College of Engineering and Computing Course Catalogs

NSU Course Catalogs and Course Descriptions

1994

Bachelor of Science Degree in Computer Science

Nova Southeastern University

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COMPUTER SCIENCE

The bachelor of science degree is offered through the Center for Computer Science in the following areas:

Computer Science	**Computer Information Systems**
Computer Engineering	**Computer Systems**

Computer Science deals with the systematic study of algorithms and data structures. This concentration will provide a base for the graduate to work in a number of computer career fields and to pursue graduate work in computer science.

Computer Engineering concentrates on the architecture, design, and development of computer hardware. Areas covered are circuit design, firmware, and the high level tradeoff between hardware and software in computer systems.

The **Computer Information Systems** major prepares the student for a career in business applications as a programmer/analyst. Emphasis is placed on programming languages, application software analysis, design and development, database management, and information system organization.

The **Computer Systems** major is designed for students who intend to combine business knowledge with an applications approach to computer science. In addition to providing a background in computer function, language, and programming, this major will focus on the use of computers in the business environment.

Telecommunications Specialty

This certificate program is designed for those students who are employed or are interested in working in telecommunications. This specialty focuses on the design, planning, organization, and control of data and voice communications networks, with emphasis on distributed computer networks. Students can complete this specialty in conjunction with a major concentration in order to earn a B.S. degree, or they can complete the certificate specialty without seeking a degree.

The following courses are required for this specialty:

TC 200	Mathematical Foundations of Telecommunications
TC 205	Electronics for Telecommunications
TC 300	Telecommunications Network Planning and Operations
TC 305	Telecommunications Software and Protocols
TC 400	Telecommunications Economics and Policy

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COMPUTER SCIENCE

GENERAL DISTRIBUTION:		39

MAJOR REQUIREMENTS:		**66**
CS 140	Discrete Mathematics	3
CS 160	Fundamentals of Logic Design	3
CS 170	Introduction to Programming	3
CS 210	Fortran	3
CS 306	Digital Design	3
CS 320	Organization of Programming Languages	3
CS 330	Structured Programming (Pascal)	3
CS 335	Assemblers and Assembly Language Programming	3
CS 340	Data Structures	3
CS 355	The "C" Programming Language	3
CS 370	Software Design	3
CS 405	Computer Architecture	3
CS 420	Operating System Concepts	3
CS 452	Database Management:	
	A Computer Science Emphasis	3
CS 460	Systems Programming	3
CS 480	Introduction to Compilers and Interpreters	3
CS	Electives	12
EE 305	Electronics for Computer Science Majors	3
— MAT 450	Probability and Statistics	3

ELECTIVES:		15

TOTAL DEGREE REQUIREMENTS:		120

COMPUTER ENGINEERING

GENERAL REQUIREMENTS: 36

MAJOR REQUIREMENTS: **69**

CS 140	Discrete Mathematics	3
CS 160	Fundamentals of Logic Design	3
CS 170	Introduction to Programming	3
CS 210	Fortran	3
CS 306	Digital Design	3
CS 330	Structured Programming (Pascal)	3
CS 335	Assemblers and Assembly Language Programming	3
CS 340	Data Structures	3
CS 405	Computer Architecture	3
EE 210	Networks I	3
EE 255	Engineering Lab I	1
EE 310	Networks II	3
EE 330	Electronics I	3
EE 335	Engineering Lab II	1
EE 340	Electronics II	3
EE 405	Networks III	3
EE 445	Engineering Lab III	1
EE 460	Microprocessor Applications	3
EE 470	Electrical Engineering Design	3
MAT 305	Calculus III	3
MAT 310	Differential Equations	3
MAT 450	Probability and Statistics	3
CS	Electives	9

ELECTIVES: 15

TOTAL DEGREE REQUIREMENTS: 120

COMPUTER INFORMATION SYSTEMS

GENERAL DISTRIBUTION: 39

MAJOR REQUIREMENTS: **63**

CS 140	Discrete Mathematics	3
CS 170	Introduction to Programming	3
CS 220	Business Oriented Language (COBOL)	3
CS 315	Advanced COBOL	3
CS 330	Structured Programming (Pascal)	3
CS 340	Data Structures	3
CS 345	Distributed Data Processing	3
CS 355	The "C" Programming Language	3
CS 365	Methods of System Analysis	3
CS 401	Organization of Computer Environment	3
CS 451	Database Management: An Information Systems Emphasis	3
CS 490	Directed Project in Computer Science	3
CS	Electives	15
ACT/BUS/ECO/FIN/MGT/MKT Electives		12

