lab 2 hours for 10 student per group (there were 2 groups) - 2 labs (OSS1005 Introduction to Optics), every lab 2 hours for 10 student per group (there were 2 groups) Date: January 6 and January 7, 2022 (8:30 -5:00 pm) Lab room: T332, T-Building, Algonquin College **In-class Labs for 2nd Year (current 3rd year) OSS Students:** - 2 labs (OSS2003 Laser Systems), every lab 2 hours for 5 student per group (there were 4 groups) - 2 labs (OSS2006 Integrated Circuits), every lab 2 hours for 5 student per group (there were 4 groups) Date: December 22 and December 23, 2022 (8:30 -5:00 pm) Lab rooms: T329 and T332, T-Building, Algonquin College.	December 22 and December 23, 2022 (8:30 -5:00 pm)
11. Establish a forum or means to foster collaboration opportunities for externally funded research between faculty members of Algonquin College and Carleton University. (Opportunity)	Many OSS professors from AC and CU are involved in applied research in partnership with industry and getting federal/provincial funding grants. We plan to host an AC-CU meeting to discuss research project collaborations between OSS professors and get the OSS students involved in these research projects at various levels (including Capstone, which has been the case for the past 3 years already). In addition, we shall engage the PAC in the development of research projects	Carleton University and Algonquin College 2021-2022 academic year	Over the past four years, there has been ongoing communication and regular meetings between Algonquin College (AC) and Carleton University (CU) to discuss research project collaborations between OSS professors from both institutions. These discussions have focused on involving OSS students at various levels, particularly in capstone research projects. Faculty members from both institutions continue to collaborate through the supervision of these capstone projects, with some involvement from the PAC. Additionally, industry partners such as NRC, TELUS, Ciena, Airy3D and Natural Resources Canada, among others, have been actively involved in capstone	Yes Over the past four years and will continue in the upcoming years.

	related to their domain of expertise and interest.		project supervision and in creating dedicated lab spaces for OSS students to carry out their work. This collaboration between AC-CU professors and industry partners will serve as a platform to identify new opportunities for collaboration and explore how externally funded research can be integrated into these existing partnerships.	