Table of Contents

LaGrange College

Course Catalog - Computer Science

Minor in Computer Science - Minor in Computer Science

Type: Minor

The minor in computer science is comprised of courses taken at LC and courses taken at partner institutions. Students must take at least six credit hours at the 3000-level or higher to earn the minor.

Courses in the following categories marked with a (P) may be taken through partner institutions.

- Introduction to Computer Science (P)
- MATH 2230 or an introductory programming course (P)
- Second programming course (P)
- MATH 3380 or similar discrete mathematics course (P)

- One 3000-level elective. Choose one course, offered by a mathematics or computer science-related department, whose primary focus is from the following list:
    - Data Science, including MATH 3092 or DATA 3000
    - Mathematical Modeling, including MATH 3185
    - Data Structures (P)
    - Algorithms (P)
    - Numerical Methods, including MATH 4410
    - Other course as appropriate for the discipline and as approved by the coordinator.

CSCI 1000 - Introduction to Computer Science

This course is designed as a first course for students who are new to the discipline of computer science. The course aims to equip students with knowledge about careers in the field and skills necessary to understand and solve real-world problems using computational approaches. Students will be given a broad introduction to the fundamental concepts of computer science, including programming, algorithms, data structures, and computer systems.

Upon completion, students will be able to:

- Design and implement simple algorithms to solve computational problems.
- Understand the basics of data structures and their applications in problem-solving.
- Develop an appreciation for the breadth and depth of the field of computer science, and its impact on nearly every aspect of modern life.
- Identify and describe the key components of a computer system, including hardware and software.
- Understand and apply rudimentary programming concepts and techniques in a high-level programming language.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

CSCI 1060 - Introduction to Computers and Technical Support Fundamentals

This course is the first of a series that prepares students for a role as an entry-level IT Support Specialist. In this course, students will be introduced to the world of Information Technology, or IT. Students will also learn about the different facets of Information Technology, like computer hardware, the Internet, computer software, troubleshooting, and customer service.

Upon completion, students will be able to:

- Demonstrate understanding of the binary system.

- Demonstrate assembly of a computer from scratch.
- Express rationale for choosing an operating system for specified applications.
- Demonstrate installation an operating system on a computer.
- Express understanding of the Internet, including what it is, how it works, and the impact it has in the modern world.
- Express understanding how applications are created and how they work on the hardware a computer.
- Demonstrate use of common problem-solving methodologies and soft skills in an Information Technology setting.

Grade Basis: P
Credit hours: 3.0
Lecture hours: 3.0

CSCI 1990 - Introduction to Algorithmic Design

This course is a foundational course for students new to the discipline of computer science. It focuses on the principles of problem-solving and the design of algorithms using an object-oriented, high-level programming language. The course covers structured programming concepts, the process of debugging, and the importance of proper documentation. It aims to equip students with the necessary skills to analyze problems and design efficient algorithms to solve them. Topics include variables, input and output, selection, repetition, and object-oriented programming.

Upon completion, students will be able to:

- Understand and apply structured programming concepts in a high-level programming language.
- Design, implement, and analyze algorithms to solve a variety of computational problems.
- Debug programs effectively and understand common debugging techniques.
- Document their code properly for ease of understanding and maintenance.
- Develop problem-solving skills and apply them in the context of algorithmic design.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

CSCI 2010 - System Administration

This course transitions understanding from working on single computers to maintaining reliable computers systems in a multi-user environment. In this course, students will learn about the infrastructure services that keep all organizations, big and small, functional. Special emphasis is given to cloud infrastructure setups and how to manage cloud resources. Management and configuration of servers and how to use industry

tools to manage computers, user information, and user productivity is discussed. Disaster recovery of an IT infrastructure rounds out the content of the course.

Upon completion, students will be able to:

- Demonstrate use of best practices for choosing hardware, vendors, and services for your organization.
- Express understanding of the functionality of most common infrastructure services and of how to manage infrastructure servers.
- Express understanding of how to optimize cloud services for an organization.
- Manage an organization’s computers and users using the directory services, Active Directory, and OpenLDAP.
- Express the ability to choose and manage the tools that an organization could use.
- Demonstrate the ability to backup an organization’s data and how to recover an IT infrastructure in the case of a disaster.
- Demonstrate use of systems administration knowledge to plan and improve processes for IT environments.

Grade Basis: P
Credit hours: 3.0
Lecture hours: 3.0

CSCI 2020 - Introduction to Cybersecurity

This course examines a variety of IT security concepts, tools, and best practices, specifically threats and attacks and how they are presented. Topics of the course include encryption algorithms and their uses, authentication, authorization, and accounting, and network security solutions, ranging from firewalls to Wifi encryption options. Philosophies and best practices for organizational security are integrated throughout the course.

Upon completion, students will be able to:

- Express understanding of how various encryption algorithms and techniques work as well as their benefits and limitations.
- Express understanding of various authentication systems and types.
- Express understanding of the difference between authentication and authorization.
- Communicate how to evaluate potential risks and recommend ways to reduce risk.
- Demonstrate and express understanding of best practices for securing a network.
- Help others to grasp security concepts and protect themselves.

Grade Basis: P
Credit hours: 3.0
Lecture hours: 3.0

CSCI 2030 - Network Fundamentals

This course transitions understanding from working on single computers to maintaining reliable computers systems in a multi-user environment. In this course, students will learn about the infrastructure services that keep all organizations, big and small, functional. Special emphasis is given to cloud infrastructure setups and how to manage cloud resources. Management and configuration of servers and how to use industry tools to manage computers, user information, and user productivity is discussed. Disaster recovery of an IT infrastructure rounds out the content of the course.

