

# MASTER OF SCIENCE APPLIED COMPUTER SCIENCE AND SOCIETY (ACS)

May 10, 2025

**Graduate Program Chair:** S. Ramanna; **Professors:** Y. Chen; **Associate Professors:** S. Camorlinga; **Assistant Professors:** M. Adedayo, Y. Al Mtawa, B. Rey, M. Beck, Q. Liu, 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](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 1, and the deadline for January start date is July 1. 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 1, and the deadline for January start date is July 1. 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-4921/3** **COMPUTER SECURITY AND PRIVACY**
- **GACS-4953/3** INTRODUCTION TO MACHINE LEARNING
- **GACS-4954/3** INTRODUCTION TO DISTRIBUTED SYSTEMS