

2000

School of Computer and Information Science Graduate Catalog

Nova Southeastern University

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NOVA SOUTHEASTERN UNIVERSITY

Graduate Catalog

The School of Computer and Information Sciences

2000-2001

Academic Calendar, Master's Programs (Master's programs have rolling admissions)

Summer 2000

- May 1–Jun 12 00 Registration period (no late fees)
- Jun 13–26 00 Late registration period (late fees)
- Jun 26 00 First day of term
- Jul 1 00 Drop/add deadline
- Jul 4 00 Holiday
- Sep 4 00 Holiday
- Sep 15 00 Last day to withdraw from a course
with a final grade of W
- Sep 15 00 Last day of term

Fall 2000

- Jul 24–Sep 4 00 Registration period (no late fees)
- Sep 5–18 00 Late registration period (late fees)
- Sep 18 00 First day of term
- Sep 23 00 Drop/add deadline
- Oct 9 00 Holiday
- Nov 23–24 00 Holiday
- Dec 8 00 Last day to withdraw from a course
with a final grade of W
- Dec 8 00 Last day of term

Winter 2001

- Oct 30–Dec 22 01 Registration period (no late fees)
- Dec 23–Jan 2 01 Late registration period (late fees)
- Jan 2 01 First day of term
- Jan 7 01 Drop/add deadline
- Jan 15 01 Holiday
- Mar 23 01 Last day to withdraw from a course
with a final grade of W
- Mar 23 01 Last day of term

Spring 2001

- Jan 29–Mar 16 01 Registration period (no late fees)
- Mar 17–26 01 Late registration period (late fees)
- Mar 26 01 First day of term
- Mar 31 01 Drop/add deadline
- Apr 13 01 Holiday
- May 28 01 Holiday
- Jun 15 01 Last day to withdraw from a course
with a final grade of W
- Jun 15 01 Last day of term

Summer 2001

- Apr 30–Jun 15 01 Registration period (no late fees)
- Jun 16–25 01 Late registration period (late fees)
- Jun 25 01 First day of term
- Jun 30 01 Drop/add deadline
- Jul 4 01 Holiday
- Sep 3 01 Holiday
- Sep 14 01 Last day to withdraw from a course
with a final grade of W
- Sep 14 01 Last day of term

Fall 2001

- Jul 23–Sep 7 01 Registration period (no late fees)
- Sep 8–17 01 Late registration period (late fees)
- Sep 17 01 First day of term
- Sep 22 01 Drop/add deadline
- Sep 18 01 Holiday
- Sep 27 01 Holiday
- Nov 22–23 01 Holiday
- Dec 7 01 Last day to withdraw from a course
with a final grade of W
- Dec 7 01 Last day of term

Academic Calendar, Doctoral Programs (Doctoral programs have rolling admissions)

Summer 2000 Institute Term

- May 29–Jun 25 00 Registration period (no late fees)
- Jun 26–Jul 9 00 Late registration period (late fees)
- Jul 8 00 New student orientation
- Jul 9 00 First day of term
- Jul 9–14 00 Meeting dates
- Jul 10 00 Drop/add deadline
- Dec 8 00 Last day to withdraw from a course
with a final grade of W
- Dec 8 00 Last day of term

Fall 2000 Cluster Term

- Jul 28–Aug 25 00 Registration period (no late fees)
- Aug 26–Sep 8 00 Late registration period (late fees)
- Sep 7 00 New student orientation
- Sep 8 00 First day of term
- Sep 8–10 00 First meeting dates
- Sep 9 00 Drop/add deadline
- Dec 1–3 00 Second meeting dates
- Feb 7 01 Last day to withdraw from a course
with a final grade of W
- Feb 7 01 Last day of term

Winter 2001 Institute Term

- Nov 27–Dec 21 01 Registration period (no late fees)
- Dec 22–Jan 7 01 Late registration period (late fees)
- Jan 6 01 New student orientation
- Jan 7 01 First day of term
- Jan 7–12 01 Meeting dates
- Jan 8 01 Drop/add deadline
- Jun 7 01 Last day to withdraw from a course
with a final grade of W
- Jun 7 01 Last day of term

Spring 2001 Cluster Term

- Jan 22–Feb 15 01 Registration period (no late fees)
- Feb 16–Mar 2 01 Late registration period (late fees)
- Mar 1 01 New student orientation
- Mar 2 01 First day of term
- Mar 2–4 01 First meeting dates
- Mar 3 01 Drop/add deadline
- Jun 1–3 01 Second meeting dates
- Aug 1 01 Last day to withdraw from a course
with a final grade of W
- Aug 1 01 Last day of term

Summer 2001 Institute Term

- May 28–Jun 21 01 Registration period (no late fees)
- Jun 22–Jul 8 01 Late registration period (late fees)
- Jul 7 01 New student orientation
- Jul 8 01 First day of term
- Jul 8–13 01 Meeting dates
- Jul 9 01 Drop/add deadline
- Dec 6 01 Last day to withdraw from a course
with a final grade of W
- Dec 6 01 Last day of term

Fall 2001 Cluster Term

- Jul 30–Aug 23 01 Registration period (no late fees)
- Aug 24–Sep 7 01 Late registration period (late fees)
- Sep 6 01 New student orientation
- Sep 7 01 First day of term
- Sep 7–9 01 First meeting dates
- Sep 8 01 Drop/add deadline
- Nov 30–Dec 2 01 Second meeting dates
- Feb 6 02 Last day to withdraw from a course
with a final grade of W
- Feb 6 02 Last day of term



Nova Southeastern University

The School of Computer and Information Sciences

2000–2001 Graduate Catalog

This catalog describes the degrees and programs offered by the School of Computer and Information Sciences (SCIS). Policies and programs set forth in the catalog are effective through December 31, 2001. Policies, regulations, and requirements, including fees, are necessarily subject to change without notice at any time at the discretion of the Nova Southeastern University administration. The university reserves the right for any reason to cancel or modify any course or program listed herein. In addition, individual course offerings may vary from year to year as circumstances dictate.

The university recognizes that individual programs require different time limits for the completion of academic studies leading to a degree. Therefore, the time frame is a matter within the discretion of each academic program. All program/center catalogs, bulletins, and handbooks carry this information.

Nova Southeastern University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, Georgia 30033-4097; Telephone number 404-679-4501) to award bachelor's, master's, educational specialist, and doctoral degrees. The master of science curricula for computer science and computer information systems follow the guidelines of the Association for Computing Machinery (ACM) and the Computer Science Accreditation Board (CSAB).

Published September 2000

The official catalog of the School of Computer and Information Sciences is the governing document for all program-related information. Please become familiar with the policies and procedures listed within. Failure to read this catalog does not excuse students from the rules and procedures contained in it. Personal factors, illness, and contradictory advice from any source are not acceptable reasons for seeking exemption from the contents of this catalog. Revised official versions of this catalog will be posted to the school's Web site before becoming available in printed form. If there is any conflict between the information contained in the catalog and that contained in other documents, the information in the catalog prevails.

President's Message

The 21st century will be historic for technological advances, and the School of Computer and Information Sciences (SCIS) at Nova Southeastern University has accepted the challenge to prepare students for this fast-paced, ever-changing field.

From our early beginnings with 17 students, NSU has grown into the largest independent educational institution in Florida with 16 centers, colleges and schools. NSU has 63,000 alumni, and more than 18,000 students enrolled in programs at the main campus, throughout Florida, in 22 states, eight foreign countries, and Puerto Rico.

As an integral component of NSU's quality educational program, SCIS pioneered the electronic classroom, offering online courses in 1983. To date, SCIS offers all four master's degree programs entirely online, which allows degree-seeking working professionals convenience and flexibility.

NSU is continuing to launch new degree programs, and to expand our facilities to meet the needs of our growing community. Construction is underway for the Nova Southeastern University Library, Research, and Information Technology Center, a joint-use facility with Broward County that will be open to the community as well as to students, faculty, and staff members of NSU. The largest library in Florida will house 1.4 million volumes, 1,000 user seats, a 500-seat performing arts auditorium, 20 electronic classrooms, and museum-style art collections and exhibits. Its presence will enhance NSU's efforts to join academe, government, citizenry, and business communities through technology. Completion of the high-tech library is scheduled for fall 2001.

Plans for the future also include the development of the Wayne Huizenga Graduate School of Business and Entrepreneurship, a three-story, 110,000-square-foot facility that will house 40 classrooms, administration and faculty offices, and student service areas. The new facility is made possible through gifts by Wayne and Marti Huizenga, Carl DeSantis, Hudson Family Foundation, August and Melba Urbanek, Leonard and Antje Farber, and many other donors.

Also on the horizon is the new Family Center Village, a \$12.5 million project to house the university's growing programs for infants, toddlers, and preschoolers, and the NSU Field House, a comprehensive, 163,000-square-foot facility that would accommodate both sports competition and recreational activities.

We affirm our commitment to adopt the latest technological advances to improve the delivery of our programs and services. SCIS will continue to preserve our tradition of representing the forefront of education in the age of technology.

The future of education is here.

Ray Ferrero, Jr.
President
Nova Southeastern University

Dean's Message

In this era of rapid technological growth, each new day brings demands for increased proficiencies of those whose professions intimately involve computers and information technology, e.g., creation of computer/software products or information systems, teaching computing, using computing technology in education and training, managing computing resources, or conducting research. The School of Computer and Information Sciences has a critical responsibility to offer programs that are timely yet provide an enduring foundation for future professional growth. The school also considers it essential that it enables working professionals to earn a graduate degree without interrupting their careers.

To provide timely programs, the school is very sensitive to changes in technology, reviews its curricula at least once a year, and makes revisions quickly. To support working professionals, the school offers three on-campus evening master's programs, four online master's programs, and five combined on-campus–online doctoral programs in several formats. All four online M.S. programs are now part of the Southern Regional Electronic Campus (SREC). The school also welcomes students who wish to earn the M.S. or Ph.D. on a full-time basis.

The online format for our master's degree programs requires the completion of 12 online courses or 10 online courses plus a thesis. Online courses require use of a computer and an Internet service provider. Students participate in online courses from anywhere in the world where Internet access is available.

Students use the Web to access course materials, announcements, email, the Electronic Library, and other information, and for interaction with faculty members and fellow students. Online activities may include forums using threaded bulletin boards, chatrooms, email, and electronic classroom sessions. In addition, the school provides a system that enables the student to submit assignments online in multimedia formats and to receive the professor's online reviews of assignments in the same multimedia formats. Students must comply with NSU policies on acceptable use of computing resources and use of material in Web pages.

The combined on-campus and online doctoral program includes two formats: *cluster* and *institute*. Both include a blend of on-campus and online activities. Students choosing the cluster format attend four cluster meetings each year, held quarterly over an extended weekend at the university. Students choosing the institute format attend a weeklong institute twice a year at the university. Clusters and institutes bring together students and faculty for participation in courses, dissertation counseling (individual and group), special lectures, and ample opportunity for student–faculty interaction.

To hone skills and develop confidence and independence, our programs — both on-campus and online — place greater-than-usual emphasis on projects. In many cases, a subject course is supplemented by a project course of equal or greater academic credit.

Edward Lieblein, Ph.D.

Dean

School of Computer and Information Sciences

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Nova Southeastern University

Nova Southeastern University (NSU) is a dynamic, not-for-profit independent institution dedicated to providing high-quality educational programs of distinction from preschool through the professional and doctoral levels, as well as service to the community. NSU prepares students for lifelong learning and leadership roles in business and the professions. It offers academic programs at times convenient to students, employing innovative delivery systems and rich learning resources on campus and at distant sites. The university fosters inquiry, research, and creative professional activity, by uniting faculty members and students in acquiring and applying knowledge in clinical, community, and professional settings.

Located on a beautiful 232-acre campus in Fort Lauderdale, NSU has approximately 18,000 students and is the largest independent institution of higher education in Florida. It ranks 25th in the size of its graduate programs among the 1,560 universities in the United States with graduate programs and 10th among independent universities. NSU awards bachelor's, master's, educational specialist, doctoral, and first-professional degrees in a wide range of fields. It has an undergraduate college and graduate schools of medicine, dentistry, pharmacy, allied health, optometry, law, computer and information sciences, psychology, education, business, oceanography, and social and systemic studies. The institution also enjoys an excellent reputation for its programs for families offered through the Family Center and University School, including innovative parenting, preschool, primary, and secondary education programs.

The university's programs are administered through academic centers that offer courses at the Fort Lauderdale campuses, as well as at locations throughout Florida, across the nation, and at selected international sites in Europe, Canada, Israel, and the Caribbean. Despite the geographic diversity of sites where classes are offered, 82 percent of the student body attends classes in Florida.

NSU's library system is composed of the East Campus Library, Einstein Library, Health Professions Division Library, Law Library, North Miami Beach Fischler Graduate School of Education and Human Services Media Union, Oceanographic Library, and four school libraries on the main campus. The catalogs of all NSU libraries are accessible to local and distance education students and faculty members, wherever they may be located, via computers, using the Electronic Library. Overall, the university libraries house approximately 340,000 volumes and 1,200,000 microform units. Online and CD-ROM databases complement the paper-based holdings and provide full-text resources. In order to further assist distance education students with library requirements, contracts, when necessary, are signed with local university libraries to provide library services. Interlibrary loan arrangements through networked organizations such as the Online Computer Library Center (OCLC), the Southeast Florida Library Information Network (SEFLIN), the Consortium of Southeastern Law Libraries (COSELL), and the National Library of Medicine provide broad access to a wide range of materials.

Nova Southeastern University has produced approximately 63,000 alumni. Since 1971, it has enjoyed full accreditation by the Commission on Colleges of the Southern Association of Colleges and Schools, the regional accrediting body for this region of the United States.

The success of NSU's programs is reflected in the accomplishments of its graduates among whom are:

1. Thirty-nine college presidents and chancellors
2. More than 100 college vice presidents, provosts, deans, and department chairs
3. Sixty-five school superintendents in 16 states, including nine of the nation's largest school districts
4. Hundreds of college and university faculty members nationwide
5. More than 100 high-ranking United States military officers, including admirals and generals, and business presidents, vice presidents, executives, middle managers, and researchers at companies such as American Express, Ameri-First Bank, AT&T, Bellcore, General Electric, GTE, Harris Corporation, IBM, Lenox China, Motorola, Nortel, Racal Datacom, BellSouth, Westinghouse, and William Penn Bank

The School of Computer and Information Sciences

A major force in educational innovation, the School of Computer and Information Sciences (SCIS) provides educational programs of distinction to prepare students for leadership roles in computer science, information systems, information science, and computing technology in education. It is distinguished by its ability to offer on-campus, online (via the Internet and World Wide Web), and combined on-campus/online formats that enable professionals to pursue M.S., Ed.D., and Ph.D. degrees without career interruption. The school also welcomes students who wish to earn the M.S. or Ph.D. on a full-time basis.

Ranked by *Forbes* magazine as one of the nation's top 20 cyber-universities, and listed in the Princeton Review's *The Best Distance Learning Graduate Schools*, NSU and SCIS pioneered online graduate education with its creation of the electronic classroom. SCIS has been offering online graduate programs and programs with an online component since 1983. All four online M.S. programs are now part of the Southern Regional Electronic Campus (SREC). The school, which has more than 1,100 students, has been awarding graduate degrees since 1980. Its research advances knowledge, improves professional practice, and contributes to understanding in the computer and information sciences.

The school offers programs leading to the M.S. in computer science, computer information systems, management information systems, and computing technology in education; the Ph.D. in computer science, information systems, computer information systems, and information science; and the Ph.D. or Ed.D. in computing technology in education.

The M.S., which is offered on-campus or online, requires 36 credit hours and may be completed in 18 months. To earn the M.S. in 18 months, the student must enroll in two courses each term. Master's terms are 12 weeks long and there are four terms each year. Terms start in September, January, April, and July. SCIS master's students may apply for early admission into the doctoral program. Early admission provides the student the opportunity to earn the Ph.D. or Ed.D. in a shorter time.

Depending on the program doctoral students may take one of two formats: *cluster* or *institute*. Clusters and institutes bring together students and faculty members for participation in courses, seminars, and dissertation counseling. Between meetings, students work on assignments and projects, and participate in online activities that facilitate frequent interaction with the faculty and with other students. Cluster students attend four cluster sessions per year, held quarterly over an extended weekend at the university, during the first two years of their programs. Cluster terms start in March and September. Institute students attend weeklong sessions at the university twice a year at the start of each term. Institute terms start in January and July. Doctoral terms are five months long.

Online activities require a computer and an Internet service provider. Online learning methods involve Web pages to access course materials, announcements, the Electronic Library, and other information, plus a range of activities that facilitate frequent student-professor and student-student interaction. Faculty members and students interact via online forums using threaded bulletin boards, chatrooms, email, electronic classroom sessions, and online submission of assignments in multimedia formats.

Degrees and Programs of the School of Computer and Information Sciences

Master of Science (M.S.)

- Computer Science
- Computer Information Systems
- Management Information Systems
- Computing Technology in Education

Doctor of Philosophy (Ph.D.) or Doctor of Education (Ed.D.)

- Computer Science (Ph.D.)
- Computer Information Systems (Ph.D.)
- Information Science (Ph.D.)
- Information Systems (Ph.D.)
- Computing Technology in Education (Ph.D. or Ed.D.)

Application for Admission

Applicants must satisfy the admission requirements described in the individual program sections of this catalog. To obtain information or admission forms, contact:

The School of Computer and Information Sciences
Nova Southeastern University
6100 Griffin Road
Fort Lauderdale, FL 33314-4416

800-986-2247 or (954) 262-2000
Email: scisinfo@nova.edu
www.scis.nova.edu

Admission forms also may be downloaded from the school's Web site.

General Information on Graduate Programs

Admissions

Admission to the School of Computer and Information Sciences is competitive. The school qualitatively evaluates applicants and makes selections based on performance, personal qualifications, and evidence of potential for success. Admission requirements for master's degree programs are specified in the section General Information on Master's Degree Programs and in descriptions of individual master's programs. Admission requirements for doctoral degree programs are specified in the section General Information on Doctoral Degree Programs and in descriptions of individual doctoral programs. Admission requirements for international students are described in the individual degree program sections of this catalog. Applicants not having an immediate degree objective are welcome to apply for master's-level courses. Requirements are described in the section General Information on Master's Degree Programs.

Library Resources

Students must be registered in order to use the university's library services. NSU's library system comprises the Einstein Library, Health Professions Division Library, Law Library, East Campus Library, North Miami Beach Fischler Graduate School of Education and Human Services Media Union, Oceanographic Library, and four school libraries on the main campus. The catalogs of all NSU libraries are accessible for remote searching (as are catalogs of other university libraries) to online students via the Electronic Library. Online and CD-ROM databases complement the paper-based holdings and provide full-text resources.

Interlibrary loan arrangements through networked organizations such as the Online Computer Library Center (OCLC), the Southeast Florida Library Information Network (SEFLIN), the Consortium of Southeastern Law Libraries (COSELL), and the National Library of Medicine provide broad access to a wide range of materials. The library also has lending agreements with large research libraries in the Midwest, which provide priority document delivery services to students. The Einstein Library is a cooperating library of the Foundation Center in New York, giving students access to collections for grants and foundation research.

Online students have access to books, journal articles, microfiche, dissertations, index searches, catalog searches, and reference librarians. Distance students may request library materials using fax, mail, or online forms. To contact Distance Library Services (DLS) by phone, call 800-541-6682, ext. 4602, or (954) 262-4602. Use the toll-free fax to order library materials: 888-347-3627 (in Broward County, fax 262-3947). Students can send email to DLS: library@nova.edu, or can reach DLS via the Web: www.nova.edu/library. All materials mailed by the DLS office are sent by first-class mail. When books are borrowed, the student will have to pay a small charge for third-class postage to return the books. Books are loaned for one month. Periodical copies or ERIC documents need not be returned.

Student Research Involving Human Subjects

All students must be aware of the university's policy regarding research involving human subjects. If you plan to do surveys (email, telephone, regular mail), interviews, testing, or any other types of assessments involving human subjects as part of your dissertation, the instruments and protocols must be reviewed by the university's Institutional Review Board (IRB). The purpose of the IRB is to protect the rights of human subjects involved in research and ensure appropriate practices are being carried out at NSU. SCIS has a representative to the IRB who can help students with the review process. There are three levels of review: exempt, expedited, and full review. The SCIS representative guides students regarding the level of review required and assists with any paperwork and procedures that might be required. Most research at SCIS falls into the exempt category, which requires a rather simple process, but it must be logged appropriately. Students should contact the SCIS IRB representative by the time they start working on their preliminary proposals. Courses also may involve human subject research. In most cases, faculty members secure approval in advance for all students in the course. If you plan to conduct human subject research in a project course or as independent study, you should raise the matter with your professor. Students may obtain additional information from the program office and from www.nova.edu/cwis/ogc/irb.

Teaching Assistantship Program

The school has a limited number of teaching assistantship positions. To be considered for a teaching assistantship, candidates must have a master's degree in a related field and must be a student in an SCIS doctoral program. Teaching assistants will spend from 20 to 30 hours per week at the university. The assistantship program includes tuition and fees; however, other expenses, e.g., books, are not included. Medical insurance is available under the

monthly employee plan. Residence within daily commuting distance to the campus is required. Each award includes a one-year renewable contract with renewal based on faculty evaluation.

Teaching assistants may teach courses, assist faculty members with course work, counsel students, conduct literature searches, assist in the preparation of course syllabi, evaluate textbooks, grade papers and projects, and participate in technical/research projects. In order to teach graduate courses, the teaching assistant must have completed 18 doctoral credits.

Interested SCIS doctoral students must submit an application, including an up-to-date curriculum vita, cover letter, and arrange for submission of SCIS evaluation forms by three SCIS faculty members. For information and applications, call 800-986-2247, ext. 2041. (The application also may be downloaded from the school's Web site.)

Financial Information

Tuition and Fees

Academic, program, and online services are provided only to SCIS students who are currently registered. Students who are not registered are not entitled to receive services. Textbooks are not included in tuition and fees and must be purchased by the student. Students are responsible for their own lodging and travel expenses. Students must be registered to gain access to NSU's computing services. Students who have grades of *Incomplete* to resolve must register for *Continuing Services* (see table below for costs). Doctoral students must be registered for courses, projects, dissertation, or continuing dissertation to receive the support of the faculty on the dissertation process.

