

Faculty of Liberal Arts and Professional Studies

**School of
INFORMATION TECHNOLOGY
GRADUATE MINI CALENDAR**

Information Systems and Technology

INTRODUCTION

York University offers the graduate program in School of Information Technology which leads to Master of Arts degree.

This mini calendar describes the program, giving entrance and degree requirements. It also describes the research interests of the faculty members associated with the Graduate Program in School of Information Technology, provides information about financial support available to graduate students and gives a description of the courses.

The Faculty of Graduate Studies Calendar can be accessed on the web at: <http://www.yorku.ca/grads>.



SUMMARY OF GRADUATE PROGRAM

The program is designed to appeal to working professionals in the Information Technology (IT) field as well as students progressing directly from undergraduate study who are interested in furthering their understanding of the application of research-based knowledge in IT. The program will be offered in both part-time and full-time formats in order to accommodate the needs of both groups.

The program in Information Systems and Technology belongs to a broad, multidisciplinary field that studies how technology can best be integrated and customized to meet the information needs of users, thereby facilitating creativity and productivity in a variety of sectors. It occupies a middle ground between programs offered by computer science departments, on the one hand, and business schools, on the other. Information systems and technology is interested in both existing and evolving technologies: it explores the application of technology to any field, from business to the sciences to the arts and humanities.



The Master of Arts in Information Systems and Technology will provide graduates with the capacity to:

- Critically analyze information technologies and services currently used in a variety of sectors
- Analyze, design, build, and manage information systems using contemporary tools
- Customize and optimize the implementation of information systems and services
- Contribute to organizational change through an advanced, comprehensive and theoretical grounding in Information Systems and Technology

The program will prepare graduates for employment in a broad range of sectors: not-for-profit; public, including health and education; and private, including business, industry, and information technology. Specific jobs may include IT manager, project leader, system and application architect, systems or database administrator, or business systems analyst.



FACULTY MEMBERS AND THEIR RESEARCH INTERESTS

An, Aijun, PhD

Professor

Department of Electrical Engineering & Computer Science,
Lassonde School of Engineering

Areas of research: Data mining, classification, clustering, pattern discovery, information retrieval.

Asgary, Ali, PhD

Professor

School of Administrative Studies, Faculty of Liberal Arts and
Professional Studies

Areas of research: urban risk mitigation, business continuity planning, economic assessment of disaster risk mitigation measures, disaster economics, post-disaster recovery and reconstruction, GIS applications in disaster management.



Benslimane, Younes, PhD

Associate Professor

School of Information Technology, Faculty of Liberal Arts and Professional Studies

Areas of research: System Analysis and Design, Business Process Management, IS Development Methodologies and Practices, Skill requirements for IT Professionals

Campeanu, Radu, PhD

Professor, Undergraduate Program Director

School of Information Technology, Faculty of Liberal Arts and Professional Studies

Areas of research: Computer imaging systems and computational quantum collisions.

Chen, Stephen, PhD

Associate Professor

School of Information Technology, Faculty of Liberal Arts and Professional Studies

Areas of research: Human-computer interactions, usability and information organization.



Diamant, Adam, PhD

Associate Professor

Management Science Specialization, Schulich School of Business

Areas of research: Health Care Operations, Scheduling, Dynamic Optimization, Artificial Intelligence, Inventory and Logistics.

Erechtchoukova, Marina, PhD

Associate Professor

School of Information Technology, Faculty of Liberal Arts and Professional Studies

Areas of research: Data modeling and database development, simulation modeling, decision making in the environmental protection.

Huang, Jimmy, PhD

Professor

School of Information Technology, Faculty of Liberal Arts and Professional Studies

Areas of research: information retrieval, data mining, natural language processing, computational linguistics and bioinformatics.



Khaiter, Peter, PhD

Associate Professor

School of Information Technology, Faculty of Liberal Arts and Professional Studies

Areas of research: Modeling of complex systems, assessment and management of natural resources.

Lesperance, Yves, PhD

Professor

Department of Electrical Engineering & Computer Science,
Lassonde School of Engineering

Areas of research: Knowledge Representation and Reasoning,
Autonomous Agents, Multi-Agent Systems, Agent Programming
Languages, Cognitive Robotics

Liaskos, Sotirios, PhD

Associate Professor

School of Information Technology, Faculty of Liberal Arts and Professional Studies

Areas of research: Requirements Engineering, Software Customization, Software Product Lines



Litou, Marin, PhD

Professor

School of Information Technology, Faculty of Liberal Arts and Professional Studies

Department of Electrical Engineering & Computer Science, Lassonde School of Engineering

Areas of research: Autonomic and Adaptive Systems; Software Engineering; High Performance Software Design for Distributed and Real Time Systems; Performance Modeling; Distributed Objects and Internet Technologies.

