This document is not intended to be a complete list of all requirements and is not a substitute for the Undergraduate Program Catalog. All students are presumed to have read the information in the Undergraduate Program Catalog, which is the final authority.

ELECTRONIC ACCESS TO UNDERGRADUATE PROGRAM INFORMATION

Information about the undergraduate program is available on the web at http://www.cis.fiu.edu/ . If you have questions, please send them to either advising@cis.fiu.edu or info-undergrad@fiu.edu .

GENERAL DEGREE INFORMATION

The School of Computing and Information Sciences offers curricula leading to the following degrees:

The **Bachelor of Science in Computer Science** provides an introduction of the theoretical foundations of computer science. Graduates of this program often conduct research work in industry as software developers.

The **Bachelor of Science in Information Technology** as a single major prepares students for entry-level jobs in support positions within companies, so they can manage company computer systems, networks, databases and web sites.

The **Bachelor of Arts in Information Technology** as a second major can be earned by a student who is either pursuing a major in another field or who has already earned a Bachelor's degree.

The **Minor in Computer Science** can be used to provide a minimal level of theoretical and practical computer science skills for students majoring in other fields.

ACCREDITATION

The Bachelor of Science program in Computer Science is accredited by:

Computing Accreditation Commission
ABET, 111 Market Place, Suite 1050
Baltimore, MD 21202-1012
Telephone 410-347-7700

For assessment information, visit http://www.cis.fiu.edu/programs/undergrad/csassessment/ and http://www.cis.fiu.edu/programs/undergrad/itassessment/ .

SCIS RESEARCH INTERESTS

Database Systems: including database design, database management systems and applications, database theory and implementation, database machines, distributed databases, and information retrieval in heterogeneous databases.

Operating systems: distributed computing, storage systems, virtualization, security, and real-time systems.

Software Engineering: including large-scale software design, programming language environments, software development and maintenance methodologies, object-oriented techniques, software reuse, and software quality assurance.

Parallel and Distributed Systems: including formal specification methodologies, distributed file systems and operating systems, and parallel algorithms.

Theory: including data structures and analysis of algorithms, theory of computation, program verification, and logic.

Artificial Intelligence: including neural networks, expert systems, automated reasoning, term rewriting systems, and intelligent tutoring systems.

Security: including stealthy malware detection and defense, runtime integrity of systems software, information flow security, and software security vulnerability mitigation

Networking: including simulation and modeling of large-scale computer networks, quality-of-service management, wireless networks, mobile computing, and high-performance routing

Bioinformatics: pattern discovery in sequences and structures, micro-array data analysis, primer design, probe design, phylogenetic analysis, image processing, and image analysis

COMPUTING RESOURCES

The School of Computing and Information Sciences provides several computing labs to service the curriculum needs of our undergraduate students. For more information about the John C. Comfort Laboratory (JCCL, ECS 241) and our other undergraduate computing resources and services, please visit our website at: http://www.aul.fiu.edu .

The JCCL is an open learning facility for undergraduate students of the School of Computing and Information Science. This laboratory is equipped with 46 Intel Core2Duo, 2.4ghz class computers that run either Windows XP or Red Hat Linux. A recent addition to this lab includes two 42-inch flat panel displays available to students for collaboration or presentation assignments. This lab has been designed to give students a broad exposure to the Windows XP environment including programming using Microsoft Visual Studio, NetBeans, and Eclipse.

The Experimental Lab or ExLab, (located in ECS 281), can be employed to meet a variety of curriculum computing needs. It is used by undergraduates as an additional open lab, but is also scheduled for class meetings if there is a need for some "hands-on" work in a lab environment. Schedules are posted on the door.

The Instructional Lab (ILab, room ECS141) supports courses that have a programming lab component. The ILab is equipped with 47 Intel Core2Duo 3.0ghz class computers. The ILab is a closed lab and is only available to students for scheduled course meetings.

The IT Hardware Lab in ECS 237 is a closed lab designed to accommodate courses that require manipulation of computer components or networking technologies. This room contains 30 workstations, which students can "tear down" and rebuild in their course work. This room also houses the networking lab where students build and troubleshoot networks.

ONLINE COURSE OFFERING

Some courses may be offered fully online, for an entire listing you may go to http://onlineapps.fiu.edu/coursecatalog/ and search in the "College of Engineering and Computing" under the "School of Computer Science".

General Requirements

University Requirements

All students must complete the **Academic Degree Requirements** and **Summer Enrollment Requirement** as explained in the FIU catalog:

http://catalog.fiu.edu/index.php?id=2727&section=academicpolicies

All students must complete the University Core Curriculum, CLAS and Foreign Language Requirement as explained in the FIU catalog:

http://catalog.fiu.edu/index.php?id=2812&section=studentservices

College of Engineering Requirements

All students must complete the General Requirements for a Baccalaureate Degree in the College of Engineering as explained in the FIU catalog:

http://catalog.fiu.edu/index.php?id=2239&section=collegesandschools&college=1&parent=2239

In particular, students must complete at least 35 semester credits in the upper-division at FIU.

SCIS Requirements

If a student takes a course at FIU and has already received transfer credit for an equivalent course at another institution, then the credits for the repeated course at FIU are not applicable toward graduation.

At least 50% of the upper division credits required for the degree must be taken at FIU.

A grade of "C" or better must be obtained in **all** courses required for the major.

Note: A "C-" is **not** an acceptable grade.

Additional Requirements

Additional Requirements for Computer Science majors in both tracks:

No computer-related courses in other departments (including CGS 3300) may be taken for elective credit by a CS major, unless specifically approved in writing by the student's advisor.

No credit for graduation will be given to CS majors for the following courses:

COP 3175, CGS 2060, CGS 3300, STA 1013, STA 2023, STA 2122, STA 3123, MAC 2233, QMB 3200 and ESI 3161 unless the student took the course before declaring a CS major.

Most of the IT classes cannot be taken for credit for Computer Science majors. The only exceptions are CGS 4285, CGS 4854, COP 4005, COP 4722, CTS 4408, COP 4813.

