

COMPUTER AND INFORMATION SYSTEMS (MS)

Department website (<https://www.uwp.edu/learn/programs/mscis.cfm>)

College: College of Business, Economics, and Computing

The master of science in computer and information systems (MSCIS) program is intended to increase the supply of high quality information technology professionals and 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 advance in their careers with up-to-date information technology knowledge and skills, and practical experience with information systems development and deployment.

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.

Program Learning Outcomes

1. Analyze an IT/IS or business system using data science techniques.
2. Work with computing technology through: Design, develop, test, and implement software using industry leading practices and/ or Develop information technology technical solutions. Lead and manage IT projects using project management principles. Design and implement organizational and IT control mechanisms that lead to a reliable and secure information system. Use research methods to investigate a problem from a technical, management, and ethical perspective. Communicate Information Systems principles and practices effectively and professionally within an enterprise.

Program-Specific Policies

Transfer Students

Students may transfer up to 12 credits of graduate work taken at another accredited institution, with a maximum of 3 transfer credits applied toward their concentration. Transferability is 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.

Additional Program Policies

A maximum of two 500-level courses and/or a maximum of three credits in independent study courses will be accepted for the graduate degree. Additionally, independent study courses will only be approved in extenuating circumstances in which other regular needed CIS graduate courses are not available in that particular academic term, and waiting for their offering would impact the expected student graduation date. The classes must be approved by the MSCIS advisor.

Requirements for the Master of Science in Computer and Information Systems

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.

To achieve the goals, MSCIS students must complete prerequisite requirements (up to 20 credits that can be waived with undergraduate equivalent courses) and a minimum of 30 credits distributed as follows: 15 credits of required course work, 9 credit hours in a concentration and 6 credit hours as electives.

Concentrations enable students to specialize in their education toward a particular career goal. Concentrations include cyber-security, data science, information technology management and software development. A thesis option is available for those students who would like to eventually pursue a doctoral degree. The requirements and the classes in each concentration area are specified below.

Code	Title	Credits
Prerequisites		
0 to 15 credits, depending on background and selected concentration area		0-15
<i>Database Management</i> ¹		
CSCI 380	Database Management Systems	
or MIS 328	Database Management Systems	
<i>Computer Systems/Data Communications</i> ¹		
Select one of the following:		
CSCI 370	Operating Systems	
CSCI 477	Computer Communications and Networks	
MIS 327	Cloud Computing in Business	
<i>Programming Proficiency Requirements</i> ²		
The normal path to ensure programming proficiency includes the following courses:		
CSCI 241	Computer Science I	
CSCI 242	Computer Science II	
Required Program Core Courses		
MBA 716	Project Management	2
CIS 710	Data Science for Computer Information Systems	3
CIS 774	Programming Paradigms	3
CIS 779	Information System Security	3
CIS 795	Research Methods in Computer and Information Systems	3
CIS 798	Computer and Information Systems Seminar	1
Concentration Courses		
Students must select a concentration area ³		9
Elective Courses ⁴		6
Total Credits		30-45

¹ Waived with a grade of C or better in an undergraduate or graduate equivalent course.

² For the software development concentration only, programming proficiency is a required prerequisite. A programming proficiency exam is available to determine placement into required prerequisites or to waive the requirement.

³ Students must select a concentration and complete a minimum of nine credits within that area. A maximum of three credits of independent study related to a project or thesis may be used to satisfy this requirement.

A student may complete a maximum of two concentrations as part of the degree program. A course cannot be used to satisfy the requirements in more than one concentration.

⁴ Students must also complete six credits of electives to ensure 30 credits overall are completed for the degree. These credits may be chosen from any of the concentration areas, may include internship or independent studies, or may choose courses from other graduate programs, with advisor approval.

Concentration Areas

MSCIS courses are divided into four concentration areas: cyber-security, data science, information technology management and software development.