Areas of research: internal control reporting and following up in the

Spraakman, Gary, PhD

Professor Emeritus

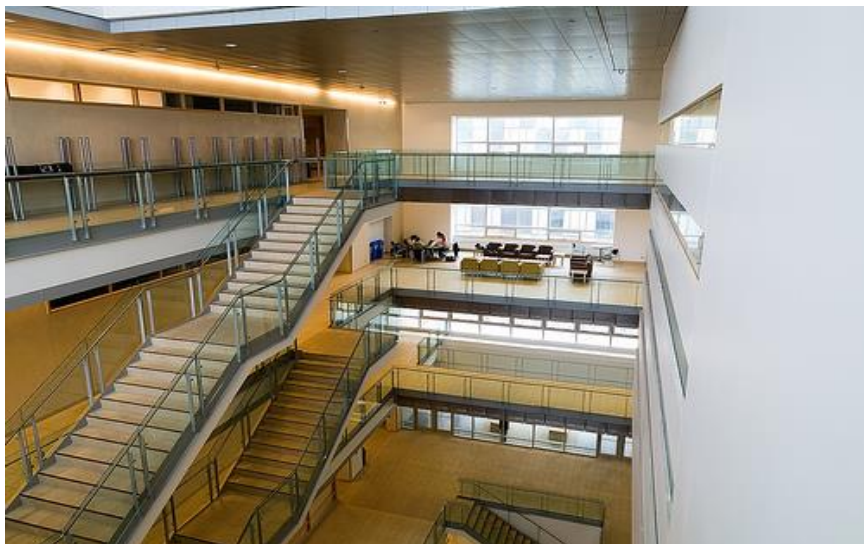
School of Administrative Studies, Faculty of Liberal Arts and Professional Studies

Areas of research: management accounting change, in particular the impact of information technology on management accounting.

Walker, Marshall, PhD

Professor Emeritus

School of Information Technology, Faculty of Liberal Arts and Professional Studies



Department of Mathematics and Statistics, Faculty of Science
Areas of research: Curves and Surfaces in Computer Aided Geometric Design and Approximation Theory

Wang, Steven, PhD

Professor

Department of Mathematics and Statistics, Faculty of Science
Areas of research: Likelihood Inference and Data Mining

Wong, Augustine, PhD

Professor and Undergraduate Program Director

Department of Mathematics and Statistics, Faculty of Science

Areas of research: Likelihood inference, computational statistics, survival data analysis, time series analysis, econometrics

Wu, Jianhong, PhD

Professor, York Research Chair, Distinguished Research Professor

Department of Mathematics and Statistics, Faculty of Science

Areas of research: Nonlinear Dynamics and Nonlinear Analysis



Yang, Zijiang, PhD

Professor

School of Information Technology, Faculty of Liberal Arts and Professional Studies

Areas of research: Performance analysis in financial services industry, Classification and prediction, data mining, decision support systems.

Yu, Xiaohui, PhD

Associate Professor, Graduate Program Director

School of Information Technology, Faculty of Liberal Arts and Professional Studies

Areas of research: Database systems.

Zhu, Huaiping, PhD

Professor, York Research Chair

Department of Mathematics and Statistics, Faculty of Science

Areas of research: Applied Math, Mathematical Epidemiology and Ecology, Differential Equations and Dynamical Systems, Bifurcation Theory and Applications, Hilbert's 16th Problem, Mathematical Modelling and Analysis in Ecology and Epidemiology, Climate

PROGRAM REGULATIONS

i. Admission Requirements

To be considered for admission, candidates must have completed an Honours undergraduate degree program (typically a four-year degree), in information technology or a related field, from a recognized postsecondary institution, with a minimum grade point average of B+ in the last two years of study. Related disciplines may include but are not limited to library science, health informatics, or computer science and engineering.

Applicants with an Honours Bachelor's degree in an area other than those listed above may be considered for admission if they have at least five years work experience at a senior level in the field of information technology.