Degrees Offered

Bachelor of Science in Computer Science, Computer Science Track

Bachelor of Science in Computer Science, Software Design Track

Bachelor of Arts in Information Technology

Bachelor of Science in Information Technology, Information Technology Major

Bachelor of Science in Information Technology, Software Major

Minor in Computer Science

Bachelor of Science in Computer Science

Computer Science Track

There are two tracks available in the upper division program for Computer Science. The Computer Science (CS) track should be followed by the student who intends to continue on to graduate study in computer science. The Software Design and Development (SDD) track may be followed by the student who intends to pursue a software engineering career. This section explains the requirements for the Computer Science track.

CS Prerequisites

Students must complete Computer Programming in Java or C++ at an acceptable level, Calculus through infinite series (and including trigonometric functions), and Physics. For a student who has not completed these prerequisites, the courses at FIU that satisfy them are:

COP 2210	Computer Programming I	PHY 2048	Physics with Calculus I w/Lab
MAC 2311	Calculus I	PHY 2049	Physics with Calculus II w/Lab
MAC 2312	Calculus II		

CS Core Courses

CDA 3103	Fundamentals of Computer Sys.	COP 4338	Computer Programming III
CDA 4101	Structured Computer Org.	COP 4555	Principles of Prog. Languages
CEN 4010	Software Engineering I	COP 4610	Operating Systems Principles
CGS 1920	Introduction to Computing	COP 4710	Database Management
CGS 3092	Ethics/Soc in Computing	COT 3420	Logic for Computer Science
CIS 4911	Senior Project	ENC 3213	Prof. and Technical Writing
COM 3110	Business Prof. Communications	MAD 2104	Discrete Mathematics
COP 3337	Computer Programming II	MAD 3512	Intro to Theory of Algorithms
COP 3530	Data Structures	STA 3033	Intro to Prob. and Stat. for CS

CS Elective Courses

CS students must have **three** elective courses.

Set 1 Electives: Choose **two** from this list:

CAP 4770	Data Mining	COP 4226	Advanced Windows Programming
CEN 4021	Software Engineering II	COP 4520	Intro to Parallel Computing
CEN 4072	Software Testing	COP 4604	Advanced UNIX Programming

Set 2 Electives: Choose **one** from this list:

MAD 3305	Graph Theory	MAD 4203	Introduction to Combinatorics
MAD 3401	Numerical Analysis	MHF 4302	Mathematical Logic

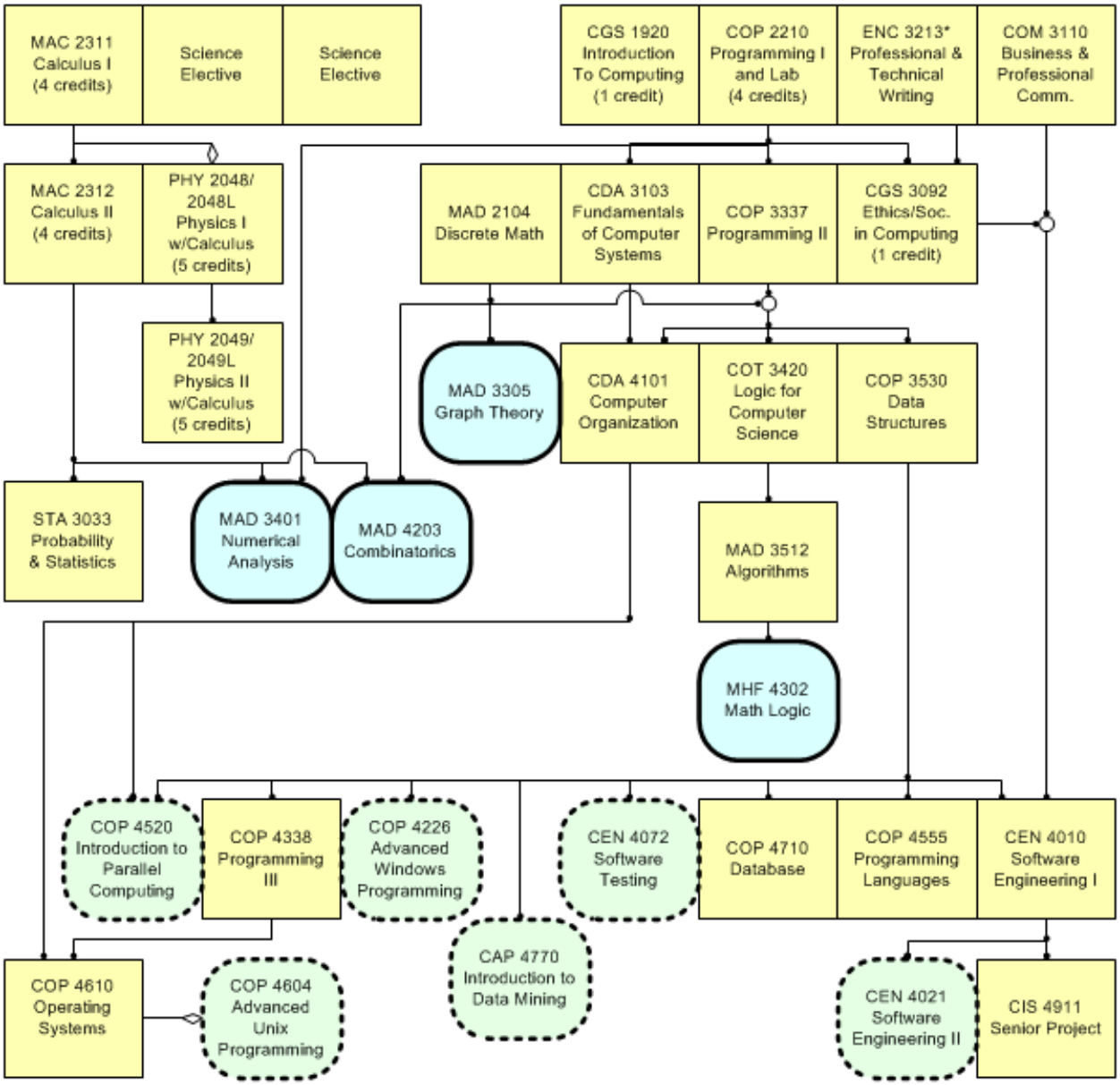
CS Science Elective Courses

CS students are required to take **two** additional one-semester courses in science for science majors with strong emphasis on quantitative methods