CyberSecurity

Code	Title	Credits
CIS 624	Advanced Business Data Communications	
or CIS 635	Linux System Administration	
or CIS 677	Computer Communications and Networks	
CIS 645	Web Application Security	
CIS 678	Network Security	
CIS 681	Security Risk	

Special Topics courses CIS 690 and CIS 790 can be used when the topic is related to the concentration. An Executive Action form will need to be submitted by the department.

Data Science

Code	Title	Credits
CIS 605	Artificial Intelligence	
CIS 611	Data Science Programming and Visualization	
CIS 612	Data Mining and Machine Learning	
CIS 614	Deep Learning	
CIS 615	Data Science/Machine Learning Project	
MBA 729	Technologies For Data Analytics	
MBA 761	Optimization Techniques	
MBA 762	Supply Chain Analytics	

Special Topics courses CIS 690 and CIS 790 can be used when the topic is related to the concentration. An Executive Action form will need to be submitted by the department.

Information Technology Management

Code	Title	Credits
CIS 624	Advanced Business Data Communications	
CIS 625	Systems Analysis and Design	
CIS 641	Advanced Project Management Tools and Techniques	
CIS 642	Project Management Simulation	
CIS 645	Web Application Security	
CIS 678	Network Security	
CIS 681	Security Risk	
MBA 502	Accounting and Finance Fundamentals For Business	
MBA 715	Advanced Operations Management	

MBA 718	Global Supply Chain Management
MBA 720	Information Technology for Business Decision Making
MBA 729	Technologies For Data Analytics
MBA 761	Optimization Techniques
MBA 762	Supply Chain Analytics

Special Topics courses CIS 690 and CIS 790 can be used when the topic is related to the concentration. An Executive Action form will need to be submitted by the department.

Software Development

Code	Title	Credits
CIS 523	Mobile Development in Android	
CIS 524	Mobile Development in iOS	
CIS 540	Data Structures and Algorithm Design	
CIS 570	Operating Systems	
CIS 605	Artificial Intelligence	
CIS 620	Computer Graphics	
CIS 621	Computer Vision	
CIS 640	Compiler Design and Implementation	
CIS 645	Web Application Security	
CIS 674	Client/Server Development	
CIS 675	Software Engineering Principles and Practice I	
CIS 676	Software Engineering/Project Management	
CIS 677	Computer Communications and Networks	
CIS 680	Advanced Databases	

Special Topics courses CIS 690 and CIS 790 can be used when the topic is related to the concentration. An Executive Action form will need to be submitted by the department.

University Requirements for Master's Degree Programs

To receive a master's degree from UW-Parkside, students must meet the following minimum requirements (note that individual programs may impose more stringent requirements):

1. Complete at least 30 graduate credits, of which no more than 12 may be transferred from another institution.
2. Have an overall GPA of at least 3.00 for all graduate work taken at UW-Parkside that is applicable to the degree program.
3. Satisfy all requirements of the graduate degree program.

Students may take no more than seven years to complete a degree, beginning with the semester in which they complete their first course as a UW-Parkside degree-seeking graduate student, unless they apply for and receive an extension through the appropriate graduate program. Some programs may impose a shorter time limit. To graduate, students must file a request for graduation. The request form, signed by the student's advisor and filed in the appropriate graduate program office, initiates the final review of the candidate's records. Students also need to apply to graduate with the Office of the Registrar.

To qualify for admission into the MSCIS program, an applicant must apply to the MSCIS Program online as indicated below, and submit all required documents to the Admissions Office.

Admissions Office
University of Wisconsin-Parkside

900 Wood Road
P.O. Box 2000
Kenosha WI 53141-2000

Admission requirements include those listed below.

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 Admissions Office. A bachelor's degree from an accredited institution with an undergraduate GPA of at least 3.0 on a 4.0 scale is required. Applicants with undergraduate degrees from international universities must also submit a WES or ECE transcript analysis.
3. GRE or GMAT scores sent directly to the Computer Science department office. The GRE or GMAT can be waived for students from U.S. regionally accredited universities with computer science, engineering, or management information systems majors, or others with undergraduate GPA above 3.2.
4. A resume that details the applicant's education and work history (recommended, not required).
5. Two letters of recommendation sent directly to the Admissions Office (recommended, not required).
6. International students must also submit a sponsorship form and an ECE or WES 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. The TOEFL/IELTS is waived for graduates of universities from English-speaking countries.
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 MSCIS program faculty, students with minor deficiencies in items 2 and 3 may be conditionally accepted into the program if they can otherwise demonstrate significant potential for success.