All applicants must:

1. Submit a Curriculum Vita.
2. Provide 3 letters of reference.

Students interested in the thesis or MRP options must also:

3. Submit a written statement describing research experiences and areas of interest. The statement should be 1 – 2 pages long.

Advanced standing is not available and transfers will not be accepted. Proof of language proficiency is required for applicants who do not meet one of the following criteria:

1. Their first language is English; OR
2. They have completed at least one year of full-time study at a recognized university in a country (or institution) where English is the official language of instruction.

A minimum TOEFL score of 600 (paper based) or 250 (computer based) or YELT score of Band 1 or equivalent and an IBT (internet-based test) score of 100 is required.

PROGRAM REGULATIONS

ii. Degree Requirements

Full time students must select Thesis Option to complete the program.

Part time students will have three options for completing the program:

- 1) **Thesis Option:** Five 3.00 credit courses and a thesis
- 2) **Major Research Project(MRP) Option:** Seven 3.00 credit courses and a research project
- 3) **Coursework Option:** Ten 3.00 credit courses

Part time students must select one of the above options prior to beginning the program. Option changes will be possible with the approval of the Graduate Program Director.

Part time students choosing the coursework option will be advised that this option may limit their eligibility for most PhD programs in the area of Information Technology.

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The required research methods course provides all students with a shared introductory experience in the program and ensures that all students understand how to formulate research questions and design projects that work towards solving applied information technology problems. Students must take the research methods course during their first year of study so that they can employ these methods in all subsequent courses and projects.

The offerings from the MAIST core provide students with the advanced technical knowledge required of IT professionals in a variety of sectors. Thus courses address such areas as database management, information systems, information retrieval, requirements engineering, information technology integration, human-computer interaction, and web systems and services.

MAIST courses provide students with an in depth understanding of advanced technology. Most courses combine this focus with strategies for deploying technology in specific organizational settings. Some, like ITEC 5210 and 6205, also include components on project management. This integrated curriculum helps to educate students to recognize the human dimension of technology development. Thus the MAIST trains students to collaborate productively with non-specialists throughout the development process.

To complement the MAIST curriculum's focus on advanced applied technology and its implementation in a variety of settings, students may take courses from other units to better understand the applications and implications of technology in specific sectors.

Supported by the knowledge and skills they develop in their coursework, MRP and thesis students will conduct research in areas such as information systems; autonomic and adaptive systems; medical information systems; health informatics; decision support systems; agent-oriented systems; the analysis, design and evaluation

COURSES

Supported by the knowledge and skills they develop in their coursework, MRP and thesis students will conduct research in areas such as information systems; autonomic and adaptive systems; medical information systems; health informatics; decision support systems; agent-oriented systems; the analysis, design and evaluation of web systems for electronic markets; workflow systems; performance modeling; performance analysis in the financial industry; IT evaluation; requirements engineering; non-functional requirements; business modeling; information retrieval; web search and mining; distributed objects; and internet technologies.

Gaining both a deep, research-based knowledge of technology and an understanding of how to respond to user needs in specific applied settings, MAIST graduates will be able to facilitate end users' ready access to and deployment of the vital information generated by complex technology, from hospital imaging to digital libraries, online banking systems, or web search engines.

Students must successfully complete the following:

The required half course:

*ITEC 6310 3.00 Research Methods in Information Technology

An additional 12 credits (thesis); 18 (MRP); 27 (coursework) from the MAIST core:

*ITEC 4010/5210 3.00 Systems Analysis and Design

*ITEC 6205 3.00 Advanced Web Mining

*ITEC 6110 3.00 Business Process Management Service Oriented Architecture

*ITEC 6120 3.00 Systems Requirements Management

*ITEC 6130 3.00 Service Oriented Computing

*ITEC 6150 3.00 Information Systems Architecture

*ITEC 6160 3.00 Cloud Computing Systems

*ITEC 6180 3.00 Business Analytics

*ITEC 6210 3.00 Advanced Information Retrieval Systems

*ITEC 6220 3.00 Advanced Information Management

*ITEC 6230 3.00 Health Information Systems

*ITEC 6240 3.00 Machine Learning and its Applications

*ITEC 6320 3.00 Information Technology and Organizational Strategy

COURSES

- *ITEC 6330 3.00 Designing and Building e-Business Applications
- *ITEC 6340 3.00 Application and Design of Metaheuristics
- *ITEC 6510 3.00 Applied Optimization in IS
- *ITEC 6520 3.00 Agent-based IT
- *ITEC 6710 3.00 Blockchain and Financial Technologies
- *ITEC 6970 3.00 Advanced Topics in Information Technology

COURSES

ITEC 6310 3.00 Research Methods in Information Technology

This course provides a foundation in scientific inquiry applied to both practical and theoretical IT-related problems. Students formulate research questions, select appropriate research design to collect and analyze data, prepare reports, and evaluate research proposals and projects. Students must complete this course during their first-year in the program or take this course later with Graduate Program Director's approval.

