College of Engineering and Computing Course Catalogs

NSU Course Catalogs and Course Descriptions

1993

Doctoral Program Computing Technology in Education

Nova Southeastern University

✛ NOVA UNIVERSITY
CENTER FOR COMPUTER AND INFORMATION SCIENCES

Doctoral Program

Computing Technology in Education

Specializations

Computer Education
Computer Systems in Education
Training and Learning

1993-1994

3301 College Avenue
Fort Lauderdale, Florida 33314
1-800-986-2247
305-475-7352

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The University

Nova University is a fully accredited, independent institution in its third decade of operation. The University offers courses of study leading to the bachelor's, master's, educational specialist, and doctoral degrees in a variety of fields. Nova's graduate programs are offered through centers that provide the following concentrations: business and entrepreneurship, computer and information sciences, education, law, oceanography, phychology, social and systemic studies, and humanities and arts. The law center is accredited by the American Bar Association and the Association of American Law Schools, and the psychology center is accredited by the American Psychological Association. In addition, Nova College offers undergraduate education, and the University School, a demonstration school, serves children from preschool through high school. Currently there are more than 11,000 students enrolled throughout all programs and more than 33,000 Nova graduates who work and contribute with distinction to their businesses and professions worldwide. From its beginning, the University has distinguished itself by its innovative outlook, its unique programs that provide both traditional and nontraditional choices in educational programs, and its research in many fields. Nova University's centers and programs share a common mission--to educate students for leadership roles in a variety of professions. Students develop a sense of professional ethics and responsibility and learn to appreciate the role of the professional as a key individual in society.

Nova programs stress the critical relationship between theory and practice; they reinforce and test classroom learning with applied research and industrial practice to provide an expanded academic experience. Nova University is committed to the idea that education should not be timebound or placebound. It extends its programs and resources to provide educational opportunities to working professionals nationwide. Many of Nova's programs are enhanced through a variety of technologies, including telecommunications.

Through its educational offerings, research projects, and programs of public service, the University encourages the free exchange of ideas and the search for knowledge that is the cornerstone of the academic tradition.

Nova University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award bachelor's, master's, educational specialist, and doctoral degrees. Nova University admits students of any race, sex, age, color, nondisqualifying handicap, religion or creed, national or ethnic origin.

The Center for Computer and Information Sciences

Nova's Center for Computer and Information Sciences (CCIS) has become a major force in educational innovation. It is distinguished by its ability to offer both traditional and nontraditional choices in educational programs and formats that enable the professional to pursue an advanced degree without career interruption.

Consistent with Nova's philosophy and mission, programs of the Center are designed to provide breadth and depth of knowledge as the basis for a quality education that keeps pace with rapidly changing professional and academic needs. Research activities stress a blend of theory and practice in an applied setting. Today, CCIS faculty and staff serve the educational needs of undergraduate and graduate students throughout the United States via a range of programs and specializations. Degrees offered by the Center include the B.S., M.S., Ph.D., Ed.D., and Sc.D.

CCIS Graduate Program Offerings

Master's Degree Programs

Computer Science (M.S.)

Computing Technology in Education (M.S.)
Specializations:

Computer Education

Training and Learning

Computer Information Systems (M.S.)
Specializations:

Computer Information Systems

Management Information Systems

Doctoral Degree Programs

Computer Information Systems (Ph.D. or Sc.D.)

Computer Science (Ph.D. or Sc.D.)

Computing Technology in Education (Ph.D., Ed.D., or Sc.D.)
Specializations:

Computer Education

Computing Systems in Education

Training and Learning

Information Systems and Science (Ph.D. or Sc.D.)
Specializations:

Information Systems

Information Science

Doctoral Program in Computing Technology in Education

The Center for Computer and Information Sciences (CCIS) offers a Doctoral Program in Computing Technology in Education with three areas of specialization, each with the opportunity to earn the Ph.D., Ed.D., or Sc.D. degree. The program specializations are designed to give students in-depth knowledge of their field of interest. Areas of specialization are:

- **Computer Education**
- **Computer Systems in Education**
- **Training and Learning**

The specializations in this program are designed to meet the specific needs of working professionals in education and training including teachers, professors, educational administrators, educational systems administrators, and trainers working in both public and private sectors. Throughout the program, educational theory, research, and practice are blended into a learning experience that emphasizes practical applications to real-world problems. Course work, specialized projects, and research activities under faculty guidance serve as an expanded learning environment for students.

