College of Engineering and Computing Course Catalogs

NSU Course Catalogs and Course Descriptions

1984

Master of Science in Computer Science Catalog

Nova Southeastern University

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.COMPUTER SCIENCE DEPARTMENT

MASTER OF SCIENCE
COMPUTER SCIENCE

1984-1985
NOVA UNIVERSITY
3301 College Avenue
Fort Lauderdale, Florida 33314

WHY THE M.S. IN COMPUTER SCIENCE

PROGRAM IS RIGHT FOR YOU

* Fully accredited programs

* Part-time and full-time degree programs

* Designed to meet the needs of South Florida industry

* Evening classes

* A graduate degree program for those who need a technical degree

* Solid academic foundation with a practitioner's approach to technology

* Faculty: practicing Engineers, Scientists, and Computer Scientists

Nova University is accredited by the Southern Association of Colleges and Schools.

MASTER OF SCIENCE, MAJOR IN

COMPUTER SCIENCE

The Department of Computer Science offers a graduate program leading to the degree of Master of Science with a major in Computer Science. This program is designed to give the student a thorough knowledge of computer systems through course work, basic and applied research activities, and specialized projects.
Current areas of specialization include:

- Artifical Intelligence
- Compiler Construction
- Computer Systems Performance
- Data Base Design
- Data Communications
- Modeling and Simulation

- Network Design
- Numerical Analysis
- Operating Systems Design
- Software Engineering
- Structured Programming

FORMAT: The Master of Science in Computer Science Program operates on a 12 week term. Each three (3) semester credit course meets for four (4) hours per week for 12 weeks. All courses in the program are scheduled in the evenings or on Saturday.

ADMISSION REQUIREMENTS

The Computer Science Graduate Program has been designed for students with undergraduate training in computer science, engineering, mathematics or physics. Applicants for the Master of Science degree in Computer Science should have an undergraduate major in one of the above areas or a related area and must meet the following requirements:

(1) A baccalaurate degree, granted by an accredited institution representing completion of a course of study which fulfills prerequisites for graduate work in the area of Computer Science.

(2) A 2.5 undergraduate grade point average on a grading scale of 4.0 (A).

(3) The intellectual capacity and motivation to pursue graduate work as determined by credentials and an interview. The interview can be waived if the applicant does not reside in the state of Florida.
The applicant's official transcript must be submitted directly from the degree-granting institution.

(4) Satisfaction of undergraduate prerequisites in:
  (a) Data Structures
  (b) Experience with higher level programming languages such as FORTRAN, PASCAL, C or PL/I and with assembly language programming.
  (c) Computer architecture
  (d) Mathematics-including calculus, linear algebra and some discrete mathematics.

Students not satisfying these prerequisites will be required to make up the appropriate deficiencies in the undergraduate program before being admitted with full graduate status.

TRANSFER CREDIT. Up to 6 graduate credits may be transferred from a regionally accredited institution. The courses selected for transfer must have received a B or better grade and must match a course in the required program. The transfer will be evaluated upon the receipt of an official transcript from the institution originally giving the credit.

MASTER OF SCIENCE DEGREE REQUIREMENTS

Two options leading to the Master of Science degree with a major in Computer Science are offered. The requirements for both the thesis and the non-thesis option are:

(1) The completion of 36 semester hours of graduate credit of which 24 semester hours are required courses and must include the following courses:

CIS 610	Theory and Principles of Programming	3 cr.
CIS 620	Modeling and Simulation	3 cr.
CIS 630	Compiler Design Theory	3 cr.
CIS 640	Operating Systems Theory and Design	3 cr.
CIS 650	Network Design and Analysis	3 cr.
CIS 660	Data Base Management	3 cr.
CIS 670	Artificial Intelligence/Expert Systems	3 cr.
CIS 680	Software Engineering	3 cr.

(2) The student must maintain a grade average of 3.0 (B) or better in all graduate level courses.

The additional requirements for the thesis option are the completion of six semester hours of approved elective courses in Computer Science, and six semester hours for a written thesis.

The non-thesis option has the additional requirement of the completion of 12 semester hours of approved elective courses in Computer Science.

ELECTIVES

CIS 600	Computer Systems	3 cr.
CIS 601	Programming Languages	3 cr.
CIS 611	Systems Programming and Project Implementation	3 cr.
CIS 612	Concurrent Programming Languages	3 cr.
CIS 621	Mathematical Programming	3 cr.
CIS 622	Numerical Analysis	3 cr.
CIS 631	Language Theory and Automata	3 cr.
CIS 632	Compiler Implementation	3 cr.
CIS 633	Graph Theory	3 cr.
CIS 634	Complexity Theory	3 cr.
CIS 641	Digital Computer Design	3 cr.
CIS 642	Integrated Computer Systems	3 cr.
CIS 643	Array Processors and Supercomputers	3 cr.
CIS 644	Operating Systems Implementation	3 cr.
CIS 645	Microprogramming and Microprocessors	3 cr.
CIS 651	Data Communications	3 cr.
CIS 652	Systems Performance Evaluation	3 cr.
CIS 661	Data Base Practicum	3 cr.
CIS 662	Distributed Data Base	3 cr.
CIS 671	Robotics and Automated Processing	3 cr.
CIS 681	Interactive Computer Graphics	3 cr.
CIS 682	Software Engineering Implementation	3 cr.
CIS 690	Special Topics	3 cr.