Acceptable lower division courses: BSC1010, BSC1011, CHM1045, CHM1046, GLY1010, GLY1100

Acceptable upper division courses: Upper division courses that have at least one of the acceptable lower division courses or PHY2048 or PHY2049 as a prerequisite. Students can find available upper division courses in Biology, Chemistry, Earth Sciences, Physics with prefixes of AST, BOT, GLY, MET, OCB, PCB, PHY, ZOO.

Bachelor of Science in Computer Science
Computer Science Track



* ENC 3213 prerequisites: complete the UCC English requirements

Effective 01/2010

Bachelor of Science in Computer Science
Computer Science Track
Plan of Study

Freshman Year - 30 Credits

CGS 1920 - Introduction to Computing (1 credit)
MAC 2147 - Pre-calculus, if needed, or General Electives (3 credits)
MAC 2311 - Calculus I (4 credits)
MAC 2312 - Calculus II (4 credits)
CS Science Elective (3 credits)
UCC courses (15 credits)

Sophomore Year - 30 credits

COP 2210 - Computer Programming I (4 credits)
PHY 2048/PHY 2048L - Physics I w/Calculus (5 credits)
PHY 2048/PHY 2048L - Physics II w/ Calculus (5 credits)
MAD 2104 - Discrete Mathematics (3 credits)
UCC Life Science and Lab (4 credits) Choose from: BSC 1010, BSC 1011 and corresponding lab
UCC courses (6 credits)
General Electives (3 credits)

Junior Year - 30 credits

CDA 3103 Fundamentals of Computer Systems (3 credits)
COP 3337 Computer Programming II (3 credits)
ENC 3213 - Professional and Technical Writing (3 credits)
COM 3110 Business and Professional Communications (3 credits)
STA 3033 - Introduction to Probability and Statistics for CS (3 credits)
CGS 3092 Professional Ethics and Social Issues in Computing (1 credit)
COP 3530 - Data Structures (3 credits)
COT 3420 - Logic for Computer Science (3 credits)
CDA 4101 - Structured Computer Organization (3 credits)
CS Elective (3 credits) General Electives (2 credits)

Senior Year - 30 credits

COP 4338 - Computer Programming III (3 credits)
MAD 3512 - Theory of Algorithms (3 credits)
CEN 4010 - Software Engineering (3 credits)
COP 4555 - Principles of Programming Languages (3 credits)
COP 4710 - Database (3 credits)
COP 4610 - Operating Systems Principles (3 credits)
CIS 4911 - Senior Project (3 credits)
CS Electives (6 credits)
General Electives (3 credits)

For students who are deficient in a foreign language, the general electives should include a two-semester sequence in one foreign language.

Students are required to earn at least nine credit hours prior to graduation by attending one or more summer semesters at FIU or any other University in the Florida State system.

Bachelor of Science in Computer Science

Software Development Track

There are two tracks available in the upper division program for Computer Science. The Computer Science (CS) track should be followed by the student who intends to continue to graduate study in computer science. The Software Design and Development (SDD) track may be followed by the student who intends to pursue a software engineering career. This section explains the requirements for the Software Design track.

Prerequisites

Students must complete Computer Programming in Java or C++ at an acceptable level, Calculus through infinite series (and including trigonometric functions), and Physics. For a student who has not completed these prerequisites, the courses at FIU that satisfy them are:

COP 2210	Computer Programming I	PHY 2048	Physics with Calculus I w/Lab
MAC 2311	Calculus I	PHY 2049	Physics with Calculus II w/Lab
MAC 2312	Calculus II		

SDD Core Courses

CDA 3103	Fundamentals of Computer Sys.	COP 3530	Data Structures
CDA 4101	Structured Computer Org.	COP 4338	Computer Programming III
CEN 4010	Software Engineering I	COP 4555	Principles of Prog. Languages
CEN 4021	Software Engineering II	COP 4610	Operating Systems Principles
CEN 4072	Software Testing	COP 4710	Database Management
CGS 1920	Introduction to Computing	COT 3420	Logic for Computer Science
CGS 3092	Ethics/Soc in Computing	ENC 3213	Prof. and Technical Writing
CIS 4911	Senior Project	MAD 2104	Discrete Mathematics
COM 3110	Business Prof. Communications	MAD 3512	Intro to Theory of Algorithms
COP 3337	Computer Programming II	STA 3033	Intro to Prob. and Stat. for CS

SDD Elective Courses

Choose **one** from this list:

CAP 4770	Data Mining	COP 4520	Into to Parallel Computing
COP 4226	Advanced Windows Programming	COP 4604	Advanced UNIX Programming