ITEC 4010/5210 3.00 Systems Analysis and Design

The course discusses concepts, theories, and techniques for analysis, design and implementation of software systems. The focus is on distributed applications, with special emphasis on requirements gathering, modeling techniques and design trade-off analysis.

Prerequisite: AP/ITEC 3010 3.00 or equivalent.

ITEC 4060/5150 3.00 Enterprise Architecture

This course examines the concept of architecture and its different meanings within Information Technology, focussing on Enterprise Architecture (EA). The role and necessity of the EA practice for modern organizations is first discussed. Dominant frameworks for developing EA are presented. The course then zeroes-in on two specific EA practice and modelling frameworks and investigates their components in depth. Through this exercise students are exposed to a variety of theories and techniques related to the EA practice including decision making, portfolio management, strategic planning, IT governance, service management and service orientation.

Prerequisites: An advanced course on Systems Analysis (such as ITEC4010) or permission by instructor.

ITEC 6002 3.00 Directed Readings

A student may count Directed Readings towards the credits required for the degree, subject to the permission of the graduate program director and the Instructor who will be directing the course. Topics will depend on student and Instructor interests but will not cover the same material as other MAIST courses offered in the same year.

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Prerequisites: Permission of the Graduate Program Director and Instructor.

ITEC 6110 3.00 Business Process Management and Service Oriented Architecture

This course introduces recent advances in business process management and related technology. Key topics covered include (i) the main lines of research conducted in this area of information technology, (ii) the business process management lifecycle and (iii) related methodologies, standards, applications and architectures (including the Service Oriented Architecture).

ITEC 6120 3.00 Systems Requirements Management

This course covers advanced and emerging methods and techniques used to elicit, model, analyze, and manage software requirements. Students will also acquire skills and knowledge necessary for conducting research in the field.

Prerequisites: An undergraduate systems requirements course equivalent to AP/ITEC 4040 3.00 or LE/EECS 4312 3.00 is desirable but not mandatory.

ITEC 6130 3.00 Service Oriented Computing

This course discusses concepts, theories, and techniques for web services, service oriented computing and services science. Examines architectures for Web applications based on the classic publish, find, and bind triangle. Key topics include semantics, transactions, Web service composition and the concept of self-managing.

ITEC 6150 3.00 Information Systems Architecture

This course examines the concept of architecture and its different meanings within Information Technology, focusing on software and enterprise architecture. The process of generating and implementing a software architecture within the systems development lifecycle is first discussed. Patterns, styles, and reference architectures are presented as tools to reuse past architectural experience. Architectural analysis and evaluation techniques are investigated. Then, various

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aspects of Enterprise Architecture (EA) are examined, including EA frameworks (TOGAF, Zachman), Enterprise Architecture Integration (EAI) and related technologies, Enterprise Resource Planning (ERP), business-to-IT alignment and IT strategy. The role of requirements analysis and management within all these processes is given special attention.

Prerequisites: Systems Requirements Management (ITEC6120), Evidence of strong Object-Oriented programming and Systems Analysis and Design skills, or permission by instructor.

ITEC 6160 3.00 Cloud Computing Systems

Cloud computing refers to a computation model where information technology resources, such as computer networks, servers, storage, applications, are shared and offered as services over the Internet. This course introduces service models, virtualization technologies, management tools and interfaces. Students learn advanced design issues that include provisioning, security, privacy, economies of scale, reliability and elasticity.

ITEC 6170 3.00 Information Visualization

This course focuses on the design, development, and study of interactive visualization techniques for the analysis, comprehension, exploration, and explanation of large collections of datasets. Topics covered include principles of visual perception, data and task abstractions, visual encodings of data, interaction methods, visual analytics, and evaluation techniques. Students get hands-on experience through projects. Prerequisite: Permission by instructor.

ITEC 6180 3.00 Business Analytics in Information Systems

Business analytics, the use of data-driven methodologies to support decisions, plays a central role in organizations. Students will learn techniques to perform business analytics. Specifically, the tools will include advanced methods such as Artificial Intelligence, Machine Learning, Data Mining, and Process Mining. The students will

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analyze real business cases and will get hands-on experience through projects and case analyses.