The formats of this program give professionals the opportunity to pursue a systematic plan of graduate study while continuing to work in their current positions. This program combines a carefully balanced mixture of traditional and non-traditional instruction. Students sit for instruction at quarterly cluster meetings or twice-yearly institutes. Students also participate in a range of computer-based activities that facilitate regular interaction with faculty, classmates, and colleagues including Nova's real-time Electronic Classroom sessions, online real-time computer discussions and conferences, electronic submission of completed assignments for review by faculty, electronic-mail communications, Nova's electronic library, Nova's information retrieval service, and online academic advisement sessions. The Internet is also used extensively in support of student research and computer-mediated communication with experts and fellow students throughout the world.

During the first two years of the program, the student completes seven or eight core courses (depending on specialization) and four projects. Either the MARP or the dissertation is the focus of the third and final year of this planned three-year program.

Schedules are shown on the following pages for the specialization areas for students that start in January 1994, however, students may begin the program at the start of any six-month semester.

While the schedules show registrations for MARP or Dissertation in the third year, students are encouraged to start working with faculty on these activities whenever feasible during the three-year schedule. Students are free to select any four of the subject areas in which to do projects (but computer education students must do the project in research and statistics).

Specialization in Computer Education (CED)

This specialization is designed for educators at all levels and concentrates on the use computers and other forms of advanced technology to improve cognition. Computers have become pervasive in the educational process, making this specialization of interest to educators in disciplines outside of computer science, for example: english, mathematics, history and the social sciences, biology, and chemistry. Educational administrators would also benefit from this program, since administration and decision-making rely heavily on computing technology. This specialization concentrates on the following study areas:

1. Application of Authoring Systems to Curriculum Design
2. Computer Application of Learning Theory
3. Computer-based Research and Statistics
4. Human-Computer Interaction
5. Multimedia and Emerging Technologies
6. Courseware and Educational Programming Languages
7. Telecommunications and Computer Networks

Computer Education Schedule for Students Starting in Winter 1994

YEAR ONE			TOTALS
January 1994	Authoring Systems	3 credits	
	Learning Theory	3 credits	
	Project 1	4 credits	10 credits
July 1994	Research & Statistics	3 credits	
	Project 2 (res/stat)	4 credits	7 credits
YEAR TWO			
January 1995	Human-Comp. Inter.	3 credits	
	Multimedia & E.T.	4 credits	10 credits
	Project 3		
July 1995	Courseware &Prog'g	3 credits	
	Telecom/Networks	3 credits	
	Project 4	4 credits	10 credits
YEAR THREE			
January 1996	Dissertation or		
	MARP Proposal	12 credits	12 credits
July 1996	Dissertation or		
	MARP Report	12 credits	12 credits
			61 credits

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Specialization in Computing Systems Education (CSE)

This specialization is designed for educators at all levels and concentrates on the development, production, implementation, management, and evaluation of computing systems that support the educational process. It is designed to meet the needs of systems administrators working in an educational environment. Educational professionals would also be interested in this program due to the increasing dominance of local area networks and multimedia platforms in American education. This specialization concentrates on the following study areas:

1. Telecommunications
2. Computer Networks
3. Artificial Intelligence and Expert Systems
4. Management of Computing Resources
5. Multimedia and Emerging Technologies
6. Human-Computer Interaction
7. Systems Analysis for Instructional Computing Systems
8. Applied Database Management Systems

CSE Schedule for Students Starting in Winter 1994

YEAR ONE			TOTALS
January 1994	Telecommunications	3 credits	
	Computer Networks	3 credits	
	Project 1	4 credits	10 credits
July 1994	AI & Expert Systems	3 credits	
	Mgt Comp Resources	3 credits	
	Project 2	4 credits	10 credits
YEAR TWO			
January 1995	Human-Comp. Inter.	3 credits	
	Multimedia & E.T.	4 credits	
	Project 3		10 credits
July 1995	Systems Analysis	3 credits	
	Applied Database	3 credits	
	Project 4	4 credits	10 credits
YEAR THREE			
January 1996	Dissertation or		
	MARP Proposal	12 credits	12 credits
July 1996	Dissertation or		
	MARP Report	12 credits	12 credits
			64 credits