Courses in Computer and Information Systems

CIS 523 | Mobile Development in Android | 3 cr

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. Multi-career cross-listing: CSCI 323.

Prerequisites: CSCI 242 with C or better, or consent of instructor.
Offered: Fall.

CIS 524 | Mobile Development in iOS | 3 cr

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. Multi-career cross-listing: CSCI 324.

Prerequisites: CSCI 242 with C or better, or consent of instructor.
Offered: Spring.

CIS 540 | Data Structures and Algorithm Design | 3 cr

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. Multi-career cross-listing: CSCI 340.

Prerequisites: CSCI 242 with B or better or consent of instructor.
Offered: Spring.

CIS 570 | Operating Systems | 3 cr

Operating system concepts, process definition and implementation, dead-lock, memory management and protection, distributed system architecture, and case studies. Not open to those with credit in CSCI 370. Multi-career cross-listing: CSCI 370.

Prerequisites: CSCI 242 with C or better.
Offered: Fall.

CIS 605 | Artificial Intelligence | 3 cr

Introduces Artificial Intelligence (AI) techniques that include search, game playing, and knowledge representation. Includes specific subdisciplines 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. Multi-career cross-listing: CSCI 405.

Prerequisites: CSCI 333, or CIS 533 with a grade of C or better, or consent of instructor.
Offered: Occasionally.

CIS 611 | Data Science Programming and Visualization | 3 cr

Surveys common programming languages for data science with visualization. Explores the development of applications for data-centric software used to visualize and extract actionable knowledge and insights from a collection of heterogeneous data sources that answer specific scientific, socio-political, or business questions. Not open to those with credit in CSCI 411. Multi-career cross-listing: CSCI 411.

Prerequisites: CSCI 410 or CIS 710 or consent of instructor.
Offered: Spring.

CIS 612 | Data Mining and Machine Learning | 3 cr

Explores data mining methods and procedures for diagnostic and predictive analytics. Includes association rules, clustering algorithms, tools for classification, and ensemble methods. Emphasizes computer implementation and applications. Multi-career cross-listing: CSCI 412. Not available for students with credit in: CSCI 412.

Prerequisites: CSCI 410 or CIS 710 or consent of instructor.
Offered: Fall.

CIS 613 | Big Data Analysis | 3 cr

Introduces the efficient processing of large data sets, including non-relational databases and algorithms that allow for the distributed processing of large data sets across clusters. Not open to those with credit in CSCI 413. Multi-career cross-listing: CSCI 413.

Prerequisites: CSCI 410 or CIS 610 or consent of instructor.
Offered: Occasionally.

CIS 614 | Deep Learning | 3 cr

Introduces deep learning, a branch of Machine Learning inspired by the human brain network. Explores several types of neural network architectures (e. g., feedforward, convolutional (CNN), and recurrent (RNN) networks). Covers building a Natural Language Processing (NLP) based sentiment analysis system with Long short-term memory (LSTM) neural network.

Prerequisites: CSCI 309 and 411; or CIS 611 and 710; or consent of instructor.
Offered: Occasionally.

CIS 615 | Data Science/Machine Learning Project | 3 cr

Develops practical experience via a data science research project, including applying various machine learning models, researching concepts, and preparing research articles. Multi-career cross-listing: CSCI 415. Not available for students with credit in: CSCI 415.

Prerequisites: CSCI 410 or CSCI 405 or CIS 605 or CIS 710 or instructor consent.

Offered: Occasionally.

CIS 620 | Computer Graphics | 3 cr

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. Multi-career cross-listing: CSCI 420.

Prerequisites: CSCI 340 or CIS 540 or consent of instructor.