Prerequisites: ITEC1620(or similar programming course), SC/MATH 2565(or similar statistics course);Permission by instructor to waive prerequisites.

ITEC 6205 3.00 Advanced Web Mining

This course explores how Web mining technology can be applied to solve problems in real-world applications, introducing advanced techniques from Web mining, information retrieval and their applications in e-commerce and Web information systems.

Prerequisites: Knowledge equivalent to an undergraduate course such as ITEC 4305 would be desirable but is not mandatory.

ITEC 6210 3.00 Advanced Information Retrieval Systems

Introduces advanced techniques and core technologies used in information retrieval and studies the theory, design, and implementation of text-based information retrieval systems. Focuses on effectively interpreting imprecise queries and providing a high quality response to them from large text-based collections.

Prerequisite: AP/ITEC 4020 3.00 or equivalent.

ITEC 6220 3.00 Advanced Information Management

This course covers design principles and techniques of advanced information management systems such as relational database systems and big data platforms. Both classic data management issues and emerging topics in big data management are discussed. Programming projects are required.

Prerequisites: Knowledge equivalent to an undergraduate database course such as AP/ITEC 3220 3.00 or LE/EECS 3421 3.00 would be desirable but is not mandatory.

ITEC 6230 3.00 Health Information Systems

One of the major aims of Health Information Management is to help health professionals make better decisions. This course reviews

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theories, methods, technologies and systems currently used for aiding the decision making process.

Prerequisites: ITEC 6310.

ITEC 6240 3.0 Machine Learning and its Application

This course introduces Machine Learning (ML) and discusses its models (supervised and unsupervised) and their real-life applications. This course will cover different topics of ML including linear regression, decision trees, neural networks, Naïve Bayes algorithm, association rules, deep learning, face recognition, and ML applications. It will also identify different best practices to enhance the ML models' performance (hyperparameter tuning, bias/variance concept).

Prerequisites: Students should have some skills in Programming (i.e. AP/ITEC 1610 3.00, AP/ITEC 1620 3.00, AP/ITEC 2610 3.00, AP/ITEC 2620 3.00), understanding of algorithms, and problem-solving and knowledge of some basics of linear algebra and statistics (i.e. SC/MATH 1013/4, SC/MATH 1021, SC/MATH 1131 or SC/MATH 2560 or SC/MATH 2565, SC/MATH 2030 or SC/MATH 2930). Permission from the instructor(s) might be required for prerequisites.

ITEC 6320 3.00 Information Technology and Organizational Strategy

This course examines the use of information technology (IT) for supporting organizational strategies. An organization's long term dynamic plan drives its use of IT such as enterprise resource planning and customer relationship management systems. This course will examine the symbiotic relationship between IT and strategy.

Prerequisite: 6 credits in the MAIST program.

ITEC 6330 3.00 Designing and Building E-Business Applications

Introduces students to advanced techniques for designing and building e-business applications, exposing students to core technologies for analyzing, designing and implementing e-business applications. Students develop an understanding of how these core

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technologies can be applied to solve real-world problems. Prerequisite: AP/IITEC 4020 3.00 or equivalent.

IITEC 6510 3.00 Applied Optimization in Information Systems

Introduces students to the idea of optimal solutions. A survey of selected topics in operations research (OR) is provided emphasizing on practical applications rather than on the mathematical properties as well as on their integration into information systems. Students engage in term-long projects and conduct an in-depth study of a topic through readings and paper reviews. Prerequisite: AP/IITEC 4030 or by permission of the instructor.

IITEC 6520 3.00 Agent-based Information Technologies

Discusses concepts, theories and techniques for agent-based applications. Examines agent-based methodologies, modeling process and modeling languages. Key topics include agent-based architectures, standards for agent-based development, designing and building an agent-based system with examples from e-health, environmental management and other application domains. Students engage in term-long implementation projects conduct an in-depth study of a topic through readings and paper reviews. Prerequisite: AP/IITEC5210/4010 or by permission of the instructor.

IITEC 6710 3.00 Introduction to Blockchain and Financial Technologies

This course offers an introduction to the field of financial technologies with a strong emphasis on blockchain and cryptocurrency technologies and platforms. Following a short overview of disruptive use of information technologies in the financial sector, the course proceeds with a technical introduction to blockchain platforms and networks and smart contracts. Students engage in term long projects at various levels of technical depth. Prerequisite: AP/IITEC5210/4010 or permission by instructor.