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Specialization in Training and Learning (TL)

This specialization addresses the role of computing and other forms of high technology in training processes in the commercial/industrial setting. Training and learning has increased in importance as organizations rely increasingly on training departments to continually educate employees to take advantage of rapid developments in technology. Computer-based training methods offer an effective means to accommodate technological growth and increase the productivity of employees. This specialization concentrates on the following areas:

1. Application of Authoring Systems to Curriculum Design
2. Computer Application of Learning Theory
3. Artificial Intelligence and Expert Systems
4. Management of Computing Resources
5. Human-Computer Interaction
6. Multimedia and Emerging Technologies
7. Courseware and Educational Programming Languages
8. Telecommunications and Computer Networks

Training & Learning Schedule for Students Starting in Winter 1994

YEAR ONE			TOTALS
January 1994	Authoring Systems	3 credits	
	Learning Theory	3 credits	
	Project 1	4 credits	10 credits
July 1994	AI & Expert Systems	3 credits	
	Mgt Comp Resources	3 credits	
	Project 2	4 credits	10 credits
YEAR TWO			
January 1995	Human-Comp. Inter.	3 credits	
	Multimedia & E.T.	4 credits	
	Project 3		10 credits
July 1995	Telecom/Networks	3 credits	
	Systems Analysis	3 credits	
	Project 4	4 credits	10 credits
YEAR THREE			
January 1996	Dissertation or		
	MARP Proposal	12 credits	12 credits
July 1996	Dissertation or		
	MARP Report	12 credits	12 credits
			64 credits

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Program Formats

This program contains six semesters, with each semester lasting six months. It is designed so that it can be completed in three years without interrupting the student's professional career. This program combines a carefully balanced mixture of traditional and non-traditional instruction. The student must choose one of two formats: *cluster* or *institute*. Each format includes group meetings and computer-based activities.

Students choosing the *cluster format* attend four cluster meetings per year. Cluster meetings are held quarterly over an extended weekend (Friday, Saturday, and half-day Sunday), at Nova University in Fort Lauderdale, Florida. Students choosing the *institute format* attend institutes twice a year at Nova University in Fort Lauderdale, Florida. Institutes are week-long meetings, usually held in January and July.

Cluster and institute meetings bring together students, faculty, staff, and nationally recognized lecturers for participation in lectures, workshops, training, discussions, and dissertation counseling. Courses are taught during these meetings by a renowned faculty and distinguished professionals who generally hold the doctoral degree. These courses are intense and demanding.

In the months between meetings, students study the course material, complete assignments, read the literature, prepare project proposals, complete research papers and applied research projects, and participate in a range of computer-based activities that facilitate frequent interaction with faculty, classmates, and colleagues.

Computer-based activities include Nova's real-time Electronic Classroom sessions, online real-time computer discussions and conferences, electronic submission of completed assignments for review by faculty, electronic-mail communications, Nova's electronic library, Nova's information retrieval service, and online academic advisement sessions. The Internet is also used extensively in support of student research and computer-mediated communication with experts and fellow students throughout the world.

Costs for clusters, institutes and computer-based activities are included as part of the student's tuition. Lodging and travel expenses related to clusters and institutes, however, are the responsibility of the student.

Equipment and Computing Resources

CCIS doctoral students are given computer accounts and are encouraged to use Nova's computing resources. There is a wealth of information and tools available to the online community and these features greatly enhance the study and research potential of the student. Students may gain access to these resources from computers located in laboratories on the campus, and may also gain access from locations distant to the campus, e.g., their homes. For remote access, either an IBM-compatible PC or an Apple/Macintosh computer is required as well as a modem. A 2400 baud modem is recommended, however a 1200 baud modem is sufficient. Students in this program must have remote access in order to participate in computer-based activities.

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Students in the local Fort Lauderdale area are encouraged to access the host computer by direct dial to 452-3300. Students away from the local Fort Lauderdale area can avoid a long-distance telephone charge by using the Tymnet data communication network. Over 85% of all CCIS students have access to Tymnet as a local phone call. (Call Tymnet at 1-800-336-0149 to determine the local Tymnet number.) Connection to Nova's host computer via Tymnet is restricted to non-business hours: nights, weekends, and declared holidays.