Upon completion, students will be able to:

- Express computer networks in terms of a five-layer model.
- Demonstrate understanding all of the standard protocols involved with TCP/IP communications.
- Demonstrate and/or express network troubleshooting tools and techniques.
- Express understanding of network services like DNS and DHCP that help make computer networks run.
- Demonstrate an understanding of cloud computing, everything as a service, and cloud storage.

Grade Basis: P
Credit hours: 3.0
Lecture hours: 3.0

CSCI 2040 - Introduction to Operating Systems

Students will learn about the main components of an operating system and how to perform critical tasks like managing software and users, and configuring hardware.

Upon completion, students will be able to:

- Demonstrate navigation of the Windows and Linux filesystems using a graphical user interface and command line interpreter.
- Create users, groups, and permissions for account access.
- Install, configure, and remove software on the Windows and Linux operating systems.
- Configure disk partitions and filesystems.
- Express understanding of how system processes work and how to manage them.
- Express understanding of system logs.
- Demonstrate use of remote connection tools.
- Utilize operating system knowledge to troubleshoot common issues in an IT Support Specialist role.

Grade Basis: P
Credit hours: 3.0
Lecture hours: 3.0

CSCI 2550 - Internship in Computer Science

(1-6 Hours) An opportunity for students to gain added early applied experience and insight in approved off-campus settings. Internships consist of at least 40 working hours per credit hour in areas related to the discipline. Assignments may include selected readings, public presentation, and a final portfolio containing essays, weekly journal, and supporting material. Advisors, program coordinators, department chairs, and the internship coordinator (or designee) must approve the internship before a student begins their work. Internships will be taken as pass/no credit.

Grade Basis: P
Credit hours: 3.0
Lecture hours: 3.0

CSCI 2990 - Algorithmic Design

This course is a continuation of the CSCI 1990 and delves deeper into the techniques for program design, program style, debugging, and testing, with a focus on larger programs. The course introduces students to algorithmic analysis and the fundamental aspects of string processing, recursion, internal search/sort methods, and data structures while reinforcing object-oriented programming using a high-level language.

Upon completion, students will be able to:

- Apply advanced programming concepts and techniques in a high-level programming language to design and style larger programs.
- Perform debugging and testing on larger programs, understanding common techniques and best practices.
- Understand and apply algorithmic analysis to evaluate the efficiency of algorithms.
- Implement string processing, recursion, internal search/sort methods, and simple data structures in problem-solving.
- Develop larger software systems that are robust, efficient, and maintainable.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- CSCI 1990 - Introduction to Algorithmic Design

CSCI 3050 - Introduction to Computer Organization.

Basic logic design, coding, number representation and arithmetic, computer architecture, and computer software.

Grade Basis: L
Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- CSCI 1990 - Introduction to Algorithmic Design

CSCI 3250 - Data Structures

This course revisits fundamental data structures, including stacks, queues, lists, and trees. It explores the concept of graphs and their real-world applications, and delves into different methods of searching and sorting, both within the internal memory and external storage. Essential aspects of managing computer memory are also addressed.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- CSCI 2990 - Algorithmic Design

CSCI 3310 - Organization of Programming Languages

This course provides an introduction to the architecture of programming languages and addresses the structure of language definitions, various data types and structures, control mechanisms, and the flow of data. The course delves into considerations for run-time, the nature of interpretative languages, and the process of lexical analysis and parsing. It's designed to give students a comprehensive understanding of how programming languages are structured and operate.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

CSCI 3400 - Computer Networks I

This course provides an introduction to the principles and applications of computer networking. Topics include network architecture, protocols, network topology, network security, and recent trends in networking technologies. The course aims to equip students with the knowledge and skills necessary to understand and design computer networks.

Upon completion, students will be able to:

- Demonstrate understanding of the fundamental principles of computer networks, including network architecture and protocols.
- Design and implement simple computer networks, understanding the role of network topology and security considerations.

- Communicate about trends in networking technologies, and understand their impact on the field of computer science.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

CSCI 3700 - Discrete Mathematical Structures in Computer Science

This course serves as an introduction to the essential mathematical tools used in computer science. The curriculum includes a study of sets, relations, and basic counting techniques. Students will delve into algebra and algorithms, explore graphs, and learn about monoids and machines. The course also covers lattices and Boolean algebras, groups and combinatorics, and provides an introduction to logic and languages.

Grade Basis: L
Credit hours: 3.0
Lecture hours: 3.0

CSCI 4050 - Database Management Systems Design

Introduction to database concepts using SQL and Oracle. Data models, normalization, data description languages, query facilities. File organization, index organization, file security, and data integrity and reliability.

Grade Basis: L
Credit hours: 3.0
Lecture hours: 3.0

CSCI 4500 - Operating Systems

A course in systems software that is largely concerned with operating systems. Topics as process management, device management, and memory management are discussed, as are relevant issues associated with security and protection, networking, and distributed operating systems.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

CSCI 4550 - Internship

(1-6 Hours) An opportunity for students to gain added applied experience and insight in approved off-campus settings. Internships consist of at least 40 working hours per credit hour in areas related to the discipline. Assignments may include selected readings, public presentation, and a final portfolio containing essays, weekly journal,

and supporting material. Advisors, program coordinators, department chairs, and the internship coordinator (or designee) must approve the internship before a student begins their work. Internships will be taken as pass/no credit.

Grade Basis: P
Credit hours: 1.0
Lecture hours: 3.0

CSCI 4950 - Capstone

A cumulative experience of the coursework in the computer science program at LaGrange College. Students will complete a capstone project.

Grade Basis: L
Credit hours: 3.0
Lecture hours: 3.0

Last updated: 05/16/2024

LaGrange College
601 Broad Street
LaGrange, GA 30240
706-880-8000