ELECTIVES: 18

TOTAL DEGREE REQUIREMENTS: 120

COMPUTER SYSTEMS

GENERAL DISTRIBUTION:	36

MAJOR REQUIREMENTS:	**45**

CS 140	Discrete Mathematics	3
CS 170	Introduction to Programming	3
CS 210	Fortran	3
CS 220	Business Oriented Language (COBOL)	3
CS 320	Organization of Programming Languages	3
CS 330	Structured Programming (Pascal)	3
CS 335	Assemblers and Assembly Language Programming	3
CS 340	Data Structures	3
CS 370	Software Design	3
CS 401	Organization of Computer Environment	3
CS 420	Operating Systems Concepts	3
CS 451	Database Management:	
	An Information Systems Emphasis	3
CS 460	Systems Programming	3
CS 471*	Advanced Microcomputer Applications	
	Interfacing	3
CS 480*	Introduction to Compilers and Interpreters	3
CS	Elective	3

*Choose one course

SPECIALTY REQUIREMENTS:	27
ELECTIVES:	12

TOTAL DEGREE REQUIREMENTS:	120

CS 140   DISCRETE MATHEMATICS (3 sem. hrs.)
An introduction to the concepts and techniques of discrete mathematical structures which are used in the theory and application of computer science. Topics covered include logic, set theory, relations, functions, recurrence relations, matrices, algebraic structures, and graph theory.
Prerequisite: demonstrated competency equivalent to MAT 150.

CS 150   INTRODUCTION TO COMPUTER ORGANIZATION (3 sem. hrs.)
An introduction to principles of digital computer operation and organization, data representation, the central processing unit, memory, input/output devices, number systems and logic systems.
Prerequisite: MAT 102

CS 160   FUNDAMENTALS OF LOGIC ANALYSIS AND DESIGN (3 sem. hrs.)
An introduction to elementary digital logic circuits, Boolean algebra, Karnaugh maps, digital counters, and other basic circuit elements. Number set modules, binary, octal and hexadecimal number systems are investigated and related to digital computing structures.
Prerequisite: CS 140

CS 165   FUNDAMENTALS OF COMPUTERS AND INFORMATION PROCESSING
(3 sem. hrs.) An introduction to various types of computer hardware. Steps in designing, programming, and implementing computer systems. Basic computer terminology.

CS 170   INTRODUCTION TO PROGRAMMING (3 sem. hrs.)
An introduction to good programming techniques including flowcharting, code design, debugging techniques and documentation, problem solving methods, pseudocode and algorithm development to be used in the design of computer programs. The Pascal language will be taught as part of this course. The topics covered in Pascal are: global declaration, local declaration, data types, arithmetic operations, scoping rules, subprogramming, control flow, loops, and input/output procedures.
Prerequisite: CS 140 and demonstrated competency equivalent to CS 150.

CS 180   INTRODUCTION TO UNIX (3 sem. hrs.)
Introduction to the basic concepts of the UNIX operating system. Topics include system commands, system editors, awk, sed, introduction to Shell programming languages, text formatting tools, use of a modem and terminal software, and system maintenance utilities.
Prerequisite: demonstrated competency equivalent to CS150.

CS 200   BASIC LANGUAGE (3 sem. hrs.)
An introduction to BASIC Language programming on the IBM-PC, using GWBASIC and QuickBasic to develop structured programs. This course will include screen formatting, error checking, program design, branching techniques, modular design, large program design, files (sequential, random, index), and documentation.
Prerequisite: CS 170

CS 210 FORTRAN (3 sem. hrs.)
A study of the FORTRAN programming language with the emphasis on problem solving techniques. Topics covered will include an introduction to structured programming, the structure of the FORTRAN language, input and output of data through formatted I/O, iteration control, array handling, and subprogramming.
Prerequisite: CS 170

CS 220   BUSINESS ORIENTED LANGUAGE (COBOL) (3 sem. hrs.)
A study of the COBOL programming language with the emphasis on business applications. Students apply a structured, multi-phase program development process that features a series of steps involving understanding of a problem, formal problem definition, design methodologies, program specification, breakdown, and files using COBOL.
Prerequisite: CS 170

CS 235   COMPUTER APPLICATIONS ENVIRONMENT (3 sem hrs.)
A survey of the uses of computers in business and science. Emphasis on specific business applications. Procedures for identifying and selecting hardware and software.
Prerequisite: CS 165.   Identical to BUS 235.