A few students may not have local Tymnet access. These students will have to find an alternate means of connecting to Nova's host computer, including: long-distance direct dial to Nova's host computer in Fort Lauderdale, Florida; out-of-state long distance connection to a Tymnet node; or access through the Internet. Many students are finding it effective to investigate local and commercial Internet opportunities, so that access to Nova's host computer is possible 24 hours a day.

Students who wish to explore local opportunities for free or low-cost Internet access are encouraged to subscribe to two online Usenet newsgroups: alt.internet.access.wanted and alt.internet.services. For detailed information on subscribing to these newsgroups students should consult the online manual by typing "man rn" when logging in to the Nova alpha computer.

There are no direct limits to online time for students in the CCIS. We encourage students to use their online time wisely, to conserve resources, but we do not regularly place prescribed limits on online time. Online time that has been excessive and for purposes other than those directly related to academics can result in a charge to the student of $15 US per hour. Students are notified on this issue before a charge for excessive hours is considered.

Four-Year Combined Master's/Doctoral Option

The combined master's and doctoral degree option offers the opportunity to earn the doctoral degree in a shorter time. Students interested in this option must first be accepted in the master of science program in computer information systems. Once students have completed eight courses (24 credits) in the master's program with a grade point average of at least 3.25, they may be accepted into the doctoral program. (Students also must fulfill all other doctoral admissions requirements).

Upon acceptance into the doctoral program and after completion of 12 credits in the doctoral program, the student is awarded the master of science degree. These 12 credits will also count toward the doctoral degree, thereby reducing the total time and cost to acquire the doctoral degree.

Degree Options and the Dissertation

The degrees granted in this program include:

- **Doctor of Philosophy (Ph.D.)**
- **Doctor of Science (Sc.D.)**
- **Doctor of Education (Ed.D.)**

Students who select the Ed.D. degree option take the same course work as students who select the Ph.D. or Sc.D. degree option. The difference between these degree options rests in the capstone activity of this doctoral program.

The **Major Applied Research Project (MARP)** is the capstone activity for students who select the Ed.D. degree option. The MARP is the main focus of the final year of study and is the most important requirement for the Ed.D. degree. The MARP is a practitioner's activity, where a real-world problem of significance is addressed in explicit detail. Many MARPs are project-oriented, although the classical research paradigm would also serve as a MARP-type project. At a minimum, the work should be original and should represent a significant extrapolation from a base of solid experience or knowledge in the area of specialization.

MARP results should be of sufficient strength to distill from the work a paper worthy of publication in a journal or conference proceedings in the area. Although such publication is not a requirement for completing the doctoral degree, students are strongly encouraged to submit their work for publication.

Students often devote six months to the MARP proposal and another six months for the MARP report. Nova has a 21 year history of supervision of MARPs. Many students use their MARPs as opportunities to advance their careers to new levels of importance.

The **Dissertation** is the capstone activity for students who select either the Ph.D. or the Sc.D. degree option. It is the main focus of the final year of study and is the most important requirement for the Ph.D. or Sc.D. degree. Each student is expected, with the help and approval of an advisor, to select an appropriate topic of sufficient scope to satisfy the requirements for the dissertation. At a minimum, the work should be original and should represent a significant extrapolation from a base of solid experience or knowledge in the area of specialization.

Dissertation results must, in a significant way, advance knowledge, improve professional practice and/or contribute to understanding in the field of computing technology in education. Dissertation results must be of sufficient strength to distill from the work a paper worthy of publication in a journal or conference proceedings in the area or to use the work as the basis for a textbook or monograph. Although such publication is not a requirement for completing the doctoral degree, students are strongly encouraged to submit their dissertation research work for publication.

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Students who favor the practitioner side of their profession tend to select the MARP, and students interested in the foundational aspects tend to select the dissertation. The decision between MARP and dissertation typically is made toward the end of course work when students begin to develop concrete ideas about their research paths.

MARPs, Dissertations, and Degree Options
Either the MARP or the dissertation may be chosen as the capstone activity for students in the Computing Technology in Education Program, independent of specialization. The choice is determined by the nature of the capstone activity: theoretical/foundational (dissertation) or practical (MARP).

Students following the dissertation path may select the Ph.D. or Sc.D. degree option at any time. The difference between the Ph.D. and Sc.D. degree option is a name difference only. The practice of allowing this option is found at other universities that award both degrees and is by no means unique to Nova University.

