

# Master of Science in Computer Science Information Systems

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1. **General Admission Requirements.** Admission to Graduate Studies (see graduate admission requirements).
2. **Program Admission.** In addition to meeting university admissions requirements for a graduate degree, admission to the M.S. in Computer Information Systems (MS-CIS) program is based on an evaluation by the program's admission committee of the following information:
  1. A resume reflecting work experience and educational background.
  2. A one-page essay that states the student's reasons for applying to the program and HIST or her career goals and research and scholarly interests, if any.
  3. Submit official GRE or GMAT scores and have an Admissions index of 1,400/980 or higher (See Graduate Admission Index page)
  4. Evidence of having completed undergraduate or graduate coursework in the following areas:
    - a. 3 s.h. of Calculus, Discrete Structures (MATH 3362), Discrete Mathematics, or Operations Research (MATH 3347)
    - b. 3 s.h. of Statistics (MATH 3391)
    - c. 3 s.h. of Information Systems in Organizations (COSC 3325)
    - d. 3 s.h. of Principles of Management (MGMT 3311, or MGMT 6351)
    - e. 3 s.h. of upper division Accounting, or 6 s.h. of lower division Principles of Accounting I and II, or ACCT 6351
    - f. 6 s.h. of programming and data structures using an object-oriented programming language. Students who do not have this preparation can take the following leveling courses to replace the programming requirement.
      - i. COSC 3317 Object Oriented Programming and Design
      - ii. COSC 3315 Application Design using GUI and Database
  5. Documentation of prior learning which satisfies program prerequisite knowledge in part or full. The student may submit to the CIS Graduate Program Advisor a portfolio of work for evaluation for exempting one or more prerequisite/leveling courses. Such work may include non-credit or non-academic course work, certifications held and other demonstrated experience or knowledge in the subject area. Such exemption will be solely at the discretion of the CIS Graduate Program Advisor, and may involve interviews, tests, or contact of references. No such waiver for non-academic experience will be done for any part of the 36 semester hours beyond the prerequisite/leveling courses.
3. **Program Admission under the "Three-Year Bachelor Bridge Program" option.** Graduates of three- year Bachelors degree programs who otherwise satisfy all the international admission requirements for the MS program in Computer Information Systems (MS-CIS,) and have the equivalent of a minimum 90 undergraduate semester credit hours, will be admitted as graduate students with the additional requirement that they must complete the Bridge program that would bring their total credit hours to the 120 hours required for a UHV bachelor's degree. Completion of the Bridge program is necessary before the student can enroll in more than 18 graduate hours as required in the MS-CIS, not counting prerequisite and leveling courses.

Each student must satisfy the requirements of Sections 1 and 2 in the following, either by transfer credit or by UHV course work. Students admitted into the Bridge program must complete courses chosen under advisement from Section 3 to meet the total requirement of 120 semester hours.

The quality of a student's work must be kept at a 3.0 grade point average or better throughout the Bridge program. Courses in which the quality of work is lower than "C" must be repeated and no more than two C's may be applied toward the Bridge program. Courses may be repeated to achieve higher grades; in cases where courses have been repeated, both course grades remain on the transcript, but only the latest grade counts toward the grade point average for the degree. If a student's GPA falls below 3.0 during the Bridge program, the student will be placed on academic probation. Students on academic probation will be informed by the Dean of the School of Arts and Science of any conditions for removing the probationary status.

### **Section 1. Required, 7 semester hours**

- Professional Writing (ENGL 3430)
- Advanced Public Speaking (COMM 3325)

### **Section 2. Other Program Requirements, 21 semester hours**

- 3 s.h. of Calculus, Discrete Structures, Discrete Mathematics, Operations Research, or Management Science
- 3 s.h. of Statistics
- 3 s.h. of Information Systems in Organizations
- 3 s.h. of Principles of Management
- 3 s.h. of upper division or graduate Accounting, or 6 s.h. of lower division Principles of Accounting I and II
- 6 s.h. of programming and data structures using an object-oriented programming language.

