Goals of the Master of Science in Computer and Information Systems Program

The master of science in computer and information systems (MSCIS) program is intended to increase the supply of high quality information technology professionals and to contribute to the professional advancement of employees in the information technology workforce. The degree program draws on the strengths of UW-Parkside’s faculty and computing resources in both computer science (CS) and management information systems (MIS). Graduates of this program will have up-to-date information technology knowledge and skills, and practical experience with information systems development and deployment.

All MSCIS graduates will be able to:

- Participate in the justification, specification, design, development, and implementation of modern enterprise systems for an organization, including ERP systems and knowledge management systems.
- Work with computing technology either through:
  - Design, develop, test, and implement software using industry leading practices and/or
  - Design and analyze information technology technical solutions
- Develop a project plan and successfully lead a project team using the project plan.
- Design and implement organizational and IT control mechanisms that lead to a reliable and secure information system.
- Develop long range IT plans including strategic and personnel plans.
- Analyze a problem from a research/modeling perspective.

Requirements for the Master of Science in Computer Information Systems (30 credits)

To achieve the above goals, MSCIS students must complete prerequisite requirements (up to 20 credits that can be waived with undergraduate equivalent courses) and 30 credits distributed as follows: 15 credits of required course work, 3 additional credits in software development or technology implementation, 2-3 additional credits in information technology management, and 9-10 credit hours in a knowledge area. Knowledge areas include software development, information technology management, project management, research/modeling methods, and cybersecurity. With approval from the MSCIS steering committee, students may also design their own knowledge areas. A thesis option is available for those students who would like to eventually pursue a doctoral degree. The requirements and the classes in each knowledge area are specified below:

A. Prerequisites (0-20 credits, depending on background)

- Probability statistics (waived with a grade of C or better in an undergraduate or graduate equivalent course)
  QM 210 or CSCI 309 ....................................................3 cr
- Database management (waived with a grade of C or better in an undergraduate or graduate equivalent course)
  MIS 328 or CSCI 380 ....................................................3 cr
- Computer systems/data communications (waived with a grade of C or better in an undergraduate or graduate equivalent course)
  MIS 327 or CSCI 477 or CSCI 370 ........................................3 cr
- Accounting (waived with a grade of C or better in an undergraduate or graduate equivalent course)
  ACCT 201 Financial Accounting ......................................3 cr

For most knowledge areas, programming proficiency is a required prerequisite. Programming proficiency depends upon results of a placement exam. Two knowledge areas, IT management and cyber-security, can alternatively be entered via an IT administration course sequence.
Programming Proficiency Requirements

A programming proficiency exam is available to determine placement into required prerequisites or to waive the requirement.

CSCI 241 Computer Science I ......................... 5 cr
CSCI 242 Computer Science II ....................... 5 cr

Optional entrance for IT Management or Cyber-Security knowledge areas:

CSCI 274 UNIX Concepts and Tools .............. 1 cr
CSCI 275 UNIX Scripting ............................... 1 cr
CSCI 375 UNIX System Administration ............ 3 cr

B. Required Courses (15 credits)

MBA 716 Project Management ....................... 2 cr
CIS 721 Enterprise Systems ......................... 3 cr
CIS 779 Information Systems Security ............ 3 cr
CIS 795 Research Methods in CIS ................. 3 cr
CIS 798 CIS Seminar ..................................... 1 cr

Choose one, depending on knowledge area:

CIS 626 Information Systems Policy and Strategy .... 3 cr
CIS 774 Modern Software Architectures ............ 3 cr

CIS 774 is required for the following knowledge areas: software development, project management, and research/modeling methods. The IT management and cyber-security knowledge areas may select either CIS 626 or 774.

C. Knowledge Area Courses (15 credits)

The MSCIS courses are divided into five knowledge areas, software development, information technology management, information technology project management, cyber-security, and research and modeling methods.

1. (5-6 credits) Students must complete at least one additional course in software development and one additional course in information technology management.

2. (9-10 credits). Students must select a knowledge area and complete 9-10 additional credits within that area. Six credits of independent study related to a project or thesis may be used to satisfy this requirement.

A course cannot be used to satisfy the requirements in more than one category. The classes must be approved by the MSCIS adviser. A maximum of two 500-level courses and/or two independent studies courses will be accepted for the graduate degree.