Admission Requirements
Applicants for the doctoral degree program must meet the following requirements:

1. Have a master's degree in a related field from a regionally accredited institution representing completion of course work that fulfills prerequisites for doctoral work in computing technology in education.
2. Submit official transcripts of all prior graduate and undergraduate work (must be sent directly from the institution to Nova University).
3. Have a graduate GPA of at least 3.25.
4. Submit a completed application with application fee.
5. Provide three letters of recommendation.
6. Have completed a master's level course or equivalent experience in applied statistics. (Not required for the specialization in Computer Education.)

At the option of Nova University, students may be admitted on a provisional basis pending completion of prerequisites.

Application Submission
It is recommended that applications be submitted three months prior to the intended start date. For example, for the February term, students should start submitting paperwork before the end of November. Students submitting applications later than this are advised to contact the program office by telephone as soon as possible to make arrangements. Copies of transcripts are acceptable for unofficial early review. Students applying late may be granted provisional acceptance pending completion of the application process.

Term Dates

Terms (semesters) are six months in length:

Semester one:	February 1 - July 31	(Institute is usually held in mid-January)
Semester two:	August 1 - January 31	(Institute is usually held in mid-July)

Tuition and Fees

Tuition (per year)	$6,300 per year
Application Fee (nonrefundable)	$40 non-refundable
Registration Fee (nonrefundable)	$30 non-refundable
Late Registration Fee (nonrefundable)	$50 non-refundable
Graduation Fee	$45

Note: Tuition and fees are subject to change. Textbooks are not included and must be purchased by the student. Students are responsible for their own lodging and travel expenses related to the clusters or institutes.

Tuition Payment Policy

Tuition is due in full at the time of registration. Tuition and fees may be satisfied with payment by cash, check, money order, credit card, or financial aid as authorized on an individual's official award letter. If their company allows direct billing, the student must attach a letter from his/her employer to the registration form that formally requests that billing be made directly to the student's employer.

Tuition Reimbursement by Employers (deferred payment)

Proof of eligibility must be provided at the time of registration. A student choosing this option will pay 50 percent of the total tuition at the time of registration, with the remaining 50 percent due five weeks after the registration period ends. A deferment fee of $50 must be paid at the time of registration.

Installment Plan

When registering, students may elect an installment payment plan. This plan requires three payments spread over 90 days. The first payment of 50 percent of the total tuition is due at the time of registration, 25 percent is due 60 days after registration, and the remaining 25 percent is due 90 days after registration. The charge for this option is $50 and postdated checks or credit card authorizations for installment must be submitted at the time of registration.

Change of Plans

If a student temporarily withdraws for a term this will naturally extend the length of the program. Students who miss an institute or cluster must make up courses at a future institute or cluster.

Time Limitation

Students in a doctoral degree program are expected to complete requirements for the degree within seven years from the date of their first registration.

Off-Campus Library Services

Off-Campus Library Services (OCLS) is as department of Nova University Libraries that provides off-campus students with most of the library services available on campus. Students may order books, request articles, search catalogs, search indexes, and even talk directly with a reference librarian. OCLS may be accessed in many different ways. Materials may be ordered by mail, FAX, or toll-free telephone. A voice mail answering machine is available 24 hours a day to take requests when the office is closed. You can also obtain many different services by accessing the Electronic Library through the campus UNIX system. Using a home computer and modem, just type "el" at the UNIX % prompt. This will give you full use of all of the OCLS services. If you don't have an account to access the UNIX system, contact the CCIS Program Office. There is no charge for most of these services. When books are borrowed, the student will have to pay a small charge for third-class (library rate) return postage to return the books. Most requests are filled on the first business day after they are received. All requests are sent out by first-class mail. Books are loaned to the student for one month. Periodical copies need not be returned. To contact OCLS by phone, call toll free (800) 541-6682.