### **Section 3. Selected Courses by Advisement**

- Any additional courses needed to total a minimum of 120, taken from upper division COSC or MATH courses.
4. **Degree Plan.** The degree plan embodies the goals to be achieved by the student at the completion of the program, as indicated by the course work required to be completed. The degree plan is drawn up by the degree plan counselor, in consultation with the student, and the CIS Graduate Program Advisor. The plan is approved by the Dean of Arts and Sciences.
  5. **Degree Requirements.** The Computer Information Systems degree plan has a 36 semester hour requirement. Students can chose a thesis or non-thesis option. Students in the non-thesis track complete 15 semester hours of core courses, 18 semester hours of specialization courses and 3 semester hours of integration course. Under the thesis option, students complete 15 semester hours of core courses, 12 semester hours of specialization courses and 6 thesis semester hours. An additional 21 semester hours of prerequisite and leveling courses may be required in either option and are not included in the 36 semester hour program requirements.
    - A. **Prerequisite/Leveling Courses (21 semester hours)**

A large percentage of the entering students in the program are anticipated to have undergraduate degrees in areas not directly related to computing. The foundation preparation courses required in three areas listed below are required of such students.

      1. **Computer Science/Information Systems (9 semester hours)**
        - Six (6) semester hours of courses in programming and data structures using an object-oriented programming language. Students who do not have this preparation can take the following leveling courses to replace the programming requirement.
          - i. COSC 3317 Object Oriented Programming and Design

- ii. COSC 3315 Application Design using GUI and Database
        - Three (3) semester hours in basic knowledge of computer information systems, including some proficiency in the use of common PC software environments, or COSC 3325.
  - 2. **Mathematics (6 semester hours)**
    - Three (3) semester hours of Calculus, Discrete Structures (MATH 3362), Discrete Mathematics, Operations Research, or Management Science.
    - Three (3) semester hours of Statistics (MATH 3391).
  - 3. **Business (6 semester hours)**
    - Three (3) semester hours of Management, or MGMT 3311 or MGMT 6351.
    - Three (3) semester hours of upper division Accounting, or ACCT 6351. This requirement may also be satisfied by the lower division sequence: Principles of Accounting I and II.
- B. Core Courses (15 semester hours)**  
 COSC 6336 Database Systems Development  
 COSC 6342 Software Engineering/Project Management  
 COSC 6350 Systems Analysis and Design  
 COSC 6339 Network Design and Management  
 COSC 6325 Policy, Strategy, and Ethical Issues in Information Systems
- C. Specialization (18 semester hours; 12 semester hours under the thesis option)**  
 These courses are selected from the following list:
- COSC 6329 Data Warehousing and Data Mining  
 COSC 6337 Web Mining and Information Retrieval  
 COSC 6340 Software and System Architecture  
 COSC 6343 Intelligent Agents and Applications  
 COSC 6347 System Administration  
 COSC 6351 Decision Support Systems  
 COSC 6353 Information Systems Security  
 COSC 6357 Web Engineering  
 COSC 6359 Advanced Computer Communication  
 COSC 6300 Special Topics in Computer Science/Information Systems  
 COSC 6344 Advanced IT Project Management
- D. Integration Course (3 semester hours)**  
 COSC 6390 Integrating the Enterprise, IS Function and IS Technologies
- E. Thesis Option**  
 Students have the option of writing a research-oriented thesis. This option is available for academically strong students wishing to advance their knowledge and, hopefully make a contribution, in a particular area of computer information systems. Approval for the thesis option by a faculty member, under whom the student has taken at least one course and a minimum overall "B" average in the program, is required. Students approved for a thesis will register for the following courses, typically during two consecutive semesters in their second year of studies: COSC 6308-6309 – Computer Systems Thesis Research.