Software Development

CIS 523 Mobile Development I ......................... 3 cr
CIS 533 Programming Languages .................... 3 cr
CIS 540 Data Structures and Algorithm Design .... 3 cr
CIS 570 Operating Systems ............................... 3 cr
CIS 605 Artificial Intelligence ...................... 3 cr
CIS 620 Computer Graphics ......................... 3 cr
CIS 621 Computer Vision ............................... 3 cr
CIS 622 Multimedia Systems ......................... 3 cr
CIS 623 Mobile Development II ....................... 3 cr
CIS 640 Compiler Design and Implementation .... 3 cr
CIS 644 Event-Driven Programming ................ 3 cr
CIS 674 Networked Applications .................... 3 cr
CIS 675 Software Engineering – Design .......... 3 cr

CIS 676 Software Engineering – Project Management ................. 3 cr
CIS 677 Computer Communications and Networks ............. 3 cr
CIS 680 Advanced Databases ............................ 3 cr
CIS 745 Web Programming ................................. 3 cr

Information Technology Management

CIS 624 Advanced Business Data Communications ................. 3 cr
CIS 626 Information Systems Policy and Strategy .......... 3 cr
CIS 678 Network Security ................................ 3 cr
CIS 723 Management of Electronic Commerce ........ 2 cr
CIS 727 Business Process Redesign and Improvement ........... 2 cr
MBA 515 Operations Management Foundations ................. 2 cr
MBA 715 Advanced Operations Management ........... 2 cr

Information Technology Project Management

CIS 625 System Analysis and Design .................. 3 cr
CIS 641 Advanced Project Management Tools and Techniques ............. 3 cr
CIS 642 Project Management Simulation ............. 3 cr
CIS 676 Software Engineering – Project Management ................ 3 cr
MBA 744 Management Techniques ...................... 2 cr

Cyber-Security

CIS 624 Advanced Business Data Communications OR
CIS 677 Computer Communications and Networks .............. 3 cr
CIS 645 Web Security ..................................... 3 cr
CIS 678 Network Security ................................ 3 cr
CIS 690 Special Topics in CIS (related to cyber-security) .... 3 cr
CIS 790 Advanced Topics in CIS (related to cyber security) .... 3 cr

Research and Modeling Methods (min. 2 credits)

MBA 712 Quantitative Methods .......................... 2 cr
MBA 713 Decision Analysis .............................. 2 cr
CIS 777 Business Simulation and Modeling .......... 2 cr
CIS 781 Modeling and Optimization Methods ................ 3 cr
CIS 690 Special Topics in CIS (related to research or modeling) .... 3 cr
CIS 790 Advanced Topics in CIS (related to research or modeling) .... 3 cr

Admission Requirements and Application Procedure

To qualify for admission into the MSCIS program, an applicant must submit to the computer science department office:

MSCIS Program
Computer Science Department
University of Wisconsin-Parkside
900 Wood Road
P.O. Box 2000
Kenosha WI 53141-2000
1. A completed application form, along with the application fee payment. The application form can be found online at: https://apply.wisconsin.edu/

2. Official transcripts of all undergraduate and graduate course work, sent directly to the computer science department office. A bachelor's degree from an accredited institution with an undergraduate GPA (UGPA) of at least 3.0 on a 4.0 scale is required.

3. GRE or GMAT scores sent directly to the computer science department office. The GMAT score + 200 times the UGPA must exceed 1000, or the sum of the GRE quantitative and verbal scores must exceed 300 and the analytical writing score must be 4 or higher.

4. A letter of application outlining the applicant's professional goals.

5. Two letters of recommendation sent directly to the computer science department office.

6. International students must also submit a sponsorship form and a transcript evaluation. International students whose native language is not English must submit evidence of English proficiency, normally by presenting a satisfactory score on the TOEFL or IELTS exam.

7. Additional materials in support of the applicant, as appropriate.

Contact the computer science department office for information about application deadlines.

At the discretion of the program faculty, students with minor deficiencies in items 2 and 3 may be conditionally accepted into the MSCIS program if they can otherwise demonstrate significant potential for success.

Grade Point Average Requirement
Students must maintain a minimum GPA of 3.0 in all course work required for the MSCIS degree to continue and complete in the degree program.

Disruption of Studies
Students are expected to complete MSCIS degree requirements in two to three years, depending on preparation. An MSCIS degree candidate who fails to complete the degree within five years after admission will be dropped from the program. A degree candidate who does not enroll in an MSCIS course within a period of 12 months must apply for readmission.

Transfer Students
Students may transfer up to 12 credits of graduate work taken at another institution, subject to equivalence with MSCIS courses. Only courses with a grade of B (3.0 on a 4.0 scale) or better will be accepted. Transfer courses are not counted toward the UW-Parkside GPA requirement of 3.0 in MSCIS course work.