Offered: Occasionally.

CIS 621 | Computer Vision | 3 cr

Reviews 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. Multi-career cross-listing: CSCI 421.

Prerequisites: CSCI 242 with a grade of C or better.

Offered: Occasionally.

CIS 624 | Advanced Business Data Communications | 3 cr

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. Multi-career cross-listing: MIS 424.

Prerequisites: CSCI 477 or MIS 327.

Offered: Fall.

CIS 625 | Systems Analysis and Design | 3 cr

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 or CSCI 475. This course may be offered online. Distance Learning Fees apply if online. Multi-career cross-listing: MIS 425.

Prerequisites: CSCI 380 or MIS 328.

Offered: Spring.

CIS 635 | Linux System Administration | 3 cr

Covers Linux system administration concepts and techniques including system organization, kernel configuration, device management, system files and runtime maintenance, software configuration and installation, and network configuration; comparison of Linux with other operating systems. Two-hour lecture; two-hour lab. Enrollment in Lecture (001) and Lab (L081) required. Multi-career cross-listing: CSCI 435. Not available for students with credit in: CSCI 435.

Prerequisites: CSCI 275 with grade of C or better.

Offered: Spring.

CIS 640 | Compiler Design and Implementation | 3 cr

Theory, design and implementation of compilers and other syntax-directed systems. Applies techniques of finite state machines, lexical analysis, symbol tables, parsing, storage allocations and code generation to the development of a compiler. Laboratory work included. Multi-career cross-listing: CSCI 440. Not open for students with credit in CSCI 440.

Prerequisites: CSCI 333 or CIS 533.

Offered: Occasionally.

CIS 641 | Advanced Project Management Tools and Techniques | 3 cr

Covers advanced tools and techniques of project management, including Microsoft Project, and 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. Multi-career cross-listing: PMGT 441.

Prerequisites: PMGT 341 or MBA 716 or CIS 676.

Offered: Yearly.

CIS 642 | Project Management Simulation | 3 cr

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. Topics include project scheduling, risk analysis, earned value, and teamwork. Not open to those with credit in PMGT 442. Multi-career cross-listing: PMGT 442.

Prerequisites: PMGT 341 or MBA 716 or CIS 676.

Offered: Yearly.

CIS 644 | Event-Driven Programming | 3 cr

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. Multi-career cross-listing: CSCI 444.

Prerequisites: CSCI 370 or CIS 570 or consent of instructor.

Offered: Occasionally.

CIS 645 | Web Application Security | 3 cr

Explores vulnerabilities and defenses of web-based software systems. Covers web architecture, document security, authentication and attacks and defenses of client-side controls, authentication, session management, access controls, data stores and back-end components. Multi-career cross-listing: CSCI 445. Not available for those with credit in: CSCI 445.

Prerequisites: CSCI 242 or 322 with a grade of C or better (in either).

Offered: Occasionally.

CIS 669 | Embedded Systems Designs | 3 cr

Covers firmware and hardware development. Includes assembly and/or C programming of micro-controllers, interrupt processing, basic hardware and logic design, programming micro-controller peripherals like Analog/Digital Converters (ADC & DAC), timers, Pulse Width Modulation (PWM), comparators, programming and using serial interfaces, basics of printed boards design. Multi-career cross-listing: CSCI 469.

Prerequisites: CSCI 245.

Offered: Fall.

CIS 674 | Client/Server Development | 3 cr

Explores server-side application programming concepts. Includes server architectures, communication protocols, relational databases and database connectivity, dynamic content delivery and communication security. Multi-career cross-listing: CSCI 424.

Prerequisites: CSCI 324 or CIS 524 with C or better (in either).

Offered: Fall.

CIS 675 | Software Engineering Principles and Practice I | 3 cr

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. Multi-career cross-listing: CSCI 475.

Prerequisites: CSCI 242 with B or better or consent of instructor.

Offered: Fall.

CIS 676 | Software Engineering/Project Management | 3 cr

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. Multi-career cross-listing: CSCI 476.

