

*Corequisite: PSY/PCMF 680 taken with PSY/PCMF 690, PSY/PCMF 681 taken with PSY/PCMF 691, PSY/PCMF 682 taken with PSY/PCMF 692.*

**PSY 685-86 (MAIN: FALL, SPRING, SUMMER) (BUCKS: FALL, SPRING, SUMMER) (MONTCO: FALL, SPRING, SUMMER)**

I/O-MHR PROGRAM INTERNSHIP

2 credits

A supervised internship experience in an approved human resource (or closely related) department of a non-profit or for-profit agency for a minimum of 200 hours per term. (Continued with 686.) Each semester is two credits Prerequisites: Completion of 24 credit hours including necessary I/O and MBA courses and successful completion of written comprehensive examination. PSY 685 taken with PSY 695, PSY 686 taken with PSY 696.

**PSY/PCMF 690-692 (Main: Fall, Spring, Summer) (Bucks: Fall, Spring, Summer) (Montco: Fall, Spring, Summer)**

PROFESSIONAL SEMINAR/CASE SEMINAR

1 credit

The personal, practical, and ethical issues involved in the practice of professional counseling and marriage and family therapy. Examination of professional development, professional associations, continuing education, credentialing, legal responsibilities and liabilities, confidentiality, agency practice, independent practice, consulting, and inter-professional cooperation. (PSY 691, 692—continuation of Professional Seminar—one credit each semester.)

*Prerequisite: Same as PSY/PCMF 680 plus completion of PSY 661 (for students required to take this course).*

**PSY 695 - 696 (MAIN: FALL, SPRING, SUMMER) (BUCKS: FALL, SPRING, SUMMER) (MONTCO: FALL, SPRING, SUMMER)**

I/O-MHR PROGRAM PROFESSIONAL SEMINAR

2 credits

The personal, practical, and ethical issues involved in the field of industrial/organizational psychology and human resource management. Examination of professional development, professional associations, continuing education, credentialing, legal responsibilities and liabilities, confidentiality, agency practice, independent practice, consulting, and inter-professional cooperation. (1 credit each semester)

*Corequisite: PSY 695 taken with PSY 685; PSY 696 taken with PSY 686*  
*Prerequisite: Same as PSY 685.*

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## MASTER OF SCIENCE IN COMPUTER INFORMATION SCIENCE

### Faculty

Program Director: Margaret McCoe, M.S.

Professors: Longo

Associate Professors: Blum, Kirsch, McManus, Redmond

Assistant Professors: Catanio, Highley, McCoe, Turk

Associate Faculty: Pasquale, Wiley

Lecturers: Wacey

### Description of Program

The Master of Science degree in Computer Information Science is a program for persons who wish to advance their knowledge of information science, technology, and practices within the professional community. Its comprehensive curriculum addresses information distribution through personal and Internet computing, distributed environments, n-tier architectures, and enterprise systems. Object-oriented and component-based programs, developed through the Unified Modeling Language, are the principal programming paradigms. Four main areas of study, the building blocks for emerging technologies, are considered.

- The software engineering area includes the methodologies of the software development life cycle, as well as leadership and communication skills.
- The database area includes current database models, design, implementation, and access through structured query language, client/server, intranet databases, and n-tier architectures.
- The systems developer area addresses systems through an object-oriented approach and component programming.
- The networking area includes the concepts of data communications and the installation and administration of networked systems.

Students gain additional depth in at least two areas of study by taking additional specialized elective(s) in those areas. Specialized elective courses address current and emerging technologies, such as Project Management, E-commerce, Enterprise Resource Planning (ERP) systems, Data Warehouses, and shifts in programming paradigms.

The program emphasizes teamwork, interpersonal communication, and presentations. To address the dynamic nature of the field and the realization that there will always be a need for some self-training, this program encourages active student involvement and collaborative learning. Students are expected to participate in class discussions, to evaluate new software packages, to make formal presentations, and to do independent projects.