Master's Degree Programs (Rates are subject to change.):

Tuition	\$395 per credit hour
Application Fee	\$50 nonrefundable
Registration Fee	\$30 nonrefundable
Late Registration Fee.....	\$100 nonrefundable
Reinstatement Fee.....	\$50 nonrefundable
Program Change Fee.....	\$100 nonrefundable
Graduation Fee	\$75
Deferment Fee for Installment Payment	\$50
Continuing Services	\$160 (leave of absence with online privileges per term)

Doctoral Degree Programs (Rates are subject to change.):

Tuition for Course Work	\$4,450 per term (10 credit hours)
Tuition for Dissertation I or II	\$4,860 per term
Tuition for Continuing Dissertation	\$2,430 per term
Tuition for Continuing Services Incompletes	\$445 per incomplete (I) grade per term
Application Fee.....	\$50 nonrefundable
Registration Fee.....	\$30 nonrefundable
Materials Fee.....	\$20 per 700-level course
Late Registration Fee.....	\$100 nonrefundable
Reinstatement Fee.....	\$50 nonrefundable
Program Change Fee.....	\$100 nonrefundable
Deferment Fee for Installment Payment.....	\$50
Graduation Fee.....	\$75

Tuition Payment Policy

Tuition and fees may be satisfied with payment by check, money order, credit card, or official financial aid award letter with associated financial aid documentation. Cash will not be accepted as payment for tuition and fees unless paid at the Office of the University Bursar. All postdated checks or credit card authorizations will be held by the university for processing until the due dates specified in this policy. The tuition payment policy is subject to change at any time at the discretion of the administration of Nova Southeastern University. There are five options available for the payment of tuition. These options are described below:

1. *Full payment by the student:* Full payment of tuition and fees is to be made at the time of registration. Registration after the registration period, when permitted, will involve payment of a late registration fee.

2. *Installment payment by the student (students attending on an I-20 are not eligible for this option):* This plan requires three payments spread over the first 90 days of the term. The first payment must be made by check, money order, or credit card. At the time of registration, the student must submit postdated checks or credit card authorizations for the second and third installments. The first payment, due at registration, includes all fees, 50 percent of the tuition, plus a \$50 deferment fee. The second payment, due 60 days from the beginning of the term, shall equal 25 percent of the tuition. The third payment, due 90 days from the beginning of the term, shall equal 25 percent of the tuition. **Registrations received without the three payments cannot be processed.**
3. *Direct payment by the student's employer:* If a letter of commitment or a voucher from the student's employer accompanies the registration form, then the student will not be required to make a payment at registration time. The letter of commitment or the voucher must indicate that the employer will remit full payment of tuition and fees to Nova Southeastern University upon receipt of the invoice from the university's accounts receivable office.
4. *Tuition reimbursement by the student's employer:* If the student submits a letter from the employer at registration time that establishes eligibility for tuition reimbursement, the student may choose a two-payment plan. The first payment, due at registration, shall include all fees, 50 percent of the tuition, plus a \$50 deferment fee. The second payment, due five weeks after the end of the term, shall equal 50 percent of the tuition. To secure this plan, the student must provide, at registration, a postdated check or credit card authorization for the deferred portion.
5. *Financial aid award:* Students who have applied for financial aid and have submitted all the required paperwork to the Office of Student Financial Assistance may register without payment.

Refunds

To receive a full refund of tuition (not including fees), a student must cancel any registration, enrollment contract, or financial agreement made with the university and such cancellation must be made in writing within three working days from the date such payment is due. A student withdrawing from a course may be eligible for a refund (full or partial) depending on the date of withdrawal. The section Withdrawal and Refund Policy describes the refund policy regarding withdrawals. **Failure to attend classes does not automatically drop or withdraw a student from the class or the university.**

Financial Aid

The Office of Student Financial Assistance administers the university's financial aid programs of grants, loans, scholarships, and student employment, and provides professional financial advisers to help students plan for the most efficient use of their financial resources for education. In order to participate in financial aid programs, a student must be admitted into a university program, and must be a citizen, a national, or a permanent resident of the United States, or be in the United States for other than a temporary purpose. **A prospective student who requires financial assistance must apply for financial aid while he or she is a candidate for admission. Students/applicants may apply for financial aid online at www.nova.edu/cwis/finaid. Students must work directly with the university's Office of Student Financial Assistance because the school's program office does not administer or manage the financial aid process.** For additional information or application forms call (954) 262-3380, 800-806-3680, or send email to lordcarl@nova.edu or finaid@nova.edu. To continue financial aid, at a minimum, enrolled students must demonstrate satisfactory academic progress toward a stated educational objective in accordance with the university's policy on satisfactory progress for financial aid recipients.

Registration

Academic Advising and Registration

Academic advising is provided by the student's program office in concert with the faculty. The registration process begins when the program office sends each student a registration packet that contains class schedules and information about the registration period and the registration process.

Deadlines

Students are expected to register during the announced registration period. Registration after the close of the announced registration period, when permitted, will require the payment of a late fee.

Academic Information and Policies

Student Original Work (See also Code of Student Conduct and Academic Responsibility.)

Each student is responsible for maintaining academic integrity and intellectual honesty in his or her academic work. It is the policy of the school that each student be academically honest, which means that each student must:

- Submit his or her own work, not that of another person
- Not falsify data
- Not engage in cheating (giving or receiving help during examinations, acquiring and/or transmitting test questions prior to an in-class examination, or falsifying any records, including admissions material)
- Not receive or give aid on assigned work that requires independent effort
- Properly credit the words or ideas of others according to accepted standards for professional publications (See, for example, *The Publication Manual of the American Psychological Association*.)
- Not use term paper writing services or consult such services for the purpose of obtaining assistance in the preparation of materials to be submitted in courses
- Not engage in plagiarism

Webster's defines plagiarism as "stealing or passing off ideas or words of another as one's own" and "the use of a created production without crediting the source." Extreme caution must be exercised by students involved in collaborative work to avoid questions of plagiarism.

Refer also to the section Student Misconduct and the section Procedures for Resolving Allegations of Student Misconduct.

Form and Style Requirements for Student Work

The book *Bugs in Writing* (Dupré, 1998) contains valuable guidance on professional writing and is specifically oriented to computer professionals. Another excellent style guide is *The Chicago Manual of Style, 14th Edition*, (University of Chicago Press). The *Publication Manual of the American Psychological Association, Fourth Edition* (1994) is also helpful, and you should give particular attention to Chapter 1 (Content and Organization of a Manuscript), Chapter 2 (Expression of Ideas), and Chapter 3 (Editorial Style). Chapter 2 has good advice on writing style, grammar, and guidelines to reduce bias in language.

These books provide general guidelines for form, style, and general writing principles in the preparation of papers, assignments, and reports. They contain guidance on punctuation, spelling, capitalization, abbreviations, quotations, numbers, statistical and mathematical material, tables, figures, footnotes, appendixes, and reference citations in text. **Doctoral students must follow the policies, procedures, and formatting requirements contained in the *SCIS Dissertation Guide* for the planning and preparation of the doctoral dissertation. For reference lists, students must follow the instructions given in the section Reference List and Annotated Bibliography of the *SCIS Dissertation Guide*.**

Attendance Policy

Master's degree students are expected to be present at each meeting of their classes on campus. Exceptions to this rule may be made in the case of illness and possibly in other instances when approved by the instructor. Students should advise their instructors in advance of any anticipated absences. Additional work may be required by an instructor for any absence. Excessive absences will result in a failing grade. For online master's courses, participation/attendance policies will be covered in the syllabus of each course.

Doctoral degree students are required to attend all of their scheduled clusters or institutes. Students are cautioned that they will risk dismissal from the doctoral program should they miss institutes or clusters. Exceptions to this rule may be made by the program director in the case of illness and possibly in other hardship situations. Absence from individual class sessions must be approved by the instructor. Students are required to advise the program office and their instructor in advance of any anticipated absences. Participation/attendance policies regarding the online components of doctoral courses will be covered in the syllabus of each course.

Grading System

Students will be assigned grades for courses and projects according to the following system:

Grade	Grade Points	Meaning of Grade
A	4.0	Superior performance
A-	3.7	
B+	3.3	
B	3.0	
B-	2.7	
C+	2.3	Satisfactory performance
C	2.0	
C-	1.7	
F	0.0	
I		
W		Lowest acceptable grade for graduate credit
WU		Extremely unsatisfactory performance. Cannot be used to satisfy degree requirements.
PR		A temporary grade assigned for incomplete work. See the section The Grade of Incomplete (I) for school policy.
NPR		Withdrawn from course. See the section The Grade of Withdrawn (W) for school policy.
P		Withdrawn by the university
AU		Progress. May be assigned to master's thesis or doctoral dissertation registration. Carries credit hours but no quality points. Indicates progress toward completion of a thesis or dissertation.
		No Progress. May be assigned to master's thesis or doctoral dissertation registration. Carries credit hours but no quality points. Indicates no progress or inadequate progress toward completion of a thesis or dissertation. Repeated NPR grades may result in evaluation for dismissal.
		Pass. Thesis and dissertation grades of PR and NPR will be changed to P when the thesis or dissertation report receives final approval.
		Audit. For students who register for a course on an audit basis.

To determine the grade point average (GPA), divide the sum of all the grade points earned in graduate courses taken toward the graduate degree by the number of course credit hours taken toward that degree. Only those courses and projects taken toward the degree that carry grade points, except repeated courses, transfer credits, and 500-level courses, are included in the computation of the GPA. The grades of I, W, WU, P, PR, and NPR do not affect the GPA. With the exception of the grade of I, once a final grade in a course has been recorded by the Office of the Registrar it can be changed only in cases of computational error or other justifiable cause approved by the dean (Refer to Challenge of Course Grade). A student may not do additional work or repeat an examination to raise a final grade.

The Grade of Incomplete (I)

The grade of Incomplete (I) will be granted only in cases of extreme hardship. In such cases, a student requiring an incomplete must submit a written appeal with full rationale to the instructor at least two weeks prior to the end of the term. **The student does not have a right to an incomplete, which may be granted only when there is clear evidence of just cause.** Should the instructor agree, an *incomplete contract* will be prepared by the student and signed by both student and instructor. The *incomplete contract* must contain a description of the work to be completed and a completion date. **The completion period should be the shortest time possible.** In no case may the completion date extend beyond 30 days from the last day of the term for master's courses or beyond 60 days from the last day of the term for doctoral courses. The *incomplete contract* will accompany the formal submission of the instructor's final grade roster to the student's program office. The program office will monitor each *incomplete contract*. If a change-of-grade form is not submitted by the scheduled completion date, the grade will be changed automatically from I to F. No student may graduate with an I on his or her record. The grade of I does not apply to master's thesis or doctoral dissertation registrations.

The Grade of Withdrawn (W)

Withdrawal requests must be submitted to the student's program office and must be made *in writing* by the student. **Requests for withdrawal received after the last day of the term will not be accepted. Failure to attend classes or participate in course activities will not automatically drop or withdraw a student from the class or the university.** Students who have not withdrawn on or before the last day of the term will receive letter grades that reflect their performance in the course(s). When a withdrawal request is approved, the transcript will show a grade of W for the course. Depending on the date of withdrawal, the student may be eligible for a partial refund (see the section Withdrawal and Refund Policy).

Repeating a Course

A student who has passed a course with a grade of B- or higher is not permitted to repeat it for credit. A student may repeat a course in which a grade of C+ or lower has been earned but credit toward the degree and the GPA will be granted only once. Permission for repeating a course must be obtained from the student's program office. The transcript will show both the original and repeat grades; however, only the higher grade will be counted in the computation of the student's GPA. Students repeating a course must pay course tuition and fees.

Academic Standing

Students must maintain a cumulative grade point average (GPA) of at least 3.0 to remain in good academic standing (see Grading System). A student whose GPA falls below 3.0 is automatically on academic probation and will not be permitted to graduate. Also, academic probation may adversely affect financial aid. If the GPA is not raised to 3.0 within two terms, the student will be dismissed from the program. A student on academic probation may be allowed to continue graduate study in subsequent terms if each term's grade point average is 3.0 or greater. Upon achieving a cumulative GPA of 3.0, the student will be removed from academic probation. If, because of very low GPA, it is impossible to raise the GPA to 3.0 within two terms, the student will be dismissed immediately. Doctoral students who do not have a cumulative GPA of 3.0 at the end of their course work will not be admitted to candidacy and will not be permitted to register for dissertation. Doctoral students who received NPR grades for successive dissertation registrations will be evaluated for probation or dismissal (see Evaluation of Dissertation Progress).

Reinstatement

A dismissed student may petition the program office for reinstatement after six months. Each petition must include a reinstatement fee of \$50 (nonrefundable). Petitions must meet application for admission deadlines and must describe the reasons why academic potential has changed. Reinstatement will be evaluated by the Academic Review Committee. Reinstated students unable to achieve a GPA of 3.0 in their program during the two terms following reinstatement will be dismissed from the school and will not be eligible for further reinstatement.

Time Limitations

Students in a master's degree program must complete requirements for the degree within five years from the date of their first registration. Students in a doctoral degree program must complete requirements for the degree within seven years from the date of their first registration. Students may petition the program office in writing for an extension of time, which may be granted only if the petition presents justifiable cause and an acceptable plan for program completion. Petitions for extension must be received in the program office at least three months before the time limit is reached. Doctoral students must be close to completing the dissertation and must obtain a recommendation for extension from their dissertation adviser. Extensions require approval by the program director and the dean. When the time limit has been exceeded, and in the absence of a petition for extension, the student will be automatically dismissed from his or her program.

Inactive Status

Students who fail to register are considered to be *inactive*. Inactive students are not eligible for academic services from faculty and staff members and are not eligible to receive computing, library, and other university services. An inactive student who has not registered for one or two consecutive terms will be reactivated with no academic penalty upon registration. An inactive student who has not registered for one year must petition the program office in writing for reinstatement and submit a reinstatement fee of \$50. Students who are reinstated will be required to meet all program requirements and policies in effect at the time of reinstatement. Reinstated students must still meet their degree program time limitations based on the date of their first registration in the program unless extensions were granted at the time of reinstatement.

Student Records and Transcripts

The university maintains a system of record keeping and provides students with official grade reports and transcripts reflecting their academic progress. This system documents all official information from the time of application for admission to graduation. Official hard copies of records are maintained by the registrar's office.

Records are secured via the computerized student information system in addition to back-up hard copy files. Computer files are secure and kept up to date. The registrar's office follows the American Association of Collegiate Registrar's and Admissions Officer's (AACRAO) guidelines for the retention and disposal of records. After the appropriate time period, hard copy files are retired to storage. Computer files are moved to historical files and permanent records are microfilmed for later reference.

Students may obtain copies of their transcripts; however, an official transcript of a student's academic record cannot be released until after all of his or her accounts, academic or nonacademic, are paid. Upon completion of a degree program at the university, students receive one transcript without charge. Any other transcripts, before or after graduation, must be specifically requested. For these, there is a \$5 fee for each official transcript requested. To obtain an official transcript, a written request is required. Students or graduates may complete a Transcript Request Form at the registrar's office or send a letter to the Office of the University Registrar, 3301 College Avenue, Fort Lauderdale, FL 33314-7796 containing your name, address, Social Security number, and answers to the following questions:

In what program were you enrolled? When did you attend? If you graduated, what date?
Do you want to delay processing because of term grades, change of grades, or conferral of degree?
How many transcripts do you want? Where should they be sent?

To receive an unofficial transcript by fax, send a signed request or fax a request to (954) 262-7265.

Challenge of Course Grade

A student who wishes to challenge a grade assigned for an entire course must communicate with the instructor, in writing, within 10 days of receipt of the grade. In this communication, the student must state the reasons for requesting a change in the grade. A decision will be made by the instructor following his or her review of the appeal. The student will not be permitted further appeal. If, however, evidence of discrimination or a violation of the student's rights is presented, then the Student Grievance Procedure shall be followed. A student may neither do additional work nor repeat an examination to raise a final grade.

Student Misconduct

The school will not tolerate acts of academic dishonesty or behavior that are clearly unethical, unprofessional, flagrantly disruptive, or that violate the general understanding of the proper conduct of graduate students. Commission of an act of misconduct will subject the student to dismissal from the university. Individual cases will be examined by the Academic Review Committee, which will present its findings to the dean for adjudication. (See the sections: Student Original Work; Code of Student Conduct and Academic Responsibility; and Student Code of Computer Ethics.)

Procedures for Resolving Allegations of Student Misconduct

Allegations of student misconduct must be made in writing to the student's program office by a faculty member, staff member, or student. All pertinent factors, witnesses, events, and evidence related to the alleged misconduct should be included. If the allegations constitute *probable cause* to proceed, the program director or assistant program director will notify the accused in writing that an inquiry will be conducted by the Academic Review Committee.

As part of the inquiry, all pertinent documentary evidence and statements from witnesses will be assembled. The accused will be given an opportunity to provide a written response to the allegations. The Academic Review Committee will submit its findings and recommendation to the dean. When misconduct is indicated beyond reasonable doubt, the penalties may be: admonition, suspension, or dismissal. In such case, a report of the findings and penalty will be provided to the accused who may acquiesce in the penalty or may contest and ask for a hearing.

Failure of the accused to respond within 20 days shall be construed as acquiescence in the report of the inquiry. If a hearing is requested, it will be conducted by the Academic Review Committee. If, after the hearing, the committee finds the accused guilty of misconduct, it will provide the dean with a report of the hearing. The dean will decide on the final action to be taken.

Student Grievance Procedure

This section describes the procedure for student grievances regarding academic matters. If the issue concerns the fairness of a grade, the procedure described in the section Challenge of Course Grade must be followed.

First, the student should attempt to resolve an issue in dispute at the level at which the dispute occurred, for example, with the appropriate faculty member or program director. This attempt must be in writing (e.g., email, regular mail, or fax). The student may wish to use certified mail to verify receipt of correspondence. In the correspondence, the student must present a rationale for his or her position based on factual information. The student will receive a reply from the recipient, in writing, that addresses the complaint.

If the reply is not acceptable, the student is encouraged to submit the complaint in writing, to the next higher level, e.g., the appropriate program director. If the program director is unable to resolve the dispute, he or she will notify the student and the dean of this in writing.

The student may then appeal in writing to the dean of the School of Computer and Information Sciences. The dean will attempt resolution. If appropriate, the dean may assign the matter to the Academic Review Committee consisting of at least three faculty members of the school, one of whom will be appointed chair. The committee will meet, carefully review the case, and make a written recommendation, including rationale, to the dean to either accept or reject the student's appeal, or may propose an approach to resolve the dispute. The dean will review the findings and recommendations of the Academic Review Committee, and will notify the student in writing of his or her decision. The dean's decision is final and cannot be appealed.

Textbooks

Book information can be found on the SCIS Web site. Click on "Textbooks" and then click on the term schedule for your program. When you reach your program, click on the "Book Info" link for each course.

SCIS students must find their own sources to purchase textbooks. Possible sources include online booksellers and national bookstores. Students may find online purchasing to be faster and less expensive. Inquiries as to availability via the Internet may be made to online booksellers such as:

Amazon Books: www.amazon.com

Barnes & Noble: www.barnesandnoble.com

Borders Online: www.borders.com

Fatbrain.com: www.fatbrain.com

Other possible sources may be found via Internet search. Discounts are often available. Students should compare prices, availability, and shipping options.

Students should place their orders early enough to ensure delivery prior to the start of the term. Please note that some texts may involve a wait of six to eight weeks.

There will be occasions when books are not available for the start of the term because they are out of stock or temporarily out of print. In such cases, faculty members will ensure that courses progress according to their schedules.

Communication by Email

When communicating with students via email, faculty and staff members will send mail only to NSU email accounts using NSU usernames. SCIS uses various course management tools that use private internal email systems. Students enrolled in courses using these tools should check both the internal email and NSU's external email system daily. Students must use the email accounts issued by SCIS when sending email to faculty and staff.

NSU offers students Web-based email access and the ability to forward email.

Student Services

Student ID Cards

Registered students are issued student ID cards. These are required to check out books from the Einstein Library. A number of businesses in the community will give students discounted rates on a variety of services ranging from movies to dinner if an ID card is shown. If an ID card is lost or destroyed, a new one may be requested at the registrar's office. There is an additional fee to replace a lost card.

Student Housing

On the main campus, one-bedroom and two-bedroom furnished and unfurnished apartments are available for graduate and married students without children. Utilities, basic cable TV, and central air conditioning are included in the housing rates. Interested students are invited to obtain further information from the university's Office of Residential Life at (954) 262-7052 or (800) 541-6682, ext. 7052.

Travel Services

Nova Southeastern University has a full-service travel agency in the Horvitz Administration Building that can make reservations and issue airline tickets and reserve rental cars. In addition, travel agents can also help make arrangements for trips and vacations. NSU's travel service accepts money orders and major credit cards. The travel agency can be reached at (954) 262-8888 or toll free (800) 541-6682, ext. 8888.

Graduation

Graduation Requirements

All degree-seeking students must complete the minimum credits as designated for the chosen program, plus meet the following requirements:

1. Admission as a degree-seeking candidate in one of the programs
2. Satisfy program requirements including completion of courses, master's thesis where appropriate, and, for the doctorate, an approved dissertation as specified in program documentation
3. Doctoral students: Attendance at all required cluster or institute meetings
4. Attainment of a cumulative grade point average of at least 3.0
5. Payment of all tuition and fees
6. Completion of graduation application form and payment of graduation fee. Application forms may be obtained from the program office or the office of the registrar. Master's students should complete the form at the time of registration for their final term. Doctoral students should complete the form upon written notification of acceptance of their dissertation report.
7. Fulfillment of all obligations to the library, the student's program, and the comptroller's office
8. Removal from provisional admission status and conditional admission status

Commencement

A commencement ceremony is held in June for Nova Southeastern University graduate students. All graduating students are encouraged to participate in this ceremony. In order for a student to participate, the program director must expect the completion of all the student's graduation requirements within six weeks following the date of the commencement ceremony.

Students expecting to graduate must complete an application for graduation and submit it to the program office at least six weeks prior to the date of the commencement ceremony. The program office will advise the university registrar of eligible students, and the registrar will distribute commencement procedures to these students.

Alumni Association

Nova Southeastern University has an active alumni association that is a division of the Office of Institutional Advancement. The association is organized on three levels—local, state, and national—that work in concert to provide special programs and other services that promote the professional and intellectual growth of graduates and maintain communications between graduates and the university. Additional information can be obtained from the Office of Alumni Relations and Special Events at (954) 262-2118 or (954) 262-2103.

Master's Degree Programs

General Information on Master's Degree Programs

Application for Admission

Admission decisions are made on a rolling basis. Before an application can be considered reviewable by the Admissions Committee, the following items must be received by the admissions office: application form, application fee, essay, summary of professional experience or GRE scores, at least two evaluation forms, and transcripts (unofficial copies are acceptable pending receipt of official transcripts). To ensure evaluation for the desired starting term, reviewable applications must be received at least one month prior to the start of that term. Late applications that cannot be processed in time for the desired starting term will be considered for the next term. Applicants may be granted **provisional admission** status pending completion of the application process. Applicants who do not meet all admission requirements may be given **conditional admission** pending removal of deficiencies.

Applicants must meet the general requirements and submit the items specified below **and must also satisfy the program-specific admission requirements contained in the individual program sections of this catalog.** Detailed instructions for the preparation and mailing of admissions materials are contained in the school's admission forms. Admission forms, brochures, and this catalog may be downloaded from the school's Web site: www.scis.nova.edu.