IITEC 6810 3.00 Introduction to Computational Social Science

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The course introduces students to computational techniques and their applications to social science. This course equips students with knowledge and skills on how computational techniques derive insights about human behavior and society from digital data. Students will gain practical experiences of applying computational techniques to addressing social questions through collecting, processing, and analyzing large-scale data using the R programming language.

ITEC 6970 3.00 Advanced Topics in Information Technology

This course introduces emerging and “hot” topics in information technology discussed in the research literature. Topics will rotate annually and will focus on a specific area of interest to the instructor that is not covered in existing courses. Proposed topics include information systems security, service-oriented architecture, management of IT, web services.

COURSES

Up to six credits of elective courses from other units may be taken in place of credits from the MAIST core, where appropriate to support students' research or career specializations, and with permission of their supervisors and the Graduate Program Director. Students may choose from the following list or suggest suitable alternatives:

CDIS 5060 3.0: Disability in an Age of Information Technology

CMCT 6500 3.0: Advanced Communication Technology

CSE 5441 3.0: Real-time Systems Theory

CSE 6412 3.0: Data Mining

CSE 6590A 3.0: Special Topics: High-Performance Computer Networks

EDUC 5850 3.0: Science, Technology and Society

EDUC 5855 3.0 Cultural Studies of Technology for Education

EDUC 5860 3.0: Issues in Digital Technology in Education

EDUC 5861 3.0: Digital Literacies and Social Media

EDUC 5862 3.0/WMST 6122 3.0: Gender, Equity, New Technologies & Education

EDUC 5863 3.0: Digital Games and Learning

HUMA 6306 6.0: The Wired World: Technology and Contemporary Philosophy

MATH 6340 3.0: Ordinary Differential Equations

MATH 6630 3.0: Applied Statistics I

MATH 6651 3.0: Advanced Numerical Methods

MATH 6931 3.0: Mathematical Modeling

Two courses provide particular flexibility within the degree:

Advanced Topics in Information Technology (ITEC 6970)

This course might include such subjects as Medical Informatics, Security Issues in Business Systems, Web Services, IT Auditing, Groupware Systems, IT Governance, and IT Management. Offerings will depend on the availability of faculty members and their interests.

THESIS, MAJOR RESEARCH PROJECT AND SUPERVISION

THESIS

The thesis is an intensive research study undertaken independently or in conjunction with the supervisor's research activities. The thesis will go beyond merely describing an issue to include independent critical analysis and to make a contribution to the field; for example at the level of a peer-refereed publication in an international journal. The length of the thesis is contingent on the nature of the research project and will be determined in conjunction with the supervisor.

The thesis will be evaluated by a thesis examining committee consisting of: the Dean of the Faculty of Graduate Studies (or his/her representative); at least two graduate faculty members from the program, at least one of whom is a member of the student's supervisory committee; and one graduate faculty member from outside the program.

MAJOR RESEARCH PROJECT

The Major Research Project (MRP) provides an opportunity for students to demonstrate their ability to integrate concepts and techniques acquired through coursework and to complete an independent research project that addresses a real-world information systems technology issue. Students will be expected to produce a paper of approximately 50-60 pages in length. The MRP will be evaluated on a pass/fail basis by the student's supervisor and one other faculty member within the program.

THESIS, MAJOR RESEARCH PROJECT AND SUPERVISION

For students completing the thesis option, the Supervisory Committee must be established no later than the second term of study (for full time students, or the fourth term for part time students). The committee will consist of a minimum of two graduate faculty members, at least one of whom is a member of the MAIST program. This member will serve as the principal supervisor.

ACCEPTABLE GRADES FOR GRADUATE STUDENTS

It is the responsibility of the student to be aware of Faculty of Graduate Studies regulations regarding acceptable grades:

<http://www.yorku.ca/grads/calendar/facultyregulations.pdf>

RESIDENCE REQUIREMENTS

<http://www.yorku.ca/grads/policies/index.htm>

“Regulations in the Faculty of Graduate Studies Calendar”

Full-time Master’s students must register and pay fees for a minimum of five terms.

Part-time Master’s students must register and pay fees for a minimum of ten terms.

Full-time students may not be absent from the campus without the permission of the Director for more than four weeks of any term in which they are registered.