The program prepares individuals for end-user computing services by addressing both technical challenges and management skills. The program promotes the professional development of the student in the field of Computer Information Science.

A strength of the program is its practical focus, based on a strong conceptual foundation. Students may culminate their learning with a capstone project or research paper under the supervision of a faculty adviser.

The program is offered at two convenient locations on Main Campus in Philadelphia and at the Bucks County Center in Newtown, Pa.

### Admission Requirements

To be accepted into the program, a student must present:

1. Evidence of successful academic achievement in the completion of a baccalaureate degree from an accredited institution of higher education with an appropriate major. Appropriate undergraduate majors include, but are not limited to, management science, business administration, electrical engineering, systems engineering, mathematics, computer science, or physics. A minimum undergraduate GPA of 3.0 will normally be required. The applicant must provide official transcripts from all undergraduate and graduate colleges and universities he/she has attended.
2. Appropriate background in computer science or a related discipline, or other equivalent training. On the basis of admissions credentials, students may be required to complete some foundation courses.

3. Two letters of recommendation from professors or supervisors who can address the candidate's ability and motivation for enrolling in the program.
4. Acceptable score in the Graduate Record Examination (GRE) General Test or Miller's Analogies Test (MAT). The MAT can be taken at the La Salle University Counseling Center. Call 215.951.1355 for information about fee and appointment schedule. Original test results are required; photocopies will not be accepted.
5. A resume addressing one's educational and professional background.
6. The Application for Admission, accompanied by the stipulated application fee payable to La Salle University. The fee is waived if the online application is used. See the program Web site.
7. Interview with member(s) of the Admission Committee. These are typically telephone interviews.

The application package is viewed as a whole, and the prevailing criterion is the applicant's capacity for completing the program successfully.

International students: An acceptable TOEFL test score is required of students whose undergraduate transcripts are from institutions outside the U.S. Transcripts/marksheets must be sent to the World Education Service ([www.wes.org](http://www.wes.org)) for a course-by-course evaluation. A statement of financial responsibility with accompanying documentation from the student's sponsor's financial institution must also be submitted.

The program is open to applicants without regard to age, creed, race, gender, or national origin. Because oral and written communication is an integral part of many courses, students must communicate clearly in English.

A maximum of six hours transfer credit may be granted for graduate work at another institution. The student must supply a course description and syllabus in order to facilitate the transfer of credit. After matriculation at La Salle, students must have a course pre-approved by the director (in conjunction with the appropriate faculty member(s)) for it to be considered for transfer purposes.

**The Application for Admission may be obtained by contacting:**

Margaret McCoey, Director  
 Graduate Program in Computer Information Science  
 La Salle University  
 Philadelphia, PA 19141  
 Phone: 215.951.1222  
 Fax: 215.951.1805  
 E-mail: [gradcis@lasalle.edu](mailto:gradcis@lasalle.edu)  
 Web site: [www.lasalle.edu/gradcis](http://www.lasalle.edu/gradcis)

**Tuition and Fees 2009-2010**

Application Fee . . . . .	\$35
Online Application . . . . .	free
Tuition, per credit hour . . . . .	\$665
General University Fee, per semester . . . . .	\$85

**Tuition Assistance**

Partial scholarship grants are offered on the basis of academic credentials and financial need.

Information about other financial aid, payment options, and application forms may be obtained from the Director of Financial Aid, La Salle University, 215.951.1070.

**Progression through the Program**

Eleven to 14 courses (at least 33 graduate credits) are required for the degree. Each student is required to satisfy the Foundation courses, all four Core courses, two areas of study through specialized electives, and sufficient electives and/or capstone experience. An area of study is composed of the appropriate Foundation course(s), the required Core course, and at least one specialized elective in the area.