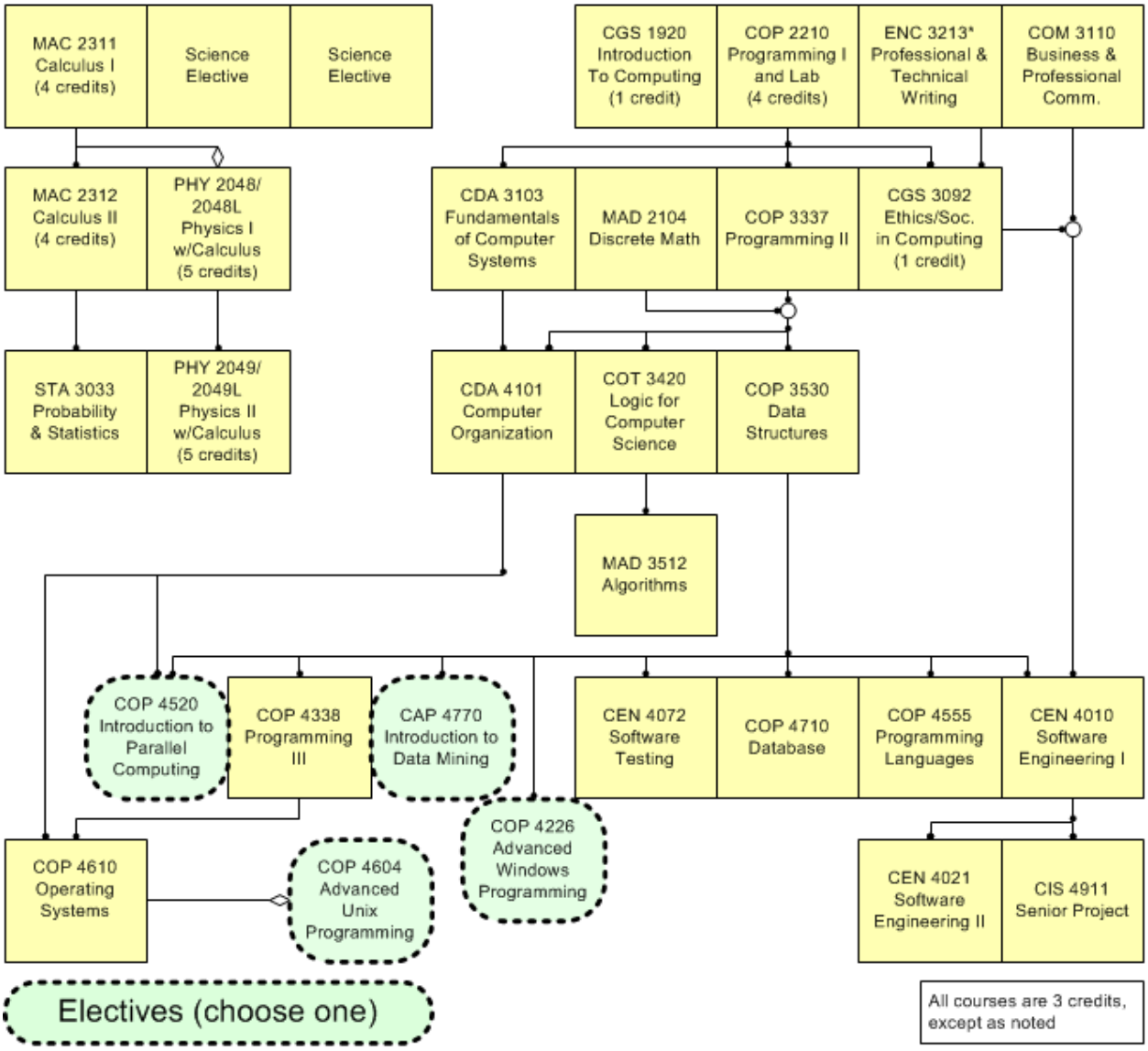
SDD Science Elective Courses

CS students are required to take **two** additional one-semester courses in science for science majors with strong emphasis on quantitative methods

Acceptable lower division courses: BSC1010, BSC1011, CHM1045, CHM1046, GLY1010, GLY1100

Acceptable upper division courses: Upper division courses that have at least one of the acceptable lower division courses or PHY2048 or PHY2049 as a prerequisite. Students can find available upper division courses in Biology, Chemistry, Earth Sciences, Physics with prefixes of AST, BOT, GLY, MET, OCB, PCB, PHY, ZOO.

Bachelor of Science in Computer Science
Software Design Track



* ENC 3213 prerequisites: complete the UCC English requirements

Effective 08/2011

Bachelor of Science in Computer Science
Software Development Track
Plan of Study

Freshman Year - 30 Credits

CGS 1920 - Introduction to Computing (1 credit)
MAC 2147 - Pre-calculus, if needed, or General Electives (3 credits)
MAC 2311 - Calculus I (4 credits)
MAC 2312 - Calculus II (4 credits)
CS Science Elective (3 credits)
UCC courses (15 credits)

Sophomore Year - 30 credits

COP 2210 - Computer Programming I (4 credits)
PHY 2048/PHY 2048L - Physics I w/Calculus (5 credits)
PHY 2048/PHY 2048L - Physics II w/ Calculus (5 credits)
MAD 2104 - Discrete Mathematics (3 credits)
UCC Life Science and Lab (4 credits) Choose from: BSC 1010, BSC 1011 and corresponding lab
UCC courses (6 credits)
General Electives (3 credits)

Junior Year - 30 credits

CDA 3103 - Fundamentals of Computer Systems (3 credits)
COP 3337 - Computer Programming II (3 credits)
ENC 3213 - Professional and Technical Writing (3 credits)
COM 3110 - Business and Professional Communications (3 credits)
STA 3033 - Introduction to Probability and Statistics for CS (3 credits
COP 3530 - Data Structures (3 credits)
COT 3420 - Logic for Computer Science (3 credits)
CDA 4101 - Structured Computer Organization (3 credits)
CGS 3092 - Professional Ethics and Social Issues in Computing (1 credit)
General Electives (5 credits)

Senior Year - 30 credits

COP 4338 - Computer Programming III (3 credits)
MAD 3512 - Theory of Algorithms (3 credits)
CEN 4010 - Software Engineering (3 credits)
COP 4710 - Database (3 credits)
COP 4555 - Principles of Programming Languages (3 credits)
COP 4610 - Operating Systems Principles (3 credits)
CEN 4021 - Software Engineering II (3 credits)
CEN 4072 - Software Testing (3 credits) CIS 4911 - Senior Project (3 credits)
CS Elective (3 credits)

For students who are deficient in a foreign language, the general electives should include a two-semester sequence in one foreign language.

Students are required to earn at least nine credit hours prior to graduation by attending one or more summer semesters at FIU or any other University in the Florida State system.

