Information Technology

- **Master of Information Technology - Digital Media**
- **Master of Information Technology - Network Technology**
- **Doctor of Philosophy in Information Technology - Digital Media**

Master of Information Technology - Digital Media

Academic Regulations

See the General Regulations section of this Calendar.

Admission Requirements

Students entering the program will have an undergraduate degree in one of the related three primary disciplines of Technology (e.g. Computer Science/Engineering and Information Technology), Content (e.g. Arts and Humanities), and People (e.g. Psychology, Communication and Business).

Program Requirements

Master of Information Technology in Digital Media (5.0 credits)

1. 0.5 credit in:		0.5
ITEC 5000 [0.5] & ITEC 5001 [0.0]	Analytical Methods for Information Technology and Information Technology Seminars	
2. 1.5 credits from:		1.5
ITEC 5200 [0.5]	Entertainment Technologies	
ITEC 5201 [0.5]	Computer Animation Technologies	
ITEC 5202 [0.5]	Visual Effects Technologies	
ITEC 5203 [0.5]	Game Design and Development Technologies	
ITEC 5204 [0.5]	Emerging Interaction Techniques	
3. 0.5 credit in electives, which may include other ITEC courses		0.5
4. 2.5 credits in:		2.5
ITEC 5909 [2.5]	Master's Thesis	
Total Credits		5.0

Master of Information Technology - Network Technology (MIT-NET)

Admission Requirements

Students entering the program will have an undergraduate degree in network technology, electrical engineering, computer science, engineering, or a closely-related discipline.

Accelerated Pathway

The accelerated pathway in the Master of Information Technology - Network Technology (MIT-NET) is a flexible and individualized plan of graduate study. Students in their final year of a Carleton BIT Network Technology degree with demonstrated academic excellence and aptitude for research may qualify for this option.

Students in their third#year of study in the BIT Network Technology degree should consult with both their Undergraduate Program Coordinator and the Associate Chair for Graduate Studies to determine if the accelerated pathway is appropriate for them and to confirm their selection of courses for their final year of undergraduate studies.

Accelerated Pathway Requirements:

1. At least 0.5 credit from: ITEC 5110, ITEC 5111, ITEC 5112, ITEC 5113, ITEC 5114 with a grade of B+ or higher
2. Minimum overall CGPA of A-

Students may receive advanced standing with transfer of up to 1.0 credit, which can reduce their time to completion.

Program Requirements

Master of Information Technology - Network Technology (5.0 credits)

1. 0.5 credit in:		0.5
ITEC 5000 [0.5] & ITEC 5001 [0.0]	Analytical Methods for Information Technology and Information Technology Seminars	
2. 2.0 credits in:		2.0
ITEC 5100 [0.5]	Planning and Design of Computer Networks	
ITEC 5101 [0.5]	Cross Layer Design for Wireless Multimedia Networks	
ITEC 5102 [0.5]	Designing Secure Networking and Computer Systems	
ITEC 5103 [0.5]	Cloud and Datacentre Networking	
3. 1.0 credit in:		1.0
ITEC 5905 [1.0]	Network Technology Project	
4. 1.5 credits in electives, which may include one fourth-year course.		1.5
Total Credits		5.0

Ph.D. in Information Technology - Digital Media

Admission Requirements

Applicants to this program will normally hold a Master's degree in one of the three related disciplines (Technology, Content, and People) but demonstrate the ability to work in multi-disciplinary groups and have some general technology (digital media) background.

Applicants judged to be generally acceptable but deficient in some preparation may be asked to complete course work in addition to the program requirements.

In addition to transcripts and letters of reference, application packages will include a statement of interest outlining the applicant's proposed area of research.

Program Requirements

Ph.D. in Information Technology - Digital Media (10.0 credits)

1. 0.5 credit in:		0.5
ITEC 6200 [0.5]	Introduction to Interdisciplinary Research in Digital Media	
2. 1.0 credit in two courses, at least one of which must be from a different discipline than that of the degree and approved by the supervisor		1.0
3. 0.0 credit in:		
ITEC 5001 [0.0]	Information Technology Seminars	
4. 0.0 credit in:		
ITEC 6907 [0.0]	Doctoral Comprehensive	
5. 0.0 credit in:		

ITEC 6908 [0.0]	Doctoral Proposal	
6. 8.5 credits in:		8.5
ITEC 6909 [8.5]	Doctoral Thesis in Digital Media	
Total Credits		10.0

Milestones

First Year: completion of course work including ITEC 6200 [0.5].
Second Year: completion of ITEC 6907 [0.0] before the end of the fourth term of registration.
Third Year: completion of ITEC 6908 [0.0] before the end of the eighth term of registration.
Fourth Year: completion of ITEC 6909 Doctoral Thesis in Digital Media .

ITEC 5000 [0.5 credit]
Analytical Methods for Information Technology
Analytical techniques for algorithms, data structures, statistical analysis methods for IT problems, research methods, and research writing.

ITEC 5001 [0.0 credit]
Information Technology Seminars
A seminar based course where the students make the presentations and participate in discussions. Some seminars done by guest lecturers. Graded Sat/Uns.

ITEC 5100 [0.5 credit]
Planning and Design of Computer Networks
Planning process of computer networks; needs and technical requirements; modeling of different network planning problems; exact and approximate algorithms; topological planning and expansion problems; equipment (switch, router) location problem; approximate and optimal routing algorithms; presentation of various case studies.