1. An earned bachelor's degree from a regionally accredited institution with an appropriate major (see program-specific admission requirements).
2. Application form, application fee, and essay.
3. Official transcripts of all graduate and undergraduate education. Transcripts must show an undergraduate GPA of at least 2.5 and a GPA of 3.0 in a major field.
4. Evaluation forms from three individuals who are familiar with your academic and/or professional capabilities and are able to assess your intellectual abilities, maturity, and motivation. Forms from family members or individuals who are unable to evaluate your academic or professional background are unacceptable.
5. Summary of Professional Experience or score report of the Graduate Record Examination (GRE).
6. Proficiency in the English language is a prerequisite for graduate study at the School of Computer and Information Sciences. Master's students are expected to write numerous papers. It is very important to note that grammatical errors, spelling errors, and writing that does not express ideas clearly will affect a student's grades and the completion of his or her degree. The faculty will not provide remedial help concerning grammatical errors or other writing problems. Applicants who are unable to write correctly and clearly are urged to seek remedial help before enrolling in any of the school's programs.

Additional Admission Requirements for International Master's Students

1. The application fee must be in U.S. dollars.
2. Online international students who do not live in the United States do not need visas to participate in the program because they do not have to travel to the United States to complete the degree.
3. Requirements for campus-based students: The university will not enroll a campus-based student who has not been approved initially, or approved for transfer, by the Immigration and Naturalization Services (INS) to attend Nova Southeastern University. The INS requires that all students on an F-1 student visa must enroll full time and attend the main campus only. All students holding J-1 or F-1 visas are required to carry medical insurance. Students on J-1 visas are required to secure an affidavit of support, from an agency or government who will be the financial sponsor, stating that they have a sufficient amount of money to support themselves for the duration of their study. Students on F-1 visas need an affidavit of support and a notarized/attested financial statement proving that they have a sufficient amount of money to support themselves for one academic year (generally nine months). Non-degree or provisional admission status is not considered a basis for the issuance of an I-20. After applicants receive a written offer of admission, the I-20 will be provided, upon request, to those who have verified financial support and require an F-1 student visa. International students must enter the United States on a valid student or other visa. Nonresident aliens currently in the United States must have a valid student or nonimmigrant visa (except B1/B2 visa) for enrollment in the university. Students sponsored by the United States government or their home government are required to enter the United States on a J-1 visa (exchange visitor's visa). For additional information regarding international students, contact the university's International Student Advising Service at (954) 262-7240 or 800-541-6682, ext. 7240; fax: (954) 262-7265.

4. Applicants whose native language is not English must take the Test of English as a Foreign Language (TOEFL). A minimum test score of 550 is required for applicants taking the written examination. A minimum test score of 213 is required for applicants taking the computer-based examination. (Scores must be no more than two years old.) Test results must be sent directly to the School of Computer and Information Sciences from TOEFL/TSE Services, P.O. Box 6153, Princeton, NJ, 08541-6153, USA; phone: (609) 771-7100; fax: (609) 771-7500, Web site: www.toefl.org.
5. The applicant must have a university-level education at least equivalent to an American bachelor's degree in a related field (see specific requirements). Official transcripts must show an equivalent undergraduate GPA of at least 2.5 and an equivalent GPA of 3.0 in a major field. Official documents must be certified by an officer of the institution attended and must show all post-high-school work including grades in each course and standing in examinations and classes. Documents issued in a language other than English must be accompanied by a certified English translation from an NSU-approved agency. Translations made by applicants are not acceptable. In cases where the original academic records do not state that a degree has been awarded, certified copies of the original diploma and certificate of graduation must be submitted. To transfer graduate credits from a foreign institution, a student must have his or her transcript evaluated, on a course-by-course basis, by an NSU-approved agency.

Admission of Non-Degree Students

A qualified applicant wishing to take one or more master's-level courses but not having an immediate degree objective is welcome to the extent that school resources allow. An applicant requesting non-degree status must have an earned bachelor's degree in a related field from a regionally accredited college or university and must submit an application form, official transcripts of undergraduate and graduate education, a request for Unix account form, and an application fee. Admission forms may be obtained from the school's Office of Admissions or may be downloaded from the school's Web site (www.scis.nova.edu).

Non-degree students may take up to 18 credits and must maintain a 3.0 GPA to continue enrollment in non-degree status. The non-degree student may apply for degree status at any time by completing the regular graduate admissions application process. Satisfactory completion of courses by non-degree students does not guarantee admission to the master's degree program. Courses completed while the student is in a non-degree status will be evaluated by a faculty committee as to the suitability of their transfer into the desired master's degree program. Courses applied to a graduate degree must fall within the time frame specified for the master's degree. An international student on an I-20 may not enroll in the non-degree status. Non-degree students are not eligible for financial aid.

Provisional or Conditional Admission

A degree-seeking applicant who has missing documents but appears to be acceptable based on documents received by SCIS may be offered **provisional admission**. Official admission will be granted upon receipt and acceptability of the remaining required documents. All missing documents must be submitted prior to the student's second registration. Examples of missing documents are an official transcript and an evaluation form. An applicant who has not met all admission requirements may be given **conditional admission** if sufficient evidence exists to suggest the ability to perform successfully in the program. A student with conditional status must remove stated deficiencies as specified in the acceptance letter.

Transfer Credit Policy

Up to six graduate credits may be transferred from a regionally accredited institution. Courses proposed for transfer must have received grades of at least B. Students must request approval of transfer credits in writing at the time of application (see instruction on the application form). Copies of catalog course descriptions or course syllabi are required to process requests for transfer credits. Federal regulations require that veteran students **MUST** report all prior credit and training, and that the school **MUST** evaluate such and grant credit as appropriate, with training time and tuition reduced proportionately and with the VA and student so notified.

Orientation and Advisement Program

New students are invited to the campus for an orientation and are also provided a Web-based orientation that includes computer/software requirements, online access, tools and methods, and library access. A guide to the school's online learning environment can be downloaded, and a hard copy is provided to each student. The school's Web site provides an extensive online "help" system including downloadable software and documents. Advisement is provided by the master's program office and the faculty.

Early Admission into the Doctoral Program (See program options in the individual M.S. program sections.)

This option provides the school's M.S. students the opportunity to earn the doctorate in a shorter time. Minimum requirements for early admission are the completion of 24 credits in the M.S. program with a GPA of 3.5 or higher and the completion of specific master's courses (see doctoral program sections for details). If admitted into the doctoral program, students will take the remaining 12 credits for the M.S. degree in the doctoral program. Master's students may apply for early admission no sooner than during the term in which they will be completing 24 credits. Students must submit applications for early admission to the SCIS Office of Admissions. Doctoral admission forms may be downloaded from the SCIS Web site. An application fee is not required. The SCIS Office of Admissions will supply the Admissions Committee with the student's current transcripts. Three evaluation forms must be completed by SCIS faculty members. Upon successful completion of 12 credits in the doctoral program, the student may apply for the master's degree. Contact the master's program office for a degree application.

Thesis and Non-Thesis Options

For the thesis option, 30 credit hours of course work and six credit hours for the master's thesis are required. For the non-thesis option, 36 credit hours of course work are required. Students interested in completing the master's thesis should contact the master's program office to make arrangements.

Term Dates

Four 12-week terms are offered each year. Terms start in September, January, April, and July. (The Academic Calendar for the master's program is printed on the inside of the front cover of this catalog.)

Program Formats

The 36-credit hour program is designed so it may be completed by full-time students in 12 months or by working professionals in 18 months while remaining in their current positions. To earn the degree in 12 months, students must enroll in three courses per term. To earn the degree in 18 months, students must enroll in two courses per term. Terms are 12 weeks long and there are four terms each year. Students select one of two formats: *online* or *on-campus* (on-campus is not available for the M.S. in computing technology in education). With the permission of the program office, a student in one format may take a course in another format.

The online format requires the completion of 12 courses via online techniques or 10 online courses and a six-credit thesis (see section on thesis option). Students participate in online courses from anywhere in the world where Internet access is available.

The on-campus format requires the completion of 12 courses or 10 courses and a six-credit thesis (see section on thesis option). Classes are held on the campus in Fort Lauderdale. Each class meets once a week from 6:30 p.m. to 9:30 p.m. for 12 weeks.

All SCIS students are provided NSU computer accounts but must obtain their own Internet service providers and use their own computer systems. New students are provided an orientation on computer and software requirements, online access, online tools and methods, and library resources. Students use the Web to access course materials, announcements, email, the Electronic Library, and other information, and for interaction with faculty and fellow students. Online activities may include Web pages, forums using threaded bulletin boards, and chatrooms. In addition, the school provides a system that enables the student to submit assignments online in multimedia formats and to receive the professor's online reviews of assignments in the same multimedia formats. Some online courses may include electronic classroom sessions. Students must comply with NSU policies on acceptable use of computing resources and use of material in Web pages.

Grade Requirements and Time Limitations

Each student must maintain a cumulative grade point average of at least 3.0 for the duration of his or her program to remain in good academic standing (see Grading System). Failure to do so will result in probation and possible dismissal. A student whose GPA falls below 3.0 is automatically on academic probation and will not be permitted to graduate. Also, academic probation may adversely affect financial aid. If the GPA is not raised to 3.0 within two terms, the student will be dismissed from the program. A student on academic probation may be allowed to continue graduate study in subsequent terms if each term's grade point average is 3.0 or greater. Upon achieving a cumulative GPA of 3.0, the student will be removed from probationary status. If, because of very low GPA, it is impossible to raise the GPA to 3.0 within two terms, the student will be dismissed immediately.

Students must complete requirements for the master's degree within five years from the date of their first registration.

Independent Study and Directed Independent Study

A student wishing to take an existing course on an independent study basis must obtain written approval from the faculty member responsible for the course and then forward a request to the program office for final approval. A student interested in conducting study or research under the supervision of a faculty member in areas not normally covered in regular courses may request approval by a faculty member and the program office to register for directed independent study. A contract for independent study or directed independent study must be prepared by the student and must include an assignment timeline. The contract must be approved by the mentoring faculty member and the program director.

Cross-Registration

Students may apply to cross-register for courses offered in other SCIS master's degree programs. Approval for cross-registration must be obtained from the student's program office prior to registration.

Master of Science (M.S.) in Computer Science

This program offers a course of study leading to the master of science (M.S.) in computer science. It is designed to give students a thorough knowledge of the field and to provide an enduring foundation for future professional growth. The program blends theory and practice into a learning experience that develops skills applicable to complex real-world problems. Its formats offer full-time students the opportunity to earn the master's degree in 12 months and working professionals the opportunity to earn the degree in 18 months while remaining in their current positions. The curriculum is consistent with recommendations for a model curriculum in computer science as outlined by the Association of Computing Machinery (ACM).

Program-Specific Admission Requirements (See pp. 13–14 for general admission requirements.)

This program is designed for students with undergraduate majors in computer science, engineering, mathematics, or physics and who have completed courses or have equivalent experience in data structures and algorithms, assembly language, computer architecture, structured programming in a modern high-level language, systems software (compilers or operating systems), calculus (differential and integral calculus), and discrete mathematics. An applicant who does not have an adequate background may be required to take one or more of the following 500-level graduate courses during the first two terms of the student's program. These are in addition to the required 36 credit hours of courses at the 600 level. Courses at the 500 level, when required, must be completed prior to taking courses at the 600 level; however, some exceptions may be permitted by the program director. Students must earn a B or better in 500-level courses. Grades for 500-level courses are not included in the student's GPA. MCIS 501 is prerequisite to MCIS 503.

MCIS 500 Assembly Language and Architecture
MCIS 501 Java Programming Language

MCIS 502 Mathematics in Computing
MCIS 503 Data Structures and Algorithms

Early Admission into the Doctoral Program

This option provides the opportunity for master's students in computer science to earn the Ph.D. in computer science or computer information systems in a shorter time. In addition to the requirements specified in the section General Information on Master's Degree Programs, the student must have completed and passed CISC 610 (Programming Languages), CISC 615 (Design and Analysis of Algorithms), CISC 630 (Compiler Design Theory), and CISC 640 (Operating Systems Theory and Design).

The Curriculum for the M.S. in Computer Science

Core courses and electives are listed below. The student may substitute up to two electives in lieu of two core courses. Students who wish to take an additional elective in lieu of a core course must request approval from the program office prior to registration. If the thesis option is elected, two courses may be omitted. Plans for the thesis option must be made with the program office. A student wishing to register for CISC 691, Project in Computer Science, must first obtain the approval of the faculty member who would supervise the project.

Core Courses:

CISC 610 Programming Languages
CISC 615 Design and Analysis of Algorithms
CISC 630 Compiler Design Theory
CISC 640 Operating Systems Theory and Design
CISC 650 Data Communications Networks
CISC 660 Database Management Systems
CISC 665 Client-Server Computing
CISC 670 Artificial Intelligence
CISC 680 Software Engineering
CISC 681 Interactive Computer Graphics
CISC 683 Object-Oriented Design
CISC 685 Human-Computer Interaction

Electives:

CISC 620 Modeling and Simulation
CISC 622 Numerical Analysis
CISC 631 Language Theory and Automata
CISC 632 Compiler Implementation
CISC 644 Operating Systems Implementation
CISC 647 Advanced Computer Architecture
CISC 651 Project in Data Communications Networks
CISC 654 Computer Security
CISC 661 Database Management Systems Implementation
CISC 663 Object-Oriented Database Systems
CISC 682 Software Engineering Implementation
CISC 688 Continuing Thesis in Computer Science
CISC 690 Special Topics in Computer Science
CISC 691 Project in Computer Science

Course Descriptions for the M.S. in Computer Science

CISC 610 Programming Languages (3 credits)

Formal languages and language hierarchies, syntactic and semantic specification, abstract machines and corresponding languages, context-free languages, abstraction, modularity, and program structure. Fundamental programming language concepts. Analysis of imperative, object-oriented, and declarative language paradigms. Several programming languages will be analyzed.

CISC 615 Design and Analysis of Algorithms (3 credits)

Topics include sorting, algorithms for tree structures, dynamic programming, greedy methods, advanced data structures, divide and conquer, graph algorithms, arithmetic operations, algorithms for parallel computers, matrix operations, string/pattern matching, network problems, approximation algorithms, and NP-completeness.

CISC 620 Modeling and Simulation (3 credits)

Use of logical and mathematical models to represent and simulate events and processes as well as computer, information, and communications systems. Introduction to computer modeling techniques and discrete-event simulation. Model development and testing. Output and problem analysis. Application of techniques to a multiprocessor system model and an Ethernet model. Examination of development programs such as GPSS, SIMULA, and SIMSCRIPT.

CISC 622 Numerical Analysis (3 credits)

Introduction to error analysis, iterative methods, eigenvalue problems, integration and differentiation by computer, interpolation, and ill-conditioned problems.

CISC 630 Compiler Design Theory (3 credits)

Language theory will be applied to the design of a compiler for a high-level language. Parsing, syntax analysis, semantic analysis, and code generation. Other areas of the compilation process will be covered, such as storage allocation, symbol table management, searching and sorting, and optimization.

CISC 631 Language Theory and Automata (3 credits)

Introduction to formal grammars, Backus-Naur notation. The formal theory behind the design of a computer language is studied. The corresponding types of automata that may serve as recognizers and generators for a language will be described.

CISC 632 Compiler Implementation (3 credits)

Design, implementation, and testing of a compiler for a high-level language. The project will utilize state-of-the-art compiler generation tools, including parser generators and code-generator generators. Prerequisite: CISC 630.

CISC 640 Operating Systems Theory and Design (3 credits)

Analysis of computer operating systems with emphasis on structured design. Multiprogramming and multiprocessing, real time, time-sharing, networks, job control, scheduling, synchronization, and other forms of resource management, I/O programming, and memory and file system management.

CISC 644 Operating Systems Implementation (3 credits)

Implementation and testing of operating system designs. Prerequisite: CISC 640.

CISC 647 Advanced Computer Architecture (3 credits)

Organizational structures of computer systems and subsystems. Topics include processor organization, memory organization, virtual memory, microarchitecture, I/O controllers and processors, architectures for complex instruction set computers (CISC) and reduced instruction set computers (RISC), performance evaluation, multiprocessors, and parallel architectures.

CISC 650 Data Communications Networks (3 credits)

This course covers detailed technical concepts of data networks, network components, associated network technologies, and data communications protocols. Technical specification, design, testing, and managing and updating of data networks from legacy systems through terabit networks are discussed. Detailed technical examination of associated network components (modems, multiplexers, hubs, gateways, etc.), guided and unguided media (wire, coax, fiber, terrestrial and satellite microwave, etc.), and routing and high-speed switching systems. Network architecture topics include software and conceptual models (OSI, TCP/IP, HDLC and SDLC, SNA, AIX, etc.), error detection and prevention systems, transfer and routing protocols, congestion and flow control, and current and future applications (SNMP2, HTTP, X.400/500, ANS.1, ISDN and B-ISDN, ultra-high-speed networks, etc.).

CISC 651 Project in Data Communications Networks (3 credits)

Students pursue a project, research study, or implementation in data and computer communications. Prerequisite: CISC 650.

CISC 654 Computer Security (3 credits)

Concepts and principles of system and data security. Risks and vulnerabilities, policy formation, controls and protection methods, database security, encryption, authentication technologies, host-based and network-based security issues, personnel and physical security issues, issues of law and privacy. Discussions include firewall design and implementation, secure internet and intranet protocols, and techniques for responding to security breaches.

CISC 660 Database Management Systems (3 credits)

Principles of database management systems. Topics include concepts of database architectures such as three-schema architectures, logical and physical data organizations, data models for database systems (network model, hierarchical model, relational model, and object-oriented model), relational algebra and calculus, query languages, design theory for relational databases, functional dependencies and normal forms, null values and partial information, semantic data modeling, transaction management and concurrency control, index schema, file structures and access methods, query systems and query optimization, view management, client-server database architectures, distributed databases, object-oriented databases, logic-based databases, and the current research and development trends of database systems.

CISC 661 Database Management Systems Implementation (3 credits)

Techniques of database management will be applied to practical projects. Prerequisite: CISC 660.

CISC 663 Object-Oriented Database Systems (3 credits)

Object-oriented data models and other data models with semantic extensions such as functional data models, object-oriented database query model and languages, object-oriented database schema evolution and modification, version management and control, object data storage structure (clustering and indexing), query processing and transaction management, authorization mechanism and security, integrating object-oriented programming and databases, and applications of object-oriented databases. Prerequisite: CISC 660 or equivalent.

CISC 665 Client-Server Computing (3 credits)

Concepts and principles of client-server architecture, security, networks, and distributed computing. Topics include IPC, RPC, sockets, the role of the GUI and front-end development tools, middleware, two-tier and three-tier architectures, operating systems, and database interaction. The role of standards in client-server development is discussed, including DCE, CORBA, ODBC, COM, and OLE, along with object-oriented aspects of client-server and distributed computing. Discussions include the various relationships between client-server computing and business process reengineering, workflow automation, and groupware. Migration from legacy systems is considered along with concerns for meeting customer requirements.

CISC 670 Artificial Intelligence (3 credits)

Basic principles and techniques of artificial intelligence will be covered. Concepts of knowledge representation including formalized symbolic logic, inconsistency and uncertainty, probabilistic reasoning, and structured knowledge will be presented. Other areas are (1) knowledge organization and manipulation including search and control strategies, matching techniques, and knowledge management; (2) perception and communication including natural language processing and pattern recognition; and (3) the architecture of expert systems.

CISC 680 Software Engineering (3 credits)

The development of software-intensive systems; software quality factors; software engineering principles; system life-cycle models; requirements definition and analysis; behavioral specification; software design; implementation; software testing techniques; verification and validation; system evolution; software project management.

CISC 681 Interactive Computer Graphics (3 credits)

Principles of interactive computer graphics. Concepts include fundamental raster operations, such as scan conversion, fill methods, and anti-aliasing; transformations; graphic languages, such as PHIGS and Open GL; projection; hidden surface removal methods; 3D modeling techniques; ray tracing; animation; and graphical user interfaces.

CISC 682 Software Engineering Implementation (3 credits)

Techniques of software engineering will be applied in projects. Prerequisite: CISC 680.

CISC 683 Object-Oriented Design (3 credits)

The concepts and principles of the object-oriented paradigm. Approaches to analyzing and modeling a system using object-oriented techniques. Techniques for the design of objects, classes, and modules. The use of inheritance to enhance reusability. Object-oriented analysis and object-oriented programming.

CISC 685 Human-Computer Interaction (3 credits)

Focuses on the dynamics of human-computer interaction (HCI). Provides a broad overview of HCI as a sub-area of computer science and explores user-centered design approaches in information systems applications. Addresses the user interface and software design strategies, user experience levels, interaction styles, usability engineering, and collaborative systems technology. Students will perform formal software evaluations and usability tests.

CISC 688 Continuing Thesis in Computer Science (1.5 credits)

Students who have not completed the thesis by the end of the second thesis registration must register for continuing thesis. This allows the student to receive faculty and administrative advice and support related to the thesis. Prerequisite: Completion of second thesis registration.

CISC 690 Special Topics in Computer Science (3 credits)

This seminar focuses on the professor's current research interests. Requires consent of instructor and program director.

CISC 691 Project in Computer Science (3 credits)

Students pursue a project, research study, or implementation under the supervision of a faculty member.

CISC 699 Master's Thesis in Computer Science (3 credits)

The student develops a framework within which research will be conducted and offers evidence of qualifications to pursue the research. Concepts and theories underlying the student's thesis research are articulated, the problem is clearly stated, specific, measurable goals are specified, a literature review is presented, the methods of conducting research are delineated, and strategy to achieve the goal is given. Registration for CISC 699 must be repeated for three more credits, for a total of six thesis credits. Prerequisite: Completion of eight courses.

Master of Science (M.S.) in Computer Information Systems

This program offers a course of study leading to the master of science (M.S.) in computer information systems. It focuses on the technological foundations of computer information systems including areas such as database systems, human-computer interaction, data and computer communications, computer security, computer graphics, software engineering, and object-orientation. It is designed to give students a thorough knowledge of the field and to provide an enduring foundation for future professional growth. The program blends theory and practice into a learning experience that develops skills applicable to complex real-world problems. Its formats offer full-time students the opportunity to earn the master's degree in 12 months and working professionals the opportunity to earn the degree in 18 months while remaining in their current positions. The curriculum is consistent with recommendations for a model curriculum in computer information systems as outlined by the Association of Computing Machinery (ACM).

Program-Specific Admission Requirements (See pp. 13–14 for general admission requirements.)

This program is designed for students with undergraduate majors in computer science, information systems, engineering, mathematics, or physics. Applicants must have knowledge of data structures and algorithms, assembly language and computer architecture, structured programming in a modern high-level language, college algebra, and discrete mathematics. An applicant who does not have an adequate background in mathematics or computer concepts may be required to take one or more of the following 500-level graduate courses during the first two terms of the student's program. Courses at the 500 level, when required, must be completed prior to taking courses at the 600 level; however, some exceptions may be permitted by the program office. Students must earn a B or better in 500-level courses. Grades for 500-level courses are not included in the student's GPA. MCIS 501 is prerequisite to MCIS 503.

MCIS 500 Assembly Language and Architecture

MCIS 501 Java Programming Language

MCIS 502 Mathematics in Computing

MCIS 503 Data Structures and Algorithms

Early Admission into the Doctoral Program

This option provides the opportunity for master's students in computer information systems to earn the Ph.D. in computer information systems or information systems in a shorter time. In addition to the requirements specified in the section General Information on Master's Degree Programs, the student must have completed and passed MCIS 611 (Survey of Programming Languages), MCIS 615 (Operating Systems Concepts), MCIS 620 (Information Systems), MCIS 630 (Database Systems), and MCIS 645 (Software Engineering).