Information Retrieval Services

The IRS does computer searches and is available to all students. The IRS has computer access to ERIC and more than 350 other databases, including many social and behavioral science databases, such as PsycInfo, Sociological Abstracts, and Books in Print. This is a valuable resource for assignments, projects, practicums, dissertations and is offered free of charge to all enrolled students. Students may contact the IRS online to request a literature search. The usercode is **irs**. For the online format that the IRS requires for a search, look in the eicbl menu online under the category **Information Retrieval Service.**

International Students

International Student Advising Service   (305) 370-5695 or (800) 541-6682
An international student applying to Nova University must (1) obtain a student (F) visa or an exchange visitor (J-1) visa (students are not permitted to study in the United States on a visitor (B-2) visa); (2) submit all secondary school and/or college-level transcripts (transcripts must be an official English language translation); (3) demonstrate the ability to meet all costs of his or her education without financial aid from Nova University; (4) purchase medical insurance (J-1 visas only); contact the international student advisor for further information concerning insurance; and (5) demonstrate proficiency in the English language with a minimum score of 550 on the Test of English as a Foreign Language (TOEFL) exam.

Veterans' Services and Benefits

Nova University's academic 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, or telephone (305) 370-5685 or (800) 541-6682, Ext. 5685.

Financial Aid Information

Nova University offers several programs of student financial aid in order to assist the greatest number of its students possible in meeting educational expenses. In order to qualify and remain eligible for financial aid, students must be accepted for admission in a University program; be eligible for continued enrollment; be a U.S. citizen or in the United States for other than a temporary purpose; and be making satisfactory academic progress toward a stated educational objective in accordance with the University's policy on satisfactory progress for financial aid recipients. For information, call (305) 475-7411 or (800) 541-6682, Ext. 7411

Travel Information

Nova University has its own full-service travel agency in the Rosenthal Student Center that can make reservations and issue airline tickets and rental cars. In addition, travel agents can also help make arrangements for trips and vacations. Nova's travel service accepts money orders and major credit cards. The travel staff can be reached at (305) 475-7522 or toll free (800) 541-6682.

Graduation Requirements

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

1. Admission as a degree-seeking candidate in one of the majors.

2. Completion of courses and an approved dissertation or MARP as specified in program documentation.

3. Attendance at all required cluster and 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 a graduation form at the time of registration for the final term of course work.

7. Fulfillment of all obligations to the library, the student's program, and the comptroller's office.

Commencement

A commencement ceremony is held once a year in early summer (usually in June) for all Nova University graduate students who have completed graduation requirements within the academic year. In order to participate, students must file a graduation application. There is an additional fee for cap and gown rental. Contact the Office of the University Registrar at (305) 475-7400 for additional information.

Grading Policy

Faculty will assign course grades for these programs according to the following system:

Grade	Quality Points
A	4.0
A-	3.7
B+	3.2
B	3.0
B-	2.7
C+	2.3
C	2.0
C-	1.7
F	0
I	Incomplete
W	Withdraw

Incomplete ("I")

A grade of Incomplete ("I") indicates that the student has not completed the course requirements and that the instructor has given the student additional time to do so. An "I" grade is not routinely assigned in courses, but only when there are mitigating circumstances to prevent completion of the course requirements. This grade may be assigned at the discretion of the instructor at the request of the student. Should the instructor choose to assign an "I," a contract must be completed and signed by both the instructor and the student with the original kept on record in the Program Office. This contract must contain an agreed completion date. If the work is not completed by that date, the "I" grade will be changed to "F".

Withdraw ("W")

A grade of Withdraw ("W") may be assigned when the student officially requests a withdrawal (in writing) from the course or project no later than one month prior to the end of the term. (Regarding refunds, see the paragraph below on Withdrawal Policy.)

Academic Standing

The grading policy requires students to maintain a cumulative grade point average of at least 3.0 for the duration of their chosen program. Failure to meet this requirement will result either in academic probation or dismissal as detailed below.

Probation and Dismissal Policy

A student with a grade point average greater than 2.5 but less than 3.0 for the first four completed courses in their program will be placed on academic probation. Such students are counseled as to the number of courses they may take in order to facilitate raising of their averages. No more than four additional courses may be taken without achieving an overall grade point average of at least 3.0. Failure to achieve this grade point average at that time will result in dismissal from the program.

A student whose grade point average for the first four completed courses is 2.5 or lower will be dismissed from the program. A student who receives two failing grades will be dismissed from the program.

Students dismissed from the program may petition for readmission after one academic year. The records of such students will be examined by the Dean of the Center for Computer and Information Sciences and the Admissions Committee. If approval for readmission is granted, only those courses with grades of "B" or better will be applicable to the doctoral program.

