# CSC 112: DATA STRUCTURES, ALGORITHMS, AND SOFTWARE ENGINEERING FOR TEACHERS

## In Workflow

1. CSC Committee Chair (shaverdian@csus.edu;%20jouyang@csus.edu)
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## Approval Path

1. Thu, 12 Nov 2020 21:06:54 GMT
   Anna Baynes (shaverdian): Approved for CSC Committee Chair
2. Wed, 18 Nov 2020 17:28:39 GMT
   Nikrouz Faroughi (faroughi): Approved for CSC Chair
3. Fri, 20 Nov 2020 17:43:50 GMT
   Gareth Figgess (figgess): Approved for ECS College Committee Chair
4. Tue, 01 Dec 2020 21:33:00 GMT
   Kevan Shafizadeh (kevan): Approved for ECS Dean

## New Course Proposal

Date Submitted: Thu, 12 Nov 2020 21:06:02 GMT

## Viewing: CSC 112 : Data Structures, Algorithms, and Software Engineering for Teachers

## Last edit: Thu, 12 Nov 2020 21:06:01 GMT

Changes proposed by: Anna Baynes (219700742)

**Contact(s):**

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**Catalog Title:**
Data Structures, Algorithms, and Software Engineering for Teachers

**Class Schedule Title:**
DS, Algs, & SE for Teachers

**Academic Group: (College)**
ECS - Engineering & Computer Science

**Academic Organization: (Department)**
Computer Science

**Will this course be offered through the College of Continuing Education (CCE)?**
Yes

**Please specify:**
CCE Only

**Catalog Year Effective:**
Spring 2021 (2021/2022 Catalog)

**Subject Area: (prefix)**
CSC - Computer Science

**Catalog Number: (course number)**
112

**Course ID: (For administrative use only.)**
TBD

**Units:**
3

**In what term(s) will this course typically be offered?**
Fall, Spring, Summer

**Does this course require a room for its final exam?**
No, final exam does not require a room

**Does this course replace an existing experimental course?**
No

**This course complies with the credit hour policy:**
Yes

**Justification for course proposal:**
This course will be part of a proposed CCE-only program for current k-12 teachers to receive a specific or introductory authorization to teach computer science in k-12. The Commission on Teacher Credentialing has defined the subject matter necessary to earn this authorization. This is one of a set of courses being proposed for this program.

**Course Description: (Not to exceed 80 words and language should conform to catalog copy.)**
Introduction of data structures, algorithms, and software engineering to give teachers the background to lead instruction in computer science curriculum. Topics include linked lists, queues, sets, algorithm analysis, recursion, basic searching, and sorting. Software Engineering topics include the methodologies and techniques in planning, engineering and implementing a software system to solve a problem, and social, ethical, and legal impacts of computing. Pedagogical content includes strategies for teaching students by developing engaging learning experiences in computer science.

**Are one or more field trips required with this course?**
No

**Fee Course?**
No

**Is this course designated as Service Learning?**
No

**Does this course require safety training?**
No

**Does this course require personal protective equipment (PPE)?**
No

**Does this course have prerequisites?**
Yes

**Prerequisite:**
CSC 111

**Prerequisites Enforced at Registration?**
Yes

**Does this course have corequisites?**
No

**Graded:**
Letter

**Approval required for enrollment?**
No Approval Required

**Course Component(s) and Classification(s):**
Discussion

**Discussion Classification**
CS#02 - Lecture/Discussion (K-factor=1WTU per unit)
**Discussion Units**
3

**Is this a paired course?**
No

**Is this course crosslisted?**
No

**Can this course be repeated for credit?**
No

**Can the course be taken for credit more than once during the same term?**
No

**Description of the Expected Learning Outcomes: Describe outcomes using the following format: 'Students will be able to: 1), 2), etc.'**
1. Identify the purposes, pros and cons, and uses and applications of different data structures and algorithms;
2. Explain phases of a software development lifecycle, including the activities and products of each phase.
3. Describe the difference between traditional and agile software development processes.
4. Explain and use standard techniques and tools for analyzing product requirements, formulating product design, coding, and testing a software product.
5. Identify and use several common analysis, specification, and design modeling notations (added as advanced topics)
6. Describe interface design and its principle
7. Recognize engineering design and its principle (added as advanced topics)
8. Identify basic software development tools (for example, DrJava, JGrasp…)
9. Collaborate effectively with others in carrying a small software development project from conception through deployment
10. Identify pedagogical content knowledge for teaching computer science, developing assessment, and designing effective instruction for AP Computer Science Principles;
11. Develop a variety of methods in the teaching computer science, including meaningful learning, collaborative learning, and inquiry-based learning
12. Identify the major core concepts and practices for frameworks and standards in Computer Science in California

**Assessment Strategies: A description of the assessment strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers) which will be used by the instructor to determine the extent to which students have achieved the learning outcomes noted above.**
L.O. 1-12 will be assessed with assignments and examinations

**For whom is this course being developed?**
Other

**Is this course required in a degree program (major, minor, graduate degree, certificate?)**
No

**Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer)?**
No

**Will there be any departments affected by this proposed course?**
No

**I/we as the author(s) of this course proposal agree to provide a new or updated accessibility checklist to the Dean's office prior to the semester when this course is taught utilizing the changes proposed here.**

I/we agree

## University Learning Goals

**Undergraduate Learning Goals:**

Competence in the disciplines
Integrative learning
Intellectual and practical skills

**Is this course required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?**

Yes

## For the Council for the Preparation of School Personnel (to be filled out with assistance of your department chair):

**Does this course change impact your department's currently written Program Standards Document?**

No

**Common Standards: In what way does this course or program change impact the currently written Common Standards document? Please include any suggested language changes:**

N/A

**Is this change in response to program or unit assessment activities?**

No

**Will this course introduce any new or changes to program assessments?**

No

## GE Course and GE Goal(s)

**Is this a General Education (GE) course or is it being considered for GE?**

No

**Please attach any additional files not requested above:**

CSC 112.docx

Key: 14364