MASTER OF SCIENCE
APPLIED COMPUTER SCIENCE AND SOCIETY (ACS)

May 10, 2024

Graduate Program Chair: S. Ramanna; **Professors**: Y. Chen, S. Liao, C. Henry; **Associate Professors**: S. Camorlinga; **Assistant Professors**: M. Adedayo, Y. Al Mtawa, M. Beck, C. Valderrama; Administrative Supervisor of Grad Students: Connie Arnhold

DEGREES/PROGRAMS OFFERED M.Sc.
The department offers a Master's program at the graduate level in **Applied Computer Science and Society** with a focus on issues of technology and ethical/human/social aspects of computing. We offer courses in three core clusters that represent frontiers of the discipline. These are: i) *Information Representation, ii) Search and Management, Intelligent Systems,* and iii) *Systems Development.*

AREAS OF RESEARCH
The research interests of our faculty include: advanced research computing, algorithms and complexity, autonomous networks, cloud computing, computational intelligence, computer vision, cybersecurity, data analysis, data warehousing, digital forensics, granular computing, health informatics, image processing, internet of things, machine learning, networks, parallel processing, pattern recognition, rough sets, security and privacy, smart systems, software engineering, web and document databases, and wireless sensor networks. Information about specific research topics can be found on the faculty web pages.
https:// www.acs.uwinnipeg.ca

We offer both thesis-based and course programs. Our thesis-based program is designed to provide an excellent basis for a PhD in computer science or other related fields. Our graduates in the course-based program are well-qualified for employment in industry, the public-sector, and academia.

REQUIREMENTS FOR AN MSc IN APPLIED COMPUTER SCIENCE AND SOCIETY (Thesis-Based)

ADMISSION REQUIREMENT
Students may be admitted to the thesis-based Master's program if they hold an Honours or 4-year Bachelor of Science degree in Applied Computer Science, Computer Science and/or Engineering, Mathematics or equivalent and if they present a suitable selection of courses. A student must have a supervisor selection prior to admission.

- Minimum entry requirement: overall GPA of 3.0.
- English requirement: A minimum TOEFL score of 550 (paper-based), 213 (computer-based), 80 (Internet-based) or International English Language Testing System **IELTS** (6.5) is needed. The test should have been taken within two years of the date a completed application is filed.

Students can also be admitted to the Master's program upon successful completion of a University of Winnipeg designed pre-Master's program which consists of a set of upper-level undergraduate courses. Please contact the Department for details.

APPLICATION DEADLINES
The Department allows students to begin their program in September or January. The application deadline for a September start date is February 1st, and the deadline for January start date is July 1st. Students can apply online at
http://www.uwinnipeg.ca/index/grad-studies-programs

PROGRAM REQUIREMENTS
Students are required to take **a minimum of** 12 credit hours of GACS-7xxx/3 courses, plus GACS-7500 Graduate Thesis. Students are required to write a thesis and successfully defend their thesis in an open oral defense in the presence of a thesis committee. Students must select their courses in consultation with their thesis supervisor.

SECOND LANGUAGE REQUIREMENT: None
EXPECTED TIME TO GRADUATE: 2 years
MAXIMUM TIME REQUIRED TO GRADUATE: 5 years

REQUIRED COURSES
- Minimum **12 credits** from the Applied Computer Science Graduate courses
- **GACS-7500 GRADUATE THESIS**

REQUIREMENTS FOR AN MSc IN APPLIED COMPUTER SCIENCE AND SOCIETY (Course-Based)

ADMISSION REQUIREMENT

Students may be admitted to the course-based Master's program if they hold an Honours or 4-year Bachelor of Science degree in Applied Computer Science, Computer Science and/or Engineering, Mathematics or equivalent and if they present a suitable selection of courses.

- Minimum entry requirement: overall GPA of 3.0 in all computing, mathematics and statistics courses.
- English requirement: A minimum TOEFL score of 550 (paper-based), 213 (computer-based), 80 (Internet-based) or International English Language Testing System **IELTS** (6.5) is needed.
  The test should have been taken within two years of the date a completed application is filed.

APPLICATION DEADLINES
The Department allows students to begin their program in September or January. The application deadline for a September start date is February 1st, and the deadline for January start date is July 1st. Students can apply online at http://www.uwinnipeg.ca/index/grad-studies-programs

PROGRAM REQUIREMENTS

Students are required to take
- **a minimum of** 21 credit hours of GACS-7xxx/3 courses (excluding GACS-7500 thesis course)
- **a minimum of** 9 credit hours of GACS-4xxx/3 courses

SECOND LANGUAGE REQUIREMENT: None
EXPECTED TIME TO GRADUATE: 2 years
MAXIMUM TIME REQUIRED TO GRADUATE: 5 years

SWITCHING from Course-based Program to Thesis-based Program:
Students may switch from *course-based to thesis-based at any time during the* program provided a thesis supervisor is willing to accept them. The department is not responsible for finding thesis supervisors.

SWITCHING from Thesis-based to Course-based Program:
Students may switch from *thesis-based to course-based program after the first term* from the date of registration. A switch can be made only with the written approval of their thesis Supervisor and the Graduate Program Committee Chair.

Applied Computer Science Department Courses

Information Representation, Search and Management Cluster:
- **GACS-7101/3** ADVANCED DATA STRUCTURES AND ALGORITHMS
- **GACS-7102/3** WEB AND DOCUMENT DATABASES
- **GACS-7103/3** SEMANTIC WEB
- **GACS-7104/3** THEORY AND PRACTICE OF SECURITY AND PRIVACY
- **GACS-7105/3** OPERATIONS RESEARCH IN COMPUTER SCIENCE

Intelligent Systems Cluster:
- **GACS-7201/3** BIOMETRICS
- **GACS-7202/3** GRANULAR COMPUTING: FOUNDATIONS AND APPLICATIONS
- **GACS-7203/3** PATTERN RECOGNITION
- **GACS-7204/3** MULTIMEDIA COMPUTING AND APPLICATIONS
- **GACS-7205/3** DIGITAL IMAGE PROCESSING
- **GACS-7206/3** ADVANCED MACHINE LEARNING

Systems Development Cluster:
- **GACS-7301/3** IMPLEMENTATION AND IMPACT OF PEER-TO-PEER SYSTEMS
- **GACS-7302/3** GLOBAL SOFTWARE PROJECT MANAGEMENT
- **GACS-7303/3** ADVANCED TOPICS IN SOFTWARE DESIGN AND ARCHITECTURE
- **GACS-7304/3** COMPUTER SYSTEMS FOR SOCIETY
- **GACS-7305/3** GRADUATE PROJECT
- **GACS-7306/3** APPLIED PARALLEL PROGRAMMING
- **GACS-7307/3** ADVANCED CONCEPTS IN CLOUD COMPUTING

Topics: - GACS-7401/3 CURRENT TOPICS IN COMPUTING

Thesis: - GACS-7500 GRADUATE THESIS

Course-Based 4xxx/3 Courses:
- **GACS-4306/3** APPLIED PARALLEL PROGRAMMING

- **GACS-4902/3** ADVANCED DATABASE SYSTEMS
- **GACS-4904/3** DATA WAREHOUSING
- **GACS-4906/3** CONCEPTUAL MODELLING
- **GACS-4953/3** INTRODUCTION TO MACHINE LEARNING
- **GACS-4954/3** INTRODUCTION TO DRISTRIBUTED SYSTEMS