Bachelor of Science in Computer Science
Master in Computer Science for current CS undergraduate students (4+1 Program)

The program should be followed by the student who wants to get a head start on the Master's degree. Graduate Program Director or Academic Advisor identifies students who are eligible for admission to the combined degree program.

Eligibility Requirements

Must be currently enrolled as a degree-seeking FIU undergraduate student

Must have earned at least 70 to 90 credits toward their bachelor's degree

If over 90 credits completed, must not have started the last 30 credits, final year, of their bachelor's degree

Must meet all of the graduate admissions requirements for the master's degree program. Note: The combined programs in CEC require between a 3.25 and 3.3 GPA, depending on the major, on both the overall and upper-division coursework. Please see program description in graduate catalog for applicable GPA requirement.

Application Process

Eligible students print out and complete the combined degree application available online at http://gradschool.fiu.edu/downloads/4+1_Application_New_2009R.pdf

The Graduate Program Director for the master's program must sign the bottom of the form, stating that the student has met all of the admissions requirements as stated above.

The completed and signed application should be submitted along with a non-refundable **$30.00 Application Fee** (payable to "Florida International University") to **Ms. Maria Parrilla** in the **Engineering Dean's Office, EC 2430,** or to the Graduate Admissions Office, PC 230.

Since the application has been signed off by the GPD of the program, the student's application is automatically updated in PantherSoft as an admission to the program. The admission letter is then printed and sent to the student.

Program Progression after Admission

Registration: Admitted students meet with the Graduate Program Director or Advisor to map out the graduate coursework that will be counted for both programs. (Only 5000 or higher-level courses and no more than 6-12 graduate credits, as specified in the catalog description for the program, can be applied to both degree programs.)

Graduation from BS program: Students are expected to apply for graduation from their bachelor's degree in the semester in which their undergraduate requirements will be met. (Note: students who have yet to graduate from the bachelor's degree are considered undergraduates and are therefore ineligible for graduate assistantships and other graduate benefits.)

Entry into Graduate Program: Once the bachelor's degree is posted, students are automatically enrolled into the master's degree program.

Graduation from MS Program: Students are expected to graduate from the master's degree program within a year of completing their bachelor's degree. NOTE: Both degrees cannot be awarded in the same semester.

Gerneral Requirements

Completed Bachelor's degree in Computer Science at FIU

Coursework:

Required:

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CEN 5011  Advanced Software Engineering     COT 5420  Theory of Computation I
COP 5725  Principles of Database Management COT 5407  Introduction to Algorithms
COP 5614  Operating Systems
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Required courses must be completed with an average of "B" or higher, and only one course may receive a grade less than "B-".

Elective: 5 courses selected from the SCS Graduate Course Offerings

Overlap: Up to 4 courses (12 credits) may be used in satisfying both the Bachelor's and Master's degree requirements. Courses must be 5000-level SCS Graduate courses.

5000-level Graduate Course	Satisfies BS Requirement
CEN 5011 Advanced Software Engineering	CEN 4010 Software Engineering
COP 5725 Principles of Database Management	COP 4710 Database
COP 5614 Operating Systems	COP 4610 Operating Systems
COT 5420 Theory of Computation I	MAD 3512 Algorithms
COT 5407 Introduction to Algorithms	Any Set 2 elective *
CEN 5120 Expert Systems	Any Set 1 elective *
CEN 5076 Software Testing	Any Set 1 elective *
CAP 5602 Artificial Intelligence	Any Set 1 elective *
COP 5621 Compiler Construction	Any Set 1 elective *
CAP 5771 Principles of Data Mining	Any Set 1 elective *

* The courses in each elective set are defined in cs.php#CSElectiveCourses .

Minor in Computer Science

Required Courses

Students must take all of these courses:

CDA 3103	Fundamentals of Computer Systems	COP 3337	Computer Programming II
COP 2210	Computer Programming I		

Elective Courses

Two courses must be selected from the following list:

CAP 4770	Introduction to Data Mining	COP 4338	Programming III
CDA 4101	Structured Computer Organization	COP 4520	Intro to Parallel Computing
CEN 4010	Software Engineering	COP 4555	Programming Languages
COP 3530	Data Structures	COP 4710	Database Management
COP 4226	Advanced Windows Programming	COT 3420	Logic for Computer Science

NOTE: Student should ensure that he or she has the necessary prerequisites for the chosen courses.

Other Requirements

At least nine of the credits for the minor must be taken from SCIS and cannot be applied to the major program of the student.

A grade of "C" or better must be obtained in all courses required for the minor.

NOTE: A "C-" is not an acceptable grade.

Undergraduate Course Offerings

Definition of Prefixes CAP-Computer Applications; CDA-Computer Design/Architecture;CEN-Computer Software Engineering; CGS-Computer General Studies; CIS-Computer Information Systems; CNT-Computer Networks; COP-Computer Programming; COT-Computing Theory; CTS-Computer Technology and Skills

CAP 4710 Principles of Computer Graphics (3). A first course in algorithms/techniques for image generation devices, geometric transformations/matrics, algorithms for hidden surfaces, ray tracing, advanced rendering. Programming with standard graphics interface. Prerequisites: COP 3337 and MAC 2312. This course will have additional fees.

CAP 4770 Introduction to Data Mining (3). Data mining applications, data preparation, data reduction and various data mining techniques such as association, clustering, classification, anomaly detection. Prerequisite: COP 3530. Corequisite: COP 4710.

CDA 4101 Structured Computer Organization (3). Covers the levels of organization in a computer: Design of memory, buses, ALU, CPU; design of microprogram. Covers virtual memory, I/O, multiple processes, CISC, RISC and parallel architectures. Prerequisites: MAD 2104, CDA 3103 and COP 3337. This course will have additional fees.

CDA 4400 Computer Hardware Analysis (3). The study of storagehardware functions of a basic computer. Topics include logic elements, arithmetic logic units, control units, memory devices, organization and I/O devices. Prerequisite: CDA 4101.