## Course Descriptions

<p><b>COSC 6105; 6205; 6305:</b></p>	<p><b>Computer Information Systems Internship</b>            Cr. 1;2;3. (1- 0); (2-0); (3-3-0). Prerequisites: A minimum of 15 semester hours of graduate courses completed in the program, plus completed course work appropriate to the project, as determined by the Mentor and Director of Internship.            The Graduate Internship in Compute Information Systems is a one, two, or three credit hour course which an MS-CIS student may complete after completing two full semesters with UHV, with exceptions made on a case-by-case basis. The credit hours earned in the internship class cannot be used for the student's concentration or focus area electives, but only as general electives. Course may be repeated, but a maximum of 3 credits may be applied to the degree program.</p>
<p><b>COSC 6300:</b></p>	<p><b>Special Topics in Computer Science / Information Systems</b>            Cr. 3. (3-3-0). Prerequisite: Graduate Standing.            May be repeated for credit when topics vary.</p>
<p><b>COSC 6302:</b></p>	<p><b>Independent Study</b>            Cr. 3. (3-3-0). Prerequisite: Graduate Standing and approval of instructor.            Course may be repeated with different topics.</p>
<p><b>COSC 6308-6309:</b></p>	<p><b>Master's Thesis</b>            Cr. 3 per semester. Prerequisite: Approval by a faculty member, under whom the student has taken at least one course; A minimum overall "B" average in the program.</p>
<p><b>COSC 6310:</b></p>	<p><b>Multimedia Development and Programming</b>            Cr. 3. (3-3-0). Prerequisite: A good understanding of object-oriented programming.            A study of media theory and programming skills, such as a creating immersive media driven applications for DVD, CD-Rom and Web; broadcasting TV-quality video on the office LAN and broadband Internet.</p>
<p><b>COSC 6320:</b></p>	<p><b>Mobile, Ubiquitous, and Pervasive Information Systems</b>            Cr. 3. (3-3-0). Prerequisite: COSC 6339.            This course provides an in-depth coverage of issues in mobile, ubiquitous, and pervasive information systems. This will include the current and emerging applications, wireless and mobile infrastructure, devices, middleware, and network access issues.</p>
<p><b>COSC 6325:</b></p>	<p><b>Policy, Strategy, and Ethical Issues in Information Systems</b>            Cr. 3. (3-3-0). Prerequisite: COSC 3325 or equivalent.            Information systems policies and procedures to support the organization's mission; contemporary information systems strategic planning and policy. A survey of contemporary legal and ethical issues faced by information systems professionals. Case studies will be used to illustrate current best practices.</p>
<p><b>COSC 6329:</b></p>	<p><b>Data Warehousing and Data Mining</b>            Cr. 3. (3-3-0). Prerequisite: COSC 6336            Data warehousing; OLAP; data mining; data marts; advanced topics in integration of different technologies.</p>

<b>COSC 6333:</b>	<p><b>Computer Science Project</b>  Cr. 3. (3-3-0). Prerequisite: Core Completed. If a substantial part of the core is complete and student is concurrently enrolled in the remainder of the core, student may petition to enroll in the same semester.  A one-semester course designed to assist the student in the Project Option to complete the special requirements of the Option. The project requires approval by a graduate faculty advisor in the student's area of interest in the semester prior to its inception. Student will develop and prepare a proposal, conduct the research, write the drafts and the final report, and make a presentation to students and program faculty, if required, all with the help of the faculty advisor. Presentation is encouraged.</p>
<b>COSC 6334:</b>	<p><b>Computer Graphics and Game User Interfaces</b>  Cr. 3. (3-3-0). Prerequisites: Heavy programming experience and knowledge of programming with C or C++ languages in Windows or Linux environments.  The objective of this course is to introduce the students to Computer Graphics and Games using interactive sound, animation, and multimedia interface design.</p>
<b>COSC 6335:</b>	<p><b>Computational Science</b>  Cr. 3. (3-3-0). Prerequisites: Calculus II, Probability and Statistics, and experience in programming.  In this course techniques for designing computational frameworks for a number of interdisciplinary applications are investigated. The computational mechanisms covered in the course range from analytical modeling to stochastic processes.</p>
<b>COSC 6336:</b>	<p><b>Database Systems Development</b>  Cr. 3. (3-3-0). Prerequisite: 3 s.h. of programming in an object-oriented programming language or equivalent experience.  Design principles of large database-based applications and distributed database. Formerly "Database Design."</p>
<b>COSC 6337:</b>	<p><b>Web Mining &amp; Information Retrieval</b>  Cr. 3. (3-3-0) Prerequisite: Graduate Standing  To study the impact of the Web on the business side of data mining. To introduce the field of information retrieval. To study the different models used to define and retrieve relevant information from the internet and the measures used to evaluate the performance of a model.</p>
<b>COSC 6338:</b>	<p><b>Computer Architecture and Parallel Processing</b>  Cr. 3. (3-3-0). Prerequisite: Nine advanced hours of computer science (COSC 3332 or COSC 6340 is recommended).  Organizational and operational analysis of digital computers at the component and functional levels. Design and performance issues. Algorithms and architectures for parallel processors.</p>
<b>COSC 6339:</b>	<p><b>Network Design and Management</b>  Cr. 3. (3-3-0). Prerequisite: Graduate Standing  Concepts and mechanisms of data transport systems including information in the form of data, voice, and image, Network architecture, terminology, control, and general topologies. Current equipment and physical interconnection are explored in an applied model incorporating a range of network services to support application development, distributed processing, information centers, and distance learning. Emphasis is placed on the impact of data</p>

