



FINAL ASSESSMENT REPORT
Executive Summary
May 2017
Master of Information Technology Security
Program Review
Faculty Dean: Dr. Pamela Ritchie
Dean of Graduate Studies: Dr. Langis Roy

Under UOIT's Quality Assurance Framework, all degree programs are subject to a comprehensive review every eight years to ensure that they continue to meet provincial quality assurance requirements and to support their ongoing rigour and coherence.

On the completion of the program review, the self-study brief together with the reviewers' report and the assessment team's response are reviewed by the appropriate standing committee of Academic Council, and are subsequently reported to Academic Council, the Board of Governors and the Quality Council.

In 2014-15 a program review was scheduled for the Master of Information Technology Security program.

This is the first program review for this program and the internal assessment team is to be commended for undertaking this assignment in addition to an already challenging workload and within very tight deadlines. The following pages provide a summary of the outcomes and action plans resulting from the review, identifying the strengths of the program as well as the opportunities for program improvement and enhancement. A report from the program outlining the progress that has been made implementing the recommendations will also be put forward eighteen months following the completion of the review.

External Reviewers: Dr. Ali Ghorbani (University of New Brunswick), Dr. Ashraf Matrawy (Carleton University), and Dr. Anil Somayaji (Carleton University)

Site Visit Dates: October 25-26, 2015

The MITS program is one of the first of its kind in Canada and one of few specialized IT security graduate degree programs available in the world. Through theory and applied learning, the program enables students to develop an extensive understanding of business and information technology security, polish communication skills and examine business and IT ethics in a team environment.

The MITS is a professional graduate degree that prepares students to work in the high-demand IT security industry. The curriculum is designed around the domains found in the Certified Information Systems Security Professional (CISSP) exam. The program adopts an experiential learning approach, allowing students to apply core course materials to a substantial project in the workplace during the latter part of the program.

Significant Strengths of the Program

- The objectives of the program are consistent with the overall mission and academic plan of UOIT
- The program responds to community needs and skills gap in the area of security and information systems.
- The program is designed around the CISSP exam requirements making it relevant and practical for students.
- The pairing of labs with all of the courses is an innovative part of the curriculum.
- The capstone projects allow MITS students to put their learning into practical use.
- Positive feedback on faculty and support staff for the program

Opportunities for Improvement and Enhancement

- Further examination of the perceived gap between theory and practice in the program
- Including topics related to privacy, usable security, forensics, mobile security, and cloud security within the curriculum.
- Improvements to ongoing assessment measures.
- Define the ideal skill set for the program graduates and improve marketing and communication of the program.
- Establish an advisory board with members from industry and government and examine co-op/internship opportunities.

The External Review

The reviewers visited the University of Ontario Institute of Technology (UOIT) campus on October 26-27, 2015. The agenda included tours of the campus, library, teaching and lab spaces. The reviewers interviewed faculty members as well as students and staff. They also met with the Provost, Associate Provost, Dean, and Associate Dean.

Summary of Reviewer Recommendations and Faculty Responses

Recommendation 1:

During our visit we were told from multiple sources that the program needs to increase enrolment, ideally doubling the current number of admissions. Given this goal, the program needs to improve program marketing and recruitment:

- a) *Better define who the ideal prospective students are.*
- b) *Improve the program's web presence: explain program differentiators, student success stories, and graduate placement statistics. There should be a process in place for routine updates of this information (e.g. once a term at a minimum).*
- c) *Target recruitment within the GTA and beyond.*
- d) *Explore options for online advertising.*

Response

In order to improve marketing and recruitment, the Faculty will invest in:

- a) Defining the ideal group of potential applicants and will work with UOIT Communications and Marketing to develop online advertisement material for this group.
- b) Updating the website so information is relevant, and attractive. The website will include information on alumni placements and career successes.

- c) Ensuring the information provided on the website is consistent and current
- d) Work with the FBIT alumni office to put in place a mechanism to track MITS alumni

Recommendation 2:

Define the ideal skill set for the program graduates. The CISSP should only be a partial guide, as it does not cover all aspects of the information security practice. Such an assessment is essential as, we believe, there is not much room left in the program for adding new material. To add new topics, the coverage of the existing ones will have to be altered/reduced. Any curriculum changes should be guided by the desired learning outcomes for the program. Moreover, we believe that the curriculum adjustments and renewal should be an on-going process.

Response

The Faculty will work with the program advisory board (see recommendation 7) and other industry partners to gather information about the skill set that graduates from the program should have. The information will be used to define a set of core courses that all graduates should have, and a number of additional technical elective courses that students can select from.

Recommendation 3:

Introduce curriculum flexibility to 1) help the program adapt to the changing practice without overly frequent curriculum overhauls and 2) allow MITS students to take other courses of interest to increase their knowledge in a desired area of specialization. Consider broadening the scope beyond what the CISSP requires in areas such as privacy, usable security, forensics, mobile security, and cloud security. A set of core material should be identified to ensure that the graduates have a common set of skills. The Faculty should look into the current curriculum to find areas where some of the current contents could be revised to allow the introduction of new topics.

Response:

The Faculty previously looked at the option of adding flexibility into the curriculum, but did not pursue it. The Faculty will re-start the process, and look into the options of:

- a) Having special topics in IT Security course, to be an in-time course holder for hot topics. The advisory board can recommend one or two topics each year that the industry is particularly interested in seeing in graduates.
- b) Define a number of technical elective courses that students can choose from.