CEN 3721 Introduction to Human Computer Interaction (3). Fundamental concepts of human-computer interaction, cognitive models, user-centered design principles and evaluation, emerging technologies Prerequisites: COP 2250 or equivalent. This course will have additional fees.

CEN 4010 Software Engineering I (3). Software Process Model, software analysis and specification, software design, testing. Prerequisites: COM 3110, CGS 3092 and COP 3530. This course will have additional fees.

CEN 4012 Software Design and Development Project (3). Students design, implement, document, and test software systems working in faculty supervised project teams and utilizing knowledge obtained in previous courses. Required for Software Design and Development track. Prerequisite: CEN 4010. This course will have additional fees.

CEN 4021 Software Engineering II (3). Issues underlying the successful development of large scale software projects: Software Architectures; Software Planning and Management; Team Structures; Cost Estimation. Prerequisite: CEN 4010. This course will have additional fees.

CEN 4072 Fundamentals of Software Testing (3). Fundamentals of software testing. Topics include: test plan creation, test case generation, program inspections, specification-based and implementation-based testing, GUI testing, and testing tools. Prerequisite: COP 3530.

CGS 1920 Introduction to Computing (1). Overview of the computing field to students, research programs and career options.

CGS 2060 Introduction to Microcomputers (3). A hands-on study of microcomputer software packages for applications such as operating system, word processing, spreadsheets, and database management. For students without a technical background. Not acceptable for credit for Computer Science majors.

CGS 2100 Intro to Microcomputer Applications for Business (3). A hands-on study of spreadsheet and database management packages for business students without a technical background. Not acceptable for credit for Computer Science majors.

COP 2270 C for Engineers (3). A first course in programming geared for engineering and natural science students that describes the syntax and semantics of ANSI C programming language. Includes developing algorithms and writing for problems in engineering and science.

CGS 2518 Computer Data Analysis (3). A hands-on study of how to use a modern spreadsheet program to analyze data, including how to perform queries, summarize data, and solve equations. For non-technical students. Not acceptable for CS students.

CGS 3092 Professional Ethics and Social Issues in Computing (1). Ethical, legal, social issues and the responsibility of computer professionals. Codes of conduct, risks and reliability, responsibility, liability, privacy, security, free speech issues. Prerequisite: ENC 3213 and (COP 2210 or COP 2250).

CGS 3416 Web-based Programming (3). A programming course in Java with emphasis on web-based applications: Applets; Components; Servlets; Java Beans. Not acceptable for credit for Computer Science majors. Prerequisites: COP 2250 and MAD 1100. This course will have additional fees.

CGS 3559 Using the Internet (1). Internet history and importance. What is available on the Net. Tools such as email, listserves, telnet, ftp, Archie, Veronica, Gopher, netfind, the World Wide Web, Wais, and Mosaic. Nontechnical. Prerequisite: CGS 2060 or equivalent.

CGS 3767 Computer Operating Systems (3). Introduction to fundamental concepts of operating systems and their implementation in UNIX and Windows. Prerequisites: COP-2250 OR COP-2210

CGS 4285 Applied Computer Network (3). Principles of computer network design, operation and management. Network protocols. Network configuration. Network security. Not acceptable for credit for Computer Science majors. Prerequisite: CGS 3767. This course will have additional fees.

CGS 4365 Knowledge-Based Management Systems (3). Introduction to knowledge-based and expert systems. Knowledge acquisition, knowledge representation, and creation of expert system. Not acceptable for credit for Computer Science majors. Prerequisite: COP 4703. This course will have additional fees.

COP 4703 Information Storage and Retrieval Concepts (3). Introduction to information management and retrieval concepts. The design and implementation of a relational database using a commercial DBMS. Online information retrieval and manipulation. Not acceptable for credit for Computer Science majors. Prerequisite: COP 3804. This course will have additional fees.

CGS 4854 Website Construction and Management (3). The fundamentals of creating and maintaining a website. Installation and maintenance of a web-server. Techniques for building multimedia interactive web-pages. Not acceptable for credit for Computer Science majors. Prerequisites: CGS 3767 and (COP 3804 or COP 3337). This course will have additional fees.

CIS 3900 Independent Study (1-5). Individual conferences, assigned readings, and reports on independent investigations.

CIS 3930 Special Topics (1-5). A course designed to give groups of students an opportunity to pursue special studies not otherwise offered.

CIS 4431 IT Automation (3). IT automation: mgmt models, auditing, assets, change mgmt, network monitoring, OS imaging, patch mgmt, help desk, remote control, user state mgmt, end-point security, backup, disaster recovery. Corequisite: CGS 4285 or permission of the instructor.

CIS 4905 Independent Study (1-20). Individual conferences, assigned readings, and reports on independent investigations.

CIS 4911 Senior Project (3). Students work on faculty supervised projects in teams of up to 5 members to design and implement solutions to problems utilizing knowledge obtained across the spectrum of Computer Science courses. Prerequisite: Permission of the instructor.

CIS 4912 Research Experience for Undergraduate Students (0-9). Participation in ongoing research in the research centers of the school.

CNT 4403 Computing and Network Security (3). Fundamental concepts and principles of computing and network security, symmetric and asymmetric cryptography, hash functions, authentication, firewalls and intrusion detection, and operational issues. Prerequisites: CGS-4285 and COP 3804

CNT 4504 Advanced Network Management (3). Advanced principles of modern internetworking network design and implementation. Hands on experience with routers and switches and core Internet support protocols. Prerequisites: CNT 45513

CNT 4513 Data Communications (3). Fundamental concepts and principles of computing and network security, symmetric and asymmetric cryptography, hash functions, authentication, firewalls and intrusion detection, and operational issues. Prerequisites: CGS 4285 and COP 3804.

COP 1000 Introduction to Computer Programming (3). Uses graphics and animation in a media programming environment to engage students with no programming experience. Students develop problem solving skills and learn fundamental programming concepts.

COP 2210 Computer Programming I (4). A first course in computer science that uses a structured programming language to study programming and problem solving on the computer. Includes the design, construction and analysis of programs. Student participation in a closed instructional lab is required. This course will have additional fees.

