

Computer Science

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Computer Science Degrees

Computer Science Major (BA)

Associate Professors: Marcus Birkenkrahe and David Sonnier

Computer Science is a rapidly changing and exciting field. Its impact on our lives is evidenced by the variety of uses of information technology in business, industry, entertainment, science, and government, to name a few. The Computer Science Major focuses on the foundations of the computer sciences including areas such as software and hardware design, mathematical foundations of computer science, and complexity of computation. The program is designed to give students an enduring foundation for future professional growth. The program blends theory and practice into a learning experience that gives students the capability to apply computer and information systems technology to a wide range of disciplines.

- MTH 115 and MTH 210 may also be used to satisfy core requirements.

NOTE: To graduate with a Bachelor of Arts or Bachelor of Science degree from Lyon College, students must successfully complete a minimum of 120 semester credit hours comprised of our required Core curriculum (44-48 hours), the requirements of at least one major (credit hours vary per major), and a selection of our Liberal Arts electives. They must also earn at least a 2.00 cumulative grade point average for all work taken at Lyon College and a 2.00 cumulative grade point average in their major, minor, and concentration.

Summary of Requirements for a Major in Computer Science

Item #	Title	Credits
	MTH 115 or MTH 290	3
MTH 210	Calculus I	4
CSC 100	Introduction to Programming in C++	3
CSC 240	Data Structures with C++	3
CSC 245	Introduction to Digital Logic	3
CSC 255	Computer Architecture	3
CSC 265	Algorithms	3
CSC 310	Mathematical Foundations of Computer Science	3
CSC 320	Programming Languages	3
CSC 420	Operating Systems	3
	CSC Electives (9 credits)	9

CORE CURRICULUM

Item #	Title	Credits
	Core Curriculum Requirements (In addition to Major hours)	44-48
	Total Credits	84-88

MTH 115 or MTH 290

Item #	Title	Credits
MTH 115	Discrete Mathematics	3
MTH 290	Foundations of Modern Mathematics	3

CSC Electives (9 credits)

3 electives at the 300/400 level; one may be a 300/400 level MTH class.

Computer Science Minor

The Computer Science minor is a course of study designed for students who wish to obtain a working knowledge of Computer Science fundamentals, to include computational theory, discrete structures, and the application of Logic to both hardware and software development. A minor in Computer Science can enhance the value of a wide variety of majors.

Students may develop an individualized major by doing research or taking an internship.

NOTE

* Students may use MTH 115 and MTH 210 to satisfy core requirements.

Summary of Requirements for a Minor in Computer Science

Item #	Title	Credits
	MTH 115 or MTH 290	3
MTH 210	Calculus I	4
CSC 100	Introduction to Programming in C++	3
CSC 240	Data Structures with C++	3
CSC 245	Introduction to Digital Logic	3
CSC 265	Algorithms	3
	CSC Elective (3 credits)	3
	Total Credits	22

MTH 115 or MTH 290

Item #	Title	Credits
MTH 115	Discrete Mathematics	3
MTH 290	Foundations of Modern Mathematics	3

CSC Elective (3 credits)

One Computer Science elective.

Computer Science (CSC) Courses

CSC 100: Introduction to Programming in C++

An introduction to structured programming, including conditional statements, loops, functions, input, output, and use of various data types. Object-oriented features are introduced.

Credits 3

Prerequisites

MTH 101 or MTH 103

CSC 105: Digital Humanities

An introduction to the theory and methods of Digital Humanities. Topics will include digital text encoding (XML), text computation and analysis, data visualization, and geographic information system (GIS) mapping.

Credits 3

CSC 109: Introduction to Programming in Python

This course assumes students have no prior programming experience and then introduces them to the Python programming language. Topics include basic programming concepts, problem-solving methods, algorithm development, program design and learning the use of packages/ libraries useful for data processing tasks.

Credits 3

Prerequisites

MTH 101

CSC 115: Introduction to Programming in Java

An introduction to object-oriented programming using Java. Topics include problem-solving methods, algorithm development, program design, testing, debugging, and documentation.