CS 291-299   SPECIAL TOPICS IN COMPUTER SCIENCE (3 sem. hrs.)
Topics in computer science that are not included in regular course offerings and may be taken without prerequisites. Specific content is announced in the course schedule for a given term. Students may re-enroll for Special Topics covering different content.

CS 293   INTRODUCTION TO ARTIFICIAL INTELLIGENCE (3 sem. hrs.)
Introduction to the basic concepts and techniques of artificial intelligence and expert systems. Topics include the philosophical implications of machine intelligence, psychological modeling, natural language processing, problem solving, search strategies, heuristic methods and knowledge representation and expert systems.
Prerequisite: CS 340

CS 300   COMPUTER SECURITY, ETHICS, AND AUDITING (3 sem. hrs.)
Issues of security, privacy, and control from the viewpoint of the computer user. Emphasis on procedures for protecting systems from unauthorized use, theft, vandalism, and natural disasters. Ethical issues in computer usage are covered.
Prerequisite: CS 235

CS 306 DIGITAL DESIGN (3 sem. hrs.)
Register transfer level design of digital computers, data transfer hardware, organization of the central processing unit, design of the controller, and a complete design example.
Prerequisites: CS 160 and EE 305

CS 308 COOPERATIVE EDUCATION (no credit)
Work placement for a period of 16-18 weeks. The placement will be directly related to the student's program of study.

CS 315 ADVANCED COBOL (3 sem. hrs.)
A study of advanced COBOL programming using structured techniques. Topics to be covered include table handling, sequential and indexed file processing, data base access, editing, sorting, and the Report Writer.
Prerequisite: CS 220

CS 320 ORGANIZATION OF PROGRAMMING LANGUAGES (3 sem. hrs.)
Development of an understanding of the organization of programming languages, introduction to formal study of programming language specification and analysis, comparison of two or more high level modern programming languages.
Prerequisites: CS 210, CS 330 and CS 340

CS 330 STRUCTURED PROGRAMMING (PASCAL) (3 sem. hrs.)
Introduction to the use of structured design, algorithm development, debugging techniques with a highly structured language such as Pascal. The use of highly structured languages is expected to speed the implementation of the program and greatly improve its reliability. The differences between functions and procedures, string functions and operations, data type concepts and classifications, records and sets, arrays and character strings, sort, recursion, files (sequential and random), pointers, and linked lists will be stressed.
Prerequisite: CS 170

CS 332   INTRODUCTION TO FILE PROCESSING (3 sem. hrs.)
An introduction to the concepts and techniques of structuring data on bulk storage devices. File access techniques, data structures used on storage devices, and file input/output are covered.
Prerequisite: CS 355

CS 335 ASSEMBLERS AND ASSEMBLY LANGUAGE PROGRAMMING
(3 sem. hrs.) A detailed analysis of the operation of assemblers. Assembler features, assembly language programming, and macrofacilities. Assembly language programs will be written as part of this course.
Prerequisite: CS 340

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CS 340   DATA STRUCTURES (3 sem. hrs.)
Introduction to the concepts and techniques for handling lists, stacks, queues, sorting and searching techniques, binary trees, AVL trees, trees and graphs, and hashing.
Prerequisites: CS 330 and CS 355

CS 345   DISTRIBUTED DATA PROCESSING (3 sem. hrs.)
An examination of the features and impact of distributed systems in the business environment.
Prerequisites: CS 340 and MAT 302 or MAT 450

CS 355   THE "C" PROGRAMMING LANGUAGE (3 sem. hrs.)
A study of the "C" Programming language that includes variable types, expressions, control-flow constructions, functions, recursive functions, arrays, pointers, structures, unions, and I/O.
Prerequisites: CS 330

CS 362   ADVANCED "C" PROGRAMMING LANGUAGE (3 sem. hrs.)
The Advanced "C" Programming Language course expands CS 355. Topic include advanced pointers, structures and unions, doubly linked lists, hash tables with doubly linked lists, I/O, "C" preprocessor, "C" code portability, and ANSI standards for "C".
Prerequisite: CS 355

CS 365   METHODS OF SYSTEM ANALYSIS (3 sem. hrs.)
An overview of systems development with emphasis on techniques and tools of system documentation and logical system specification.
Prerequisite: CS 345