Master of Science in Computer and Information Systems Courses (CIS)

523 Mobile Development I .................................................3 cr
Prereq: C or better in CSCI 242, or consent of instructor. Freq: Occasionally.
Examines existing tools, environments and programming languages for developing applications for mobile devices on the Android platform. Explores current research on mobile applications and future trends. Not open to those with credit in CSCI 323.

533 Programming Languages .........................................3 cr
Prereq: CSCI 242 and consent of instructor. Freq: Spring.
Introduction to the syntax and semantic issues in programming languages and their effect on language implementation. This includes methods to specify languages, data storage, and the sequence of control in programs. Non-procedural languages, including functional and logic languages, will be examined. Not open to those with credit in CSCI 333.

540 Data Structures and Algorithm Design ....................3 cr
Prereq: CSCI 242 with B or better, or consent of instructor. Freq: Spring.
Study of the design, implementation and analysis of computer algorithms; time and space requirements for sorting, searching, graph theory, mathematics and string processing algorithms. Not open to those with credit in CSCI 340.

570 Operating Systems ................................................3 cr
Prereq: CSCI 242 with B or better. Freq: Fall.
Operating system concepts, process definition and implementation, deadlock, memory management and protection, distributed system architecture, and case studies. Not open to those with credit in CSCI 370.

605 Artificial Intelligence ..............................................3 cr
Prereq: CSCI 333 or CIS 533 or consent of instructor. Freq: Occasionally.
Introduction to Artificial Intelligence (AI) techniques that include search, game playing, and knowledge representation. Specific sub-disciplines of AI including natural language processing and neural networks. Programming assignments in both Prolog and LISP. Not open to those with credit in CSCI 405.

609 Human-Computer Interfaces ..................................3 cr
Prereq: Consent of instructor. Freq: Occasionally.
A survey of the field of human-computer interaction including the user interface development process, human memory, perception, and motor abilities as they relate to user interface design. Qualitative overview of descriptive and inferential statistics. Students design a low-tech prototype of a user interface (user and task analysis, design and evaluation). Not open to those with credit in CSCI 409.

620 Computer Graphics ...............................................3 cr
Prereq: CS 340 or CIS 540 or consent of instructor. Freq: Occasionally.
Graphics hardware and software, techniques for representation and visualization, two- and three-dimensional transformations, concepts and techniques of visual realism. Not open to those with credit in CSCI 420.

621 Computer Vision ..................................................3 cr
Prereq: CSCI 340 or 333; or CIS 540 or 533. Freq: Occasionally.
Review of algebra of matrices and partial differentiation. Introduction to Machine Vision and Image Processing including image formation, thresholding, image filtering, edge detection, image segmentation, image data compression, image similarity and some dynamic vision. Not open to those with credit in CSCI 421.