The Curriculum for the M.S. in Computer Information Systems

Core courses and electives are listed below. Students may substitute up to two electives in lieu of two core courses. Students who wish to take an additional elective in lieu of a core course must request approval from the program office prior to registration. If the thesis option is elected, two courses may be omitted. Plans for the thesis option must be made with the program office. A student wishing to register for MCIS 682, Project in Information Systems, must first obtain the approval of the faculty member who would supervise the project.

Core Courses:

MCIS 611 Survey of Programming Languages
MCIS 615 Operating Systems Concepts
MCIS 620 Information Systems
MCIS 625 Computer Graphics
MCIS 630 Database Systems
MCIS 645 Software Engineering
MCIS 650 Data Communications Networks
MCIS 661 Object-Oriented Applications
MCIS 665 Client-Server Computing
MCIS 670 Artificial Intelligence and Expert Systems
MCIS 671 Decision Support Systems
MCIS 680 Human-Computer Interaction

Electives:

MCIS 621 Information Systems Project Management
MCIS 623 Legal and Ethical Aspects of Computing
MCIS 631 Database Systems Project
MCIS 651 Project in Data Communications Networks
MCIS 652 Computer Security
MCIS 654 Electronic Commerce on the Internet
MCIS 681 Multimedia Systems
MCIS 682 Project in Information Systems
MCIS 688 Continuing Thesis in Computer Information Systems
MCIS 691 Special Topics in Computer Information Systems

Course Descriptions for the M.S. in Computer Information Systems

MCIS 500 Assembly Language and Architecture (3 credits)

A comprehensive examination of the fundamental concepts and architectural structures of contemporary computers. The course focuses on assembly language programming and the influence of low-level computer architecture on modern computer applications.

MCIS 501 Java Programming Language (3 credits)

An in-depth study of the Java programming language. Principles of the object-oriented paradigm. Object-oriented programming theory and practice.

MCIS 502 Mathematics in Computing (3 credits)

Graph theory, lattices and boolean algebras, state models and abstract algebraic structures, logical systems, production systems, computability theory, recursive function theory.

MCIS 503 Data Structures and Algorithms (3 credits)

Sorting and searching, algorithms for tree structures, advanced data structures, graph algorithms, complexity, dynamic programming, optimization problems. Prerequisite: MCIS 501 or equivalent.

MCIS 611 Survey of Programming Languages (3 credits)

Organization and types of programming languages. Analysis of imperative, object-oriented, and declarative language paradigms. Higher-level languages. Comparative analysis of programming languages used in the development of computer information systems.

MCIS 615 Operating Systems Concepts (3 credits)

Objectives of managing computer system resources. Memory management, process management, file system management, scheduling, synchronization, interrupt processing, distributed processing, and parallel systems. An analysis of the role of operating systems in computer information systems development, operation, and evolution.

MCIS 620 Information Systems (3 credits)

Covers major concepts and architecture of computer information systems, including information concepts; information flow; types of information systems; the role of information in planning operations, control, and decision making; integrated information systems across a range of functional elements. Computer information systems in organizations.

MCIS 621 Information Systems Project Management (3 credits)

Life-cycle models/paradigms. Project planning and risk analysis. Project control including work breakdown structures, project scheduling, activities, and milestones. Software cost-estimation techniques/models. Software quality assurance and metrics for software productivity and quality. Inspections, walkthroughs, and reviews. Approaches to team organization. Configuration management. Automated project management tools. Software maintenance. Information system security. Procurement of software services and systems. Management of operational systems. Legal/ethical issues associated with CIS and software.

MCIS 623 Legal and Ethical Aspects of Computing (3 credits)

Focuses on issues that involve computer impact on society and related concerns. Transitional data flow; copyright protection; information as a source of economic power; rights to access computer systems; computer crime; data privacy; establishing national priorities in the technical and social aspects of computing; current and anticipated uses of computer prediction; and protection of personal ethical concerns. National computer policies of Japan, France, Great Britain, and the European Economic Community. The status of regulation and emerging standards.

MCIS 625 Computer Graphics (3 credits)

Presents computer graphics as an aid to information managers who need a clear means of presenting the analysis of information. Topics include basic graphic techniques (e.g., histograms, bar charts, pie charts), the theory of graphic presentation of information, desktop publishing software, presentation software, graphics monitors (EGA, CGA, VGA, RGB, composite), laser printers, computer-screen projection systems, and standards.

MCIS 630 Database Systems (3 credits)

Methodologies and principles of database analysis and design are presented. Conceptual modeling and specifications of databases, database design process and tools, functional analysis and methodologies for database design, entity relationship model and advanced semantic modeling methods are discussed. Topics include theories of database systems, including the architectures of database systems, logical and physical database organizations, data models for database systems (network, hierarchical, relational, and object-oriented model), relational algebra and calculus, query languages, normal forms, null values and partial information, relational database design utilizing dependencies, view design and integration, concurrency control, query optimization, client-server database applications, distributed databases, object-oriented databases, and the current research and development trends of database analysis, design, modeling, and applications.

MCIS 631 Database Systems Project (3 credits)

The techniques of database management systems are applied to practical projects. Prerequisite: MCIS 630.

MCIS 645 Software Engineering (3 credits)

The development of software-intensive systems; software quality factors; software engineering principles; system life-cycle models and paradigms; requirements definition and analysis; behavioral specification; software design; implementation; software testing techniques; verification and validation; system evolution; software project management.

MCIS 650 Data Communications Networks (3 credits)

This course covers the technical concepts of data networks, network components, associated network technologies, and data communications protocols. Specification, design, testing, managing, and updating of data networks from legacy systems through terabit networks are discussed. Examination of associated network components (modems, multiplexers, hub, gateways, etc.), guided and unguided media (wire, coax, fiber, terrestrial, and satellite microwave, etc.), and routing and high-speed switching systems. Network architecture topics include software and conceptual models (OSI, TCP/IP, HDLC and SDLC, SNA, AIX, etc.), error detection and prevention systems, transfer and routing protocols, congestion and flow control, and current and future applications (SNMP2, HTTP, X.400/500, ANS.1, ISDN and B-ISDN, ultra-high-speed networks, etc.).

MCIS 651 Project in Data Communications Networks (3 credits)

Students pursue a project, research study, or implementation in data communications networks. Prerequisite: MCIS 650.

MCIS 652 Computer Security (3 credits)

Concepts and principles of system and data security. Risks and vulnerabilities, policy formation, controls and protection methods, database security, encryption, authentication technologies, host-based and network-based security issues, personnel and physical security issues, issues of law and privacy. Discussions include firewall design and implementation, secure internet and intranet protocols, and techniques for responding to security breaches.

MCIS 654 Electronic Commerce on the Internet (3 credits)

Electronic commerce has grown at an incredible rate, and experts forecast extraordinary growth over the near-term and long-term. It will be examined from three perspectives: (1) customer-business; (2) business-business; and (3) intra-organization. The Internet, intranets and extranets, electronic data interchange (EDI), security, electronic payment systems, tax issues, and global policy will be investigated. The student will participate in an Internet shopping experience and create or enhance a Web page.

MCIS 661 Object-Oriented Applications (3 credits)

Principles of the object-oriented paradigm. Application of object-oriented methods in computer information systems. Object-oriented languages and design methods for class creation. Study of the use of object-oriented techniques in applications such as user interfaces, graphics, database systems, visual programming, hypermedia, office automation systems, and decision support systems. Techniques for software reuse.

MCIS 665 Client-Server Computing (3 credits)

Concepts and principles of client-server architecture, security, networks, and distributed computing. Topics include IPC, RPC, sockets, the role of the GUI and front-end development tools, middleware, two-tier and three-tier architectures, operating systems, and database interaction. The role of standards in client-server development is discussed, including DCE, CORBA, ODBC, COM, and OLE, along with object-oriented aspects of client-server and distributed computing. Discussions include the various relationships between client-server computing and business process reengineering, workflow automation, and groupware. Migration from legacy systems is considered along with concerns for meeting customer requirements.

MCIS 670 Artificial Intelligence and Expert Systems (3 credits)

Includes an introduction to artificial intelligence as well as historical and current trends and characterization of knowledge-based systems. Search, logic and deduction, knowledge representation, production systems, and expert systems will be examined. Additional areas include architecture of expert systems and criteria for selecting expert system shells, such as end-user interface, developer interface, system interface, inference engine, knowledge base, and data interface. The student will use a commercial shell to build a working expert system.

MCIS 671 Decision Support Systems (3 credits)

Examines concepts of decision support in both nonautomated and automated environments. Focuses on structures, modeling, and the application of various decision support systems in today's corporate environment. Additional emphasis is placed on the use of executive information and expert system applications. Case studies examine applications of each of these types of technology.

MCIS 680 Human-Computer Interaction (3 credits)

Focuses on the dynamics of human-computer interaction (HCI). Provides a broad overview of HCI as a sub-area of computer science and explores user-centered design approaches in information systems applications. Addresses the user interface and software design strategies, user experience levels, interaction styles, usability engineering, and collaborative systems technology. Students will perform formal software evaluations and usability tests.

MCIS 681 Multimedia Systems (3 credits)

Introduction to multimedia systems. Definition of terms and concepts related to multimedia. Trends in the development and the use of multimedia. Tools, techniques, and guidelines facilitating the planning, design, production, and implementation of multimedia products.

MCIS 682 Project in Information Systems (3 credits)

Students pursue a project, research study, or implementation under the supervision of a faculty member.

MCIS 688 Continuing Thesis in Computer Information Systems (1.5 credits)

Students who have not completed the thesis by the end of the second thesis registration must register for continuing thesis. This allows the student to receive faculty and administrative advice and support related to the thesis. Prerequisite: Completion of second thesis registration.

MCIS 691 Special Topics in Computer Information Systems (3 credits)

This seminar focuses on the professor's current research interests. Requires consent of instructor and program director.

MCIS 699 Master's Thesis in Computer Information Systems (3 credits)

The student develops a framework within which research will be conducted and offers evidence of qualifications to pursue the research. Concepts and theories underlying the student's thesis research are articulated, the problem is clearly stated, specific, measurable goals are specified, a literature review is presented, the methods of conducting research are delineated, and strategy to achieve the goal is given. Registration for MCIS 699 must be repeated for three more credits, for a total of six thesis credits. Prerequisite: Completion of eight courses.

Master of Science (M.S.) in Management Information Systems

This program offers a course of study leading to the master of science (M.S.) in management information systems. It focuses on the application of information system concepts to the collection, retention, and dissemination of information for management planning and decision making. The program blends theory and practice into a learning experience that develops skills applicable to complex real-world problems. Its formats offer full-time students the opportunity to earn the master's degree in 12 months and working professionals the opportunity to earn the degree in 18 months while remaining in their current positions.

Program-Specific Admission Requirements (See pp. 13–14 for general admission requirements.)

This program is designed for students with undergraduate majors in management information systems, computer information systems, business administration, or a related field, and having knowledge and significant experience in computer applications. Experience with the Internet is preferred. Students who cannot demonstrate competence in programming in a high-level language such as C, C++, or Java must take MMIS 501 Introduction to Java Programming during the first or second term of their registration in the program. Students must earn a B or better in 500-level courses. Grades for 500-level courses are not included in the student's GPA.

Early Admission into the Doctoral Program

This option provides the opportunity for master's students in management information systems to earn the Ph.D. in information systems in a shorter time. In addition to the requirements specified in the section General Information on Master's Degree Programs, the student must have completed and passed MMIS 610 (Survey of Computer Languages), MMIS 620 (Management Information Systems), MMIS 626 (Client–Server and Distributed Computing), MMIS 630 (Database Systems), and MMIS 660 (Systems Analysis and Design).

The Curriculum for the M.S. in Management Information Systems

Core courses and electives are listed below. The student may substitute up to two electives for two core courses. Students who wish to take an additional elective in lieu of a core course must request approval from the program office prior to registration. If the thesis option is elected, two courses may be omitted. Plans for the thesis option must be made with the program office. A student wishing to register for MMIS 682, Project in Management Information Systems, must obtain the approval of the faculty member who would supervise the project.

Core Courses:

MMIS 610 Survey of Computer Languages
MMIS 620 Management Information Systems
MMIS 621 Information Systems Project Management
MMIS 626 Client–Server and Distributed Computing
MMIS 630 Database Systems
MMIS 642 Data Warehousing
MMIS 653 Telecommunications and Computer Networking
MMIS 654 Electronic Commerce on the Internet
MMIS 660 Systems Analysis and Design
MMIS 661 Object-Oriented Applications
MMIS 671 Decision Support Systems
MMIS 680 Human-Computer Interaction

Electives:

MMIS 611 Computer Structures and Algorithms Using COBOL
MMIS 615 Quantitative Methods
MMIS 623 Legal and Ethical Aspects of Computing
MMIS 625 Computer Graphics
MMIS 631 Database Systems Project
MMIS 640 System Test and Evaluation
MMIS 652 Computer Security
MMIS 670 Artificial Intelligence and Expert Systems
MMIS 681 Multimedia Systems
MMIS 682 Project in Management Information Systems
MMIS 688 Continuing Thesis in MIS
MMIS 691 Special Topics in MIS

Course Descriptions for the M.S. in Management Information Systems

MMIS 501 Introduction to Java Programming (3 credits)

This course is an introduction to the Java programming language. The course will include an introduction to the concepts of object-oriented programming and will show how Java supports this programming paradigm. You will learn about the Java environment and will write both applets (programs that execute in a Web browser) and applications (stand alone program). In addition to learning about basic language statements, you will also learn how Java provides support for such diverse applications as Web pages, multimedia, educational, etc.

MMIS 610 Survey of Computer Languages (3 credits)

A study of high-level languages, fourth-generation languages, and command languages used in the development of software for management information systems. The logical and physical structure of programs and data. Concepts of structured programming. Data structures, file management, and their use in problem solving. Students will complete a variety of high-level language computer programs.

MMIS 611 Computer Structures and Algorithms Using COBOL (3 credits)

Data and file structure concepts, data record format and file organization, sequential vs. random file access methods, tree-based file structure and search techniques, indexing and data clustering, multiway sort/merge and sort algorithms, input/output blocking and buffering. The student will design and implement programs in COBOL.

MMIS 615 Quantitative Methods (3 credits)

An introduction to the basic quantitative tools needed to support problem solving and decision making in the information systems environment. Heavy emphasis is placed on the application of these tools in a case-based, real-world environment.

MMIS 620 Management Information Systems (3 credits)

The application of information system concepts to the collection, retention, and dissemination of information for management planning and decision making. Issues such as personnel selection, budgeting, policy development, and organizational interfacing are discussed. Conceptual foundations and planning and development of management information systems. The role of MIS in an organization and the fit between the system and the organization.

MMIS 621 Information Systems Project Management (3 credits)

Practical examination of how projects can be managed from start to finish. Life-cycle models and paradigms. Life-cycle phases. Project planning and risk analysis. Project control including work breakdown structures, project scheduling, activities, and milestones. Software cost estimations techniques/models. Software quality assurance and metrics for software productivity and quality. Inspections, walkthroughs, and reviews. Approaches to team organization. Documentation and configuration management. Automated project management tools. Software maintenance. Procurement of software services and systems.

MMIS 623 Legal and Ethical Aspects of Computing (3 credits)

Focuses on issues that involve computer impact and related societal concerns. Topics include transitional data flow; copyright protection; information as a source of economic power; rights to access to computer systems; computer crime; data privacy; establishing national priorities in the technical and social aspects of computing; current and anticipated uses of computer prediction; and protection of personal ethical concerns. National computer policies of Japan, France, Great Britain, and the EEC, and the status of regulation and emerging standards.

MMIS 625 Computer Graphics (3 credits)

Presents computer graphics as an aid to information managers who need a clear means of presenting the analysis of information. Topics include basic graphic techniques (e.g., histograms, bar charts, pie charts), the theory of graphic presentation of information, desktop publishing software, presentation software, graphics monitors (EGA, CGA, VGA, RGB, composite), laser printers, computer-screen projection systems, and standards.

MMIS 626 Client-Server and Distributed Computing (3 credits)

Included in this course are a wide range of issues, methods, techniques, and case examples for developing and managing client-server and distributed systems. These include client-server development using RAD methodologies, transaction process monitors, types of aboveware and middleware, middleware standards (DCE, RPC, and CORBA), managing client-server environments, software installation and distribution, electronic mail architectures in client-server systems, evaluation of vendor strategies, issues in selecting client-server products, legacy system migration issues, interoperability, scalability, network and security concerns, the emerging desktop standards, the role of network computers and thin clients, and the emergence of the Web as an extension of the client-server environment.

MMIS 630 Database Systems (3 credits)

The application of database concepts to management information systems. Design objectives, methods, costs, and benefits associated with the use of a database management system. Tools and techniques for the management of large amounts of data. Database design, performance, and administration. File organization and access methods. The architectures of database systems; data models for database systems (network, hierarchical, relational, and object-oriented model), client-server database applications, distributed databases, and object-oriented databases.

MMIS 631 Database Systems Project (3 credits)

The techniques of database management systems will be applied to practical projects. Prerequisite: MMIS 630.

MMIS 640 System Test and Evaluation (3 credits)

An analysis of the verification and validation process. Methods, procedures, and techniques for integration and acceptance testing. Reliability measurement. Goals for testing. Testing in the small and testing in the large. Allocation of testing resources. When to stop testing. Test case design methods. Black box software testing techniques including equivalence partitioning, boundary-value analysis, cause-effect graphing, and error guessing. White box software testing techniques including statement coverage criterion, edge coverage criterion, condition coverage criterion, and path coverage criterion. Test of concurrent and real-time systems.

MMIS 642 Data Warehousing (3 credits)

This course includes the various factors involved in developing data warehouses and data marts: planning, design, implementation, and evaluation; review of vendor data warehouse products; cases involving contemporary implementations in business, government, and industry; techniques for maximizing effectiveness through OLAP and data mining.

MMIS 652 Computer Security (3 credits)

Concepts and principles of system and data security. Risks and vulnerabilities, policy formation, controls and protection methods, database security, encryption, authentication technologies, host-based and network-based security issues, personnel and physical security issues, issues of law and privacy. Discussions include firewall design and implementation, secure internet and intranet protocols, and techniques for responding to security breaches.

MMIS 653 Telecommunications and Computer Networking (3 credits)

This course provides a framework for understanding telecommunications fundamentals and computer network functionality, characteristics, and configurations. Topics include wire-free and wire-based communications; network topologies, protocols, and architectures; emerging trends in network technologies and services; and the role of ISDN (Integrated Services Digital Network) and ATM (Asynchronous Transfer Mode) in the corporate environment. Strategies for network planning, implementation, and management are introduced. Recent advances in standardization, internetworking, and deployment of LANs (local area networks), MANs (metropolitan area networks), and WANs (wide area networks) are examined.

MMIS 654 Electronic Commerce on the Internet (3 credits)

Electronic commerce has grown at an incredible rate, and experts forecast extraordinary growth over the near-term and long-term. It will be examined from three perspectives: (1) customer-business; (2) business-business; and (3) intra-organization. The Internet, intranets and extranets, electronic data interchange (EDI), security, electronic payment systems, tax issues, and global policy will be investigated. The student will participate in an Internet shopping experience and create or enhance a Web page.

MMIS 660 Systems Analysis and Design (3 credits)

Analysis of requirements for information systems. Elicitation/fact-finding, problem analysis, decomposition, and the requirements document. Concepts, methods, techniques, and tools for systems analysis, modeling and simulation, and prototyping. Structured and object-oriented analysis. Role of the systems analyst in the organization. Gaining user commitment and fulfilling user needs. Concepts, tools, and techniques for systems design. Design principles, quality factors, decomposition of complex systems, and modularization techniques. Design methods such as object-oriented and function-oriented design. Comparison of analysis and design techniques.

MMIS 661 Object-Oriented Applications (3 credits)

Principles of the object-oriented paradigm. Application of object-oriented methods in management information systems. Object-oriented languages and design methods for class creation. Study of the use of object-oriented techniques in applications such as user interfaces, graphics, database systems, visual programming, hypermedia, office automation systems, and decision support systems. Techniques for software reuse.

MMIS 670 Artificial Intelligence and Expert Systems (3 credits)

This course will include an introduction to artificial intelligence as well as historical and current trends and characterization of knowledge-based systems. Search, logic and deduction, knowledge representation, production systems, and expert systems will be examined. Additional areas include architecture of expert systems and criteria for selecting expert system shells, such as end-user interface, developer interface, system interface, inference engine, knowledge base, and data interface. The student will use a commercial shell to build a working expert system.

MMIS 671 Decision Support Systems (3 credits)

Examines concepts of decision support in both nonautomated and automated environments. Emphasis will be placed on structures, modeling, and the application of various decision support systems in today's corporate environment. Additional emphasis will be placed on the use of executive information and expert system applications. Case studies will be used to look at existent applications of each of these types of technology.

MMIS 680 Human-Computer Interaction (3 credits)

The dynamics of human-computer interaction (HCI). Provides a broad overview and offers specific background relating to user-centered design approaches in information systems applications. Areas to be addressed include the user interface and software design strategies, user experience levels, interaction styles, usability engineering, and collaborative systems technology. Students will perform formal software evaluations and usability tests.

MMIS 681 Multimedia Systems (3 credits)

Introduction to multimedia systems. Definitions of terms and concepts related to multimedia. Trends in the development and the use of multimedia. Tools, techniques, and guidelines facilitating the planning, design, production, and implementation of multimedia products.

MMIS 682 Project in Management Information Systems (3 credits)

Students are assigned a project that involves part or all of the system development cycle and gain experience in analyzing, designing, implementing, and evaluating information systems. Prerequisite: Prior consent of instructor.

MMIS 688 Continuing Thesis in Management Information Systems (1.5 credits)

Students who have not completed the thesis by the end of the second thesis registration must register for continuing thesis. This allows the student to receive faculty and administrative advice and support related to the thesis. Prerequisite: Completion of second thesis registration.

MMIS 691 Special Topics in Management Information Systems (3 credits)

This seminar focuses on the professor's current research interests. Requires consent of instructor and program director.

MMIS 699 Master's Thesis in Management Information Systems (3 credits)

The student develops a framework within which research will be conducted and offers evidence of qualifications to pursue the research. Concepts and theories underlying the student's thesis research are articulated, the problem is clearly stated, specific, measurable goals are specified, a literature review is presented, the methods of conducting research are delineated, and strategy to achieve the goal is given. Registration for MMIS 699 must be repeated for three more credits, for a total of six thesis credits. Prerequisite: Completion of eight courses.

Master of Science (M.S.) in Computing Technology in Education

This program offers a course of study leading to the master of science (M.S.) in computing technology in education. It is designed to meet the needs of working professionals such as teachers, educational administrators, and trainers working in either the public or the private sector. The program blends educational theory and practice into a learning experience that develops skills applicable to complex real-world problems. It enhances knowledge of how computers, software, and other forms of high technology can be used to improve learning outcomes. The program's online format offers full-time students the opportunity to earn the master's degree in 12 months and working professionals the opportunity to earn the degree in 18 months while remaining in their current positions. Many of the courses in the program have been approved for teacher certification in computer science (grades K-12) or recertification by Florida's Bureau of Teacher Certification. They may be taken as part of the degree program or independently. (Satisfactory completion of the master's program does not guarantee that students will meet certificate requirements for the state in which they are employed.)