The design of this program assumes that the student has a background in computer science or a related discipline, or professional training. The total number of credits to fulfill the requirements depends upon the student's academic and professional background. Some students may be required to take one to five Foundation courses to supplement their computing expertise. The Admission Committee determines the appropriate number of Foundation courses; one or more Foundation courses may be waived, based on the student's academic and professional background. Individual plans for progression will be determined for each student in consultation with the Program Director.

The following is presented as a model for progression through the program. Students take a maximum of five Foundation courses (as specified by the Admission Committee) and four Core courses. Then students select one of three options to complete the program:

**Capstone Project Option: 11-14 courses (33-42 credits)**

- At least three elective courses, at least two of which are specialized electives; students will complete two areas of study by taking one specialized elective in each of these two selected areas.
- Capstone project, designed and developed in a two-course sequence (CIS 681, 682) over a two-semester time period.

**Capstone Paper Option: 11-14 courses (33-42 credits)**

- At least four elective courses, at least two of which are specialized electives; students will complete two areas of study by taking one specialized elective in each of these two selected areas.
- Capstone research project or paper, completed in one course (CIS 685) in a one-semester time period.

**Additional Coursework Option: 11-14 courses (33-42 credits)**

- At least five elective courses, at least two of which are specialized electives; students will complete two areas of study by taking one specialized elective in each of these two selected areas.

**Certificate Program in Computer Information Science**

This program is designed for students with bachelor's degrees who wish to supplement their knowledge of technical application development.

The Certificate is attained by the successful completion of three La Salle University graduate courses in applications technology development. If the candidate lacks sufficient background knowledge in a particular area, he/she may be required to complete one or more Foundation courses prior to beginning the certificate program. Each Foundation course adds an additional course requirement to the certificate program.

**Certificate Requirements:**

9 credits (3 courses) and a 3.0 G.P.A.

- Courses (3 Courses, 9 credits) from
- CIS 623** N-tier Architecture
  - CIS 624** Data Warehouses
  - CIS 625** Internet and Web Programming
  - CIS 627** Enterprise Data Management

## Warranty Program

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Graduates of the M.S. C.I.S. Program can participate in the Warranty Program, which provides the opportunity for them to extend or refresh their skills and knowledge by taking three additional C.I.S. or I.N.L. courses on a space-available basis for free. Details and conditions can be found on the program's Web site.

## Foundation Courses

The purpose of the foundation courses is to provide students with a broad-based background in computing concepts and practice, as well as leadership skills. The following five courses are required, but may be waived based on a student's academic and professional training.

- CIS 523** Data Processing and Database Management
- CIS 530** Graphical User Interfaces
- CIS 536** An Object Approach to Operating Systems
- CIS 540** Data Communications and Internetworking
- MBA 810** Self-Assessment for Leadership

## Core Courses

The core courses provide the essential computing concepts, methodologies, and practical tools of the four main areas of study: software engineering, databases, systems and development, and networking. The courses provide a comprehensive study of current computing concepts and technologies.

- CIS 613** Software Engineering
- CIS 623** N-Tier Architectures
- CIS 630** Component-based Programming
- CIS 643** Design and Implementation of Networks

## Specialized Elective Courses

Students are required to complete two areas of study by taking one specialized elective for that area. Not all specialized elective courses are offered at all locations; specialized elective courses are determined by student interest at each location. Students should contact the M.S. C.I.S. office for more information as to what specialized electives are offered. A student may also use a course designated as a special elective to fulfill the elective requirement.

## Software Engineering

- CIS 615** Project Management for IT/IS

## Databases

- CIS 624** Data Warehouses
- CIS 625** Internet and Web Programming
- CIS 627** Enterprise Data Management

## Systems and Developer

- CIS 607** Computer Graphics
- CIS 636** Advanced Computing with Java

## Networking

- CIS 645** Internet and E-Commerce Architecture

## Additional Electives

Additional elective courses provide supplemental topics of current interest, such as security, intelligent systems technology, enterprise resource systems, digital arts, and other emerging technologies. Students may take one or more additional electives to complete their curriculum. Not all elective courses are offered at all locations; elective courses are determined by student interest at each location. Students should contact the M.S.-CIS office for more information as to what electives are offered at each location.