622 Multimedia Systems ..............................................3 cr
Prereq: Consent of instructor. Freq: Occasionally.
Principles and design of multimedia systems; implementation of multimedia algorithms; current multimedia technologies. Not open to those with credit in CSCI 422.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Prerequisites</th>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>623</td>
<td>Mobile Development II</td>
<td>3 cr</td>
<td>C or better in CSCI 323 or CIS 523; consent of instructor.</td>
<td>Occasionally</td>
<td>Examines existing tools, environments and programming languages for developing applications for mobile devices on the iOS platform. Explores current research on mobile applications and future trends. Not open to those with credit in CSCI 423.</td>
</tr>
<tr>
<td>624</td>
<td>Advanced Business Data Communications</td>
<td>3 cr</td>
<td>MIS 327 or CSCI 477. Freq: Fall.</td>
<td></td>
<td>Fundamentals of transmission protocols and network services. Setting up and configuring network protocols, routing, security, and networking services such as name resolution and dynamic addressing. Lab exercises and case studies. Not open to those with credit in MIS 424. This course may be offered online.</td>
</tr>
<tr>
<td>625</td>
<td>System Analysis and Design</td>
<td>3 cr</td>
<td>MIS 328 or CSCI 380. Freq: Spring.</td>
<td></td>
<td>System development using the life cycle, rapid application development, prototyping, software acquisition, structured and object-oriented techniques and project management. Not open to those with credit in MIS 425. This course may be offered online.</td>
</tr>
<tr>
<td>626</td>
<td>Information Systems Policy and Strategy</td>
<td>3 cr</td>
<td>Consent of instructor. Freq: Fall.</td>
<td></td>
<td>The management of Information Technology (IT) and Information Systems (IS) from the perspective of upper management, covering IT strategic planning, IS organizational structures, human resource planning, and control structures. Cases, executive presentations, and project work included.</td>
</tr>
<tr>
<td>640</td>
<td>Compiler Design and Implementation</td>
<td>3 cr</td>
<td>CSCI 333 or CIS 533. Freq: Occasionally.</td>
<td></td>
<td>Theory, design and implementation of compilers and other syntax-directed systems. Applies techniques of finite state machines, lexical analysis, symbol tables, parsing, storage allocation and code generation to the development of a compiler. Laboratory work included. Not open to those with credit in CSCI 440.</td>
</tr>
<tr>
<td>641</td>
<td>Advanced Project Management Tools and Techniques</td>
<td>3 cr</td>
<td>PMGT 341 or MBA 716 or CIS 676. Freq: Yearly.</td>
<td></td>
<td>Covers advanced tools and technologies of project management, including Microsoft Project, Microsoft Excel, Work Breakdown Structure (WBS), budgeting a project, scheduling a project using PERT/CPM, allocating scarce resources, critical chain and critical path, resource leveling, monitoring the project costs, evaluating and terminating a project. Not open to those with credit in PMGT 441.</td>
</tr>
<tr>
<td>642</td>
<td>Project Management Simulation</td>
<td>3 cr</td>
<td>PMGT 341 or MBA 716 or CIS 676. Freq: Yearly.</td>
<td></td>
<td>Topics include project scheduling, risk analysis, earned value and teamwork. Students apply project management skills to a simulated or live project, develop project justification and project plan, and execute the project plan and track performance. Not open to those with credit in PMGT 442.</td>
</tr>
<tr>
<td>644</td>
<td>Event-Driven Programming</td>
<td>3 cr</td>
<td>CS 370 or CIS 570 or consent of instructor.</td>
<td>Occasionally</td>
<td>Origins of events; the event-driven programming model; interrupt processing as event handling; client-server architectures; windowing environments and GUI programming; development support software; and case studies. Project work included. Not open to those with credit in CSCI 444.</td>
</tr>
<tr>
<td>654</td>
<td>Web Security</td>
<td>3 cr</td>
<td>CSCI 242 or consent of instructor.</td>
<td>Occasionally</td>
<td>Vulnerabilities of web languages, interfaces, servers and databases. Identifying and avoiding vulnerabilities with shopping carts, HTTP/HTTPS and the URL. Detecting and preventing hacking techniques such as cyber graffiti, e-shoplifting, impersonation, buffer overflows and cross-site scripting. Not open to those with credit in CSCI 445.</td>
</tr>
<tr>
<td>674</td>
<td>Networked Applications</td>
<td>3 cr</td>
<td>C or better in CSCI 423 or CIS 623; consent of instructor.</td>
<td>Freq: Fall</td>
<td>Explores server-side application programming concepts. Topics include server architectures, communication protocols, relational databases and database connectivity, dynamic content delivery and communication security. Not open to those with credit in CSCI 424</td>
</tr>
<tr>
<td>675</td>
<td>Software Engineering-Design</td>
<td>3 cr</td>
<td>CSCI 242 with B or better, or consent of instructor.</td>
<td>Freq: Fall</td>
<td>An introduction to UML design and teamwork in the development of a larger software system. The use of UML use case, activity, class/object, interaction, and state diagrams in the creation of efficient designs and systems. Not open to those with credit in CSCI 475.</td>
</tr>
<tr>
<td>676</td>
<td>Software Engineering-Project Management</td>
<td>3 cr</td>
<td>CIS 625 or 675. Freq: Spring.</td>
<td></td>
<td>Software development from an engineering perspective including software development models, team organization and management, implementation strategies, software testing and verification, and project cost estimation. Students will demonstrate their mastery of software engineering design and development strategies through implementation of a significant team-based project. Not open to those with credit in CSCI 476.</td>
</tr>
<tr>
<td>677</td>
<td>Computer Communications and Networks</td>
<td>3 cr</td>
<td>B or better in CSCI 242 or CSCI 570, or consent of instructor.</td>
<td>Freq: Occasionally</td>
<td>Transmission protocols, layered network protocols, network topology, message routing, performance analysis, security, and case studies. Not open to those with credit in CSCI 477.</td>
</tr>
<tr>
<td>678</td>
<td>Network Security</td>
<td>3 cr</td>
<td>MIS 327 or CSCI 370 or 375. Freq: Occasionally.</td>
<td></td>
<td>Computer and network security related to operating systems, networks and system administration issues; hacking, incident response, firewalls, VPNs, intrusion detection, and auditing. Not open to those with credit in CSCI 478.</td>
</tr>
<tr>
<td>690</td>
<td>Special Topics in CIS</td>
<td>3 cr</td>
<td>Consent of instructor. Freq: Spring.</td>
<td></td>
<td>In-depth study of new and/or special-interest subject areas within the discipline. Subject selection will vary from offering to offering.</td>
</tr>
<tr>
<td>721</td>
<td>Enterprise Systems</td>
<td>3 cr</td>
<td>Consent of instructor. Freq: Fall.</td>
<td></td>
<td>Explores common enterprise systems that are used across organizations including enterprise resource planning systems, customer relationship management systems, and knowledge management. Include technical architecture of integrated systems and relationships to the organization’s business processes.</td>
</tr>
<tr>
<td>723</td>
<td>Management of Electronic Commerce</td>
<td>2 cr</td>
<td>Consent of instructor. Freq: Occasionally.</td>
<td></td>
<td>Electronic commerce (e-commerce) technology; developing an e-commerce architecture, business-to-consumer and business-to-business e-commerce, e-commerce planning, and social implications.</td>
</tr>
<tr>
<td>727</td>
<td>Business Process Redesign and Improvement</td>
<td>2 cr</td>
<td>Consent of instructor. Freq: Occasionally.</td>
<td></td>
<td>Cost reduction, service improvements, supply chain management, and time-to-product speedups through information technology; business process improvement (BPI) methodologies; analysis, modeling, and redesign of a system. Case studies and projects included.</td>
</tr>
</tbody>
</table>
**745 Web Programming** ................................................................. 3 cr
Prereq: MIS 328 or CSCI 480. Freq: Spring.
Essentials of developing and deploying robust applications for the World Wide Web, including client-side markup languages and scripting, applets, client/server communication, server-side applications, database connectivity, distributed components, and multi-tiered architectures.