	communications technology on organizations and on the design of future information systems.
<b>COSC 6340:</b>	<p><b>Software and System Architecture</b>  Cr. 3. (3-3-0). Prerequisite: 3 semester hours of programming; Graduate Standing.  Concepts of computer systems from applications down to logic gates. Topics include high-level languages, operating systems, assembly and machine languages, and architecture.</p>
<b>COSC 6341:</b>	<p><b>Internet Programming</b>  Cr. 3. (3-3-0). Prerequisite: A good understanding of object-oriented programming.  A study of JAVA programming skills for Internet applications, through learning JAVA concepts and developing JAVA applications in the areas of computer graphics, graphical user interface, multi-threading, multimedia, servlet, RMI, networking and JAVA beans.</p>
<b>COSC 6342:</b>	<p><b>Software Engineering Project Management</b>  Cr. 3. (3-3-0). Prerequisite: Programming Experience.  A study of the software development process, how to plan and manage it, process improvement. We will also consider social and environmental factors.</p>
<b>COSC 6343:</b>	<p><b>Intelligent Agents and Applications</b>  Cr. 3. (3-3-0). Prerequisites: COSC 6361 or 6 semester hours of programming.  Critically examine what intelligent agents are, how to design them, and how new techniques arising from this field can be applied to problems requiring intelligent solutions in both business and engineering applications. Reference will be made to the different types of problems which intelligent agents techniques can help solve, such as automating decision making, recognition tasks. It will equip students with sufficient understanding of current theory and applications so that they will be able to apply that knowledge to address future software and business needs.</p>
<b>COSC 6344:</b>	<p><b>Advanced IT Project Management</b>  Cr. 3. (3-3-0).  Students will acquire and apply the knowledge and skills necessary to manage or lead successful IT and Information Systems project teams. Some advanced topics will be discussed. Term project required.</p>
<b>COSC 6345:</b>	<p><b>Design and Analysis of Algorithms</b>  Cr. 3. (3-3-0). Prerequisites: COSC 3333 or equivalent  Study of algorithm design, analysis tools, and techniques for selected problems including sorting, searching, graphs, branch and bound strategies, dynamic programming, game theory, algebraic methods, parallel algorithms, and string matching.</p>
<b>COSC 6346:</b>	<p><b>Automata and Formal Languages</b>  Cr. 3. (3-3-0). Prerequisites: COSC 3333 or equivalent  Introduction to fundamental concepts in automata theory and formal languages including grammar, finite automation, regular expression, formal language, pushdown automaton, Turing machine, and an into to computability and decidability. Study the properties of these models, and various rigorous techniques for analyzing and comparing them, using both formalism and</p>

	examples.
<b>COSC 6347:</b>	<p><b>System Administration</b>  Cr. 3. (3-3-0). Prerequisite: Graduate Standing  Develop insight and understanding of Unix systems at a level useful for systems and network administration. Installing and administering Linux. Network administration will be covered at an OS level as an integral part of systems administration. Basic system security, performance tuning, and system diagnostics will be discussed throughout the course. Students will develop an understanding of the Unix philosophy and fundamental design ideas of Unix.</p>
<b>COSC 6350:</b>	<p><b>Systems Analysis &amp; Design</b>  Cr. 3. (3-3-0). Prerequisites: COSC 6361 or 6 semester hours of programming.  Systems Development Life cycle and the technologies used to model, design, document, and implement high quality information systems. Systems analysis and design is the essence of the IS professional's work. This course will allow students to synthesize their experiences in software development and project management, into a comprehensive project. CASE tools that emphasize object-oriented analysis and design principles will be used. Requirements determination, specification development, testing, documentation, and reporting will be emphasized.</p>
<b>COSC 6351:</b>	<p><b>Decision Support Systems</b>  Cr. 3. (3-3-0). Prerequisites: COSC 3325 or equivalent  Support systems for decision-making in complex, technologically rich environments. Decision theory principles, problem identification, model formulation, and solution procedures. Sample quantitative and qualitative tools to study the behavioral aspects of decision making in a decision support environment. At least one expert system will be examined or developed. Neural networks are discussed.</p>
<b>COSC 6353:</b>	<p><b>Information Systems Security</b>  Cr. 3. (3-3-0). Prerequisites: COSC 6361 or 6 semester hours of programming.  Develop knowledge and skills for security of information and information systems within organizations. Concepts and methods associated with planning, designing, implementing, managing, and auditing security at all levels and on all systems platforms, including worldwide networks. Techniques for assessing risk associated with accidental and intentional breaches of security. The associated issues of ethical uses of information and privacy considerations. Security in computer operating systems, networks, and data.</p>
<b>COSC 6357:</b>	<p><b>Web Engineering</b>  Cr. 3. (3-3-0). Prerequisites: COSC 6361 or 6 semester hours of programming  Design and implementation of Internet and World Wide Web based application using the current technology. Other topics include data compression, multimedia data technologies, and wireless computing.</p>
<b>COSC 6358:</b>	<p><b>Advanced Operating System Concepts</b>  Cr. 3. (3-3-0). Prerequisites: COSC 6340 or equivalent  Learning, understanding, and implementing operating system fundamentals, including process and thread management, concurrency with semaphores and monitors, deadlocks, storage management, file systems, and I/O. Hands-on experiences of operating system design and implementation and how it</p>