Program-Specific Admission Requirements (See pp. 13-14 for general admission requirements.)

The applicant must have an earned bachelor's degree in a related field from a regionally accredited institution and extensive experience with computer applications and the World Wide Web.

Early Admission into the Doctoral Program

This option provides the opportunity to earn the Ph.D. or Ed.D. in computing technology in education in a shorter time. See detailed requirements in the section General Information on Master's Degree Programs.

The Curriculum for the M.S. in Computing Technology in Education

Core courses are listed below. If the thesis option is elected, two courses may be omitted. (Plans for the thesis option must be made with the program office.)

MCTE 615 The Internet	MCTE 660 Multimedia Systems
MCTE 625 Survey of Courseware	MCTE 661 Instructional Delivery Systems
MCTE 628 Instructional Systems Design	MCTE 670 Learning Theory and Computer Applications
MCTE 630 Database Systems	MCTE 680 Human-Computer Interaction
MCTE 645 Integrated Applications	MCTE 690 Research Methodology
MCTE 650 Computer Networks	MCTE 691 Master's Project in CTE

Course Descriptions for the M.S. in Computing Technology in Education

MCTE 615 The Internet (3 credits)

The Internet and online information systems associated with the evolving information superhighway. This course emphasizes the development of effective online skills so that bibliographic, full-text, graphical, and numerical information can be accessed in an efficient manner. It also addresses skills and approaches required to teach about the Internet.

MCTE 625 Survey of Courseware (3 credits)

State-of-the-art, content-rich courseware, across the grades, subjects, and platforms, will be explored and evaluated for educational value. Methods for integrating these programs into the curriculum will be discussed. Tutorials, drill and practice, instructional games, simulations, tests, and reference programs are included.

MCTE 628 Instructional Systems Design (3 credits)

This course develops practical instructional systems design competencies appropriate for the development of computer-assisted instruction applications. Students will experience both theory and best practices from the areas of education and training as they develop and acquire instructional systems design skills and knowledge.

MCTE 630 Database Systems (3 credits)

This course covers fundamentals of database architecture, database management systems, and database systems. Principles and methodologies of database design, and techniques for database application development.

MCTE 645 Integrated Applications (3 credits)

This course provides experience with the multiple roles of electronic spreadsheets, databases, and graphs in teaching, learning, and the management of instruction. Using an integrated software package, these tools will be used to develop and reinforce skills in organizing, problem solving, generalizing, predicting, decision making, and hypothesizing.

MCTE 650 Computer Networks (3 credits)

This course provides a framework for understanding computer network functionality, characteristics, and configurations. Topics include network topologies, protocols, and architectures; emerging trends in network technologies and services; and the role of ISDN (Integrated Services Digital Network) and ATM (Asynchronous Transfer Mode) in the educational environment. Strategies for network planning, implementation, management, and security are introduced. Recent advances in standardization, internetworking, and deployment of LANs (local area networks), MANs (metropolitan area networks), and WANs (wide area networks) are examined.

MCTE 660 Multimedia Systems (3 credits)

Recent advances and future trends in learning technology and educational computing are examined. Innovations in teacher and student workstation technology are reviewed. Emphasis is placed on an examination of audio/video and computer-based tools currently in use in schools and training centers. Special attention is given to CD-ROM technology and laser disc technology. Guidelines for selection and implementation of multimedia projects are presented.

MCTE 661 Instructional Delivery Systems (3 credits)

An investigation of the expansion and applications of instructional delivery systems, such as electronic delivery via telecommunications (email, electronic bulletin boards, conferencing systems), electronic classrooms or electronic whiteboards, audioconferencing, compressed video, World Wide Web (including HTML interfaces), group support systems, computer-aided instruction, broadcast via satellite, and multimedia. Comparative evaluation of instructional delivery systems.

MCTE 670 Learning Theory and Computer Applications (3 credits)

Students will explore learning theories and how learning is achieved when instruction is presented from a computer-based paradigm. The course will emphasize the computer as a learning device that can be used in an effective manner to model learning theories associated with behaviorism, cognitivism, and human information processing.

MCTE 680 Human-Computer Interaction (3 credits)

Explores the emerging field of human-computer interaction. Emphasis is placed on how software design practices are integrated with human factors, principles, and methods. Other issues covered include user experience levels, interaction styles, usability engineering, interaction devices and strategies, user-centered design, human information processing, social aspects of computing, and computer-supported cooperative work.

MCTE 688 Continuing Thesis in Computing Technology in Education (1.5 credits)

Students who have not completed the thesis by the end of the second thesis registration must register for continuing thesis. This allows the student to receive faculty and administrative advice and support related to the thesis. Prerequisite: Completion of second thesis registration.

MCTE 690 Research Methodology (3 credits)

This course is an introduction to research, statistical analysis, and decision making. Close attention is paid to data types, data contributions, the identification of variables, and descriptive data presentation techniques. Students are introduced to both parametric and nonparametric data analysis procedures including independent and dependent sample t-tests, chi-square analysis, and simple analysis of variance. Hypothesis testing and the use of statistical software packages are emphasized.

MCTE 691 Master's Project in Computing Technology in Education (3 credits)

This course is the capstone of the program. Each student will develop a comprehensive technology-based project using an environment of choice. Its purpose is to allow students the opportunity to further pursue topics or areas in which they have considerable interest. Each project will be closely mentored by faculty.

MCTE 695 Special Topics in Computing Technology in Education (3 credits)

This seminar focuses on the professor's current research interests. Requires consent of instructor and program director.

MCTE 699 Master's Thesis in Computing Technology in Education (3 credits)

The student develops a framework within which research will be conducted and offers evidence of qualifications to pursue the research. Concepts and theories underlying the student's thesis research are articulated, the problem is clearly stated, specific, measurable goals are specified, a literature review is presented, the methods of conducting research are delineated, and strategy to achieve the goal is given. Registration for MCTE 699 must be repeated for three more credits, for a total of six thesis credits. Prerequisite: Completion of eight courses.

Doctoral Degree Programs

General Information on Doctoral Degree Programs

Application for Admission

Admission decisions are made on a rolling basis. Before an application can be considered reviewable by the Admissions Committee, the following items must be received by the admissions office: application form, application fee, essay, summary of professional experience, at least two evaluation forms, and transcripts (unofficial copies are acceptable pending receipt of official transcripts). To ensure evaluation for the desired starting term, reviewable applications must be received at least one month prior to the start of that term. Late applications that cannot be processed in time for the desired starting term will be considered for the next term. Applicants may be granted **provisional admission** status pending completion of the application process. Applicants who do not meet all admission requirements may be given **conditional admission** pending removal of deficiencies.

Applicants must meet the general requirements and submit the items specified below, **and must also satisfy the program-specific admission requirements contained in the individual program sections of this catalog.** Detailed instructions for the preparation and mailing of admissions materials are contained in the school's admission forms. Admission forms, brochures, and this catalog may be downloaded from the school's Web site: www.scis.nova.edu.

1. An earned master's degree from a regionally accredited institution with an appropriate major (see program-specific admission requirements). Alternatively, SCIS master's students may apply for early admission into the doctoral program in the same program major (see description in this catalog).
2. Application form, application fee, and essay.
3. Official transcripts of all graduate and undergraduate education. The graduate GPA must be at least 3.25.
4. Evaluation forms from three individuals who are familiar with your academic and/or professional capabilities and are able to assess your intellectual abilities, maturity, and motivation. Forms from family members or individuals who are unable to evaluate your academic or professional background are unacceptable.
5. Summary of Professional Experience.
6. Proficiency in the English language is a prerequisite for graduate study at the School of Computer and Information Sciences. Doctoral students are expected to write numerous papers and a dissertation. It is very important to note that grammatical errors, spelling errors, and writing that does not express ideas clearly will affect a student's grades and the completion of his or her degree. The faculty will not provide remedial help concerning grammatical errors or other writing problems. Applicants who are unable to write correctly and clearly are urged to seek remedial help before enrolling in any of the school's programs.

Additional Admission Requirements for International Doctoral Students

1. The application fee must be in U.S. dollars.
2. International students who do not live in the United States but only travel to the United States to attend four cluster weekends a year, or two institute weeks a year, can travel to the United States on tourist visas and need not apply for an I-20.
3. Requirements for campus-based students: The university will not enroll any campus-based student who has not been approved initially, or approved for transfer, by the Immigration and Naturalization Services (INS) to attend Nova Southeastern University. The INS requires that all students on an F-1 student visa must enroll full time and attend the main campus only. All students holding J-1 or F-1 visas are required to carry medical insurance. Students on J-1 visas are required to secure an affidavit of support, from an agency or government who will be the financial sponsor, stating that they have a sufficient amount of money to support themselves for the duration of their study. Students on F-1 visas need an affidavit of support and a notarized/attested financial statement proving that they have a sufficient amount of money to support themselves for one academic year (generally nine months). Non-degree or provisional admission status is not considered a basis for the issuance of an I-20. After applicants receive a written offer of admission, the I-20 will be provided, upon request, to those who have verified financial support and require an F-1 student visa. International students must enter the United States on a valid student or other visa. Nonresident aliens currently in the United States must have a valid student or

nonimmigrant visa (except B1/B2 visa) for enrollment in the university. Students sponsored by the United States government or their home government are required to enter the United States on a J-1 (exchange visitor's) visa. For additional information regarding international students, contact the university's International Student Advising Service at (954) 262-7240 or 800-541-6682, ext. 7240; fax: (954) 262-7265.

4. Applicants whose native language is not English must take the Test of English as a Foreign Language (TOEFL). A minimum test score of 550 is required for applicants taking the written examination. A minimum test score of 213 is required for applicants taking the computer-based examination. (Scores must be no more than two years old.) Test results must be sent directly to the School of Computer and Information Sciences from TOEFL/TSE Services, P.O. Box 6153, Princeton, NJ, 08541-6153, USA; (609) 771-7100; fax: (609) 771-7500, Web site: www.toefl.org.
5. The applicant must have a university-level education at least equivalent to an American master's degree in a related field (see specific requirements). Official transcripts must show an equivalent graduate GPA of at least 3.25. Official documents must be certified by an officer of the institution attended and must show all post-high-school work including grades in each course and standing in examinations and classes. Documents issued in a language other than English must be accompanied by a certified English translation from an NSU-approved agency. Translations made by applicants are not acceptable. In cases where the original academic records do not state that a degree has been awarded, certified copies of the original diploma and certificate of graduation must be submitted.

Provisional or Conditional Admission

A degree-seeking applicant who has missing documents but appears to be acceptable based on documents received by SCIS may be offered **provisional admission**. Official admission will be granted upon receipt and acceptability of the remaining required documents. All missing documents must be submitted prior to the student's second registration. Examples of missing documents are an official transcript and an evaluation form. An applicant who has not met all admission requirements may be given **conditional admission** if sufficient evidence exists to suggest the ability to perform successfully in the program. A student with conditional status must remove stated deficiencies as specified in the acceptance letter.

Early Admission into the Doctoral Program

This option provides the school's M.S. students the opportunity to earn the doctorate in a shorter time (see p. 15 for requirements).

Orientation and Advisement Program

New doctoral students must attend an orientation day on the campus in Fort Lauderdale at their first cluster or institute meeting. The orientation includes introductions to the program office staff, computer requirements, online access, software tools that enhance the educational process, library services, registration support, and financial aid counseling. The school's Web site provides an extensive online "help" system including downloadable software and documents. Students are offered dissertation counseling throughout the program. Advisement is provided by the program office and the faculty.

Program Formats and Term Dates

Terms for the doctoral program are five months long. During the first two years of the program, most students complete two three-credit core courses and one four-credit project course each term. After the completion of all core courses and 40 credit hours with a GPA of at least 3.0, the student registers for the dissertation at 12 credits per term. Students who have not completed the dissertation during registrations for Dissertation I and Dissertation II must register for Continuing Dissertation until they have satisfied the dissertation requirement. Doctoral residence is defined as continuous enrollment for two consecutive terms at a minimum of 10 credit hours per term.

Depending on the program, students may select one of two formats: *cluster* or *institute*. Computer information systems and computer science are offered in cluster format only. Computing technology in education, information science, and information systems are offered in both cluster and institute formats. Cluster students attend four cluster meetings per year, held quarterly over an extended weekend (Friday, Saturday, and half-day Sunday) at the university. Cluster terms start in March and September. Cluster weekends are held in March, June, September, and December. Institute students attend a weeklong institute twice a year at the university. Institutes are held in January and July at the start of each five-month term. Clusters and institutes bring together students, faculty, and staff

members for participation in courses, workshops, and dissertation counseling. Between on-campus meetings, students work on assignments and projects, and participate in online activities that facilitate interaction with faculty members, classmates, and colleagues. **Students are required to attend all of their scheduled cluster or institute class sessions.**

The online component involves use of World Wide Web pages to access course materials, announcements, email, the Electronic Library, and other information, plus a range of activities that facilitate frequent student–professor and student–student interaction. These may include online forums using threaded bulletin boards and chatrooms. In addition, the school provides a system that enables students to submit assignments online in multimedia formats and to receive their professors’ online reviews of assignments in the same multimedia formats. Some online courses may include electronic classroom sessions. Students are provided NSU computer accounts but must obtain their own Internet service providers and use their own computer systems.

Grade Requirements and Time Limitations

Each student must maintain a cumulative grade point average of at least 3.0 for the duration of his or her program to remain in good academic standing. Failure to do so will result in probation and possible dismissal. Students must complete requirements for the doctorate within seven years from the date of their first registration.

Independent Study and Directed Independent Study

A student wishing to take an existing course or project on an independent study basis must obtain written approval from the faculty member responsible for the course and then forward a request to the program office for final approval. A student interested in conducting study or research under the supervision of a faculty member in areas not normally covered in regular courses may request approval by a faculty member and the program office to register for directed independent study. A contract for independent study or directed independent study must be prepared by the student and must include an assignment timeline. The contract must be approved by the mentoring faculty member and the program director. See the course description for directed independent study for more information.

The Dissertation

The dissertation is the most important requirement for the doctoral degree. Each student is expected, with the approval of a faculty adviser, to select an appropriate topic of sufficient scope to satisfy the requirements for the dissertation. Although registration for dissertation credits typically occurs at or near the end of completion of the course requirements, students are encouraged to learn about the dissertation process as early as possible and to begin talking with faculty members about potential research topics early in the program. The dissertation must be an original work and must represent a significant extrapolation from a base of solid experience or knowledge in the student’s area of concentration. Dissertation results must, in a significant way, advance knowledge, improve professional practice, or contribute to understanding in the field of study. Results must be of sufficient strength to distill from the work a paper worthy of publication in a journal or conference proceedings, or to use the work as the basis of a textbook or monograph. Although publication is not a requirement for completing the doctorate, students are encouraged to submit their dissertation research for publication. Doctoral students must follow the policies, procedures, and formatting requirements contained in the *SCIS Dissertation Guide*. Students may attend campus presentations on the dissertation process, research methodology, and writing for publication.

Evaluation of Dissertation Progress

Each student is evaluated on a number of occasions regarding his or her dissertation progress. The purpose of such evaluation is to provide students with relevant and timely feedback concerning their overall performance in the dissertation process and to serve as a screening procedure. Failure to demonstrate the ability to complete a dissertation or to maintain satisfactory progress on the dissertation may result in review by the Academic Review Committee and possible probation or dismissal from the doctoral program. Each student must demonstrate proficiency in the use of the English language in all work submitted during the dissertation process. Grammatical errors, spelling errors, and writing that does not express ideas clearly will not be tolerated and may result in the rejection of dissertation work. The faculty will not provide remedial help concerning grammatical errors or other writing problems that students might have. Students who are unable to write correctly and clearly are urged to contact their program office for sources of remedial help.

Ph.D. Program in Computer Information Systems

This program offers a course of study leading to the degree of doctor of philosophy (Ph.D.) in computer information systems. It is offered in the cluster format, which combines traditional and online instruction to provide professionals the opportunity to pursue graduate study while continuing to work in their current positions. The program is especially well suited to professionals in business, government, industry, or education who are involved with research, design, implementation, management, evaluation, utilization, or teaching of computer information systems. It provides technology-oriented professionals with the knowledge and ability to develop creative solutions to substantive real-world problems. Each student must complete eight courses, four projects, and a dissertation.

Program-Specific Admission Requirements (See pp. 28–29 for general admission requirements.)

This program is designed for the student with a master's degree in computer information systems, computer science, or a closely related field. The applicant should satisfy graduate prerequisites or have equivalent experience in information systems, programming languages, database systems, systems analysis and design, data communications and networks, and computer architecture. Alternatively, SCIS master's students in computer science or computer information systems may apply for early admission into the Ph.D. program. (For details see the section General Information on Master's Degree Programs and descriptions of individual master's programs.)

The Curriculum for the Ph.D. in Computer Information Systems

The program requires 64 credit hours, of which 40 are for courses and 24 are for the dissertation. Most students take two core/elective courses and one project course per term during the first two years and register for the dissertation in the third year. Core/elective courses, project courses, and dissertation registrations are listed below:

Core Courses (three credits each) (All students **must** take these.)

- DCIS 720 Human-Computer Interaction
- DCIS 740 Data Communications and Computer Networking
- DCIS 750 Database Systems
- DCIS 760 Artificial Intelligence and Expert Systems
- DCIS 770 Software Engineering
- DCIS 791 Distributed Systems

Elective Courses (three credits each) (Select two of these.)

- DCIS 710 Decision Support Systems
- DCIS 730 Information Security
- DCIS 735 Knowledge Management
- DCIS 780 Multimedia Systems
- DCIS 790 Special Topics in Computer Information Systems (offered on various subjects)

Project Courses (four credits each) (Select four of these. Must be taken concurrent with, or following completion of, the corresponding core or elective course.)

- DCIS 810 Project in Decision Support Systems
- DCIS 820 Project in Human-Computer Interaction
- DCIS 830 Project in Information Security
- DCIS 835 Project in Knowledge Management
- DCIS 840 Project in Data Communications and Computer Networking
- DCIS 850 Project in Database Systems
- DCIS 860 Project in Artificial Intelligence and Expert Systems
- DCIS 870 Project in Software Engineering
- DCIS 880 Project in Multimedia Systems
- DCIS 890 Project in Special Topics in Computer Information Systems
- DCIS 891 Project in Distributed Systems

Dissertation Registrations

- DCIS 910 Dissertation I (12 credits)
- DCIS 915 Dissertation II (12 credits)
- DCIS 920 Continuing Dissertation (6 credits)

Course Descriptions for the Ph.D. in Computer Information Systems

DCIS 710 Decision Support Systems (3 credits)

Principles and techniques relating to automated support for decision making and organizational problem solving. Topics include decision theory, modeling and simulation, decision support system architecture, group decision support systems, knowledge-based expert systems, and intelligent systems.

DCIS 720 Human-Computer Interaction (3 credits)

Issues relating to effective human-computer interaction are presented. Basic elements, procedures, tools, and environments contributing to the development of successful user interfaces are explored. User interface design principles, guidelines, and methodologies are reviewed. Other topics include multidisciplinary dynamics of human-computer interaction as a field of study, current and projected developments in HCI research, and usability engineering.

DCIS 730 Information Security (3 credits)

Study of the theory, mechanisms, and implementation of information security and data protection. Topics include formal models for computer security, secure operating systems, mechanisms for mandatory and discretionary controls, distributed secure system architectures, encryption and authentication, access control, integrity models and mechanisms, and programming and vulnerability analysis. An emphasis will be placed on current issues, future directions, and research areas.

DCIS 735 Knowledge Management (3 credits)

Knowledge management (KM) is said to promote innovation, improve efficiency and effectiveness, and provide a sustainable competitive advantage in today's global environment. This course examines computer-based systems for supporting KM. Principles of developing systems for KM are explored. System architectures, tools and techniques, and their use in capturing, storing, locating, evaluating, disseminating, and using information and knowledge are examined. Topics will include techniques for indexing, searching, retrieving, and displaying information from knowledge bases. Investigation of the issues in the application of knowledge management to organizational learning and decision making is included. Application of these principles and techniques through the use of rapidly evolving information/communication technologies is studied in the context of their impact on organizations.

DCIS 740 Data Communications and Computer Networking (3 credits)

Recent advances and new applications in the expanding field of telecommunications and computer networks are examined. The technical fundamentals, architecture, and design of computer networks are described. Strategies, tools, and techniques for network planning, implementation, management, maintenance, and security are delineated. Topics include the OSI Model, TCP/IP, transmission media, network operating systems, topologies, configurations, protocols, and performance characteristics. Trends in standardization, internetworking, downsizing, and the development of networks are explored. The emphasis of the material for this class will be in the analysis, design, development, and management of network systems. The theory behind each component will be presented while exploring the design and development of data and computer networks.

DCIS 750 Database Systems (3 credits)

Theory and principles of databases and their management. Design, implementation, and traditional and nontraditional applications of database management systems. An emphasis will be placed on current issues, future directions, and research topics.

DCIS 760 Artificial Intelligence and Expert Systems (3 credits)

Theory of, and major approaches to, artificial intelligence. Topics include knowledge representation, heuristic search, artificial neural networks, machine learning, intelligent agents, and knowledge-based systems.

DCIS 770 Software Engineering (3 credits)

Covers advanced topics in the development of software-intensive systems, system life cycles, requirements definition and analysis, behavioral specification, design, implementation, verification and validation, system evolution, and project management. An emphasis will be placed on current issues, future directions, and research topics.

DCIS 780 Multimedia Systems (3 credits)

A course in advanced systems covering both theoretical and practical issues in designing multimedia systems. Topics include introduction to multimedia systems, compression techniques, synchronization, user interface issues, storage, video indexing and retrieval techniques, operating system support for digital audio and video, as well as network and transport protocols for multimedia. Emphasis on current design issues, research topics, software implementation, and discussion of future directions.

DCIS 790 Special Topics in Computer Information Systems (3 credits)

Covers advanced topics in areas of current research interest in computer information systems. May include topics such as client-server computing, distributed database systems, advanced computer graphics, object-oriented technology, the integration of networks and operating systems, and parallel computation. Topics will vary depending on student and faculty interest.

DCIS 791 Distributed Systems (3 credits)

Students are expected to contribute to the expansion of the client-server and distributed system paradigms. Topics include the components of client-server and distributed systems architecture, operating systems, networking, interprocess communication, user interface, middleware, distributed objects, groupware, security, and software development. The role of standards in client-server and distributed systems development is discussed, including a detailed study of protocols. Development of the client-server computing-model and the application to business process reengineering. Migration from legacy systems is considered along with project development and management. The emphasis of the material for this class will be in the analysis, design, development,

and management of client-server and distributed systems. The theory behind each component will be presented while exploring the design and development of client-server and distributed systems.

DCIS 810 Project in Decision Support Systems (4 credits)

Students advance their knowledge through the completion of a research paper or project in the area of decision support systems. Some topics of current interest include model management, investigation of decision support aids, knowledge-based systems and intelligent systems, group DSS, and distributed DSS.

