



## COMPUTER SCIENCE (2021-2022) Division of Mathematics, Engineering & Computer Science Robert Keller, Ph.D., Chair

The Computer Science degree prepares graduates with a strong background in the fundamentals of computer sciences. Depth of knowledge on important programming skills, digital hardware, and algorithm design are paramount in this program. Important topics like cybersecurity and software engineering are spread throughout the curriculum to allow students to see how best to apply these topics.

Student Learning Outcomes – Computer Science	
1.	Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2.	Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of computer science.
3.	Communicate effectively in a variety of professional contexts.
4.	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5.	Function effectively as a member or leader of a team engaged in activities appropriate to computer science.
6.	Apply computer science theory and software development fundamentals to produce computing-based solutions.

**Requirements for the major in Computer Science (B.S.):**  
Courses taken for the major must have a cumulative GPA of 2.000.

Req	Course	Cr's
1	L.MAT-150: Calculus of One Variable I-FM	4
2	L.MAT-230: Discrete Mathematics	4
<b>Select one from Req. 3</b>		
3	L.CSC-115: Introduction to Programming	4
3	L.EGR-116: Intro to Programming with Robotics-ES	4
4	L.CSC-225: Data Structures & Algorithms	4
5	L.CSC-319: Computer Organization & Architecture	4
6	L.CSC-325: Algorithm Design & Analysis	3
7	L.CSC-337: Database Programming	3
8	L.CSC-490: Capstone Project I	3
9	L.CSC-491: Capstone Project II-IN	3
<b>Select at least ten credits from Req 10</b>		
10	L.BAN-460: Big Data Analytics	3
10	L.CSC-310: Artificial Intelligence	3
10	L.CSC-311: Human Computer Interaction	3

10	L.CSC-332: Web Programming	3
10	L.CSC-340: Machine Learning	3
10	L.CSC-350: Computer Graphics	3
10	L.CSC-440: Operating Systems	3
<b>42 total required credits</b>		

### Requirements for the minor in Computer Science:

Courses taken for the minor must have a cumulative GPA of 2.000.

Req	Course	Cr's
<b>Select one from Req 1</b>		
1	L.CSC-115: Introduction to Programming	4
1	L.EGR-116: Intro to Programming with Robotics-ES	4
2	L.CSC-225: Data Structures & Algorithms	4
<b>Select four from Req 3</b>		
3	L.BAN-460: Big Data Analytics	3
3	L.CSC-310: Artificial Intelligence	3
3	L.CSC-311: Human Computer Interaction	3
3	L.CSC-319: Computer Organization & Architecture	4
3	L.CSC-325: Algorithm Design & Analysis	3
3	L.CSC-332: Web Programming	3
3	L.CSC-337: Database Programming	3
3	L.CSC-340: Machine Learning	3
3	L.CSC-350: Computer Graphics	3
3	L.CSC-440: Operating Systems	3
<b>20 to 21 total required credits</b>		

## 2021-2022 COMPUTER SCIENCE COURSES:

### L.CSC-115: Introduction to Programming

This course provides an introduction to the software engineering principles and tools used in the solution of problems, introduces a programming language and introduces students to social and professional concerns which arise with the use of computers. Prerequisite: L.MAT-117 or above. 4 credits.

### L.CSC-225: Data Structures & Algorithms

This course provides an introduction to basic data structures and abstract data types. It introduces a variety of algorithms and problem-solving strategies as well as elementary algorithm analysis. Prerequisite: L.CSC-115 or L.EGR-116. 4 credits.

### L.CSC-310: Artificial Intelligence

This is an upper-level course focused on the development of intelligent agents. This course covers what an intelligent agent is, how intelligent agents view the world, and how intelligent agents solve problems. The types of agents discussed include those that search for solutions, those that analyze data, and those that learn from their surroundings. Prerequisite: L.CSC-225. 3 credits.

**L.CSC-311: Human Computer Interaction**

This course provides an introduction to the discipline of Human Computer Interaction. It is concerned with the design, evaluation and implementation of effective computing systems for human use. Topics that will be covered are history, principles for design, understanding users and their task, designed with the user, basic human factor, and designing visual interfaces. Prerequisites: L.CSC-115 or L.EGR-116 and at least one other course from the following: L.CSC-225, L.CIT-326, L.CIT-327, or L.CSC-332. 3 credits.

**L.CSC-319: Computer Organization & Architecture**

This course introduces the fundamentals of computer hardware where the students will learn basic building blocks of a small computer and how the hardware and software interface with one another. This course includes lab component where students learn the basic building blocks of computer hardware. Prerequisite: L.CSC-115 or L.EGR-116. 4 credits.

**L.CSC-325: Algorithm Design & Analysis**

This course introduces various algorithm design strategies, familiarizes students with well-known algorithms from a variety of areas, does average and worst-case time analysis of algorithms, and extends the set of data structures with which the students are able to work. Prerequisites: L.CSC-225 and L.MAT-230. 3 credits.

**L.CSC-332: Web Programming**

Students learn a programming language designed to be used on the internet. Then, by working on projects that use the language students learn about the different technologies used on the World Wide Web, such as network and inter-network protocols, process-to-process communication, interfacing to databases, human-computer interaction, and intelligent agents. Prerequisite: L.CSC-115 or L.EGR-116. 3 credits.

**L.CSC-337: Database Programming**

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**L.CSC-340: Machine Learning**

This course introduces students to topics in the Machine Learning area of Artificial Intelligence. It will include an introduction to some popular algorithms computers use to make decisions and predictions based on problems consisting of varied types of data. In addition to utilizing the algorithms themselves, students will learn about different methods of evaluating these algorithms and how to choose an algorithm for a particular problem. Prerequisite: L.CSC-225. 3 credits.

**L.CSC-350: Computer Graphics**

This course provides an introduction to computer graphics. This will include some of the fundamental algorithms as well as experience in graphics programming using OpenGL. Prerequisite: L.CSC-225. 3 credits.

**L.CSC-394: Internship**

This course provides structured experience in a work environment outside the classroom. Prerequisites: Two courses in CSC. GPA of 3.000 overall. Credit varies.

**L.CSC-440: Operating Systems**

The focus of this course is the study of the fundamental algorithms used to manage the hardware resources of a computer. The topics include CPU scheduling, file structures, memory management, deadlock detection and avoidance, and concurrency control. Prerequisites: L.CSC-225 and L.CSC-319. 3 credits.

**L.CSC-490: Capstone Project**

This course provides the experience of a semester-long group project. It requires the students to apply their hardware and software skills in a group setting where cooperation and coordination are necessary for the

successful completion of the project. Prerequisites: must have completed at least four courses in CSC numbered 200 or above and have senior standing. 3 credits.

**L.CSC-490E: Comprehensive Examination**

A placeholder course which indicates attempt and completion of the required comprehensive examination. 0 credits. Pass/fail only.

**L.CSC-491: Capstone Project II-IN**

This course provides the experience of a semester long group project. It requires the students to apply their hardware and software skills in a group setting where cooperation and coordination are necessary for the successful completion of the project. 3 credits.