Prerequisites: CIS 625 or 675.

Offered: Spring.

CIS 677 | Computer Communications and Networks | 3 cr

Examines transmission protocols, layered network protocols, network topology, message routing, performance analysis, security, and case studies. Not open to those with credit in CSCI 477. Multi-career cross-listing: CSCI 477.

Prerequisites: B or better in CSCI 242, or CIS 570 or consent of instructor.

Offered: Occasionally.

CIS 678 | Network Security | 3 cr

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. Multi-career cross-listing: CSCI 478.

Prerequisites: CSCI 370, CSCI 375 or MIS 327.

Offered: Spring.

CIS 680 | Advanced Databases | 3 cr

Reviews relational database languages such SQL and Relational Algebra, query optimization techniques. Non-relational database models including object-oriented databases. XML databases, deductive databases. Data mining, transaction management, concurrency control, text retrieval, and web data management. Not open to those with credit in CSCI 480. Multi-career cross-listing: CSCI 480.

Prerequisites: CSCI 380 with C or better.

Offered: Occasionally.

CIS 681 | Security Risk | 3 cr

Focuses on risk analysis, including qualitative, quantitative, and ethical risk. Involves investigating an industry or topic of choice, delving into sources of risk information, researching regulation and statistics, and developing a comprehensive analysis of risk related to the selected topic. Multi-career cross-listing: CSCI 481. Not available for students with credit in: CSCI 481.

Prerequisites: CIS 678 or CIS 779.

Offered: Occasionally.

CIS 690 | Special Topics in Computer and Information Systems | 3 cr

In-depth study of new and/or special-interest subject areas within the discipline. May repeat with different topic.

Prerequisites: Consent of instructor.

Offered: Occasionally.

CIS 710 | Data Science for Computer Information Systems | 3 cr

Examines key data science concepts, methods, and processes.

Addresses issues for developing, managing and supporting data-driven decision-making in the organization. Provides knowledge and tools for incorporating data science into IT project workflows including data analytics, data warehousing, machine learning, and artificial intelligence.

Prerequisites: CSCI 242 or CIS 774 or concurrent enrollment in CIS 774.

Offered: Fall.

CIS 774 | Programming Paradigms | 3 cr

Explores a variety of computer programming paradigms such as functional, logic, declarative, procedural, concurrent, multi-paradigm and block-based coding. Requires developing computer programs in at least four paradigms.

Prerequisites: CSCI 241.

Offered: Fall.

CIS 779 | Information System Security | 3 cr

Introduces technical, administrative, and physical aspects of IT security. Includes fraud, risk, information protection, business continuity, network security, auditing, and security planning and governance.

Prerequisites: CSCI 380 or MIS 328 or CIS 774 or consent of instructor.

Offered: Spring.

CIS 790 | Advanced Topics in Computer and Information Systems | 3 cr

In-depth study of new and/or special-interest subject areas within the discipline. Subject selection will vary from offering to offering.

Prerequisites: Consent of instructor.

Offered: Spring.

CIS 793 | Internship | 1-2 cr

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. May be repeated for a maximum of 6 credits.

Prerequisites: Consent of instructor and department chair.

Offered: Fall, Spring, Summer.

CIS 795 | Research Methods in Computer and Information Systems | 3 cr

Explores research methods used in the computer and information systems discipline including quantitative and qualitative methods. Reviews current research in CIS.

Prerequisites: A minimum of 6 credits in CIS courses.

Offered: Yearly.

CIS 796 | Computer and Information Systems Project | 1 cr

Completion of a CIS project in conjunction with another 600- or 700-level CIS course; includes project documentation and oral and written reports.

Prerequisites: Consent of instructor.

Offered: Occasionally.

CIS 798 | Computer and Information Systems Seminar | 1 cr

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.

Prerequisites: Consent of instructor.

Offered: Spring.

CIS 799 | Independent Study | 1-4 cr

Independent work on a specific problem in CIS under the supervision of faculty.

Prerequisites: Consent of instructor and department chair.

Offered: Fall, Spring.