DCIS 820 Project in Human-Computer Interaction (4 credits)

Students produce a research paper or project on a current topic in HCI. Some topics of interest include interface quality and evaluation, computer system and computer interface architecture, Internet-based user interface design issues, legal and ethical aspects of computing, speech interfaces, and computer-supported cooperative work.

DCIS 830 Project in Information Security (4 credits)

Students pursue a research project or implementation on a current topic in information security and assurance. Topics of current interest include secure operating systems and networks, intrusion detection, cryptographic theory and applications, vulnerability analysis, and malicious code detection.

DCIS 835 Project in Knowledge Management (4 credits)

Students pursue a research study, project, or implementation in knowledge management.

DCIS 840 Project in Data Communications and Computer Networking (4 credits)

Students will advance their data communications and computer networking knowledge through the completion of a research paper or project. Some topics of current interest include protocol development and comparisons, the relationship between networks and applications, QoS, network operating systems, and security.

DCIS 850 Project in Database Systems (4 credits)

Students pursue a research study on a current topic in database systems or complete a database-oriented development project. Some areas of current interest include object-oriented database systems, extended relational DBMS, federated or heterogeneous database systems, high-performance parallel database systems, and advanced conceptual logic database modeling.

DCIS 860 Project in Artificial Intelligence and Expert Systems (4 credits)

Students pursue a research or development project in artificial intelligence. Some topics of current interest are artificial life, learning technologies (including symbol learning, neural networks, and genetic algorithms), intelligent agents, natural language processing, deep domain models in expert systems, vision, speech recognition, handwriting recognition, and parallel and distributed artificial intelligence.

DCIS 870 Project in Software Engineering (4 credits)

Students pursue a research project in a current topic in software engineering or complete a software engineering development project. Some topics of current interest include object-oriented analysis and design, software/system life cycles, reusability, specification, and verification.

DCIS 880 Project in Multimedia Systems (4 credits)

Students pursue a research study or project on a current topic in multimedia systems. Some areas of current interest include design and implementation of interactive multimedia applications including interactive television (e.g., video-on-demand, home shopping, voting, and games), hypermedia systems, digital signal processing, network architectures and protocols, multimedia authoring, videoconferencing, and groupware.

DCIS 890 Project in Special Topics in Computer Information Systems (4 credits)

Students pursue a research study, project, or implementation related to DCIS 790.

DCIS 891 Project in Distributed Systems (4 credits)

Students will advance their client-server/distributed systems knowledge through the completion of a research paper or project. Some topics of current interest include distributed object technology, QoS middleware, operating systems, and groupware.

DCIS 910 Dissertation I (12 credits)

The student develops a framework within which doctoral research will be conducted and offers evidence of qualifications to pursue the research. Prerequisite: Satisfactory completion of all course work.

DCIS 915 Dissertation II (12 credits)

Concepts and theories underlying the student's doctoral research are articulated, the problem is clearly stated, specific, measurable goals are specified, a thorough literature review is presented, the methods of conducting the research are delineated, and a strategy to achieve the goal is given. Prerequisite: Dissertation I.

DCIS 920 Continuing Dissertation (6 credits)

Students who have not completed the dissertation by the end of Dissertation II must register for Continuing Dissertation each term in order to receive faculty and administrative advice and support related to the dissertation. Prerequisite: Dissertation II.

DCIS 1200 Directed Independent Study (3 credits or 4 credits)

Involves directed readings, research, and creative activities under the supervision of a faculty member. A contract for the independent study must be prepared by the student, include an assignment timeline, and be approved by the mentoring faculty member and the program director. NOTE: In special situations, a student may be granted permission to take a regular numbered course on an independent study basis. In such cases, the same conditions would apply but the course number would reflect the regular numbered course.

Ph.D. Program in Computer Science

This program offers a course of study leading to the degree of doctor of philosophy (Ph.D.) in computer science. It is offered in the cluster format, which combines traditional and online instruction to give professionals the opportunity to pursue graduate study while continuing to work in their current positions. The program is especially well suited to those in industry, education, or government who are involved with one of the many areas of computer science. It provides research-oriented professionals with knowledge in the major areas of computer science and the ability to develop creative solutions to substantive real-world problems. Each student must complete eight courses, four projects, and a dissertation.

Program-Specific Admission Requirements (See pp. 28–29 for general admission requirements.)

This program is designed for the student with a master's degree in computer science, or a closely related field. The applicant should satisfy graduate prerequisites or have equivalent experience in programming languages, data communications and computer networks, operating systems, compilers, database management systems, theory of computation, design and analysis of algorithms, and computer architecture. Alternatively, SCIS master's students may apply for early admission into the Ph.D. program. (For details, see the section General Information on Master's Degree Programs and description of individual master's programs.)

The Curriculum for the Ph.D. in Computer Science

The program requires 64 credit hours, of which 40 are for courses and 24 are for the dissertation. Most students take two core/elective courses and one project course per term during the first two years and register for the dissertation in the third year. Core/elective courses, project courses, and dissertation registrations are listed below:

Core Courses (three credits each) (All students **must** take these.)

- CISD 700 Theory and Principles of Programming
- CISD 730 Operating Systems
- CISD 740 Data Communications and Computer Networking
- CISD 750 Database Management Systems
- CISD 760 Artificial Intelligence
- CISD 770 Software Engineering

Elective Courses (three credits each) (Select two of these.)

- CISD 790 Special Topics in Computer Science
(offered on various subjects; may take up to two of these)
- CISD 792 Computer Graphics
- CISD 794 Knowledge Discovery in Databases

Project Courses (four credits each) (Select four of these. Must be taken concurrently with, or following completion of, the corresponding core course.)

- CISD 800 Project in Theory and Principles of Programming
- CISD 830 Project in Operating Systems
- CISD 840 Project in Data Communications and Computer Networking
- CISD 850 Project in Database Management Systems
- CISD 860 Project in Artificial Intelligence
- CISD 870 Project in Software Engineering
- CISD 890 Project in Special Topics in Computer Science
- CISD 892 Project in Computer Graphics
- CISD 894 Project in Knowledge Discovery in Databases

Dissertation Registrations

- CISD 910 Dissertation I (12 credits)
- CISD 915 Dissertation II (12 credits)
- CISD 920 Continuing Dissertation (6 credits)

Course Descriptions for the Ph.D. in Computer Science

CISD 700 Theory and Principles of Programming (3 credits)

Covers advanced topics in areas of current research interest in programming languages, semantics, visual languages, and compiler design for contemporary systems and applications.

CISD 730 Operating Systems (3 credits)

Recent advances in the theory and practice of state-of-the-art methods in the structure and development of operating systems. Topics include operating system architectures, object-oriented operating systems, distributed operating systems, real-time issues, performance, and software engineering issues in the development of an operating system. An emphasis will be placed on current issues, future directions, and research topics.

CISD 740 Data Communications and Computer Networking (3 credits)

Study of data communications and network theory, design, and implementation. Topics include network architectures, transmission encoding, direct-link networks, switching, routing, network analysis, network algorithms, internetworking, addressing, name services, security, data compression, congestion control, and high-speed networking. An emphasis will be placed on current issues, future directions, and research topics.

CISD 750 Database Management Systems (3 credits)

Theory and principles of databases and their management. Design, implementation, and traditional and nontraditional applications of database management systems.

CISD 760 Artificial Intelligence (3 credits)

Theory and practice of artificial intelligence and knowledge-based expert systems including issues in knowledge representation, search, heuristics, learning techniques, tools, languages, and programming techniques. Current issues, future directions, and research topics will be explored.

CISD 770 Software Engineering (3 credits)

Covers advanced topics in areas of current research interest in the development of software-intensive systems. Topics include metrics, requirements definition, development life cycles, software engineering processes, reuse, formal methods, verification and validation, and project management.

CISD 790 Special Topics in Computer Science (3 credits)

Covers advanced topics in areas of current research interest in computer science. May include topics in advanced computer architecture, artificial intelligence, distributed database management systems, advanced computer graphics, object-oriented technology, and parallel computation. Topics will vary depending on student and faculty interest. Depending on interest, several special-topics courses may be offered concurrently.

CISD 792 Computer Graphics (3 credits)

This course will focus on algorithms and techniques that have emerged in the past several years. Topics include basic and advanced modeling and rendering methods, volume and scientific visualization techniques, visual programming languages and environments, and computer animation.

CISD 794 Knowledge Discovery in Databases (3 credits)

This course will study a number of emerging technical approaches to knowledge discovery in databases such as data clustering and summarization, algorithms for learning classification and characteristic rules, finding dependency networks, analyzing changes, detecting anomalies, and their applications. Current issues, future directions, and research topics will be explored.

CISD 800 Project in Theory and Principles of Programming (4 credits)

The mathematics of algorithms and the specification of design are the basis for the project to illustrate the benefits of structured models, quantitative documentation, and logical assertions for the interpretation and structure of computer programs. The projects include the use of modern languages to demonstrate the abstract structures necessary for application and system development.

CISD 830 Project in Operating Systems (4 credits)

Students pursue a research project or implementation on a current topic in operating systems. Implementation projects may involve constructing a portion of an operating system, simulating the behavior of key components, performance studies of existing systems, creation of a concurrent programming environment to model parallel hardware and software. Research papers may investigate current topics such as open systems, distributed systems, massive parallelism, object-oriented operating systems, and real-time operating systems.

CISD 840 Project in Data Communications and Computer Networking (4 credits)

A research report, design, implementation, or simulation is the focus of a student project. Topics of current interest include routing, security, internetworking, and network or transport layer protocol design.

CISD 850 Project in Database Management Systems (4 credits)

Students pursue a research study on a current topic in database systems or complete a database-oriented development project. Some areas of current interest include object-oriented database systems, extended relational DBMS, deductive and logic-based expert database systems, federated or heterogeneous database systems, other high-performance parallel database systems, and advanced conceptual logic database modeling.

CISD 860 Project in Artificial Intelligence (4 credits)

Students pursue a research or development project in artificial intelligence. Topics of current interest are artificial life, learning technologies (including symbol learning, neural networks, and genetic algorithms), intelligent agents, natural language processing, deep domain models in expert systems, vision, speech recognition, handwriting recognition, and parallel and distributed artificial intelligence.

CISD 870 Project in Software Engineering (4 credits)

A research report or implementation is the focus of a student project. Topics of current interest are metrics, formal methods, development life cycles, reuse, object-oriented analysis and design and software engineering for distributed systems.

CISD 890 Project in Special Topics in Computer Science (4 credits)

Students pursue a research study, project, or implementation related to the Special Topics in Computer Science course.

CISD 892 Project in Computer Graphics (4 credits)

Students pursue a research or implementation project on a current topic in computer graphics. Topics of interest include basic and advanced modeling and rendering methods, volume and scientific visualization techniques, visual programming languages and environments, computer animation, and virtual reality.

CISD 894 Project in Knowledge Discovery in Databases (4 credits)

Students pursue a research project or implementation on a current topic in knowledge discovery in databases. The research process for the project includes searching the literature, dissecting the existing methodologies for knowledge discovery in databases, and developing a new approach for knowledge discovery in databases.

CISD 910 Dissertation I (12 credits)

The student develops a framework within which doctoral research will be conducted and offers evidence of qualifications to pursue the research. Prerequisite: Satisfactory completion of all course work.

CISD 915 Dissertation II (12 credits)

Concepts and theories underlying the student's doctoral research are articulated, the problem is clearly stated, specific, measurable goals are specified, a thorough literature review is presented, the methods of conducting the research are delineated, and a strategy to achieve the goal is given. Prerequisite: Dissertation I.

CISD 920 Continuing Dissertation (6 credits)

Students who have not completed the dissertation by the end of Dissertation II must register for Continuing Dissertation each term in order to receive faculty and administrative advice and support related to the dissertation. Prerequisite: Completion of Dissertation II.

CISD 1200 Directed Independent Study (3 credits or 4 credits)

Involves directed readings, research, and creative activities under the supervision of a faculty member. A contract for the independent study must be prepared by the student, include an assignment timeline, and be approved by the mentoring faculty member and the program director. NOTE: In special situations, a student may be granted permission to take a regular numbered course on an independent study basis. In such cases, the same conditions would apply but the course number would reflect the regular numbered course.

Ph.D./Ed.D. Program in Computing Technology in Education

This program offers a course of study leading to the degree of doctor of philosophy (Ph.D.) or doctor of education (Ed.D.) in computing technology in education. It is offered in both cluster and institute formats, which combine on-campus and online instruction to provide professionals the opportunity to pursue graduate study while continuing to work in their current positions. This program addresses: (1) the use of computing technologies to improve cognition; (2) the development, management, and evaluation of computing systems that support the educational process; and (3) the role of computing and other advanced technology in education and training. The program is especially well suited to educators, educational administrators, instructional system designers, and trainers. It provides technology-oriented professionals with the knowledge and ability to develop creative solutions to substantive real-world problems. Each student must complete eight courses, four projects, and a dissertation. A student may declare a degree preference (Ph.D. or Ed.D.) at any time during the program. The difference between these degrees is a name difference only. Many of the courses in the program have been approved for teacher certification in computer science (grades K–12) or recertification by Florida's Bureau of Teacher Certification. They may be taken as part of the degree program or independently.

Program-Specific Admission Requirements (See pp. 28–29 for general admission requirements.)

This program is designed for the student with a master's degree in education, training and learning, instructional design, information systems, educational leadership, or a closely related field. The candidate must have a significant amount of experience using computer applications and the Internet. Alternatively, SCIS master's students may apply for early admission into the Ph.D./Ed.D. program. (For details, see the section General Information on Master's Degree Programs and descriptions of individual master's programs.)

The Curriculum for the Ph.D./Ed.D. in Computing Technology in Education

The program requires 64 credit hours, of which 40 are for courses and 24 are for the dissertation. Most students take two core/elective courses and one project course per term during the first two years and register for the dissertation in the third year. Students are required to take concurrently the core course and project course in Research Methodology (DCTE 700/800). Core courses, elective courses, project courses, and dissertation registrations are listed below:

Core Courses (three credits each) (All students **must** take these.)

- DCTE700 Research Methodology
- DCTE720 Human-Computer Interaction
- DCTE730 Seminar in Online Learning Environments
- DCTE740 Telecommunications and Computer Networks
- DCTE750 Educational Database Systems
- DCTE760 Instruction Delivery Systems
- DCTE770 Courseware Design and Development

Elective Courses (three credits each) (Select one of these.)

- DCTE747 Learning Theory and Computer Applications
- DCTE790 Special Topics in Computing Technology in Education
(offered on various subjects such as information policy, knowledge management,
and online information systems)

Project Courses (four credits each) (Select four of these. Must be taken concurrent with, or following completion of the corresponding core or elective course.)

- DCTE800 Project in Research Methodology (required concurrent with DCTE 700)
- DCTE820 Project in Human-Computer Interaction
- DCTE830 Project in Online Learning Environments
- DCTE840 Project in Telecommunications and Computer Networks
- DCTE847 Project in Learning Theory and Computer Applications
- DCTE850 Project in Educational Database Systems
- DCTE860 Project in Instruction Delivery Systems
- DCTE870 Project in Courseware Design and Development
- DCTE890 Project in Special Topics in Computing Technology in Education

Dissertation Registrations

- DCTE910 Dissertation I (12 credits)
- DCTE915 Dissertation II (12 credits)
- DCTE920 Continuing Dissertation (6 credits)

Course Descriptions for the Ph.D./Ed.D. in Computing Technology in Education

DCTE 700 Research Methodology (3 credits)

An in-depth treatment of the research process from an experimental, developmental, and evaluative perspective is provided. Techniques for planning and designing these types of projects as well as the methodologies for data collection, evaluation, and analysis are examined. Special emphasis is placed on the appropriate choice of methodologies for a variety of problem situations in both business and educational settings. Major emphasis is placed on the development of the proposal stage of research. Corequisite: DCTE 800.

DCTE 720 Human-Computer Interaction (3 credits)

Techniques facilitating effective human-computer interaction are presented. Basic elements, procedures, tools, and environments contributing to the development of a successful user interface are explored. Design principles, guidelines, and methodologies for building, installing, managing, and maintaining interactive systems that optimize user productivity are reviewed. Topics include the multidisciplinary dynamics of human-computer interaction, current and projected developments in HCI research, computer-supported cooperative work, and strategies for implementing and evaluating human-computer dialogues.

DCTE 730 Seminar in Online Learning Environments (3 credits)

This course explores the emergence of online learning environments (OLEs) as viable alternatives or supplements to traditional classroom instruction. Students will investigate the theoretical, conceptual, instructional, and technical framework of implementing and using OLEs to support the learning paradigm. The basic technology and pedagogical implications of OLEs will be explored, including issues such as learning communities and learning technologies, the Internet and the Web, online electronic performance systems, asynchronous/synchronous communication tools, methods of instruction and online tools to support learning and instruction, design of OLEs, faculty and learner considerations, and evaluation of OLEs.

DCTE 740 Telecommunications and Computer Networks (3 credits)

Recent advances and new applications in the expanding field of telecommunications and computer networks are examined. The technical fundamentals, architecture, and design of computer networks are described. Strategies, tools, and techniques for network planning, implementation, management, maintenance, and security are delineated. Topics include ISDN, ATM, the OSI Model, transmission media, network operating systems, topologies, configurations, protocols, and performance characteristics. Trends in standardization, internetworking, and the development of local area networks (LANs), metropolitan area networks (MANs), wide area networks (WANs), intranets, and extranets are examined.

DCTE 747 Learning Theory and Computer Applications (3 credits)

Computing technology is assuming an increasingly dominant role in instructional delivery. In this course, students explore learning theories and how learning is achieved when instruction is presented from a computer-based paradigm. The course examines the value of the computer as a learning device to model learning theories associated with behaviorism, cognitivism, and human information processing. An emphasis will be placed on current issues, future directions, and research topics.

DCTE 750 Educational Database Systems (3 credits)

Techniques for determining database requirements and managing organizational data resources are examined. Strategies for designing database management systems applications that satisfy specific requirements are presented. Components and architecture of the relational data model are analyzed. Methods for creating and implementing object-oriented information systems are explored. Topics include object-oriented languages, the user interface, databases and expert systems, distributed computing, and the advantages and drawbacks of commercially available DBMS tools and products.

DCTE 760 Instruction Delivery Systems (3 credits)

An IDS is the setting, environment, or functional unit in which instruction takes place. This course will cover past, current, and future delivery systems used to bring learning and training to user populations. Principles of learning will be used to support a wide range of delivery in synchronous and asynchronous modes and in on-campus and distance formats.

DCTE 770 Courseware Design and Development (3 credits)

Explores the concepts and principles that underlie the design and development of courseware in education and training and implements the findings in the development of prototype materials. Students will become immersed in two important issues for successful functioning in the technological society of the 21st century: instructional design and team productions.

DCTE 790 Special Topics in Computing Technology in Education (3 credits)

Covers advanced topics in areas of current research interest in computing technology in education. May include topics in areas such as distance education, learning theory, adaptive devices, CD-ROM development, artificial intelligence and expert systems, adult literacy, computer graphics, and distributed database systems. Topics will vary depending on student and faculty interest. Depending on interest, several special-topics courses may be offered concurrently.

DCTE 800 Project in Research Methodology (4 credits)

This course will focus on the collection and analysis of data collected from experimental, developmental, and evaluative studies. Emphasis will be placed on the application of tools and techniques appropriate to the scenario and data type collected. The logical development of decisions based on the data analysis in terms of predefined hypotheses and/or project goals and objectives will be discussed. Major emphasis is placed on the development of the report stage of research. Corequisite: DCTE 700.

DCTE 820 Project in Human-Computer Interaction (4 credits)

Students pursue a research study, project, or implementation in human-computer interaction.

DCTE 830 Project in Online Learning Environments (4 credits)

Students pursue a research study, project, or implementation in online learning environments.

DCTE 840 Project in Telecommunications and Computer Networks (4 credits)

Students pursue a research study, project, or implementation in telecommunications and computer networks.

DCTE 847 Project in Learning Theory and Computer Applications (4 credits)

Students pursue a research study, project, or implementation in learning theory and computer applications.

DCTE 850 Project in Educational Database Systems (4 credits)

Students pursue a research study, project, or implementation in educational database management systems.

DCTE 860 Project in Instruction Delivery Systems (4 credits)

Students pursue a research study, project, or implementation in instructional delivery systems.

DCTE 870 Project in Courseware Design and Development (4 credits)

Requires the production of an entire courseware package. It is necessary to have a representative target population for purposes of beta testing the resulting product. The product should accommodate a range of learning styles. It must be submitted with development charts, a narrative explaining the roles taken at different times by team members, a review of the literature, and fully functional, intuitively used software. The inclusion of a management system is totally optional. However, the management component comes after the development and must not detract from software use. Additional teaching aids developed may be included.

DCTE 890 Project in Special Topics in Computing Technology in Education (4 credits)

Students pursue a research study, project, or implementation on special topics in computing technology in education.

DCTE 910 Dissertation I (12 credits)

The student develops a framework within which doctoral research will be conducted and offers evidence of qualifications to pursue the research. Prerequisite: Satisfactory completion of all course work.

DCTE 915 Dissertation II (12 credits)

Concepts and theories underlying the student's doctoral research are articulated, the problem is clearly stated, specific, measurable goals are specified, a thorough literature review is presented, the methods of conducting the research are delineated, and a strategy to achieve the goal is given. Prerequisite: Dissertation I.

DCTE 920 Continuing Dissertation (6 credits)

Students who have not completed the dissertation by the end of Dissertation II must register for Continuing Dissertation each term in order to receive faculty and administrative advice and support related to the dissertation. Prerequisite: Completion of Dissertation II.

DCTE 1200 Directed Independent Study (3 credits or 4 credits)

Involves directed readings, research, and creative activities under the supervision of a faculty member. A contract for the independent study must be prepared by the student, include an assignment timeline, and be approved by the mentoring faculty member and the program director. NOTE: In special situations, a student may be granted permission to take a regular numbered course on an independent study basis. In such cases, the same conditions would apply but the course number would reflect the regular numbered course.

Ph.D. Program in Information Science

This program offers a course of study leading to the degree of doctor of philosophy (Ph.D.) in information science. It is offered in both cluster and institute formats that combine traditional and online instruction to provide professionals the opportunity to pursue graduate study while continuing to work in their current positions. The program focuses on information organization and retrieval, which have evolved into issues of enormous importance in light of the continued rapid developments in computing technology. The program is especially well suited to professionals working in a library or information center environment in education, business, government, or industry. It provides research- and technology-oriented professionals the knowledge and ability to develop creative solutions to substantive real-world problems in information science. Each student must complete eight courses, four projects, and a dissertation.

Program-Specific Admission Requirements (See pp. 28–29 for general admission requirements.)

This program is designed for the student with a master's degree in information systems, information science, library science, computer education, or a closely related area. The candidate must have a significant amount of experience using computer applications and the Internet. Alternatively, SCIS master's students may apply for early admission into the Ph.D. program. (For details, see the section General Information on Master's Degree Programs and descriptions of individual master's programs.)