TUITION AND FEES

Tuition (per credit) $150
Application fee, nonrefundable $20
Registration fee, nonrefundable $15

REGISTRATION CLOSES ONE WEEK BEFORE THE BEGINNING OF THE TERM.

NEW TERM BEGINS:

September 24, 1984
January 7, 1985
April 8, 1985
July 15, 1985

FOR INFORMATION CALL:

(305) 475-7563
        or
(305) 475-7484

OR WRITE:

Nova University
Department of Computer Science, Master's Program
3301 College Avenue
Fort Lauderdale, Florida 33314

COURSE DESCRIPTIONS

CIS 600 COMPUTER SYSTEMS
Introduction to digital computer design, peripheral devices, storage
allocation, operating systems, compilers and assemblers. An under-
standing of the total operating environment will be developed.
Investigation of the common programming techniques and their
theory. Segmentation and overlays, recursion, dynamic storage
processing, (stacks, queues, trees), macros.
PREREQUISITE: CONSENT OF INSTRUCTOR. May be required of students whose
undergraduate major was not computer science.

CIS 601 PROGRAMMING LANGUAGES
Introduction to data structures and data types, and understanding of the modern
approach to structured programming will be developed. A comparative study of
several high-level programming languages. Emphasis will be placed on how
concepts are expressed in each of the major languages, such as FORTRAN, COBOL,
PL/1, PASCAL, and ALGOL.
PREREQUISITE: CONSENT OF INSTRUCTOR. May be required of students whose
undergraduate major was not computer science.

CIS 610 THEORY AND PRINCIPLES OF PROGRAMMING
The mathematics of algorithm and programming construction. The art
of structured programming. The dynamic environment of a program and its
record of execution. The theory of concurrent programming.
PREREQUISITES: CIS 600, CIS 601.

CIS 611 SYSTEMS PROGRAMMING AND PROJECT IMPLEMENTATION
Participation in the implementation of an industrial, business or
University project requiring the knowledge of system's programming.
PREREQUISITES: CIS 600, CIS 601.

CIS 612 CONCURRENT PROGRAMMING LANGUAGES (ADA, MODULA AND SIMULA-67)
An introduction to concurrent programming languages. Modules and class
structures, packages and concurrent tasks in ADA. Generic procedures.
Concurrent programming, mailbox tasks, signals and semaphores. Abstract
data types, operations on abstract objects, hiding of the representation
of objects of a given type, private data types.
PREREQUISITES: CIS 600, CIS 601.

CIS 620 MODELING AND SIMULATION
Introduction to modeling techniques. Discrete events systems. Development
of models (e.g. mathematical) of physical processes. Use of simulation
programs such as SIMULA, GPSS,and SIMSCRIPT.
PREREQUISITE: CONSENT OF INSTRUCTOR.

CIS 621 MATHEMATICAL PROGRAMMING
Introduction to linear programming. Non linear models. Integer programming.
The transportation problem. Mathematical programming models. Model languages.
PREREQUISITE: CONSENT OF INSTRUCTOR.

CIS 622 NUMERICAL ANALYSIS
Introduction to error analysis, iterative methods, eigenvalue problems;
integration and differentiation by computer, interpolation, ill-conditioned
problems.
PREREQUISITES: CIS 600, CIS 601.

CIS 630 COMPILER DESIGN THEORY
Language theory will be applied to the design of a compiler for a high-
level language. Parsing, syntax analysis, interpretation phase and
code generation. Other areas of the compilation process will be covered,
such as storage allocation, symbol table management, searching and sorting,
and recursion.
PREREQUISITES: CIS 600, CIS 601.

CIS 631 LANGUAGE THEORY AND AUTOMATA
Introduction to formal grammars, Backus-Naur notation. The formal theory
behind the design of a computer language is studied. The corresponding
types of automata which may serve as recognizers and generators for a
language will be described.
PREREQUISITES: CIS 600, CIS 601.

CIS 632 COMPILER IMPLEMENTATION
Design, implementation, and testing of a compiler for a high-level language.
PREREQUISITE: CIS 630.

CIS 633 GRAPH THEORY
Finite linear graphs. Applications to modeling optimization, networks,
operating systems design, digital design.
PREREQUISITES: CIS 600, CIS 601.

CIS 634 COMPLEXITY THEORY
A general theory of computational complexity. Theory of algorithms.
Turing machines, unsolvable problems. Exponential difficulty, NP-Completeness.
PREREQUISITE: CIS 633.

CIS 640 OPERATING SYSTEMS THEORY AND DESIGN
Analysis of computer operating systems with emphasis on structured design.
Multi-programming and multiprocessing, real-time, time-sharing, networks,
job control. Scheduling, synchronization and other forms of resource
management: I/O programming memory and file system management.
PREREQUISITES: ICS 600, ICS 601.