CS 370   SOFTWARE DESIGN (3 sem. hrs.)
Algorithm analysis, software design, management of large software projects, functional specification, design and testing phase of large scale projects, quality control.
Prerequisite: CS 340

CS 375   CURRENT ISSUES IN INFORMATION MANAGEMENT
(3 sem. hrs.)   Computer topics of importance to the data processing business manager.   Flow of data, distributed processing, decision support systems, modeling.   Emphasis is on information as a company resource and source information management practices.
Prerequisite: CS 345.   Identical to BUS 375

CS 401   ORGANIZATION OF THE COMPUTER ENVIRONMENT
(3 sem. hrs.)   Management of the computer environment, personnel, customer interface, budgeting, coordination, policy development, staffing, department interface, hardware and software selection planning, maintenance, and management.
Prerequisite: requires Senior standing.

CS 405 COMPUTER ARCHITECTURE (3 sem. hrs.)
The analysis and design of computer systems, the interrelation of software and hardware design in the final computer system, the interrelation between the operating system and the architecture of computer systems, concurrent processes and resource allocation.
Prerequisites: CS 306 and CS 340

CS 420 OPERATING SYSTEM CONCEPTS (3 sem. hrs.)
Methods in the analysis and design of large scale systems, including concepts of semaphores, processes, linear address space, resource allocation, protection, and basic topics in operating system development.
Prerequisite: CS 355

CS 430 INTRODUCTION TO ROBOTICS (3 sem. hrs.)
The principles and concepts of modern robots and automated systems are developed: robot's intelligence, drive methods, motion control, software and hardware support.
Prerequisite: CS 405

CS 451 DATABASE MANAGEMENT An Information Systems Emphasis
(3 sem. hrs.) Concepts and structures necessary to design and implement a database management system including logical file organization and data organization techniques, data models, networks, data integrity, and file security. Emphasis is on the logical and user's viewpoint.
Prerequisite: CS 340. Students may not receive credit for this course and CS 452.

CS 452 DATABASE MANAGEMENT A Computer Science Emphasis
(3 sem. hrs.) Concepts and structures necessary to design and implement a database management system, including physical file organization and data organization techniques, data models, networks, data integrity, and file security. Emphasis is on theoretical foundations and physical system implementation while considering logical and user problems.
Prerequisite: CS 340. Students may not receive credit for this course and CS 451.

CS 460 SYSTEMS PROGRAMMING (3 sem. hrs.)
A study of various system programming techniques, hardware-software interface, software controlled hardware. A comparison of several existing computer systems will be made.
Prerequisite: CS 335 and CS 340

CS 471 ADVANCED MICROCOMPUTER APPLICATIONS INTERFACING
(3 sem. hrs.) This course will deal with the hands-on use of a microcomputer utilizing word processor, spreadsheet, database interfacing with programming languages, and introduction to decision support system construction and expert systems.
Prerequisite: requires Senior standing.

CS 475 EDP AUDIT AND CONTROL (3 sem. hrs.)
Introduction to EDP auditing with emphasis on EDP controls, audit types, and audit techniques including their effects on computer system development.
Prerequisites: CS 315 and CS 345

CS 480 INTRODUCTION TO COMPILERS AND INTERPRETERS
(3 sem. hrs.) An introduction to compiler/interpreter design. Topics include lexical analysis, parsing, intermediate code, final code generation, optimization, and error recovery.
Prerequisite: CS 320

CS 481 ADA PROGRAMMING LANGUAGE (3 sem. hrs.)
Fundamentals of Ada including details of its historical development and its similarities to Pascal. Emphasis on the special features of Ada including data abstractions, multitasking, exception handling, encapsulation, and generics.
Prerequisite: CS 340

CS 483 ADVANCED UNIX (3 sem. hrs.)
The Advanced UNIX course expands CS 180, Introduction to UNIX. Topics include advanced Bourne Shell and Korn Shell techniques. Also covered are advanced awk techniques, system calls in "C", lex, yacc, ar, and make.
Prerequisites: CS 180 and CS 340.

CS 485 THEORY OF COMPUTATION (3 sem. hrs.)
Theoretical approach to computer science. Topics include correctness, automata and turing machines, finite state machines, and grammars.
Prerequisite: requires Senior standing.

CS 490 DIRECTED PROJECT IN COMPUTER SCIENCE (3 sem. hrs.)
A major project in computer science will be completed by the student under the direction of a faculty member.
Prerequisite: requires Senior standing.