Credits 3

Prerequisites

MTH 101 or MTH 103

CSC 230: Web Development

This course introduces basic web page development techniques. Topics include HTML, CSS, scripting languages, and commercial software packages used in the development of web pages. The course also includes detailed discussion of design practices, such as the appropriate use of text and graphics, font and color selection, navigation techniques, media formats, and methods of enhancing the user experience. At the conclusion of this course, students will be able to use specified markup languages to develop basic web pages.

Credits 3

Prerequisites

CSC 100, CSC 109, or CSC 115

CSC 240: Data Structures with C++

Fundamentals of data structures as they are used for the efficient storage and manipulation of data. Topics include common data structures that are used in various computational problems, such as stacks, queues, trees, lists, and heaps

Credits 3

Prerequisites

MTH 115 or MTH 290 **and** CSC 100, CSC 109, or CSC 115

CSC 245: Introduction to Digital Logic

An introduction to digital electronic circuits and techniques. Boolean algebra, digital logic gates, registers, automata theory, and integrated circuits.

Credits 3

Prerequisites

MTH 115 or MTH 290

CSC 255: Computer Architecture

Introduction to computer organization and the basic structure of a modern programmable computer. Topics covered include the von Neumann architecture, the CPU, pipelining, memory hierarchy, assembly/ machine language, and the basic laws underlying performance evaluation.

Credits 3

Prerequisites

CSC 240 and CSC 245

CSC 265: Algorithms

Study of algorithmic paradigms including divide and conquer algorithms, greedy methods, dynamic programming, heuristics, and probabilistic algorithms.

Credits 3

Prerequisites

CSC 240

CSC 301: Junior Internship

Practical experience through a supervised internship. Students can conduct their internships on-site, working under the supervision of computing/automation/IT professionals, or on eIntern.

Credits 1-2

Prerequisites

CSC 100 and permission of instructor

CSC 310: Mathematical Foundations of Computer Science

Introduction to mathematical topics as they relate to computer science, such as finite state automata, regular expressions, context-free grammars, Turing machines, and unsolvability.

Credits 3
Prerequisites
CSC 265

CSC 320: Programming Languages

A study of programming languages, their data, paradigms, and design and implementation issues. Topics include language representation, control structures, binding, run-time environment, exception handling, information handling, encapsulation and static and dynamic types.

Credits 3
Prerequisites
CSC 310

CSC 330: Database Theory and Application

An introduction to the theory of databases, database design, and database application development. Topics include database models such as relational, network, hierarchical, object-oriented, and distributed. Students will apply this theory to the development of an actual database application.

Credits 3
Prerequisites
MTH 115 or MTH 290 **and** CSC 100, CSC 109, or CSC 115

CSC 401: Senior Internship

Practical experience through a supervised internship. Students can conduct their internships on-site, working under the supervision of computing/automation/IT professionals, or on eIntern.

Credits 1-2
Prerequisites
CSC 100 and permission of instructor

CSC 410: Data Communications and Networks

An introduction to the theory and practice of computer networks, software protocols, communication hardware, error detection, and handling.

Credits 3
Prerequisites
CSC 265 and CSC 310

CSC 415: Numerical Analysis

Examination of error analysis, interpolation, approximate differentiation, approximate integration, solutions to differential equations, matrix manipulation, and solutions to systems of linear equations. (Same as MTH 415)

Credits 3
Prerequisites
CSC 100, CSC 109, or CSC 115 **and** MTH 300 and

CSC 420: Operating Systems

An introduction to the components and organization of operating systems. Batch, interactive and distributed operating systems will be considered. Other topics include multiprogramming, multiprocessing, concurrent programming, memory management, and resource allocation.

Credits 3

Prerequisites

CSC 265

CSC 450: Independent Study

Individual work on special topics in computer science.

Credits 1-3

Prerequisites

Permission of instructor.

CSC 482: Special Topics in Computer Science

Study of selected topics in computer science. Prerequisites will vary.

Credits 3