



[csc@csudh.edu](mailto:csc@csudh.edu)  
<http://csc.csudh.edu/>

**Computer Science Department**  
**College of Natural and Behavioral Sciences**  
**California State University, Dominguez Hills**

NSM A-132  
 1000 East Victoria  
 Carson, CA 90747  
*Ph:* (310) 243-3398  
*fax:* (310) 243-3153

**Specific Computer Science Supplementary Authorization Curriculum**

The certificate program will consist of 3 courses for a total of 10 credits to be offered in 3 consecutive sessions - a one-year program. Courses would use open-source software and free textbooks.

**Course I:**

**CSC395-61: Introduction to Hardware & Programming** (3 credits)

Topics: Computer Hardware (digital devices, systems), Problem Solving, Programming with Python, Ethics in Computing

Learning Objectives:

- Identify the major components of a modern computer system
- Convert values into different number systems
- Apply frameworks for problem solving
- Write programs using Python
- Recommend ethical practices in Computing

Course Outline:

Topics	Sub-topics	Timeline (48 Hrs)
Overview of course, Pre-course survey	Topics to be covered during the course, understand the level of enrolled participants using survey	2 hours
Computer Hardware	Different hardware components of computer	3 hours
	Computer Memory Hierarchy	3 hours
	Representation of numbers in binary, octal and hexadecimal	4 hours
Problem Solving	IDEAL Problem Solving Framework	6 hours
	Word Problems, Puzzles	6 hours
Programming with Python	Variable, conditionals, loops, functions, list	18 hours
Social Issues in Computing	Identity theft, Cyber Bullying, Gaming Addiction, Privacy, Health and fitness, Education	4 hours
End-course survey, Preview of next course	Survey to receive feedback from participants, preview of the next course and materials	2 hours



[csc@csudh.edu](mailto:csc@csudh.edu)  
<http://csc.csudh.edu/>

**Computer Science Department**  
**College of Natural and Behavioral Sciences**  
**California State University, Dominguez Hills**

NSM A-132  
 1000 East Victoria  
 Carson, CA 90747  
*Ph:* (310) 243-3398  
*fax:* (310) 243-3153

**Course II:**

**CSC395-62: Computer Networks & Ethics** (3 credits)

Topics: Networking, Computational Thinking, Computer Programming with Java, Social Issues in Computing

Learning Objectives:

- Describe the major components of computer networks
- Explain the different types of communication and network devices
- Apply Computational Thinking principles for problem solving
- Write programs using Java
- Discuss Social Issues in Computing

Course Outline:

Topics	Sub-topics	Timeline (48 Hrs)
Review of pervious course, Overview of current course, Pre-course survey	Review pervious topics, topics to be covered during the current course, understand the level of enrolled participants using survey	2 hours
Computer Networks	Internet and OSI Model	3 hours
	Network Protocols	4 hours
	Wireless Communication	4 hours
Computational Thinking	Decomposition, Pattern recognition, Abstraction, Algorithm design	6 hours
	Duke 7-step process	6 hours
Programming with Java	Variable, conditionals, loops, methods, Class, Object Oriented Programming Principles	18 hours
Ethics in Computing	Privacy and Anonymity, Computer Crime	3 hours
End-course survey, Preview of next course	Survey to receive feedback from participants, preview of the next course and materials	2 hours



[csc@csudh.edu](mailto:csc@csudh.edu)  
<http://csc.csudh.edu/>

**Computer Science Department**  
**College of Natural and Behavioral Sciences**  
**California State University, Dominguez Hills**

NSM A-132  
 1000 East Victoria  
 Carson, CA 90747  
*Ph:* (310) 243-3398  
*fax:* (310) 243-3153

**Course III:**

**CSC395-63: Algorithms & Software Design** (4 credits)

Topics: Data Structures & Algorithms, Software Design, Legal Issues in Computing, Methods

Learning Objectives:

- Examine the different data structures and their applications
- Design algorithms using different principles to solve problems
- Apply the different software design models
- Discuss Legal Issues in Computing
- Explore the pedagogy in Computer Science

Course Outline:

Topics	Sub-topics	Timeline (60 Hrs)
Review of pervious course, Overview of current course, Pre-course survey	Review pervious topics, topics to be covered during the current course, understand the level of enrolled participants using survey	2 hours
Data Structures & Algorithms	Arrays, Stack, Queue, Linked List, Trees, Graphs, Hash Map	14 hours
	Analysis of Algorithms, Searching and Sorting, Greedy Algorithms, Divide and Conquer	10 hours
Software Design	Design Concepts, Modeling language, Design patterns	7 hours
	Software Development Life Cycle, Waterfall mode, Agile development	7 hours
Legal Issues in Computing	Intellectual Property, Professional responsibility, Globalization	7 hours
Computer Science Methods	Pedagogy in Computer Science	12 hours
End-course survey, End of certificate survey	Survey to receive feedback from participants for the course and also the certificate	1 hour

## Courses/Topics Mapping Table

Course #	Courses Title/Topics	Computer Programming	Data structures and algorithms	Digital devices, systems and networks	Software design	Impact of Computing
CSC395-61	Introduction to Hardware & Programming	X		X		X
CSC395-62	Computer Networks & Ethics	X		X	X	X
CSC395-63	Algorithms & Software Design		X		X	X

**Specific supplementary authorizations may be added to Single Subject, Standard Secondary and Special Secondary (academic subject areas only) Teaching Credentials and authorize the holder to teach the specific subject in grades preschool, kindergarten-12, and classes organized primarily for adults.**

Computer Science → Coursework completed must cover the following content areas:

- **Computer Programming:** includes expertise in at least one modern, high-level programming language (e.g., Python, Java, C/C++/C#).
- **Data structures and algorithms:** covers data representation, abstraction, searching and sorting in the context of solving problems using programming and computational tools.
- **Digital devices, systems and networks:** covers computer and communication devices and the systems they compose, including the concepts and abstractions that enable stand-alone, networked, and mobile digital devices to operate and communicate.
- **Software design:** covers the process of planning, engineering and implementing a software system to solve a problem, typically using both a design and a programming methodology, such as object-oriented and functional approaches.
- **Impacts of computing:** includes the social, ethical, and legal issues and impacts of computing, as well as the contributions of computer science to current and future innovations in the arts, business, humanities, medicine, and science. These topics may be included within courses that cover any of the other content areas. → The balance of the units may be in any course that falls within the academic department for that subject category. Computer classes in the Education Department may be used including a pedagogy course in computer science from either department.