Issues in Computing

- CIS 610** Legal, Ethical, and Social Issues in Computing

## E-Business

- CIS 646** Collaboration Technologies
- CIS 655** Intelligent Systems
- CIS 656** Electronic Commerce System Architecture
- CIS 657** Computer-Based Training
- CIS 658** Data Mining

## Digital Arts Systems

- CIS 628** Web Animation

## Emerging Technologies

- CIS 67x** Special Topics in Computer Information Science
- INL 631** Technology Architecture
- INL 644** Data Security Technologies

## Capstone Experience

Students may culminate their learning by a capstone project, achieved in a two-course sequence, or by a research paper, achieved in one course, under the supervision of a faculty adviser. Students may work on a capstone experience either individually or in a group. Some students partner with an external company or work on a project associated with their employer as a project deliverable for that company.

## Capstone Project

- CIS 681** Project Design and Implementation I
- CIS 682** Project Design and Implementation II

## Capstone Paper

- CIS 685** Independent Research

## Five-Year Bachelor's to Master's in Computer Information Science

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Five-Year Bachelor's/Master's Degree - Computer Science (B.A./B.S.), Computer Information Science (M.S.)

Students may earn either the B.A. or B.S. in Computer Science and the Master of Science in Computer Information Science (M.S. CIS) by participating in the five-year program. The student would satisfy the undergraduate Computer Science degree requirements for either the Bachelor of Arts or the Bachelor of Science during their first four years at the University, earning a minimum of 120 undergraduate credits of which a maximum of six (6) may be graduate credits, completing a minimum of 38 courses, while maintaining a GPA of 3.0 or better. The student would then enter the Master of Science in Computer Information Science program. The M.S. CIS Program is composed of Core, specialized electives, and free electives and/or capstone courses. Individual Foundation courses may be waived for those students entering with the B.A. or B.S. For successful completion of the master's degree, a student must earn a minimum of 33 graduate credits and maintain a GPA of 3.0 or better.

## Course Descriptions

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Course descriptions for the INL courses are located in the M.S. Information Technology Leadership section and for the MBA courses in the MBA program section.

### CIS 523

DATA PROCESSING AND DATABASE MANAGEMENT  
3 credits

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, relational algebra, in addition to social, ethical considerations, and privacy of data. This course incorporates case studies and a project using a relational DBMS.

**CIS 530**  
GRAPHICAL USER INTERFACES  
3 credits

This course provides a foundation in designing and implementing graphical user interfaces (GUI) in Visual Basic .NET. In addition to learning to program a standard set of user-interface controls, there will be some emphasis placed on problem-solving and the object-oriented approach to programming. The Unified Modeling Language will be introduced as a means of communicating ideas about software design. In addition, principles of human-computer interaction will be considered as they pertain to the interface design.

*Prerequisite: Programming skills in a high-level language*

**CIS 536**  
AN OBJECT APPROACH TO OPERATING SYSTEMS  
3 credits

This course includes objects, object-oriented design, and object-oriented programming in C++ or Java along with computer systems concepts and algorithms. Students will be expected to design and implement various operating systems simulations in an object-oriented programming language (C++, Java). Also considered are accountability issues in software development.

*Prerequisite: Programming skills in a high-level language*

**CIS 540**  
DATA COMMUNICATIONS AND INTERNETWORKING  
3 credits

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 the 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 607**  
COMPUTER GRAPHICS  
3 credits

This course covers fundamental concepts including: graphics primitives (points, lines, polygons), surfaces (primary and off-screen), frame-by-frame and sprite animation (time-dependent behavior), viewing and clipping, visual perception and color models, event-driven interaction, collision detection, scan conversion, and graphics file formats and compression techniques. Algorithms and data structures that are specific to Computer Graphics will be studied. Display and video adapter hardware will be studied. Libraries and application programming interfaces (APIs and SDKs) that are specific to creating graphics applications will be used to create custom applications.