EE 210   NETWORKS I   (3 sem. hrs.)
Definitions of charge, current, voltage, resistance, capacitance, and inductance. Study of Ohm's law, Kirchoff's laws, nodal analysis, and mesh analysis. Principles of superposition, maximum power theorem, Thevenin's theorem and Norton's theorem.
Prerequisites: PHY 250 and MAT 220

EE 255   ENGINEERING LABORATORY I   (1 sem. hr.)
Basic laboratory to complement Networks I.
Prerequisite or Corequisite: EE 210

EE 305   ELECTRONICS FOR COMPUTER SCIENCE MAJORS   (3 sem. hrs.)
An introduction to network analysis and electronic circuitry. Definitions of circuit parameters and components: voltage, current, resistance, capacitance, and inductance. Fundamental circuit analysis techniques, series and parallel combinations of components, transistor and diode characteristics and their applications in logic circuits, differences in existing manufacturing technologies for VLSI such as C-MOS, N-MOS, and P-MOS. Intended as a special survey course for CS majors but will not meet requirements for EE or CE majors.

EE 308   COOPERATIVE EDUCATION   (No credit)
Work placement for a period of 16-18 weeks. The placement will be directly related to the student's program of study.

EE 310   NETWORKS II (3 sem. hrs.)
Phasors, sinusoidal steady-state analysis, rms value, average power, balanced three-phase circuits, resonance, frequency response, two-port networks, and Laplace transforms are studied.
Prerequisites: EE 210 and MAT 310

EE 330 ELECTRONICS I (3 sem. hrs.)
Introduction to the physical theory of semiconductor devices, diodes, diode circuit applications, transistor characteristics, transistor equivalent circuits, and single-stage amplifiers.
Prerequisite: EE 310

EE 335   ENGINEERING LAB II (1 sem. hr.)
Laboratory work to complement electronics theory course.
Prerequisite or Corequisite: EE 330

EE 340   ELECTRONICS II (3 sem. hrs.)
Analysis and design of single-stage and multi-stage amplifiers, difference amplifiers, and operational amplifiers. Frequency response and other performance criteria with feedback. Oscillators.
Prerequisite: EE 330

EE 405   NETWORKS III (3 sem. hrs.)
Continuation of Networks II emphasizing Laplace transforms for solving advanced network problems.
Prerequisites: EE 310, EE 340, MAT 305 and MAT 310

EE 430   FUNDAMENTALS OF COMMUNICATION SYSTEMS (3 sem. hrs.)
Fourier series and transforms, modulation systems, sampling, digital data transmission, noise, channel capacity, design and analysis of communication systems.
Prerequisites: EE 340 and EE 405

EE 445   ENGINEERING LAB III (1 sem. hr.)
Lab work to complement electronics theory course.
Prerequisites: EE 405

EE 460   MICROPROCESSOR APPLICATIONS (3 sem. hrs.)
Applications in the design of microprocessor-based circuits.
Prerequisites: CS 306 and CS 335

EE 470   ELECTRICAL ENGINEERING DESIGN (3 sem. hrs.)
application of design techniques to special projects in electrical engineering.
Prerequisite: EE 405

TELECOMMUNICATIONS (TC)

TC 200   MATHEMATICAL FOUNDATIONS OF TELECOMMUNICATIONS
(3 sem. hrs.)   Development of techniques applied to telecommunications systems for solution of problems solved by queuing theory, information theory, operations research, statistics, and topology.
Prerequisites: MAT 150 and MAT 302

TC 205   ELECTRONICS FOR TELECOMMUNICATIONS (3 sem. hrs.)
An introduction to electronic systems for communications including signaling, modulation, demodulation, data transmission, switching, satellites, optical methods, test equipment, and error control.
Prerequisites: TC 200 and EE 305

TC 300 TELECOMMUNICATIONS NETWORK PLANNING AND OPERATIONS
(3 sem. hrs.)   Development of techniques applied to telecommunication systems for the planning and operation of telecommunications networks.
Prerequisites: CS 345, TC 200 and TC 205

TC 305   TELECOMMUNICATIONS SOFTWARE AND PROTOCOLS (3 sem. hrs.)
Development of protocols by example for software support of telecommunications systems.
Prerequisites: CS 345 and TC 200

TC 400   TELECOMMUNICATIONS ECONOMICS AND POLICY (3 sem. hrs.)
Development of the economic and regulatory environment of modern telecommunications systems and the effects on planning, cost, and operations.
Prerequisites: CS 345 and TC 200