COMPUTER INFORMATION SCIENCE, M.S.

Program Description

The M.S. Computer Information Science program provides students with a structured study of applied technical solutions to real-world problems. The program emphasizes the need to understand the program from definition, through implementation and review. The program uses real-world cases that develop problem solving techniques through the software engineering methodologies. The students also learn to manage the problem solution through the gathering of requirements, problem refinement, design modeling, implementation and user-testing. The curriculum emphasizes group interaction and problem solving skills through iterative processes and project management from problem definition through solution deployment.

The program emphasizes group work, presentation skills and collaboration through the use of technology. The M.S. Computer Information Science requires that students complete a capstone project to integrate core competencies with specific student goals based on the elective certificate. Examples of capstone projects are development and implementation of a new software solution or major extension to a completed software project; a research project on new trends or findings in software application development.

The M.S. Computer Information Science program is offered in an online format. It follows the traditional academic calendar of a fall and spring semester and a shorter summer semester. The fall and spring semesters are divided into two 8 week terms. A full-time graduate student carries a minimum of 6 semester credit hours. Some courses may require more hours per week in some areas of instruction. All courses are online and 3 credits in the length. The courses will meet both synchronously (optional) and asynchronously. Students are required to participate in chat sessions and/or discussion boards, which will take the place of classroom meetings. Synchronous sessions will be recorded for students who are not able to attend the actual session. Students who are not able to attend the synchronous sessions will be asked to complete a short assignment related to the recorded session. Depending on their personal schedules, students may elect to take courses every term or wait for the next term to continue studies. Courses in the summer are also 8 weeks in length. If a student decides to take two courses during the summer session, they will overlap in the time frame.

Mission

Graduate education in Computer Information Science will provide a forum for the study, investigation, discussion, and presentation of how technical solutions may be used to improve an individual's productivity and to enhance departmental and corporate systems. In order to prepare computing professionals who will be able to keep pace with the dynamic nature of the discipline and contribute to its growth, this program will emphasize individual and group effort, as well as lecture and hands-on training. The approach will be consistent will the philosophy of graduate education at La Salle.

Program Specific Information

Progression through the Program

Ten courses (30 credits) are required for the degree. Each student is required to satisfy the all six required courses (which includes the capstone), a grouping of 5 additional courses.

The design of this program assumes that the student has either a background in computer science or a related discipline or professional training involving programming.

4+1 Bachelor's in Computer Science to Master's in Computer Information Science

Students may earn both a B.A. in Computer Science and a M.S. in Computer Information Science or a B.S. in Computer Science and a M.S. in Computer Information Science by participating in the University's 4+1 Program. Students would satisfy the undergraduate computer science major requirements during their first four years at the University, earning a minimum of 120 credits. A maximum of three undergraduate courses (9 credits) may be applied toward the graduate credits if the student maintains a GPA of 3.0 or better and the undergraduate course grade was B or better. Upon completion of a bachelor's degree, students enter the M.S. in Computer Information Science program and complete the remaining 7 courses (21 credits).

Degree or Certificate Earned

M.S.

Required for Program Completion

- Courses
  - 10
- Credits
  - 30
- GPA
  - 3.0

Program Goals

- Prepare students to create, implement, manage and review a technical solution to a real world problem through all phases of the problem resolution
- Prepare students to use problem solving techniques and skills to analyze, design, and develop technical solutions using software engineering methodologies.
- Manage the problem solution through the gathering of requirements, problem refinement, design modeling, implementation, and user testing
- Prepare students to collaborate on problem solutions
- Prepare students for professional workforce.

Student Learning Outcomes

- Create, plan, implement and test a technical problem solution.
- Develop problem definitions and solution designs.
- Create solutions specific to current technologies (such as mobile development, database services, and web services.)
- Create client side designs for problem solutions
- Create server side designs for problem solutions

Academic Requirements

Students complete at least 10 courses, six core courses (including a capstone project) and 4 additional courses from the groupings. Students are expected to have a foundation in computer programming.