The Curriculum for the Ph.D. in Information Science

The program requires 64 credit hours, of which 40 are for courses and 24 are for the dissertation. Most students take two core/elective courses and one project course per term during the first two years and register for the dissertation in the third year. Core/elective courses, project courses, and dissertation registrations are listed below:

Core Courses (three credits each) (All students **must** take these.)

- DCTE720 Human-Computer Interaction
- DISC 725 Online Information Systems
- DISC 735 Knowledge Management
- DCTE740 Telecommunications and Computer Networks
- DISS 770 Information Policy
- DISS 780 Multimedia Systems

Elective Courses (three credits each) (Select two of these.)

- DCTE700 Research Methodology (DCTE 800 must be taken concurrently)
- or DISS 700 Research Methodology (DISS 800 must be taken concurrently)
- DCTE730 Seminar in Online Learning Environments
- DCTE750 Educational Database Systems
- DISS 755 Information Security
- DISC 790 Special Topics in Information Science (offered on various subjects)

Project Courses (four credits each) (Select four of these. Must be taken concurrent with, or following completion of, the corresponding core or elective course.)

- DCTE800 Project in Research Methodology (must be taken concurrent with DCTE 700)
- or DISS 800 Project in Research Methodology (must be taken concurrent with DISS 700)
- DCTE820 Project in Human-Computer Interaction
- DISC 825 Project in Online Information Systems
- DCTE830 Project in Online Learning Environments
- DISC 835 Project in Knowledge Management
- DCTE840 Project in Telecommunications and Computer Networks
- DCTE850 Project in Educational Database Systems
- DISS 855 Project in Information Security
- DISS 870 Project in Information Policy
- DISS 880 Project in Multimedia Systems
- DISC 890 Project in Special Topics in Information Science

Dissertation Registrations

- DISC 910 Dissertation I (12 credits)
- DISC 915 Dissertation II (12 credits)
- DISC 920 Continuing Dissertation (6 credits)

Course Descriptions for the Ph.D. in Information Science

DCTE 700 Research Methodology (3 credits)

An in-depth treatment of the research process from an experimental, developmental, and evaluative perspective is provided. Techniques for planning and designing these types of projects, as well as the methodologies for data collection, evaluation, and analysis are examined. Special emphasis is placed on the appropriate choice of methodologies for a variety of problem situations in both business and educational settings. Major emphasis is placed on the development of the proposal stage of research.

DCTE 720 Human-Computer Interaction (3 credits)

Techniques facilitating effective human-computer interaction are presented. Basic elements, procedures, tools, and environments contributing to the development of a successful user interface are explored. Design principles, guidelines, and methodologies for building, installing, managing, and maintaining interactive systems that optimize user productivity are reviewed. Topics include the multidisciplinary dynamics of human-computer interaction, current and projected developments in HCI research, computer-supported cooperative work, and strategies for implementing and evaluating human-computer dialogues.

DISC 725 Online Information Systems (3 credits)

The evolution, design, and structure of online information systems. Principles, concepts, and techniques for information retrieval. Topics include the methodology of the search process, bibliometrics, the World Wide Web, user interface design and considerations, hypermedia, and related technologies, as well as information standards. Trends in system enhancements, use of online services for information retrieval, electronic document delivery, electronic publishing, and end-user training and support. Problems and issues associated with electronic information access and delivery.

DCTE 730 Seminar in Online Learning Environments (3 credits)

This course explores the emergence of online learning environments (OLEs) as viable alternatives or supplements to traditional classroom instruction. Students will investigate the theoretical, conceptual, instructional, and technical framework of implementing and using OLEs to support the learning paradigm. The basic technology and pedagogical implications of OLEs will be explored, including issues such as learning communities and learning technologies, the Internet and the Web, online electronic performance systems, asynchronous/synchronous communication tools, methods of instruction and online tools to support learning and instruction, design of OLEs, faculty and learner considerations, and evaluation of OLEs.

DISC 735 Knowledge Management (3 credits)

Principles of knowledge management and their use in locating, evaluating, disseminating, and using information and knowledge. Application of these principles and techniques through the use of rapidly evolving information/communication technologies is delineated in the context of a flexible and responsive organizational structure. This nexus, which can promote innovation, improve efficiency and effectiveness, and provide a sustainable competitive advantage in today's global environment, is outlined.

DCTE 740 Telecommunications and Computer Networks (3 credits)

Recent advances and new applications in the expanding field of telecommunications and computer networks are examined. The technical fundamentals, architecture, and design of computer networks are described. Strategies, tools, and techniques for network planning, implementation, management, maintenance, and security are delineated. Topics include ISDN, ATM, the OSI Model, transmission media, network operating systems, topologies, configurations, protocols, and performance characteristics. Trends in standardization, internetworking, and the development of local area networks (LANs), metropolitan area networks (MANs), wide area networks (WANs), intranets, and extranets are examined.

DCTE 747 Learning Theory and Computer Applications (3 credits)

Computing technology is assuming an increasingly dominant role in instructional delivery. In this course, students explore learning theories and how learning is achieved when instruction is presented from a computer-based paradigm. The course examines the value of the computer as a learning device to model learning theories associated with behaviorism, cognitivism, and human information processing. An emphasis will be placed on current issues, future directions, and research topics.

DCTE 750 Educational Database Systems (3 credits)

Techniques for determining database requirements and managing organizational data resources are examined. Strategies for designing database management systems applications that satisfy specific requirements are presented. Components and architecture of the relational data model are analyzed. Methods for creating and implementing object-oriented information systems are explored. Topics include object-oriented languages, the user interface, databases and expert systems, distributed computing, and the advantages and drawbacks of commercially available DBMS tools and products.

DISS 755 Information Security (3 credits)

Security policies, models, and mechanisms for secrecy, integrity, and availability. Topics will include threats to information systems, information security policies and management issues, the evaluation of secure information systems, encryption and authentication, network security, requirements analysis, and the practical problems that have to be solved in order to make those technologies workable in a networked environment. Emphasis on current issues, future directions, and research areas.

DISS 770 Information Policy (3 credits)

Information technology's dramatic global impact on society, government, and the economy has given rise to complex legal, regulatory, and policy issues. This course explores issues ranging from the consequences of information commodification to the impact of privacy concerns, e-commerce, information ownership (patents/copyrights/trademarks), social equity, crime, free speech, telecommunications, national security, international trade, etc. All have immediate relevance to the IT workplace. While U.S. policy issues serve as the framework for the course, the U.S. experience is compared and contrasted to policy developments throughout the world.

DISS 780 Multimedia Systems (3 credits)

Advanced systems covering theoretical and practical issues in designing multimedia systems. Topics include introduction to multimedia systems, compression techniques, synchronization, user interface issues, storage, video indexing and retrieval techniques, operating system support for digital audio and video, as well as network and transport protocols for multimedia. An emphasis will be placed on current design issues, research topics, software implementation, and discussion of future directions.

DISC 790 Special Topics in Information Science (3 credits)

Advanced topics in areas of current research interest in information science. May include topics such as the virtual library, network security, the emerging national information infrastructure (NII), Internet issues, and design/implementation of information system services and applications. Topics will vary depending on student and faculty interest.

DCTE 800 Project in Research Methodology (4 credits)

This course will focus on the collection and analysis of data collected from experimental, developmental, and evaluative studies. Emphasis will be placed on the application of tools and techniques appropriate to the scenario and data type collected. The logical development of decisions based on the data analysis in terms of predefined hypotheses and/or project goals and objectives will be discussed. Major emphasis is placed on the development of the report stage of research.

DCTE 820 Project in Human-Computer Interaction (4 credits)

Students pursue a research study, project, or implementation in human-computer interaction.

DISC 825 Project in Online Information Systems (4 credits)

Students pursue a research study, project, or implementation in online information systems.

DCTE 830 Project in Online Learning Environments (4 credits)

Students pursue a research study, project, or implementation in online learning environments.

DISC 835 Project in Knowledge Management (4 credits)

Students pursue a research study, project, or implementation in knowledge management.

DCTE 840 Project in Telecommunications and Computer Networks (4 credits)

Students pursue a research study, project, or implementation in telecommunications and computer networks.

DCTE 847 Project in Learning Theory and Computer Applications (4 credits)

Students pursue a research study, project, or implementation in learning theory and computer applications.

DCTE 850 Project in Educational Database Systems (4 credits)

Students pursue a research study, project, or implementation in educational database management systems.

DISS 855 Project in Information Security (3 credits)

Students will pursue a research project or implementation on a current topic in information security and assurance. Topics: security-related applications and systems, vulnerability analysis, information security policies and management issues, security audits, and secure e-commerce.

DISS 870 Project in Information Policy (4 credits)

Students pursue a research study, project, or implementation in information policy.

DISS 880 Project in Multimedia Systems (4 credits)

Students pursue a research study or project on a current topic in multimedia systems. Some areas of current interest include design and implementation of interactive multimedia applications including interactive television (e.g., video-on-demand, home shopping, voting, and games), hypermedia systems, digital signal processing, network architectures and protocols, multimedia authoring, videoconferencing, and groupware.

DISC 890 Project in Special Topics in Information Science (4 credits)

Students pursue a research study, project, or implementation in special topics in information science.

DISC 910 Dissertation I (12 credits)

The student develops a framework within which doctoral research will be conducted and offers evidence of qualifications to pursue the research. Prerequisite: Satisfactory completion of all course work.

DISC 915 Dissertation II (12 credits)

Concepts and theories underlying the student's doctoral research are articulated, the problem is clearly stated, specific, measurable goals are specified, a thorough literature review is presented, the methods of conducting the research are delineated, and a strategy to achieve the goal is given. Prerequisite: Dissertation I.

DISC 920 Continuing Dissertation (6 credits)

Students who have not completed the dissertation by the end of Dissertation II must register for Continuing Dissertation each term in order to receive faculty and administrative advice and support related to the dissertation. Prerequisite: Dissertation II.

DISC 1200 Directed Independent Study (3 credits or 4 credits)

Directed readings, research, and creative activities under the supervision of a faculty member. A contract for the independent study must be prepared by the student, include an assignment timeline, and be approved by the mentoring faculty member and the program director. NOTE: In special situations, a student may be granted permission to take a regular numbered course on an independent study basis. In such cases, the same conditions would apply but the course number would reflect the regular numbered course.

Ph.D. Program in Information Systems

This program offers a course of study leading to the degree of doctor of philosophy (Ph.D.) in information systems. It is offered in both cluster and institute formats that combine traditional and online instruction to provide professionals the opportunity to pursue graduate study while continuing to work in their current positions. The program is especially well suited to professionals working in areas such as information system planning, systems analysis and design, project management, information system administration, or software engineering. It provides technology-oriented professionals with the knowledge and ability to develop creative solutions to substantive real-world problems in information systems. Each student must complete eight courses, four projects, and a dissertation.

Program-Specific Admission Requirements (See pp. 28–29 for general admission requirements.)

This program is designed for the student with a master's degree in information systems, information science, computer science, or a related area. The applicant should satisfy graduate prerequisites or have equivalent experience in information systems, programming languages, database systems, systems analysis and design, data communications and networks, and computer architecture. Alternatively, SCIS master's students in information systems may apply for early admission into the Ph.D. program. (See the section General Information on Master's Degree Programs and description of individual master's programs for details.)

The Curriculum for the Ph.D. in Information Systems

The program requires 64 credit hours, of which 40 are for courses and 24 are for the dissertation. Most students take two core/elective courses and one project course per term during the first two years and register for the dissertation in the third year. Core/elective courses, project courses, and dissertation registrations are listed below:

Core Courses (three credits each)

All students **must** take the following four courses:

- DISS 710 Decision Support Systems
- DISS 720 Human–Computer Interaction
- DISS 725 The System Development Process
- DISS 750 Database Systems

All students **must** take one of the following courses:

- DISS 740 Telecommunications and Computer Networks
- DISS 791 Client–Server Computing

Elective Courses (three credits each) (Select three of these.)

- DISS 700 Research Methodology (must be taken concurrent with DISS 800)
- DISS 740 Telecommunications and Computer Networks (if not taken as a core course)
- DISS 755 Information Security
- DISS 770 Information Policy
- DISS 780 Multimedia Systems
- DISS 790 Special Topics in Information Systems (offered on various subjects)
- DISS 791 Client–Server Computing (if not taken as a core course)

Project Courses (four credits each) (Select four of these. Must be taken concurrent with, or following completion of, the corresponding core or elective course.)

- DISS 800 Project in Research Methodology (must be taken concurrent with DISS 705)
- DISS 810 Project in Decision Support Systems
- DISS 820 Project in Human–Computer Interaction
- DISS 825 Project in the System Development Process
- DISS 840 Project in Telecommunications and Computer Networks
- DISS 850 Project in Database Systems
- DISS 855 Project in Information Security
- DISS 870 Project in Information Policy
- DISS 880 Project in Multimedia Systems
- DISS 890 Project in Special Topics in Information Systems
- DISS 891 Project in Client–Server Computing

Dissertation Registrations

- DISS 910 Dissertation I (12 credits)
- DISS 915 Dissertation II (12 credits)
- DISS 920 Continuing Dissertation (6 credits)

Course Descriptions for the Ph.D. in Information Systems

DISS 700 Research Methodology (3 credits)

This course generally covers advanced topics in areas of current research interest in information systems. It presents an in-depth treatment of the research process from an experimental, developmental, and evaluative perspective. Techniques for planning and designing these types of research projects, as well as the methodologies for data collection, evaluation, and analysis are examined. Special emphasis is placed on the appropriate choice of methodologies for a variety of problem situations in both business and educational settings. Major emphasis is placed on the development of the proposal stage of research carried out in conjunction with the student's dissertation. Corequisite: DISS 800.

DISS 710 Decision Support Systems (3 credits)

Structure, functions, capabilities, and limitations of decision support systems (DSS) are discussed. Development tools and techniques for constructing DSS are investigated. The focus is on automatic support for decision making and organizational problem solving. Topics include decision theory, modeling and simulation, decision support system architecture, group decision support systems, knowledge-based expert systems, and intelligent systems.

DISS 720 Human-Computer Interaction (3 credits)

Issues relating to effective human-computer interaction are presented. Basic elements, procedures, tools, and environments contributing to the development of successful user interfaces are explored. User interface design principles, guidelines, and methodologies are reviewed. Other topics include the multidisciplinary dynamics of human-computer interaction as a field of study, current and projected developments in HCI research, and usability engineering.

DISS 725 The System Development Process (3 credits)

System life-cycle models, application development strategies, and feasibility assessment. Techniques, methods, and tools for the analysis and specification of information systems. Design principles including abstraction, modularity, encapsulation, information hiding, and reusability. Quality factors. Contemporary design methods and tools, including object-oriented design and function-oriented design. Study of the verification and validation process. Integration and acceptance testing. Reliability measurement. Software testing techniques. Test of concurrent and real-time systems. Techniques for managing hardware, software, communications, distributed applications, multimedia systems, and end-user computing. Approaches to project planning, managing change and innovation, and facilitating computer and communications security.

DISS 740 Telecommunications and Computer Networks (3 credits)

Advances and new applications in telecommunications and computer networks. Technical fundamentals, architecture, and design of computer networks. Strategies, tools, and techniques for network planning, implementation, management, maintenance, and security. Topics include ISDN, ATM, the OSI Model, transmission media, network operating systems, topologies, configurations, protocols, and performance characteristics. Trends in standardization, internetworking, and the development of local area networks (LANs), metropolitan area networks (MANs), wide area networks (WANs), intranets, and extranets.

DISS 750 Database Systems (3 credits)

Theory and principles of databases and their management. Design, implementation, and traditional and nontraditional applications of database management systems. Emphasis will be placed on current issues, future directions, and research topics.

DISS 755 Information Security (3 credits)

A study of security policies, models, and mechanisms for secrecy, integrity, and availability. Topics include threats to information systems, information security policies and management issues, the evaluation of secure information systems, encryption and authentication, network security, requirements analysis, and the practical problems that have to be solved in order to make those technologies workable in a networked environment. Emphasis on current issues, future directions, and research areas.

DISS 770 Information Policy (3 credits)

Information technology's dramatic global impact on society, government, and the economy has given rise to complex legal, regulatory, and policy issues. This course explores issues ranging from the consequences of information commodification to the impact of privacy concerns, e-commerce, information ownership (patents/copyrights/trademarks), social equity, crime, free speech, telecommunications, national security, international trade, etc. All have immediate relevance to the IT workplace. While U.S. policy issues serve as the framework for the course, the U.S. experience is compared and contrasted to policy developments throughout the world.

DISS 780 Multimedia Systems (3 credits)

Advanced systems covering theoretical and practical issues in designing multimedia systems. Topics include introduction to multimedia systems, compression techniques, synchronization, user interface issues, storage, video indexing and retrieval techniques, operating system support for digital audio and video, as well as network and transport protocols for multimedia. An emphasis will be placed on current design issues, research topics, software implementation, and discussion of future directions.

DISS 790 Special Topics in Information Systems (3 credits)

Covers advanced topics in areas of current research interest in information systems. May include topics such as client-server computing, distributed database systems, advanced computer graphics, object-oriented technology, the integration of networks and operating systems, ATM-based networks (asynchronous transfer mode), computer and network security, and parallel computation. Topics will vary depending on student and faculty interest.

DISS 791 Client-Server Computing (3 credits)

Emphasis on the information systems approach to client-server and distributed systems analysis, design, and management. The theory behind each component will be presented while exploring the impact it has on the business of managing information. Topics include the components of client-server and distributed systems architecture, operating systems, networking, interprocess communication, user interface, middleware, distributed objects, security, and the software development process. The role of standards in client-server and distributed systems development is discussed, including a detailed study of protocols. Also included are the various relationships between client-server computing and business process reengineering, workflow automation, and groupware. Migration from legacy systems is considered along with project development and management.

DISS 800 Project in Research Methodology (4 credits)

Focuses on the collection and analysis of data collected from experimental, developmental, and evaluative studies. Emphasis will be placed on the application of tools and techniques appropriate to the scenario and data type collected. The logical development of decisions based on the data analysis in terms of predefined hypotheses and/or project goals and objectives will be discussed. Major emphasis is placed on the development of the report stage of research. Corequisite: DISS 700.

DISS 810 Project in Decision Support Systems (4 credits)

Completion of a research paper or project in the area of decision support systems. Some topics of current interest include comparisons of decision support aids, the relationship between decision support systems and expert systems, DSS hardware and software, group DSS, distributed DSS and data communications, and human problem solving through DSS.

DISS 820 Project in Human-Computer Interaction (4 credits)

Students produce a research paper or project on a current topic in HCI. Some topics of interest include interface quality and evaluation, computer system and computer interface architecture, Internet-based user interface design issues, legal and ethical aspects of computing, speech interfaces, and computer-supported cooperative work.

DISS 825 Project in the System Development Process (4 credits)

Students pursue a research study, project, or implementation in the system development process.

DISS 840 Project in Telecommunications and Computer Networks (4 credits)

Students pursue a research study, project, or implementation in computer networks and telecommunications.

DISS 850 Project in Database Systems (4 credits)

Students pursue a research study on a current topic in database systems or complete a database-oriented development project. Some areas of current interest include object-oriented database systems, extended relational DBMS, federated or heterogeneous database systems, high-performance parallel database systems, and advanced conceptual logic database modeling.

DISS 855 Project in Information Security (4 credits)

Students pursue a research project or implementation on a current topic in information security; security-related applications and systems, vulnerability analysis, information security policies and management issues, security audits, and secure e-commerce.

DISS 870 Project in Information Policy (4 credits)

Students pursue a research study, project, or implementation in information policy.

DISS 880 Project in Multimedia Systems (4 credits)

Students pursue a research study or project on a current topic in multimedia systems. Some areas of current interest include design and implementation of interactive multimedia applications including interactive television (e.g., video-on-demand, home shopping, voting, and games), hypermedia systems, digital signal processing, network architectures and protocols, multimedia authoring, and videoconferencing and groupware.

DISS 890 Project in Special Topics in Information Systems (4 credits)

Students pursue a research study, project, or implementation in special topics in information systems.

DISS 891 Project in Client-Server Computing (4 credits)

Completion of a research paper or project in Client-Server/Distributed Systems. Some topics of current interest include distributed object technology, QoS middleware, operating systems, information systems management, and groupware.

DISS 910 Dissertation I (12 credits)

The student develops a framework within which doctoral research will be conducted and offers evidence of qualifications to pursue the research. Prerequisite: Satisfactory completion of all course work.

DISS 915 Dissertation II (12 credits)

Concepts and theories underlying the student's doctoral research are articulated, the problem is clearly stated, specific, measurable goals are specified, a thorough literature review is presented, the methods of conducting the research are delineated, and a strategy to achieve the goal is given. Prerequisite: Dissertation I.

DISS 920 Continuing Dissertation (6 credits)

Students who have not completed the dissertation by the end of Dissertation II must register for Continuing Dissertation each term in order to receive faculty and administrative advice and support related to the dissertation. Prerequisite: Dissertation II.

DISS 1200 Directed Independent Study (3 credits or 4 credits)

Involves readings, research, and projects under the supervision of a faculty member. A contract for independent study must be prepared by the student, include an assignment timeline, and be approved by the mentoring faculty member and the program director. NOTE: In special situations, a student may be granted permission to take a regular numbered course on an independent study basis. In such cases, the same conditions would apply but the course number would reflect the regular numbered course.

Faculty and Staff of the School of Computer and Information Sciences

The Faculty

Gertrude W. Abramson, Ed.D., Columbia University. Professor. Computer-supported education, hypermedia/multimedia, instructional systems design and development, distance learning, instruction delivery systems.

James Cannady, Ph.D., Nova Southeastern University. Assistant Professor. Information security, artificial neural networks, distributed computing, machine learning, artificial intelligence.

Maxine S. Cohen, Ph.D., State University of New York at Binghamton. Associate Professor. Human-computer interaction, multimedia, usability engineering, database systems, distance education.

Laurie P. Dringus, Ph.D., Nova Southeastern University. Associate Professor. Human-computer interaction, group support systems, usability engineering, learning theory, distance learning.

Timothy J. Ellis, Ph.D., Nova Southeastern University. Assistant Professor. Multimedia, distance education, the Internet as a tool for education and commerce, adult education, networks and electronic communication.

George K. Fornshell, Ph.D., Nova Southeastern University. Associate Professor. Instructional systems development, multimedia, authoring systems, human factors, distance education.

William L. Hafner, Ph.D., Nova Southeastern University. Assistant Professor. Human-computer interaction, data warehousing, information storage and retrieval, computer security, artificial intelligence.

William M. Hartman, Ph.D., Nova Southeastern University. Lecturer. Software engineering, data communications, computer networks, decision support systems, mathematics in computing.

Michael J. Laszlo, Ph.D., Princeton University. Associate Professor. Data structures and algorithms, software engineering, programming, computer graphics.

Jacques Levin, Ph.D., University of Grenoble. Professor. Database management, modeling, distance education, decision support systems, numerical analysis.

Edward Lieblein, Ph.D., University of Pennsylvania. Professor and Dean. Software engineering, object-oriented design, programming languages, automata theory.

Marlyn Kemper Littman, Ph.D., Nova Southeastern University. Professor. Computer networks, ATM, wirefree and wire-based communications, network security, distance learning.