COP 2250 Programming in Java (3). A first course in programming for IT majors. Syntax and semantics of Java. Classes and Objects. Object oriented program development. Not acceptable for credit for Computer Science majors. This course will have additional fees.

COP 3175 Programming in Visual Basic (3). An introduction to Visual Basic programming with emphasis on Business Applications. Not acceptable for credit for Computer Science majors. Prerequisites: CGS 2100 or CGS 2060. This course will have additional fees.

COP 3337 Computer Programming II (3). An intermediate level course in Object Oriented programming. Topics include primitive types, control structures, strings arrays, objects and classes, data abstraction inheritance polymorphism and an introduction to data structures. Prerequisite: COP 2210 or EEL 2880. This course will have additional fees.

COP 3353 Introduction to Using Unix/Linux Systems (3). Techniques of Unix/Linux systems. Basic use, file system structure, process system structure, unix tools (regular expressions, grep, find), simple and complex shell scripts, Xwindows. Not acceptable for credit for Computer Science majors. Prerequisites: COP 2210 or COP 2250 or equivalent. This course will have additional fees.

CDA 3103 Fundamentals of Computer Systems (3). Overview of computer systems organization. Data representation. Machine and assembly language programming. Prerequisites: COP 2210 or equivalent. This course will have additional fees.

COP 3465 Data Structures for IT (3). Basic concepts of running time of a program, data structures including lists, stacks, queues, binary search trees, and hash tables, and internal sorting. Not acceptable for credit for CS majors. Prerequisite: Programming II (IT). This course will have additional fees.

COP 3530 Data Structures (3). Basic concepts of data organization, running time of a program, abstract types, data structures including linked lists, nary trees, sets and graphs, internal sorting. Prerequisites: MAD 2104 and COP 3337. This course will have additional fees.

CDA 3003 Microcomputer Organization (3). A study of the hardware components of modern microcomputers and their organization. Evaluation and comparison of the various microcomputer systems. Not acceptable for credit for Computer Science Majors. Prerequisite: COP 2250. This course will have additional fees.

COP 3804 Intermediate Java Programming (3). A second course in Java programming. Continues Programming in Java by discussing object-oriented programming in a more detail, with larger programming projects and emphasis on inheritance. Not acceptable for credit for CS majors. Prerequisite: COP 2250. Corequisite: CEN 3721. This course will have additional fees.

COP 3832 Advanced Web Server Communication (3). Maintain a web server on the Internet. Learn HTML, PERL, Javascript. Configure the Apache web server. Write interactive server scripts. Discuss Web security & ASP. Use Java applets and ActiveX controls. Prerequisites: CGS 3559, COP 2210 or equivalents. This course will have additional fees.

COP 3835 Designing Web Pages (3). Designing basic pages for display on the World Wide Web. Fundamental design elements and contemporary design tools are discussed. Computer literacy is expected..

COP 3949 Cooperative Education in Computer Science (1-3). One semester of full-time work, or equivalent, in an outside organization, limited to students admitted to the CO-OP program. A written report and supervisor evaluation is required of each student. Prerequisites: MAC 2312 and COP 3337.

COP 4005 Windows Programming for IT Majors (3). Application development techniques in Windows: Visual Basic Classes, Objects, Controls, Forms and Dialogs, Database, Active X and Internet Programming and Enterprise Application Architecture. Not acceptable for credit for CS Majors. Prerequisite: COP 3804 or COP 3337. Corequisite: COP 4703. This course will have additional fees.

COP 4009 Windows Components Technology (3). Component-Based and Distributed Programming Techniques: C#, Common Type System, Windows and Web Forms, Multithreading, Distributed Objects. Prerequisites: COP 4226 or COP 4005. This course will have additional fees.

COP 4604 Advanced Unix Programming (3). Unix overview: files and directories, shell scripting and systems programming. Unix tools; Internals: file systems, process structure. Using the system call interface. Interprocess communication. Prerequisite: COP 4338. Corequisite: COP 4610. This course will have additional fees.

COP 4226 Advanced Windows Programming (3). Document and Dialog Based App, Message Passing, Printing, Drawing, GUI Design, Common Controls, Multithreaded Programming, Serialization, Database Connectivity, Runtime Libraries, Memory Management. Prerequisite: COP 3530. This course will have additional fees.

COP 4338 Computer Programming III (3). Topics include Object-Oriented programming Concepts and Modern Programming Techniques. Prerequisite: COP 3530. This course will have additional fees.

COP 4520 Introduction to Parallel Computing (3). This course introduces the field of parallel computing. The students will be taught how to design efficient parallel programs and how to use parallel computing techniques to solve scientific problems. Prerequisites: COP 3530 and (CDA 4101 or EEL 4709C). .

COP 4710 Database Management (3). Logical aspects of databases including Relational, Entity-Relationship, and Object-Oriented data models, database design, SQL, relational algebra, tuple calculus, domain calculus, and physical database organization. Prerequisite: COP 3530. This course will have additional fees.

COP 4555 Principles of Programming Languages (3). A comparative study of several programming languages and paradigms. Emphasis is given to design, evaluation and implementation. Programs are written in a few of the languages. Prerequisite: COP 3530. This course will have additional fees.

COP 4610 Operating Systems Principles (3). Operating systems design principles and implementation techniques. Address spaces, system call interface, process/threads, interprocess communication, deadlock, scheduling, memory, virtual memory, I/O, file systems. Prerequisites: CDA 4101 and COP 4338. This course will have additional fees.

COP 4655 Mobile Application Development (3). Design and development of mobile applications. Introduction to the mobile application frameworks, including user interface, sensors, event handling, data management and network interface. Prerequisite: COP 4814

COP 4722 Survey of Database Systems (3). Design and management of enterprise systems; concurrency techniques; distributed, object-oriented, spatial, and multimedia databases; databases integration; datawarehousing and datamining; OLAP; XML interchange. Prerequisites: COP 4703 or COP 4710.