Required Courses

Core Courses

The core courses provide the essential computing concepts and practical tools for the program. The courses provide a comprehensive study of current Web-centric, mobile-development, and data-driven computing concepts and emerging technologies.

Specialization Courses

Students are required to complete a specialization by selecting 4 courses from either group. If a student does not wish to consider a specialization, they may select any four courses from the groupings.

Capstone Course

Students conclude their studies with a capstone project, completed in one course, under the supervision of a faculty adviser. Some students partner with an external company or work on a project associated with their employer as a project deliverable for that company. Students may also complete research on new developments in Computer Information Science.

Code	Title	Credits
Core Courses		
CIS 621	Client Interface Development	3
CIS 626	Web Services Development	3
CIS 627	Web Database Services Development	3
CIS 629	Mobile Development	3
Select one of the following:		3
CIS 670		
CIS 671		
CIS 672		
CIS 673		
CIS 674		
CIS 675		
CIS 676		
CIS 677		
CIS 679		
Specialization Courses		
Complete a set of four courses selected from one of the following groups:		15
IT and Cybersecurity Policy Specialization		
ECF 625	Litigation Support Practices and Procedures	
CYB 644	Information Security	
CYB 612	Ethics, Issues, and Government Regulations	
CYB 652	Leadership Assessment and Evaluation	
CIS 619	Crisis Management and Business Continuity	
Data Science Specialization		
CIS 523	Data Processing and Database Management	
CIS 658	Data Mining	
CIS 633	Data Analysis with R	
or CIS 675		
CIS 654	Artificial Intelligence	
ANA 615		
Capstone		
CIS 685	CIS Capstone (Every semester as needed)	3
Total Credits		**33**

Course Sequence

Tentative Schedule

Course	Title	Credits
First Year		
First Semester		
CIS 621	Client Interface Development	3
CIS 626	Web Services Development	3
	Credits	**6**
Second Semester		
CIS 629	Mobile Development	3
CIS 627	Web Database Services Development	3
	Credits	**6**
Third Semester		
Select one of the following:		3
CIS 670-679		
	Credits	**3**
Second Year		
First Semester		
Group 1 or 2 course		3
Group 1 or 2 course		3
	Credits	**6**
Second Semester		
Group 1 or 2 course		3
Group 1 or 2 course		3
	Credits	**6**
Third Semester		
CIS 685	CIS Capstone (Every semester as needed)	3
	Credits	**3**
	Total Credits	**30**

Course Descriptions

Analytics

Computer Information Science

CIS 523 Data Processing and Database Management
This course entails analysis and evaluation of database designs in relation to the strategic mission of the project. Topics include database systems, database architectures, and data-definition and data-manipulation languages. Also included are logical and physical database design, database models (e.g., entity-relationship, relational), normalization, integrity, query languages including SQL, and relational algebra, in addition to social and ethical considerations and privacy of data. This course incorporates case studies and a project using a relational DBMS.

CIS 540 Network Theory
Lecture/theory course considers the current methods, practices, and standards used to enable communication on computer and voice networks. This includes a study of the physical layers, architectural layers, design, operation, management, and ISO standards, with particular consideration given to many of the IEEE 802 standards, various protocols in the TCP/IP suite, and telephony technologies. Both local and wide area networks are examined.

CIS 619 Crisis Management and Business Continuity
This course explores the area of Risk Management with particular emphasis on Business Continuity Management. Risk Management involves assessing threats which may lead to disastrous events, evaluating control alternatives and implementing solutions. Potential threats include terrorist, criminal, industrial, natural, technological, environmental, economic and political. Practical solutions to enable an organization to protect assets, mitigate risk, manage crisis and recover after a disaster will be discussed. The role of business and government will be explored, as well as professional practices, standards and strategies. The course is designed to expose the student to all aspects of a holistic Business Continuity & Crisis Management program and to determine the most appropriate requirements.

CIS 621 Client Interface Development
This course addresses the design and development of standards-based client interfaces for Web applications. The course includes Web-based standards and tool sets that support these standards. Application development emphasizes client Web interface scripting to serve as a general introduction to computer programming. The specific tool set used will depend on the types of interfaces to be developed, considering technology trends. Examples of possible tools include XHTML, CSS, and JavaScript. This course may be waived if the student has prior experience in client interface development.