*Prerequisite: CIS 630*

**CIS 610**  
LEGAL, ETHICAL, AND SOCIAL ISSUES IN COMPUTING  
3 credits

This course considers privacy both on- and off-line; legal background of intellectual property and e-mail; cryptography and encryption; effects of the September 11 attacks; ethics and codes of ethics; effects of computers on work and society; responsibilities and risks of computing, including computerized and Internet voting; and accuracy of information.

**CIS 613**  
SOFTWARE ENGINEERING  
3 credits

Software Engineering treats the technical and administrative issues of the software development life-cycle process. Models of the software development process, including structured analysis and design as well as object-oriented analysis and design methodologies, are presented. Topics include software milestones, project planning, team management, requirements analysis, specification development, analysis and design, implementation, integration, testing, and maintenance. Software legal issues including contractual ownership, copyrights, and intellectual property rights are considered. Additional topics include ethical issues recommended by the IEEE and ACM Code of Ethics as well as ethical responsibility of accurate software. The Unified Modeling Language (UML) and tools will be utilized. This course requires the completion of a team project.

*Prerequisites: CIS 523, CIS 530, MBA 810*

**CIS 615**  
PROJECT MANAGEMENT FOR IT/IS  
3 credits

This course entails standard Project Management (PM) concepts, principles, and practices for information technology (IT) and systems. It considers the various corporate organizational structures, politics, and external influences impacting effective PM for IT projects. It also covers systems development, product and PM life cycles, including the Project Management Institute's (PMI) Project Management Body of Knowledge (PMBOK). The course incorporates exploration of project phases and processes, and how they relate to the disciplines of PM—integration, scope, time, cost, procurement, risk, human resources, quality, and communications. Students will analyze, evaluate, and select appropriate PM systems, tools, and methodologies from a project leader point of view and develop understanding of PM practices through selected project work.

**CIS 623**  
N-TIER ARCHITECTURES  
3 credits

This course encompasses programming models that support database access, including ADO.NET. It covers client/server and multi-tiered architectures; use of components, including COM Class Libraries and .NET Framework; development of database applications using VB.NET and ASP.NET; Internet and intranet database design and implementation; database-driven Web sites; and use of XML syntax related to databases. It also considers privacy of data and data protection on servers.

*Prerequisite: CIS 523, CIS 530*

**CIS 624**  
DATA WAREHOUSES  
3 credits

This course covers the use of large-scale data stores to support decision making; critical success factors in designing and implementing a data warehouse and management of a data warehouse project; requirements analysis; design using the star schema; entire data warehouse integration; infrastructure needs; data staging process including data cleansing and transformation; data access including On-line Analytic Processing (OLAP) tools. Also considered are introduction to data mining; analysis, evaluation, and selection of data warehousing tools, techniques, and methodologies.

*Prerequisite: CIS 523 or CIS 623*

**CIS 625**

## INTERNET AND WEB PROGRAMMING

3 credits

This course will focus on Web application development (both client and server side) using various programming techniques. The course will discuss and use popular Internet mark-up languages, e.g. HTML, DHTML, XML/XSLT, and scripting languages, e.g. Java Script, PHP, and ActiveX components. In addition, other topics such as ASP.NET will be covered.

*Prerequisite:* CIS 523, CIS 540, and CIS 530 or CIS 530 or CIS 536

**CIS 627**

## ENTERPRISE DATA MANAGEMENT

3 credits

This course covers the design and implementation of enterprise-wide data-management systems, including an exploration of the internals of modern Relational Database Management Systems (RDBMS) servers. Topics include advanced use and administration of RDBMS servers and data integration across the enterprise. The course examines the impact of enterprise data management on both customized and package-based solutions such as Oracle.