CTS 4408 Database Administration (3). Client-server architecture; planning, installation, server configuration; user management; performance optimization; backup, restoration; security configuration; replication management; administrative tasks. Prerequisites: COP 4703 or COP 4710.

COP 4813 Web Application Programming (3). Creating Web applications with user interfaces, databases, state management, user authentication, error handling, and web services. Prerequisites: CGS 4854 and COP 4005.

COP 4814 Component-Based Software Development (3). Concept of software components, component models and web services such as WSDL and SOAP. Prerequisites: COP 4703 AND CGS 4854.

COP 4906 Research Experiences in Computer Science (1-3). Participation in ongoing research in the research centers of the school. Prerequisite: Permission of the instructor.

COP 4949 Cooperative Education in Computer Science (1-3). One semester of full-time work, or equivalent, in an outside organization, limited to students admitted to the CO-OP program. A written report and supervisor evaluation is required of each student. Prerequisites: MAC 2312, STA 3033 and COP 3337.

COT 3420 Logic for Computer Science (3). An introduction to the logical concepts and computational aspects of propositional and predicate logic, as well as to concepts and techniques underlying logic programming, in particular, the computer language Prolog. Prerequisites: COP 3337 and MAD 2104. This course will have additional fees.

CTS 2327 Microsoft Windows NT Administration (3). A two-part course covering introduction to Networking and the Windows NT Operating System. This course will cover material that is covered on the Microsoft Certified systems Engineer (MCSE) exam. Prerequisites: CGS 2060, or CGS 2100, or equivalent. This course will have additional fees.

CTS 4348 Unix System Administration (3). Techniques of Unix system administration: system configuration and management; user setup, management and accounting; software installation and configuration; network setup, configuration and management. Prerequisite: COP 3353.

Faculty and Research Interests

S. S. IYENGAR	Ryder Professor and Director, Ph.D., Mississippi State University 1974. Computational Sensor Networks; Parallel and Distributed Algorithms.
MARK WEISS	Associate Director; Professor, Ph.D., Princeton, 1987. Data Structures and Algorithm Analysis.
WALID AKACHE	Instructor, M.S. Miami 1984. Computer Science.
DAVID BARTON	Professor, Ph.D., Cambridge 1966. Distributed systems and data communications.
TOBY BERK	Professor Emeritus, Ph.D., Purdue, 1972. Computer graphics and operating systems.
BOGDAN CARBUNAR	Assistant Professor, Ph.D., Purdue University. Data and Network Security, Applied Cryptography, Distributed Algorithms.
SHU-CHING CHEN	Associate Professor, Ph.D., Purdue University, West Lafayette, Indiana 1998. Electrical and Computer Engineering.
PETER CLARKE	Assistant Professor, Ph.D., Clemson University 2003. Software Engineering, Software Testing, Software Maintenance, and Programming Languages.
TIM DOWNEY	Senior Instructor, M.S., SUNY Albany 1986. Computer Science.
XUDONG HE	Professor, Ph.D., Virginia Polytechnic Institute & State University, 1989. Computer Science.
VAGELIS HRISTIDIS	Associate Professor, Ph.D., University of California 2004. Computer Science.
KIP IRVINE	Senior Instructor, M.S., University of Miami, 1995. Computer Science.
BILL KRAYNEK	Professor Emeritus, Ph.D., Carnegie Mellon., 1968. Programming languages and Computer Science Education.
TAO LI	Assistant Professor, Ph.D., University of Rochester, 2004. Computer Science.
CHRISTINE LISETTI	Associate Professor, Ph.D., Florida International University, 1995. Affective Computing, Human-Computer Interaction, Human-Robot Interaction.
XIAOWEN LIU	Assistant Professor, Ph.D., Dartmouth College, 2003. Modeling and Simulation, Parallel Computing.
MASOUD MILANI	Associate Professor, Ph.D., Central Florida 1986. Programming language environments.
JAINENDRA NAVLAKHA	Professor, Ph.D., Case Western Reserve 1977. Analysis of algorithms program verification software metrics.
GIRI NARASIMHAN	Professor, Ph. D., University of Wisconsin, 1989. Design and Analysis of Algorithms, Experimental Algorithms, Computational Statistics, Neural Networks and Genetic Algorithms, Graph Theory and Combinatorics.
DENG PAN	Assistant Professor, Ph.D., University of New York at Stony Brook, 2007. High Speed Networking, Network Security.
ALEXANDER PELIN	Associate Professor, Ph.D., Pennsylvania 1977. Automated reasoning.
NORMAN PESTAINA	Senior Instructor, M.S., Penn State 1979. Computer Science.
NIKI PISSINOU	Professor, Ph.D., University of Southern California, 1991.

NAGARAJAN PRABAKAR	Associate Professor, Ph.D., Queensland 1985. Database systems, graphics.
RAJU RANGASWAMI	Assistant Professor, Ph.D. University of California Santa Barbara 2004. Computer Science.
NAPHTALI RISHE	Professor, Ph.D., Tel-Aviv 1984. Database Management and Systems.
MASOUD SADJADI	Associate Professor, Ph.D., Michigan State University 2004. Computer Science.
GREGORY SHAW	Instructor, M.S., Barry University 1992.
TIANA SOLIS	Visiting Instructor, M.S., N.Y.I.T. 1994 .
GOEFFREY SMITH	Associate Professor, Ph.D., Cornel University, 1991. Programming languages and semantics: type systems, computer security.
JOSLYN SMITH	Instructor, M.S., Canada. 1994.
JINPENG WEI	Assistant Professor, Ph.D., Georgia Tech, 2009. System Software Security, Applications of System Virtualization.
JILL WEISS	Instructor, M.S. Barry University 1992.
ZHENYU YANG	Assistant Professor, Ph.D., University of Illinois at Urbana-Champaign, 2007. 3D Tele-immersive Environments.
MING ZHAO	Assistant Professor, Ph.D., University of Florida, 2008. Distributed/Grid Computing, Virtualization, High-performance Systems, Autonomic Computing.