CIS 626 Web Services Development
This course focuses on the development of Web services for use by many different types of Web applications. The course develops basic programming techniques to implement the server side function of the application. The course uses a non-Windows interface for the tools set.

CIS 627 Web Database Services Development
This course is an extension to CIS 623. It encompasses programming models that support database access, including ADO.NET. It covers client/server and multitiered architectures; development of database applications; Internet and intranet database design and implementation; database-driven Web sites; and use of XML syntax related to databases. Examples of the possible tool sets for this tool set are PHP and mySQL on either a Linux or Windows server. The course also considers privacy of data and data protection on servers. Prerequisite(s): CIS 523, CIS 622, or CIS 626

CIS 629 Mobile Development
This course covers development of mobile applications and integration with existing systems on the devices. Students will extend development of mobile solutions with enhancements to views, layouts, and intents including interaction with the location-based services, messaging services, multimedia interfaces, and sensors available on the mobile device. The applications will manage data sources, both locally and from database providers. The applications will be tested in an emulation environment and prepared for deployment in a mobile marketplace.

CIS 633 Data Analysis with R
This course will require students to learn the R programming language and assess how to use it and find interesting features in data. Students will learn about R and statistical best practices and how to display data in a manner that will help you explain your findings to those who do not have a technical background. Moreover, the course introduces students to modeling and simulation. Topics may include basic queueing theory, the role of random numbers in simulations, and the identification of input probability distributions.

CIS 654 Artificial Intelligence
This course introduces students to the field of artificial intelligence (AI). Students will learn how big data and data mining techniques are utilized by machines to create the AI models used by autonomous aircraft and automobiles, personal assistants, IT security software, fraud investigations and credit bureaus. The course will review the history, present day use, and future of artificial intelligence. Through case studies and current events, students will examine the benefits and risks associated with AI. The course will cover issues related to AI and privacy, ethics, and machine bias. Neuromorphic computing, the Open Neural Network Exchange (ONNX), and data analytics will also be discussed.

CIS 658 Data Mining
This course introduces the field of data mining, with specific emphasis on its use for Machine Learning algorithms. Techniques covered may include conceptual clustering, learning decision rules and decision trees, case-based reasoning, Bayesian analysis, genetic algorithms, and neural networks. The course covers data preparation and analysis of results. Skills in Microsoft Excel are useful. Prerequisite(s): CIS 523

Cybersecurity

CYB 612 Ethics, Issues, and Government Regulations
This course considers privacy both on- and off-line; legal background of intellectual property and e-mail; ethics and codes of ethics; effects of computers on work and society; and responsibilities and risks of computing, including topics such as accuracy of information, e-waste, and multitasking. This course includes an examination of government policies and regulations related to data security and information assurance.

CYB 644 Information Security
This course explores all aspects of computing and communications security, including policy, authentication, authorization, administration, and business resumption planning. It examines key security technologies, such as encryption, firewalls, public-key infrastructures, smart cards, and related technologies that support the development of an overall security architecture. Coursework includes plans for developing and implementing a technology security strategy focused on business needs. Prerequisite(s): CIS 540

CYB 652 Leadership Assessment and Evaluation
This experiential course emphasizes the importance of feedback and self- assessment for leadership development. It includes extensive assessment of each participant's management style and skills based on self-evaluations (using structured questionnaires) and feedback from coworkers, faculty, and other participants. Leadership development experiences emphasize time and stress management, individual and group problem-solving, communication, power and influence, motivation, conflict management, empowerment, and team leadership. Each participant identifies skills he or she needs to develop and reports on efforts to develop those skills.

Faculty

Program Director: Margaret McCoey, M.S.
Associate Professors: Blum, Highley, Redmond, Wang
Assistant Professors: McCoey, Yin
Lecturers: McGinley, Monaghan, Waldron

Program Contact Information

If you have any questions regarding the Computer Information Science program, please contact:

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