ITEC 5101 [0.5 credit]
Cross Layer Design for Wireless Multimedia Networks
Quality of service measures at different layers. Parameter adaptation, trade-offs, and optimization at physical, data-link, network, transport, and application layers. Cross-layer design in cellular, ad hoc, sensor, local area, green, and cognitive radio networks.

ITEC 5102 [0.5 credit]
Designing Secure Networking and Computer Systems
Network security with coverage of computer security in support of networking concepts. Security issues in data networks at different protocol layers. Routing security, worm attacks, and botnets. Security of new mobile networks and emerging networked paradigms such as social networks and cloud computing.

ITEC 5103 [0.5 credit]
Cloud and Datacentre Networking
Special issues of the networking requirements in datacentres and cloud computing environments. Performance, power requirements, redundancy of datacentre networks.

ITEC 5110 [0.5 credit]
Emerging Network Technologies
Overview of technologies, protocols and techniques related to Information Technology networking that are either in their early stage of adoption or are not yet mainstream (i.e. beta or prototype stage). Focus will vary from year to year to reflect the evolutionary nature of this domain.
Also offered at the undergraduate level, with different requirements, as NET 4000, for which additional credit is precluded.

ITEC 5111 [0.5 credit]
Multimedia Networking
Audio and video compression. H.261, JPEG, MPEG and DVI. Accessing audio and video from a web server. Real Time Streaming Protocol (RTSP). Multimedia operating systems. Multimedia database. Network support for multimedia applications. Multimedia synchronization.
Also offered at the undergraduate level, with different requirements, as NET 4007, for which additional credit is precluded.

ITEC 5112 [0.5 credit]
Secure Mobile Networking
The concept, principle and rationale of mobile networking. Mobile network architecture, protocols, mobility management, routing and mobile TCP/IP; Security challenges, vulnerabilities and threats in mobile networks; Security defense techniques and countermeasures in mobile networks.
Also offered at the undergraduate level, with different requirements, as NET 4010, for which additional credit is precluded.

ITEC 5113 [0.5 credit]
Network Simulation
Introduction to discrete event simulation; fundamental stochastic models for networking; queueing theory; deterministic algorithms for networking; confidence intervals; introduction to network modeling. Simulation exercises including traffic monitoring, congestion, routing protocols, resource utilization and growth planning using OPNET simulation tool.
Also offered at the undergraduate level, with different requirements, as NET 4001, for which additional credit is precluded.

ITEC 5114 [0.5 credit]
Networked Applications
Architectures for computing in modern data networks that adopt the Internet architecture. Topics covered include socket programming, RPC and RMI. Client-server and peer-to-peer models. Emerging application architectures.
Also offered at the undergraduate level, with different requirements, as NET 4005, for which additional credit is precluded.

ITEC 5200 [0.5 credit]
Entertainment Technologies
Advanced topics in entertainment technologies including web-based, film and television, video games and interactive systems.

ITEC 5201 [0.5 credit]
Computer Animation Technologies
Advanced topics in computer animation: full body motion capture, space-time systems, physics-based animation, realistic rendering techniques, industry methods for large scene animations and live action integration; behavioural animation.

ITEC 5202 [0.5 credit]
Visual Effects Technologies
Advanced look at the processes and technologies in visual effects, specifically in advanced processing of virtual sets (e.g. using chroma-keying), lighting and colour integration, filming technologies, motion tracking, and the integration of 3D objects/elements into real scenes.

ITEC 5203 [0.5 credit]
Game Design and Development Technologies
Advanced technologies in the development of computer game systems and gaming experiences; the production process from idea to design: story, level, and character development. Games, game engine, theory and methodology.

ITEC 5204 [0.5 credit]
Emerging Interaction Techniques
Advanced interaction styles and their associated technologies. Topics may include hand held and gestural interactions, ubiquitous computing, deformable user interfaces, physiological computing and tangible user interfaces.

ITEC 5900 [0.5 credit]
Directed Studies
A course of independent study that fits the student's area of interest under the supervision of a faculty member of the School.

ITEC 5905 [1.0 credit]
Network Technology Project
Students pursuing this degree will conduct a networking study, analysis, and/or design project under the supervision of a faculty member in the area of networks.

ITEC 5909 [2.5 credits]
Master's Thesis

ITEC 5910 [0.5 credit]
Selected Topics in Network Technologies
Recent and advanced topics in network technologies. Trends in wireless networking, software defined networks, power-line networking. Students may be expected to contribute to lectures or seminars on selected topics.

ITEC 5920 [0.5 credit]
Selected Topics in Digital Media
Recent and advanced topics in Digital Media. Students may be expected to contribute to lectures or seminars on selected topics.

ITEC 6200 [0.5 credit]
Introduction to Interdisciplinary Research in Digital Media
Introduction to concepts and practices for research in digital media. Understanding the defining properties of digital media and related technologies. Emphasis on bringing together skills related to technology, people and content in order to solve problems and explore new possibilities.

ITEC 6900 [0.5 credit]
Directed Studies
A course of independent study that fits the student's area of interest under the supervision of a faculty member of the School.

ITEC 6907 [0.0 credit]
Doctoral Comprehensive

ITEC 6908 [0.0 credit]
Doctoral Proposal
Within eight terms following initial registration in the program, a document generally defining the problem addressed, relating it to the literature, and outlining the hypotheses, goals, research methodology, initial results and validation approach must be submitted to an examination committee and successfully defended.

ITEC 6909 [8.5 credits]
Doctoral Thesis in Digital Media

ITEC 6920 [0.5 credit]
Selected Topics in Digital Media
Recent and advanced topics in Digital Media. Students are expected to contribute to lectures or seminars.