Withdrawal Policy

Students who wish to withdraw from the program--either temporarily or permanently-- must inform the Program Office in writing to be eligible for allowable refunds. Students who give written notice of their intent to withdraw prior to a course will not be assessed for subsequent courses until they are formally readmitted. Students who withdraw are subject to prevailing tuition rates.

Students who have registered for an upcoming term and notify the program office of their intention to withdraw from the program may be entitled to a refund of all or part of monies paid (with the exception of the $40 nonrefundable application fee). Students who wish to receive a refund of tuition upon withdrawal from a term must submit a written request through U.S. mail to the CCIS program office. The following schedule will apply:

100 percent refund:	a written request must be received prior to the beginning of the term
80 percent refund:	a written request for withdrawal must be received within two weeks after the term begins
60 percent refund:	a written request for withdrawal must be received within three weeks
40 percent refund:	a written request for withdrawal must be received within four weeks
20 percent refund:	a written request for withdrawal must be received within five weeks.

Computing Technology in Education Program
Course Descriptions

DCTE XXX Application of Authoring Systems to Curriculum Design (3 credits)
American education has become increasingly dependent on computer-mediated instruction. To meet this need for good software that matches instructional tasks to instructional media, many educational practitioners are turning to authoring systems. This course will stress the capabilities of authoring systems, both hypertext and frame-based paradigms. Students in this course will explore the use of authoring systems as tools for the curricular design of tutorials, drill and practice activities, instructional games, and simulations.

DCTE XXX Computer Application of Learning Theory (3 credits)
Computing machinery and other forms of high technology are assuming an increasingly dominant role in instructional delivery and school management. Many states are investing considerable resources on studies related to technology and student learning. This course will examine the complexity of learning and behavioral change, with emphasis placed on how computing machinery can be used effectively in the learning process.

DCTE XXX Computer-Based Research and Statistics (3 credits)
An in-depth treatment of the research and evaluation process including design, measurement, and statistical analysis is provided. Techniques for planning, designing, and conducting research and evaluation projects and collecting and analyzing data using various statistical techniques are examined. Special emphasis is placed on the selection of appropriate methodologies for a variety of problem-solving situations. Software programs for performing statistical procedures are reviewed.

DCTE XXX 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 XXX Multimedia and Emerging Technologies (3 credits)
Recent advances in high performance computing and computer networks and their impact on network-bases applications and workgroup productivity are examined. New developments in optical storage technologies, imaging systems, computer architectures, communications services, and graphical user interfaces are delineated. Trends in the development and use of multimedia to support instruction, learning, and research are described. Tools, techniques, and guidelines facilitating the planning, design, production, and implementation of multimedia projects are delineated.

DCTE XXX Courseware and Educational Programming Languages (3 credits)
This course is an indepth exploration of the basic concepts, principles and methods of software design, including methodologies, the software product life cycle, levels of design, design presentations, design documentation, and design practices and techniques found in instructional software. The student will develop competencies in analyzing and synthesizing design for courseware using on-line tools, C-Pilot, Course Writers Workbench, and off-line tools such as Hypercard, ToolBook, Linkway Live, and other tools such as authoring systems, and structured programming and other educational languages.

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DCTE XXX 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 and B-ISDN, the OSI Model, transmission media, network operating systems, topologies, configurations, protocols, and performance characteristics. Trends in standardization, internetworking, downsizing, and the development of local area networks (LANs), wide area networks (WANs), metropolitan area networks (MANs), and enterprise-wide networks are examined.

DCTE XXX Telecommunications (3 credits)
An introduction to key aspects of the telecommunications from fundamental communications concepts and principles to new directions in information transfer and delivery is presented. methods, tools, and techniques for telecommunication planning, forecasting services, developing requirements and specifications, and project management are described. Strategies for integrating communication elements into computer networks are delineated. Topics include communications media, services, architectures, protocols, and standards. New applications in voice, video, data, and image communications are discussed. Recent developments in data communications and distributed networks, satellite communications, fiber optics, and client/server computing are examined.

DCTE XXX Computer Networks (3 credits)
The technical fundamentals, design, configuration, and implementation of computer networks are described. Networking applications that are revolutionizing information access and delivery are examined. Strategies, tools, and techniques to expedite network planning, management, maintenance, and security are reviewed. Topics include information communications, the OSI Model, ISDN and B-ISDN, transmission media, network architecture, operating systems, topologies, protocols, and performance characteristics. Trends in standardization, internetworking, downsizing, and the development of local area networks (LANs), wide area networks (WANs), metropolitan area networks (MANs), and enterprise-wide networks are delineated.