CIS 641 DIGITAL COMPUTER DESIGN
Principles and techniques of digital computer design. Integrated circuits,
logic design, LSI and MSI design, sequential circuit analysis. Processor
logic design, arithmetic unit, memory systems, input-output structures,
microprogramming.
PREREQUISITES: CIS 600, CIS 601.

CIS 642 INTEGRATED COMPUTER SYSTEMS (VLSI)
Introduction to MOS circuits. The technology of integrated systems. Design
of elementary components and subsystems (shift registers, dynamic registers,
stacks). Fabrication process and implementation procedures. The design
of an Integrated Computer System (data path, controller, microprogrammed
control). System timing. Processor arrays. The physics of integrated
systems.
PREREQUISITE: CONSENT OF INSTRUCTOR.

CIS 643 ARRAY PROCESSORS AND SUPERCOMPUTERS
An introduction to supercomputers. Parallel computer organization. Pipe-
line, associative and array computer architectures. Examples: Texas
Instrument ASC, Control Data STARAN, CRAY-I, Burroughs BSP. Control and
parallel processors. Stream of micro-instructions. Conflict free memory.
Algorithmic detection of recurrent relations. Control flow graphs.
PREREQUISITES: CIS 600, CIS 601.

CIS 644 OPERATING SYSTEMS IMPLEMENTATION
Implementation and testing of operating system design on actual hardware.
PREREQUISITE: CIS 640.

CIS 645 MICROPROGRAMMING AND MICROPROCESSORS
The past, present and future of microprogramming will be discussed in detai
with particular attention given to processor technology. An in-depth surve
of commercially available microprogrammable microprocessors will be presented
as well as monolithic microprogrammed devices. The students will implement
a processor instruction set in both vertical and horizontal microcode
utilizing a Simulator, Micro-assembler, and Register Transfer language.
Advanced topics in special-purpose processor design and architecture re-
definition (dynamic) will be presented.
PREREQUISITE: CONSENT OF INSTRUCTOR.

CIS 650 NETWORK DESIGN AND ANALYSIS
Distributed processing and other forms of network systems.
PREREQUISITES: CIS 600, CIS 601.

CIS 651 DATA COMMUNICATIONS
An introduction to basic data communication concepts, coding modes and
types of transmissions, multiplexing, line protocols, switching
techniques and communication satellite technology.
PREREQUISITE: CIS 650.

CIS 652 SYSTEMS PERFORMANCE EVALUATION
An analysis of the computer resources in a monitoring environment. CPU, I/O
channel, memory and mix utilization statistics. Hardware monitors and soft
ware monitors. Determining the overloaded computer system. Capacity analysis.
PREREQUISITES: CIS 600, CIS 601.

CIS 660 DATA BASE MANAGEMENT
Computer-oriented technqiues for information storage and retrieval with
emphasis on on-line capability. File structures, including data definition
and manipulation languages.
PREREQUISITES: CIS 600, CIS 601.

CIS 661 DATA BASE PRACTICUM
The techniques of Data Base Management will be applied to practical projects.
PREREQUISITE: CIS 660.

CIS 662 DISTRIBUTED DATA BASE
The study of information storage and retrieval in a distributed environment. Distributed processing networks.
PREREQUISITE: CONSENT OF INSTRUCTOR.

CIS 670 ARTIFICIAL INTELLIGENCE/EXPERT SYSTEMS
This course emphasizes the area of programming involved with non-deterministic solutions to problems. Concepts of LISP, PROLOG, OPS5 and other specialized programming languages will be presented. The notion of knowledge bases will be developed and all students will be expected to produce a working expert system which embodies these concepts.
PREREQUISITES: CIS 600, CIS 601.

CIS 671 ROBOTICS AND AUTOMATED PROCESSING
The principles and concepts of modern robots and automation are developed. The concepts of algorithmic and non-algorithmic control are presented along with the details of sensor and device I/O. Experiments with simulated and real robots will be performed to reinforce the basic concepts presented.
PREREQUISITE: CIS 670.

CIS 680 SOFTWARE ENGINEERING
This course offers a thorough analysis of the problems related to the design, development and implementation of software projects. First, the fundamenta s of software project management are presented, followed by a discussion of t e techniques of software development. A comprehensive, modern approach to structured programming, program modularization and program correctness is offered. Software verification and validation, software security and soft-ware protection will also be analyzed in detail.
PREREQUISITE: CONSENT OF INSTRUCTOR.

CIS 681 INTERACTIVE COMPUTER GRAPHICS
The principles of interactive computer graphics are presented. Emphasis will be placed on mastering the concepts of two-dimensional graphics in-cluding the basic transformations (scale, translate, rotate), perspective, hidden-line removal and hardware support devices. The two-dimensional concepts will be extended to include three-dimensional computer graphics including smoothing algorithms, animation and a variety of related topics.
PREREQUISITES: CIS 600, CIS 601.

CIS 682 SOFTWARE ENGINEERING IMPLEMENTATION

The techniques of software engineering will be applied to practical projects.
PREREQUISITE: CIS 680.

CIS 690 SPECIAL TOPICS
This seminar will focus on the professor's current research interests.
PREREQUISITE: CONSENT OF INSTRUCTOR.