Minor Program Adjustment

Faculty: Business and Information Technology	**Date**: October 24, 2017
Program: Master of IT security	
Undergraduate: ☐	**Graduate**: ☒

Minor Program Adjustments include: New required courses, Deletion of required courses, Other changes to degree requirements or program learning outcomes, New academic requirements or changes to existing requirements.

Motion to CPRC or GSC: To approve MITS admission requirements and semester offering of courses

Proposal Brief

Summary of the proposed change

To remove the requirement to submit detailed course descriptions for admission to the MITS program, while allowing such documentation to be requested by the admission committee on a case-by-case basis.

To update the calendar description of the program with a list of courses only, not specific offering in each semester.

Description of the ways in which the proposed change will enhance the program and/or opportunities for students

Obtaining course descriptions is often a challenge for many students, and some applications get rejected for not providing this documentation. The new wording allows the admission committee to request such documentation on a case-by-case basis.

In the past a fixed schedule of courses for Fall and Winter semesters had been specified in the calendar. Therefore, any changes to the schedule would have required a calendar change. The new format gives the area the flexibility to swap courses between the two semesters based on instructor availability and scheduling requirements.

Process of consultation with other units if the change(s) involves students, staff, and/or faculty from other programs or courses

The change does not involve other faculties.

Analysis of financial and enrolment implications

N/A

Proposed Implementation Date (state term, e.g. Fall 2017)

Fall 2018

Transition Plan (include a plan for all current students in the program, by year level)

N/A

Calendar Copy and/or Program Maps (highlight revisions to existing curriculum)

Admission requirements

In addition to the general admission requirements for graduate studies at UOIT, MITS applicants must meet the following program-specific requirements:

While applicants may hold any four-year undergraduate degree from an accredited institution, preference is given to applicants whose undergraduate degree is in the field of IT, engineering, science or related fields.

- Work experience in IT-related jobs is preferred.
- Submission of a portfolio indicating relevant work experience and skills in IT.
- Successful completion of at least one course in advanced programming (e.g., Java/C/C++/C#) and advanced mathematics (e.g., linear algebra, calculus, number theory, etc.), and at least one course or proven work experience in operating systems (Windows and/or Unix or Linux). The applicant may be asked to provide course descriptions to assist with the assessment of the application. ~~To assist with the assessment of the application, applicants should submit detailed descriptions of any completed courses in these areas. Course descriptions should be copied from the university's academic calendar.~~

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Degree requirements

Students are required to complete eight core courses, a non-credit seminar course, and either capstone research project I/II or two elective courses for a total of 30 credits. Students must also successfully complete the non-credit MITS 5900G - MITS Seminar course. Approximate time for program completion, based on full-time status, is 12 months.

List of courses:

MITS 5100G - Law & Ethics of IT Security
MITS 5400G - Secure Software Systems
MITS 5500G - Cryptography and Secure Communications
MITS 6400G - Biometrics/Access Control and Smart Card Technology
MITS 5200G - Advanced Communication Networks
MITS 5300G - Operating Systems Security
MITS 5600G - Security Policies and Risk Management
MITS 6100G - Attack and Defence
MITS 5900G – MITS Seminar*
MITS 6300G – MITS Capstone Research Project I or Elective course**
MITS 6600G – MITS Capstone Research Project II or Elective course**

Note:
* MITS 5900G - MITS Seminar continues in the second semester and concludes in third semester.
**Students must either take both Capstone Research Project I and II courses, or two elective courses in their places. They cannot take one capstone course and one elective course. Students may take relevant 5000- or 6000-level courses in Information Technology, Computer Science, Electrical and Computer

Engineering or Health Informatics as electives. The choice of elective courses must be approved by the graduate program director for the MITS program prior to course registration.

APPROVAL DATES

Curriculum Committee approval	October 24, 2017
Faculty Council approval	
CPRC Approval	
Submission to Academic Council	

TEMPLATE 8-A

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

Faculty: Business and IT			
Full Course Title: Complex Networks			
Short Form Course Title (max 30 characters): Complex Networks			
Subject Code and Course number: MITS 6700G	**Cross-listings:**	☐ **Core** ☒ **Elective**	**Credit weight: 3**
Contact hours (please indicate number of hours for each component): ☒ Lecture ☐ Lab ☐ Tutorial ☐ Other			

PROGRAM(S) (if applicable, form should accompany a program adjustment/proposal)

Master of Information Technology Security

CALENDAR DESCRIPTION

This course studies commonalities across diverse engineered and physical networks such as computer networks, information networks, and social networks. It focuses on rigorous data-driven methods aimed at understanding the structure and dynamics of these networks. We will cover recent research on analysis of large social and information networks and on models and algorithms that abstract their basic properties. Class also reviews fundamental algorithms behind high-impact companies, such as Google, Facebook, etc. We explore how to measure and predict the structure and dynamics of large-scale networks, measure the robustness of networks, make networks more robust, predict the dynamics of information cascades, and develop and test our own data-driven hypotheses about networks.