**774 Modern Software Architectures** ........................................... 3 cr
Prereq: Consent of instructor. Freq: Fall.
Study of a variety of software architectures including: client-server, thin client, multi-tiered, distributed and parallel systems. Emphasis will be placed on both understanding where each type of system is used in modern industry and on designing and developing programs in each.

**777 Business Simulation and Modeling** ...................................... 2 cr
Prereq: MBA 712, OM 210 or CSCI 309 or equivalent; MBA 715 or OM 319 or equivalent. Freq: Spring.
Focuses on modeling the situations that are commonly observed in manufacturing or service industries. Students will learn follow up analysis on simulation results and how to make appropriate business decisions.

**779 Information Systems Security** .............................................. 3 cr
Prereq: CSCI 242 and either CSCI 380 or MIS 328. Freq: Spring.
Introduction to information systems security; considers technical, administrative, and physical aspects of IT security; topics include fraud, risk, information protection, business continuity, network security, auditing, and security planning and governance.

**781 Modeling and Optimization Methods** ................................. 3 cr
Prereq: Graduate standing. Freq: Occasionally.
Introduction to simulation, optimization and other types of models used to support organizational decisions. Multiple languages, tools, and techniques are explored.

**790 Advanced Topics in CIS** .................................................... 3 cr
Prereq: Consent of instructor. Freq: Spring.
In-depth study of new and/or special-interest subject areas within the discipline. Subject selection will vary from offering to offering.

**793 Internship in Computer Information Systems** ....................... 1-2 cr
Prereq: Consent of instructor. Freq: Fall, Spring, Summer.
Participation in the technical activities of an ongoing organization under the joint guidance and supervision of a member of the organization and a member of the faculty. Grading will be on a credit/no-credit basis. A student may register and receive credit in this course for a maximum of 6 credits.

**795 Research Methods in CIS** .................................................. 3 cr
Prereq: A minimum of 6 credits in CIS courses. Freq: Occasionally.
Explores research methods used in the computer and information systems discipline including quantitative and qualitative methods. Reviews current research in CIS.

**796 CIS Project** ........................................................................ 1 cr
Prereq: Consent of instructor. Freq: Occasionally.
Completion of a CIS project in conjunction with another 600- or 700-level CIS course; includes project documentation and oral and written reports.

**797 CIS Thesis** ......................................................................... 1-4 cr
Prereq: Consent of instructor. Freq: Fall, Spring, Summer.
Student conducts research under the direction of a faculty member and produces a master’s level thesis in a CIS subject. For students ultimately interested in pursuing doctoral studies.

**798 CIS Seminar** ...................................................................... 1 cr
Prereq: Consent of instructor. Freq: Spring.
Social, legal and ethical issues in computing, including: privacy, encryption, reliability and risk, free speech, computer crime, intellectual property rights. Personal and professional ethics. An emphasis will be placed on students further developing nontechnical professional skills, including writing and oral presentations.

**799 Independent Study** ............................................................. 1-4 cr
Prereq: Consent of instructor. Freq: Fall, Spring.
Independent work on a specific problem in CIS under the supervision of faculty.