Recommendation 4:

We understand that currently there are no formal course evaluations in the MITS program. There should be a way to evaluate the teaching of MITS courses outside of the occasional surveys. We recommend the Faculty institute a formal process for the assessment of teaching and learning (e.g., students evaluation of the course contents and Instructor).

Response:

The MITS program is part of the graduate studies program at UOIT, and the reason why there is no course evaluation at the graduate level is the small number of graduate students, which means a low level of anonymity. With the increase in the number of graduate students across the university, the Dean of Graduate Studies is currently looking at how to implement course evaluation for graduate students. FBIT will also develop an exit survey to gain feedback from students at the end of the program regarding their class experiences.

Recommendation 5:

It will help if the Faculty have information about students' recruitment and indicators/statistics of the success of their MITS graduates.

Response:

The Faculty will use the recently established FBIT alumni office to develop a tracking mechanism for alumni - leverage this for success stories, co-op placements, networking, etc.

Recommendation 6:

It was suggested by at least one student that a co-op option will be appealing to many students. We believe adding co-op option to the program will further strengthen the program. A Co-operative Education Program formally integrates a student's academic studies with work experience. Co-op programs with more than one work term experience provide students with better opportunity for career exploration.

Response:

The MITS program does not qualify for co-op accreditation thus a formal co-op program is not viable. The Faculty will consider integrating internships into the program. The option might be attractive for the students coming into the program who do not have relevant work experience. The Faculty will look into whether:

- a) We would need to have a separate stream for those who are already employed.
- b) Accepting internship in place of capstone.

Recommendation 7:

Establish a strong advisory board with members from industry and government. Having such an advisory board could help provide input on the required skill sets in the current job market; it could also help with the development of a co-op program.

Response:

The Faculty has started the process to establish an advisory board for the program. The advisory board will include mainly industrial personnel. The Faculty will work with the board and other industrial partners to define the skill set for the program graduates.

Recommendation 8:

There should be a process to make sure that the lab equipment are updated in a timely fashion.

Response:

The Faculty has already allocated a budget to update the hackers research lab for this year. UOIT has a 5 year plan for capital investments. This plan is reviewed and updated on an annual basis as part of the budgeting process. The prioritization of investment is based on usage, program need, and budget availability. The Faculty asks each area about the needs for teaching labs annually to ensure that FBIT submits their needs assessment on a continual basis.

Recommendation 9:

Increased enrolment and providing curriculum flexibility will undoubtedly need more resources. Faculty workload might need to be adjusted accordingly.

Response:

If the Faculty determines that additional courses are required, the budget implications for teaching resources will need to be considered. Some of these electives may be cross-listed with the Masters in Computer Science program to provide better economies of scale. Given the current cohort size the feasibility of multiple electives each year may be an issue and will be part of the consideration in any proposed program change.

Recommendation 10:

The program needs a Faculty member from within the area of information security to act as an academic coordinator to look after the academic affairs of the program.

Response:

The responsibility of an area coordinator is now shared between the area coordinator and the graduate program coordinator. The Graduate program committee has a representative from the networking and IT security area that serves on the committee to represent this program. This person is responsible to bring any issues regarding the program or concerns from Faculty teaching in the program to the Graduate program committee and the Graduate program director for resolution.

Recommendation 11:

Support for lab development is needed. Many courses would benefit from applied security exercises that are time consuming to develop. The undergraduate program currently has such support for developing hands-on labs; similar support should be given to the MITS program.

Response:

The Faculty members involved in teaching each course are those best able to determine the appropriate content for any lab related to their course. Many courses originally had labs as part of their course design but those teaching the courses determined the labs were not necessary and had them removed through the curriculum quality assurance process. Instructors or the program committee is able to revise the course outcomes and requirements to include a lab component if the instructor identifies a need. The Faculty has provided support previously in the form of teaching releases for the original development of the courses and associated labs. Any specific supports could be discussed with the Dean as part of the annual performance meetings and workload assignment discussions once the curriculum changes were approved.

Recommendation 12:

Library resources are adequate, but given a large portion of MITS students are from GTA, we recommend that UOIT explore the possibility of its MITS students to have free access to University of Toronto library system, including borrowing privileges. This puts at their disposal one of the richest CS/IT library collections in North America.

Response:

UOIT has already an Interlibrary Loan (ILL) service in place. The service is free, and is available to all students. The service, called RACER System (Rapid Access to Collections by Electronic Requesting), allows students to search and request academic material from other academic institutions. Students have not expressed any concerns regarding accessing library resources.

Plan of Action

The table below presents a timeline of the actions planned to address the recommendations from the external report.

| Proposed Action | Timeline | Person/Area Responsible |
|---|-----------------|---|
| Establish an advisory board for the MITS program | July 2017 | FBIT Graduate Education Committee |
| Update MITS program map and courses to allow more flexibility and focus on emerging areas | March 2017 | FBIT Graduate Education Committee/Approval by the Faculty Council |
| Update MITS web site and enhance promotional material | July 2017 | UOIT Communication and Marketing/Office of Graduate Studies |
| Develop an exit survey for the MITS graduate to collect their feedback | July 2017 | FBIT Alumni office |
| Upgrade Hackers Research Lab with new equipment and design | March 2017 | FBIT budget and planning officer, Graduate Education Committee |

Due Date for 18-Month Follow-up on Plan of Action: July 2017

Date of Next Cyclical Review: 2022-2023