Prerequisites	**None**
Co-requisites	**None**
Credit restrictions	**None**
Equivalency courses	**None**
Grading scheme	☒ **letter grade** ☐ **pass/fail**

LEARNING OUTCOMES (this section is required)

On the successful completion of the course, students will be able to:

- Understand and apply methods and algorithms for collecting network data from computer and information networks.
- Analyze large-scale social and information networks and develop and test their own data-driven hypotheses.
- Apply tools and methods for network data visualization.
- Understand the fundamental structural characteristics of networks.
- Understand techniques, algorithms, and tools for measuring the structure and dynamics of networks.
- Demonstrate knowledge of computational models for the dynamics of networks such as information cascade, virus propagation, failure cascade, etc.
- Understand efficient methods for distributed search

Be able to measure the robustness and resilience of networks against attacks and failure.

COURSE INSTRUCTIONAL METHOD

(check all that may apply)	☒ **CLS (in-class)**	☐ **HYB (in-class and online)**
	☐ **IND (individual studies)**	☐ **OFF (off-site)**
	☐ **WB1 (synchronous online delivery)**	
	☐ **WEB (asynchronous online delivery)**	

TEACHING AND ASSESSMENT METHODS

Assignments: 25%
Presentation: 15%
Midterm: 20%

Final Project: 40%

CONSULTATION AND FINANCIAL IMPLICATIONS, WHERE APPROPRIATE

None

EFFECTIVE SEMESTER (Specify Term e.g. Fall 2017)

Fall 2018

APPROVAL DATES

Curriculum Committee approval	
Faculty Council approval	
Submission to CPRC/GSC	

TEMPLATE 8-A

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

Faculty: Business and IT			
Full Course Title: Machine Learning			
Short Form Course Title (max 30 characters):			
Subject Code and Course number: MITS 6800G	**Cross-listings:** **INFR3700U Machine Learning**	☐ **Core** ☒ **Elective**	**Credit weight:** **3**
Contact hours (please indicate number of hours for each component): ☒ Lecture ☐ Lab ☐ Tutorial ☐ Other			

PROGRAM(S) (if applicable, form should accompany a program adjustment/proposal)

Master of IT Security

CALENDAR DESCRIPTION

Students will learn the mathematical foundations of machine learning and how to program a computer system to make predictions on, classify, or cluster data that the system has never seen before. Topics include theory and practice of supervised and unsupervised learning, covering well-known algorithms such as ordinary and penalized linear regression, Naïve Bayes, support vector machines, ensemble methods, and K-means.

Prerequisites	**None**
Co-requisites	
Credit restrictions	
Credit exemptions	
Grading scheme	☒ **letter grade** ☐ **pass/fail**

LEARNING OUTCOMES (this section is required)

Upon successful completion of the course, students will be able to:

1. Evaluate and analyze data to understand its attributes.
2. Hypothesize as to what learning algorithm is most appropriate for a given data set.
3. Create and evaluate a machine learning model based on the data characteristics.
4. Choose and utilize machine learning libraries to perform data analysis.
5. Select graphs that help understand data and the performance of machine learning algorithms.
6. Develop machine learning foundations adequate for IT professionals at the graduate level.

COURSE INSTRUCTIONAL METHOD

(check all that <u>may</u> apply) ☒ **CLS (in-class)** ☐ **HYB (in-class and online)**
☐ **WB1 (synchronous online delivery)**
☐ **WEB (asynchronous online delivery)**

TEACHING AND ASSESSMENT METHODS

Assignments (20%), Midterm (30%), Final project (40%), participation in guest lectures and project presentations (10%).

CONSULTATION AND FINANCIAL IMPLICATIONS, WHERE APPROPRIATE

None

EFFECTIVE SEMESTER (Specify Term e.g. Fall 2017)

Fall 2018

APPROVAL DATES

Curriculum Committee approval	***October 24, 2017***
Faculty Council approval	
Submission to CPRC/GSC	