	impacts application systems design and performance.
<b>COSC 6359:</b>	<p><b>Advanced Computer Communication</b>  Cr. 3. (3-3-0). Prerequisite: COSC 6339  Study of the conceptual and experimental issues in the design and implementation of data and computer communications from the physical layer to communication architecture and protocols. Formerly "Computer Communication Protocols."</p>
<b>COSC 6360:</b>	<p><b>Fundamentals of Programming</b>  Cr. 3. (3-3-0). Prerequisites: Graduate standing. Not open to MAIS students except to satisfy the programming prerequisite. Will NOT count toward the 36 semester hour requirements.  Object-oriented programming using Java; abstraction, encapsulation, inheritance, and polymorphism. The concept of an abstract data type (such as a stack or queue or both) and their implementations. Programming projects will be assigned throughout the semester. Offered every fall semester.</p>
<b>COSC 6361:</b>	<p><b>Programming and Data Structures</b>  Cr. 3. (3-3-0). Prerequisites: COSC 6360. Not open to MAIS students except to satisfy the programming prerequisite. Will NOT count toward the 36 semester hour requirements.  Object-oriented programming using Java; abstraction, encapsulation, inheritance, and polymorphism. The concept of an abstract data type (such as a stack or queue or both) and their implementations. Programming projects will be assigned throughout the semester. Offered every fall semester.</p>
<b>COSC 6390:</b>	<p><b>Integrating the Enterprise, IS Function and IS Technologies</b>  Cr. 3. (3-3-0). Prerequisites: Completion of the entire core.  Builds on previous courses, integrative in nature. Taught in seminar style. Current and strategic issues in information management from the executive perspective; analyze, synthesize, and respond at the highest organization level. Overall information needs of an organization and the role information systems play in meeting those needs. A major research paper based on a thorough literature search of primary sources in information systems; presentation of research.</p>





## Graduate Admissions Index

Admissions Index formula for **GRE tests taken prior to August 1, 2011:**  
 $(\text{GPA} * 200) + \text{GRE Verbal and Quantitative combined score}$

Admissions Index formula for **GRE tests taken on or after August 1, 2011:**  
 $(\text{GPA} * 200) + (15 * (\text{GRE Verbal and Quantitative combined score} - 260))$

<p><b>Admissions index of 1,400 or higher</b> (for GRE tests taken prior to August 1, 2011)</p> <p><b>Admissions index of 980 or higher</b> (for GRE tests taken on or after August 1, 2011)</p>	<p>Students are admitted, so long as they meet any additional criteria specific to a particular degree program. Students who are denied admission may discuss their options with an academic advisor.</p>
<p><b>Admissions index of 1,300-1,399</b> (for GRE tests taken prior to August 1, 2011)</p> <p><b>Admissions index of 890-979</b> (for GRE tests taken on or after August 1, 2011)</p>	<p>Students may be admitted by the dean of the school, considering scores on the analytic portion of the GRE (or equivalent), grades in particularly relevant courses, or other relevant indicators of a student's potential to success in a given graduate degree program. Such admission may be conditional or probationary with initial coursework specified. Students who are denied admission may discuss their options with an academic advisor.</p>
<p><b>Admissions index below 1,300</b> (for GRE tests taken prior to August 1, 2011)</p> <p><b>Admissions index below 890</b> (for GRE tests taken on or after August 1, 2011)</p>	<p>Students will not be admitted and may not appeal the decision.</p>

\*Please note the GPA used is based on the last 60 hours of undergraduate coursework.