*Prerequisite:* CIS 623

**CIS 628**

## WEB ANIMATION

3 credits

This course involves current topics in Web animation, digital arts, and multimedia technologies.

*Prerequisite:* T.B.D.

**CIS 630**

## COMPONENT-BASED PROGRAMMING

3 credits

This course studies software reuse. Applications and examples use the Microsoft environment and the component technologies COM and .NET. Topics include: the component object model; implementing a COM client and server; using the Active Template Library; key concepts of .NET; meaning of a component in .NET; using C# to create a .NET client and component; and component-related aspects of .NET including delegates, events, and threads.

*Prerequisite:* CIS 536

**CIS 636**

## ADVANCED COMPUTING WITH JAVA

3 credits

This course is a high-level introduction to Java for experienced programmers. Topics include: an overview of the basic syntax (including object-oriented concepts, interfaces, and exception handling) and semantics of Java, Java Files and Streams, Java Foundation Class (JFC, including the Abstract Window Toolkit, AWT, and Swing), Sockets, Threads, Pipes, Callbacks, Servlets, and Java Server Pages (JSP). Depending on interests and time, topics such as Applets, Java Database Connectivity (JDBC), Remote Invocation (RMI), Java Internet Networking Interface (JINI), and distributed computing issues will be discussed. Students will be expected to complete weekly programming assignments, a team project, and hands-on examinations.

*Prerequisites:* CIS 536, 540

**CIS 643**

## NETWORK DESIGN AND INSTALLATION

3 credits

This course will focus on the designing, setting up, and managing of local area networks and intranets. Various topologies, architectures,

and management software will be discussed. Students will be expected to install and administer a LAN. Data security issues, viruses, and virus protection are also covered.

*Prerequisite:* CIS 540

**CIS 645**

## INTERNET AND E-COMMERCE ARCHITECTURE

3 credits

This course covers technologies and approaches that support the design and implementation of Internet and E-commerce sites. Topics include hardware, networks, and server software such as Unix, Linux, and Windows for the foundation, Web site hosting using Apache or Internet Information Server (IIS), and database connections to Oracle, SQL Server, and MySQL. Also included are security and privacy technologies as well as integration between Web sites. The course covers both consumer and business issues with an emphasis on business issues.

*Prerequisite:* CIS 540, 643

**CIS 646**

## COLLABORATION TECHNOLOGIES

3 credits

This course entails collaboration technologies and processes addressing issues such as group process, facilitation, control, data-sharing, privacy, security, consistency, and globalization. Other topics include human-computer interaction, groupware design, architecture, and implementation. This course will consider collaboration technologies such as electronic mail, intranets, portals, online communities, Weblogs, dashboards, location awareness applications, conferencing, forums, meeting rooms, learning management, scheduling, calendars, workflow, document, and knowledge management. Students will design and implement a project using a variety of collaboration tools and technologies.

*Prerequisites:* CIS 523, CIS 540

**CIS 655**

## INTELLIGENT SYSTEMS

3 credits

This course will examine intelligent systems technologies that have or may become practical for organizational use. Topics may include simple expert systems, case-based reasoning, machine learning, neural networks, genetic algorithms, fuzzy logic, and natural language processing. Students will be expected to use, understand, and evaluate intelligent systems technologies for practical use.

*Prerequisites:* Successful completion of two required courses from CIS program

**CIS 656**

## ELECTRONIC COMMERCE SYSTEM ARCHITECTURE

3 credits

This course will identify the technologies necessary to develop an Electronic Commerce (EC) business model; the technologies necessary to develop an EC application including distributed processing, security, Web-to-legacy database connectivity, etc; and then how to evaluate the effectiveness of a transaction-based Web site. The course also will include EC business models, and analyze and evaluate appropriate e-commerce systems, tools, and methodologies. The course will include a case study approach, examining successful sites.