DCTE XXX Artificial Intelligence and Expert Systems (3 credits)
Principles underlying basic AI research and their applications in practice are introduced. Key AI concepts including knowledge representation, natural language processing, machine learning, and heuristic search techniques are examined. Special emphasis is place on examining the characteristics, attributes, conceptual design and structure of expert systems. An in-depth analysis is presented of the tools, techniques, methods, and processes involved in building, implementing, and maintaining expert systems that comply with specific needs and requirements.

DCTE XXX Management of Computing Resources (3 credits)
New developments in information technology management are examined. Practical techniques and methods for managing hardware, software, communications, distributed. Guidelines for creating an environment that integrates next generation computing components for maximum information accessibility are introduced. Various approaches to project planning, managing change and innovation, and facilitating computer and communications security are reviewed.

DCTE XXX Systems Analysis for Educational Computing Systems (3 credits)
An in-depth study of techniques, methods, and tools for the analysis and specification of requirements for educational computing systems. Topics include: the requirements definition process including fact-finding, problem/needs analysis and decomposition, and the requirements document; system life-cycle models; application development strategies; feasibility assessment; logical specification of the planned system; the behavioral specification; the role of prototyping; structuring and modeling techniques for requirements definition and behavioral specification including object-oriented techniques; an overview of design, implementation, and verification and validation; and techniques for project management.

DCTE XXX Applied Database Management 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 XXX Project in Application of Authoring Systems to Curriculum Design
(4 credits)

DCTE XXX Project in Computer Application of Learning Theory (4 credits)

DCTE XXX Project in Computer-Based Research and Statistics (4 credits)

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

DCTE XXX Project in Multimedia and Emerging Technologies (4 credits)

DCTE XXX Project in Courseware and Educational Programming Languages
(4 credits)

DCTE XXX Project in Telecommunications and Networking (4 credits)

DCTE XXX Project in Telecommunications (4 credits)

DCTE XXX Project in Computer Networks (4 credits)

DCTE XXX Project in Artificial Intelligence and Expert Systems (4 credits)

DCTE XXX Project in Management of Computing Resources (4 credits)

DCTE XXX Project in Systems Analysis for Educational Computing Systems
(4 credits)

DCTE XXX Project in Applied Database Management Systems (4 credits)

CCIS Faculty

Phillip M. Adams, Professor; Ph.D. Nova University. Compilers, artificial intelligence and expert systems, operating systems, systems software, and computer architecture.

Raymond Barrett, Assistant Professor; Ph.D. Florida Atlantic University. Digital signal processing, modeling and simulation, information systems analysis and design and VLSI design.

Edmond Chao, Adjunct Lecturer; M.S., M.B.A. Nova University. Data communications, computer systems, and computer security.

Harvey Deitel, Professor; Ph.D. Boston University. Operating systems, open systems, software engineering, computer networks, and object-oriented design.

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Margaret Hutto, Lecturer; M.A. Teacher College, Columbia University; M.S. Pace University. Artificial intelligence, structured programming, COBOL, and modeling and simulation.

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Marlyn Kemper Littman, Associate Professor; Ph.D. Nova University. Computer networks, telecommunications, applications and assessment of emerging technologies.

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Frank Mitropolous, Adjunct Lecturer; M.S. Nova University. Programming languages, and software engineering.

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Raul Salazar, Lecturer; Ed.S. Nova University. Programming languages, computer systems, networks, computer graphics, and multimedia.

John Scigliano, Professor and Vice-President for Computer and Information Technology; Ed.D. University of Florida. Online information systems, information systems management.

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

Raisa Szabo, Associate Professor; Ph.D. Budapest Technical Institute. Computer architecture, artificial intelligence and neural networks, robotics and automated systems, and operations research.

Steven R. Terrell, Assistant Professor, Ed.D. Florida International University. Information systems analysis and design, research methodology and statistics, computer managed instruction, and programming languages.

Clovis L. Tondo, Visiting Professor; Ph.D. Nova University. Data structures, programming languages, object-oriented programming, and compilers.