Frank Mitropoulos, M.S., Nova Southeastern University. Instructor. Programming languages, data structures, software engineering, object-oriented design, C, C++, Java.

Sumitra Mukherjee, Ph.D., Carnegie Mellon University. Associate Professor. Database, decision support systems, information systems, network security, artificial intelligence, telecommunications.

Paul Rendulic, Ed.D., Florida International University. Associate Professor. Research methodology and statistics, learning theory, program evaluation, and survey design, development, and analysis.

John Scigliano, Ed.D., University of Florida. Professor. Management information systems, client-server computing, project management, instruction delivery systems.

Greg Simco, Ph.D., Nova Southeastern University. Assistant Professor. Operating systems, data communications, computer networks, client-server computing, online learning environments, C++, Java.

Junping Sun, Ph.D., Wayne State University. Associate Professor. Database management systems, object-oriented database systems, artificial neural networks.

Steven R. Terrell, Ed.D., Florida International University. Professor. Research methodology and statistics, learning theory, distance education, computer-managed instruction.

Visiting and Adjunct Faculty

Anne Abate, Ph.D.	Phyllis Chasser, Ph.D.	Andre Folleco, Ph.D.	Lee Leitner, Ph.D.
Robert Lipton, Ph.D.	Richard Manning, Ph.D.	Ronald McFarland, Ph.D.	Terry McQueen, D.B.A.
David Metcalf II, Ph.D.	Steven Zink, Ph.D.		

Teaching Assistants

Mohamad Foustok, M.S.

The Administrative and Technical Staff

Admissions

Clare Singer, B.S., Director ext. 2003, singerc
Nancy Azoulay, B.S., Assistant Director ext. 2026, azoulayn
Richard North, Admissions Representative ext. 2002, rnorth1
Josette Davis, M.S., Admissions Representative ext. 2004, davisjos
Irene Stringer, Coordinator ext. 2001, stringer
Jeffrey Payanis, B.S., Coordinator ext. 2005, payanis
Cameran Morgan, B.S., Administrative Secretary ext. 2025, morganca
Diane Ocampo, Clerical Assistant ext. 2008, ocampod

Master's Program Office

Eric Ackerman, Ph.D., Director ext. 2063, esa
Kimberley Driscoll, M.S., Adviser ext. 2062, kimsd
Elizabeth Koenig, B.S., Adviser ext. 2061, koenige
Kristen Oldberg, Assistant to the Director ext. 2010, oldbergk
Lauren Piazza, Administrative Secretary ext. 2060, piazza

Doctoral Program Office

Diane King, Ph.D., Director ext. 2054, kingdi
Sharon Brown, B.A., Assistant Director ext. 2056, sharonb
Crystal Darville, Coordinator ext. 2053, darville
Sylvia Yepes, B.A., Coordinator ext. 2052, yepessil
Elizabeth Wardlaw, A.A., Administrative Secretary ext. 2050, ewardlaw

Network and Software Services

Mark Powell, B.S., Senior Coordinator ext. 2015, powelma
Will Ferri, B.S., Coordinator ext. 2014, ferriw
Theodore Leonard, A.A., Coordinator ext. 2016, theo

Dean's Office

Edward Lieblein, Ph.D., Dean ext. 2034, lieblein
Bellarmin Selvaraj, Ph.D., Director, Research and Planning ext. 2048, selvaraj
Candy L. Fish, M.S., Operations Manager and Executive Asst. to the Dean ext. 2034, fishc
L. Kathleen Bryan, Coordinator, Faculty Support ext. 2032, bryankat
Dawn Sawyers, B.S., Receptionist ext. 2031, sawyerda

Finance and Administration

Barbara Edge, M.S., Director ext. 2043, barb
Claudia Chong, Manager ext. 2041, chongc
Elizabeth Vayda, Coordinator ext. 2042, vaydab
Ramona Moussignac, Coordinator ext. 2044, woodsr
Raysa Andrade, Assistant to the Director ext. 2040, andrade

Provisions

The provisions set forth in this document are not to be regarded as an irrevocable contract between the student and Nova Southeastern University. Regulations and requirements, including tuition and fees, are necessarily subject to change without notice at any time at the discretion of the administration. The university further reserves the right to require a student to withdraw at any time, as well as the right to impose probation on any student whose conduct is unsatisfactory. Any admission on the basis of false statements or documents is void upon discovery of the fraud, and the student is not entitled to any credit for work that he or she may have done at the university. Upon dismissal or suspension from the university for cause, there will be no refund of tuition and fees. The balance due Nova Southeastern University will be considered receivable and will be collected.

A transcript of a student's academic record cannot be released until all of his or her accounts, academic and nonacademic, are paid.

Any Nova Southeastern University student has the right to inspect and review his or her educational record. The policy of the university is not to disclose personally identifiable information contained in a student's educational record without prior written consent from the student, except: to university officials, to officials of another school in which the student seeks enrollment, to authorized representatives of federal or state agencies, to accrediting organizations, to parents of dependent students, under judicial order, to parties in a health or safety emergency, or when verifying graduation with a particular degree.

A student has the right to petition Nova Southeastern University to amend or correct any part of his or her educational record that he or she believes to be inaccurate, misleading, or in violation of the privacy or other rights of students. If the university decides it will not amend or correct a student's record, the student has a right to a hearing to present evidence that the record is inaccurate, misleading, or in violation of the privacy or other rights of students.

If these rights are violated, a student may file a complaint with the Department of Education. A student may obtain a copy of the Educational Privacy Act policy by requesting it in writing from the Office of the University Registrar, Nova Southeastern University, 3301 College Avenue, Fort Lauderdale, Florida 33314-7796. A schedule of fees and a listing of the types and locations of educational records are contained in this policy.

Nova Southeastern University does not discriminate on the basis of disability, sex, race, religion, or national or ethnic origin in admission, access, or employment for any of its programs and activities. The university registrar and director of human resources have been designated as student and employee coordinators, respectively, to ensure compliance with the provisions of the applicable laws and regulations relative to nondiscrimination.

The school is authorized under federal law to enroll nonimmigrant alien students.

Policies Governing Student Relations

General

Nova Southeastern University has established specific policies, procedures, and guidelines defining its relationship with its students. The term "student" as used in this catalog defines the student, or parents of the student if the student qualifies as a dependent under the provisions of the Internal Revenue Code.

Institutional and Academic Information

Nova Southeastern University and its composite academic units periodically publish bulletins or catalogs describing the university and its academic programs. These bulletins are available to enrolled and prospective students through the various admissions offices associated with the academic units or from the Office of the University Registrar. Each academic unit, group of units, and/or the Office of the University Registrar maintain at least one full-time employee to assist all students in obtaining information.

International Students

International students who intend to reside in the United States and who are required to obtain an I-20 visa must be full-time, degree-seeking students and must attend the main campus in Fort Lauderdale, Florida. For further

information, contact the International Student Adviser, Nova Southeastern University, 3301 College Avenue, Fort Lauderdale, Florida 33314-7796, telephone: (954) 262-7240 or toll free 800-541-6682, ext. 7240.

Veterans' Benefits

Nova Southeastern University programs are approved for the training of veterans and other eligible persons by the Bureau of State Approval for Veterans' Training, Florida Department of Veterans' Affairs. Eligible veterans and veterans' dependents should contact the Office of the University Registrar, 3301 College Avenue, Fort Lauderdale, Florida 33314-7796, telephone (954) 262-7236 or toll free 800-541-6682, ext. 7236.

Notice of Nondiscrimination

Nova Southeastern University admits students of any race, color, sex, age, nondisqualifying disability, religion or creed, or national or ethnic origin to all the rights, privileges, programs, and activities generally accorded or made available to students at the school, and does not discriminate in administration of its educational policies, admissions policies, scholarship and loan programs, and athletic and other school-administered programs. The Office of the University Registrar is designated as the policy coordinator to ensure compliance with all federal, state, and local laws and regulations relative to nondiscrimination.

Americans with Disabilities Act

Nova Southeastern University complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. No qualified individual with a disability shall be excluded from participation in or be denied the benefits of the services, programs, or activities of the university, or be subjected to discrimination by reason of his or her disability. For additional information on the university ADA policy and obtaining reasonable accommodations, please contact the ADA coordinator of the applicable center or program.

Grievances

When questions about procedures, decisions, or judgments occur, program staff members are available for discussion and possible resolution of differences. Students may also have recourse to more formal avenues of appeal and redress. Grievance procedures are explained elsewhere in this catalog.

Student Publications

Nova Southeastern University, as publisher, bears the legal responsibility for the contents of student publications. In the delegation of editorial responsibility to students, the university provides sufficient editorial freedom for the student publications to maintain their integrity of purpose as vehicles of free inquiry and free expression in the Nova Southeastern University academic community.

The delegated editorial freedom of student editors and managers is subject to corollary responsibilities to be governed by the canons of responsible journalism, such as the avoidance of libel, indecency, undocumented allegations, attacks on personal integrity, and the techniques of harassment and innuendo.

As safeguards for the delegated editorial freedom of student publications, the following provisions are made:

1. The student press shall be free of censorship and advance approval of copy, and its editors and managers shall be free to develop their own editorial policies and news coverage.
2. Editors and managers of student publications shall be protected from arbitrary suspension and removal because of student, faculty, administrative, or public disapproval of editorial policy or content. Only for proper and stated causes shall editors and managers be subject to removal, and then by orderly and prescribed procedures.
3. All university-published and -financed student publications shall explicitly state on the editorial page that the opinions therein expressed are not necessarily those of Nova Southeastern University or of the student body.

Student Participation in University Governance

In furtherance of its commitment to teaching and learning, Nova Southeastern University encourages student participation in institutional decision making. Within each school or center, elected student government bodies provide vehicles for student expression of views and opinions on issues of institutional policy. Officers of the student

government are members of the President's Student Advisory Committee, which meets monthly with the president and appropriate senior administrative staff to discuss university matters of general interest to the student body. Additionally, students are regularly appointed to committees, task forces, and ad hoc groups dealing with issues of concern to students, including appointment to each self-study subcommittee.

Code of Student Conduct and Academic Responsibility

This code seeks to promote high standards of academic integrity by setting forth the responsibilities of students as members of the university community. Abiding by the code ensures a climate wherein all members of the university community can exercise their rights of membership.

Nova Southeastern University Statement of Academic Rights and Responsibilities

Nova Southeastern University, as a community of women and men, is committed to furthering scholarship, academic pursuits, and service to our society. As an institution, our purpose is to ensure all students an equal opportunity to fulfill their intellectual potential through pursuit of the highest standards of academic excellence.

Certain rights and obligations flow from membership in any academic community committed to such goals:

1. the rights of personal and intellectual freedom, which are fundamental to the idea of a university
2. scrupulous respect for the equal rights and dignity of others
3. dedication to the scholarly and educational purposes of the university and participation in promoting and ensuring the academic quality and credibility of the institution

Students are responsible for obtaining, learning, and observing the established university and center policies as listed in all official publications. In addition, students must comply with the legal and ethical standards of the institution as well as those of Broward County and the state of Florida. All members of the community should inform the appropriate official of any violation of conduct regulations.

A. Academic Standards

The university expects its students to manifest a commitment to academic integrity through rigid observance of standards for academic honesty. The academic honesty standards include:

1. Original Work. (See also the section Student Original Work.) Assignments such as course preparations, exams, texts, projects, term papers, dissertations, etc., must be the original work of the student. Original work may include the thoughts and words of another author but, if that is the case, those ideas or words must be indicated in a manner consistent with a university-recognized form and style manual.

Work is not original that has been submitted previously by the author or by anyone else for academic credit. Work is not original that has been copied or partially copied from any other source, including another student, unless such copying is acknowledged by the person submitting the work for the credit at the time the work is being submitted or unless copying, sharing, or joint authorship is an express part of the assignment. Exams and tests are original work when no unauthorized aid is given, received, or used prior to or during the course of the examination.

2. Referencing the Works of Another Author. All academic work submitted for credit or as partial fulfillment of course requirements must adhere to each center's specific accepted reference manuals and rules of documentation. Standards of scholarship require that proper acknowledgment be given by the writer when the thoughts and words of another author are used. Students must acquire a style manual approved by their center and become familiar with accepted scholarly and editorial practice in their program. Students' work must comport with the adopted citation manual for their particular center.

At Nova Southeastern University, it is plagiarism to represent another person's work, words, or ideas as one's own without use of a center-recognized method of citation. Deviating from center standards (A) (1) or (A) (2) is considered plagiarism at Nova Southeastern University.

3. Tendering of Information. All academic work must be the original work of the student. Giving or allowing one's work to be copied, giving out exam questions or answers, or releasing or selling term papers is prohibited.

4. Acts Prohibited. Students should avoid any impropriety or the appearance thereof, in taking examinations or completing work in pursuance of their educational goals.

Violations of academic responsibility include, but are not limited to:

- plagiarism
- any form of cheating
- conspiracy to commit academic dishonesty
- misrepresentation
- bribery in an attempt to gain an academic advantage
- forging or altering documents or credentials
- knowingly furnishing false information to the institution

5. Additional Matters of Ethical Concern. Where circumstances are such as to place students in positions of power over university personnel, inside or outside the institution, students should avoid any reasonable suspicion that they have used that power for personal benefit or in a capricious manner.

B. Conduct Standards

1. Students should not interfere with the rights, safety, or health of members of the university community nor interfere with other students' right to learn. Students are expected to abide by all university, center, and program rules and regulations and all local, state, and federal laws. Violations of conduct standards include, but are not limited to:

- theft
- vandalism
- disruptive behavior
- possession or use of firearms, fireworks, explosives, or other dangerous substances or items
- possession, transfer, sale, or use of illicit drugs
- appearance in class or on campus under the apparent influence of alcohol or illicit drugs or chemicals
- violations of housing regulations
- any act or conspiracy to commit an act which is harassing or abusive or which invades an individual's right to privacy, including, but not limited to, sexual harassment and abuse against members of a particular racial, ethnic, religious, or cultural group
- threats of or actual damage to property or physical harm to others
- failure to pay tuition and fees in a timely manner

Furthermore, Nova Southeastern University prohibits any activity that may be construed as hazing. ("Hazing" is defined as: any action or situation which recklessly or intentionally endangers the mental or physical health or safety of a student for the purpose of initiation or admission into or affiliation with any organization operating under the sanction of a university).

2. Students must have authorization from the university to have access to university documents, data, programs, and other types of information and information systems. Any use of the above without authorization is prohibited.

C. Supplementary Standards

Students are expected to comply with the legal and ethical standards of this institution and those of their chosen field of study, including the code of ethics for computer usage. The university and each center or program may prescribe additional standards for student conduct as would comport with the letter and spirit of this code.

D. Violations

Any violation(s) of any of the academic standards, conduct standards, or supplementary standards may result in a complaint being filed against a student to enforce the Code of Student Conduct and Academic Responsibility. Deans or directors may, in their discretion, immediately suspend students pending a hearing on charges of academic conduct or supplementary standard violations. Any student found guilty of a violation of the academic, conduct, or supplementary standards will be subject to disciplinary action, including expulsion from the university.

Student Code of Computer Ethics

Student users of Nova Southeastern University's computer systems are subject to all applicable federal, state, and international computer laws. A copy of the Florida Computer Crimes Act and referenced Florida State Statutes may be examined online or in a student's academic program office.

Nova Southeastern University provides computer systems with access to hardware, software, and networks to enhance academic experience. Ethical conduct by students in the use of this technology is the same as in all other areas of university life, and it is of equal importance. All students are expected to abide by the Nova Southeastern University Code of Student Conduct and Academic Responsibility.

Policy on Acceptable Use of Computing Resources

This policy provides guidelines for the appropriate and inappropriate use of the computing resources of Nova Southeastern University. It applies to all users of the university's computing resources, including students, faculty members, staff, alumni, and guests of the university. Computing resources include all computers, related equipment, software, data, and local area networks for which the university is responsible, as well as networks throughout the world to which the university provides computer access.

The computing resources of Nova Southeastern University are intended to be used for its programs of instruction and research and to conduct the legitimate business of the university. All users must have proper authorization for the use of the university's computing resources. Users are responsible for seeing that these computing resources are used in an effective, ethical, and legal manner. Users must apply standards of normal academic and professional ethics and considerate conduct to their use of the university's computing resources. Users must be aware of the legal and moral responsibility for ethical conduct in the use of computing resources. Users have a responsibility not to abuse the network and resources, and to respect the privacy, copyrights, and intellectual property rights of others.

In addition to the policy contained herein, usage must be in accordance with applicable university policies (see "Related Policies" listed elsewhere in this policy) and applicable state and federal laws. Among the more important laws are the Florida Computer Crimes Act, the Federal Computer Abuse Amendment Act 1994, the Federal Electronic Communications Privacy Act, and the U.S. Copyright Act. Copies of these laws and the NSU copyright policy may be examined in the Office of Academic Affairs.

Policy violations generally fall into five categories that involve the use of computing resources:

1. for purposes other than the university's programs of instruction and research and the legitimate business of the university
2. to harass, threaten, or otherwise cause harm to specific individuals or classes of individuals
3. to impede, interfere with, impair, or otherwise cause harm to the activities of others
4. to download, post, or install to university computers, or transport across university networks, material that is illegal, proprietary, in violation of license agreements, in violation of copyrights, in violation of university contracts, or otherwise damaging to the institution
5. to recklessly or maliciously interfere with or damage computer or network resources or computer data, files, or other information

Examples (not a comprehensive list) of policy violations related to the above five categories include:

- using computer resources for personal reasons
- sending email on matters not concerning the legitimate business of the university
- sending an individual or group repeated and unwanted (harassing) email or using email to threaten someone

- accessing, or attempting to access, another individual's data or information without proper authorization (e.g., using another's computing account and password to look at his/her personal information)
- propagating electronic chain mail, pyramid schemes, or sending forged or falsified email
- obtaining, possessing, using, or attempting to use someone else's password, regardless of how the password was obtained
- copying a graphical image from a Web site without permission
- posting a university site-licensed program to a public bulletin board
- using illegally obtained licensed data/software, or using licensed data/software in violation of its license or purchase agreement
- releasing a virus, worm, or other program that damages or otherwise harms a system or network
- preventing others from accessing services
- attempting to tamper with or obstruct the operation of NSU's computer systems or networks
- using or attempting to use NSU's computer systems or networks as a means for the unauthorized access to computer systems or networks outside the university
- viewing, distributing, downloading, posting, or transporting child, or any, pornography via the Web, including sexually explicit material for personal use that is not required for educational purposes
- using university resources for unauthorized purposes (e.g., using personal computers connected to the campus network to set up Web servers for illegal, commercial, or profit-making purposes)
- violating federal copyright laws or the NSU copyright policy

Inappropriate conduct and violations of this policy will be addressed by the appropriate procedures and agents (e.g., the Office of the Dean, the Office of the Vice President for Academic Affairs, or the Office of Human Resources) depending on the individual's affiliation to the university. In cases where a user violates any of the terms of this policy, the university may, in addition to other remedies, temporarily or permanently deny access to any and all NSU computing resources, and appropriate disciplinary actions may be taken, up to and including dismissal.

RELATED POLICIES:

Student-Related:	Code of Student Conduct and Academic Responsibility (in SCIS Graduate Catalog)
Faculty-Related:	Faculty Policy Manual
Staff-Related:	Employee Handbook
General Policies:	Copyright and Patent Policy Computing Account Security Agreement Policy on the Use of Material in Web Pages

Policy on the Use of Material in Web Pages

You should assume that materials you find on the Web are protected by copyright law unless a disclaimer or waiver is expressly stated. You may not place such materials on your Web page(s) without the expressed permission of the author/creator of the work or owner of the copyright. (Examples: course materials, graphic images from other Web pages, articles, video, audio, photographs, software, or images scanned from published works.) You may include short quotations of text, provided you identify in an obvious way (e.g., in a footnote) the author and the work from which the quotation is taken. If you want to include something from another Web page in one of your Web pages, then link to it rather than copy it. The occurrence of plagiarism on your Web page is subject to the same sanctions that apply to plagiarism in any other media. Images in the NSU graphics repository may be used on Web pages without permission. Clip art images provided with licensed software may be used if permitted in the license agreement for such software. You may not place any pictures or videos of people on a Web page without the expressed permission of the people in the picture or video. Every person has a right to privacy, which includes the right to restrict the use of his/her own image. In addition, the picture or video may be protected by copyright.

If you have received formal permission to use material owned by another, place the following notice on the page that contains the copied material:

Copyright <year of copyright> by <name of the copyright owner>. Used with permission.

Although a copyright notice is not required to assert your rights to your own original material, you may want to include a minimal notice of copyright in a Web page footer when appropriate. When used, the copyright notice should appear as follows*:

Individual Web pages:

Copyright <year of copyright> <your name>. All Rights Reserved.

Organization Web pages (examples):

Copyright 2000 Cornell Law Review. All Rights Reserved.

Copyright 1997 Nova Southeastern University. All Rights Reserved.

Copyright 1999 School of Computer and Information Sciences. All Rights Reserved.

Related policies that also apply to Web pages are as follows:

1. General Policies:

Policy on Acceptable Use of Computing Resources

Copyright and Patent Policy

Computing Account Security Agreement

2. Student-related: Code of Student Conduct and Academic Responsibility (in SCIS Graduate Catalog)

3. Faculty/Administrator-related: Faculty/Academic Administrator Policy Manual

4. Staff-related: The NSU Employee Handbook

*The symbol © may be used in lieu of "copyright" or immediately after it.

Privacy of Records

Nova Southeastern University maintains a system of records that includes application forms, admission test scores, and transcripts of students' previous academic records and performance while in residence. These records are available for review by present and former students upon written request to the Office of the University Registrar. However, the registrar will not release transcripts of students' academic records until all accounts, both academic and nonacademic, have been paid.

The law limits access by and disclosure to a third party. Such access is given only upon consent of the student or if required by law, except for the following information, which may be released as directory information: (a) student's name, (b) address, (c) dates of attendance, (d) degree and awards received. Requests for such information must be submitted in writing to the university. The university reserves the right to refuse the above information if the reason for the request is not considered to be a sufficient need to know.

Any student or parent not wishing to have this information disclosed should notify the Office of the University Registrar in writing prior to September 1 of the relevant school year.

A person does not have the right of access to educational records until he or she has been admitted to and has actually begun attending Nova Southeastern University. There is no prohibition from disclosing such information to the parents of students who are listed on their parents' federal income tax forms.

Parents or eligible students will be provided a hearing by the university if they wish to challenge the content of the record. If they are still not satisfied, the parents or eligible students may add explanatory or rebuttal matter to the record. If the students or parents are denied access to a hearing or if the records are alleged to have been illegally disclosed to a third party, the students or parents may file a complaint with the U.S. Department of Education.

Reservation of Power

Nova Southeastern University reserves the right to amend, modify, add to, or delete its rules, policies, and procedures affecting its institutional relationship with students as deemed necessary by the administration. Any such amendment, modification, addition, or deletion shall not be considered a violation of the relationship between the university and the student. Such right includes modification to academic requirements, curriculum, tuition, and/or fees when in the judgment of the administration such changes are required in the exercise of its educational responsibility.

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