*Prerequisite:* CIS 523

**CIS 657**  
COMPUTER-BASED TRAINING  
3 credits

This course encompasses history, design, comparison, evaluation, and examples of computer-based training and knowledge communication systems. Human-Computer Interaction principles and guidelines will be applied to domain specific training and end-user assistance problems and projects. Issues include linear versus nonlinear control, interactive communication, and end-user assessment. Students will design and implement a project.

*Prerequisite: CIS 630*

**CIS 658**  
DATA MINING  
3 credits

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: CIS 536 for CIS students and MBA 620 or its equivalent for ITL students.*

**CIS 670, 671, 672**  
SPECIAL TOPICS IN COMPUTER INFORMATION SCIENCE  
3 credits

Specialized study in Computer Information Science. Topics vary according to interest of students and faculty.

**CIS 681**  
PROJECT DESIGN AND IMPLEMENTATION I  
3 credits

This course covers the design of a project appropriate to Computer Information Science. This may be an individual or a group project and may be the outgrowth of a design done in a previous course. The proposal must have the approval of the Graduate Director and the faculty member who is supervising the project. The project design will use a software engineering approach, including an information description, functional description, validation criteria, requirements cross-reference, and test provisions, developed in a progressively detailed process. Students are required to deliver an oral presentation about the project. This course must be successfully completed before the student may enroll in CIS 682 Project Design and Implementation II.

*Prerequisite: All Core courses*

**CIS 682**  
PROJECT DESIGN AND IMPLEMENTATION II  
3 credits

This course is the implementation of the project designed in Project Design and Implementation I. The project will be supervised by a faculty member. The project implementation will use a software engineering approach, including an initial prototype, a full implementation, test report, and documentation. Results of this project should include the project deliverable and an oral presentation on the project. The student must have successfully completed CIS 681 Project Design and Implementation I before enrolling in this course.

*Prerequisite: All Core courses and CIS 681*

**CIS 685**  
INDEPENDENT RESEARCH  
3 credits

Independent research on an approved topic in Computer Information Science. Students will be directed by a faculty member in this research. The topic must be approved by the Graduate Director and the faculty member who is directing the research. Results of this research should include the preparation of a publishable quality paper or report and an oral presentation on the research.

*Prerequisite: All Core courses*

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## GRADUATE EDUCATION PROGRAMS

The Education Department provides a variety of programs:

- M.A. in Education
- M.A. in Education with Certification  
Elementary and Special Education Certification  
Secondary Education Certification
- Certificate in Teaching English as a Second Language (ESL)
- M.A. in Education with Certification as a Reading Specialist
- Certification as a Reading Specialist

The description and requirements for each program are provided, followed by the Education course descriptions.

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## MASTER OF ARTS IN EDUCATION

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### Faculty

Director: Harris Lewin, Ed.D.

Associate Directors: Autism Certificate Program (Patrylo); Leadership Programs (Roesser); Reading Specialist Program (Modla); STEM education (Richardson)

Professors: Bednar, Clabaugh, Feden, Sweeder, R. Vogel, Yost

Associate Professors: Liang, Modla, Mosca, Richardson, Schoen

Assistant Professor: Patrylo

Lecturers: Beltz, Buckley, Buchanan, Dougans, Finore, Gradel, Himes, Huber, Hughes, Keating, Kersul, Roesser, Schalk, Sartori, M. Vogel

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### Admission Requirements

To be accepted for admission into the program, a student must:

1. Provide evidence of successful academic achievement in completion of a baccalaureate degree from an accredited institution of higher education.
2. Obtain acceptable scores on the Miller Analogies Test (MAT). (Arrangements to take this examination may be made with La Salle's Counseling Center. This requirement may be waived for applicants with an overall G.P.A. of 3.4 or above or hold an existing Masters degree.)
3. Provide two letters of recommendation from colleagues or supervisors who can address the candidate's ability and motivation for enrollment.
4. Complete the Application for Admission, accompanied by the stipulated application fee payable to La Salle University.