

Survey of Computer Science

Overview

This course introduces the basics of computing using fun and engaging activities instead of formally describing the concepts. It follows the framework of Seven Big Ideas adopted in the AP Computer Science Principles course, but it has more emphasis on exploration and experimentation, and less emphasis on problem-solving and formal analysis than a regular CSP course. To prepare students for the rigors of other courses in the Pathway, this course models ways to adopt a productive disposition that fosters creativity and perseverance. In addition, career exploration lessons are threaded throughout the course, with a focus on developing students' interest in computing and identification with the computing professions.

Objectives

- Demonstrate how to use technology to create computing artifacts.
- Explain the Big Ideas in Computing.
- Describe how computers work, and how to use them effectively.
- Analyze how the Big Ideas in Computing are relevant in daily life.
- Describe careers related to computing and the requisites for each.
- Communicate computing ideas using appropriate terminology
- Collaborate with other students to develop computing artifacts, algorithms or protocols.

Assessment

Formative assessment includes worksheets and several practice activities for each lesson, and unit quizzes. Summative assessment includes projects and/or tests at the end of each unit.

Course Essentials

Equipment	Cost/Unit
Classroom set of computers	\$0 if you already have some, \$500-600 per computer if you need to purchase

Outline:

Unit 1: Creativity	This unit is an overview of the creative development process and its use for creating computational artifacts. Students will complete 2 projects to express themselves using technology.
Unit 2: Abstraction	By exploring simple models and simulations, students learn to identify patterns in natural phenomena and reason about them using suitable abstractions.
Unit 3: Data and Information	Students work with data using different tools and techniques to better understand how data transforms into information used by society.
Unit 4: Algorithms	Students develop and express original algorithms, implement algorithms and analyze them.
Unit 5: Programming	Students are introduced to concepts and techniques used in writing programs, developing software, and using software effectively. They learn the distinction between algorithms and programs by comparing different implementations of the same algorithm in several programming languages.
Unit 6: The Internet	Students learn how the Internet operates, study the characteristics of the Internet and the systems that are built on it, and analyze important concerns related to the Internet, such as cybersecurity.
Unit 7: Societal impact of computing	Students become familiar with many of the ways computing enables innovation. They will also analyze the potential benefits and harmful effects of computing in several contexts.



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1. Materials

Internet access, 1-to-1 computer use daily, and access to the LSU servers.

Consumables		
Various consumables for projects such as index cards, multi colored pens, paper, playing cards etc. Detailed list will be provided to teachers at the training.	1 per classroom	\$100

2. Required software, networking access, and access to LSU servers:

- Students will need to sign up with online development and testing environments, including but not limited to codesandbox.io, jsfiddle.net, scratch.mit.edu and others.
- Students will need access to YouTube instructional videos relevant to the course, as well as other educational video repositories.
- Teachers will need to be able to access the LSU servers using several Internet protocols including but not limited to HTTPS and SSH.
- Principals will need to communicate with the district’s information technology department to ensure that there are no technological restrictions that block access to the LSU servers in the lsu.edu, college-readiness.lsu.edu or stempathways.lsu.edu domains on any port. In addition to the sites mentioned above, students may need web access to additional sites as needed.

3. Required teacher collaborations

Teachers will communicate with LSU instructors via emails, Google Drive, and/or apps hosted on the LSU servers. Teachers will need to share sample student work with their designated LSU Pathway Point-of-Contact.

4. Required administration of course content, pre/post test, and research instruments

All required materials and instruments will be either posted in the LSU servers, Google Drive, or their location announced via email.

5. Course Work

Teachers must present the course material in sequence or as approved by collaboration with the LSU Pathway Point-of-Contact. Teachers are expected to deliver a minimum of 80% of the course material.

6. Other

As this is a project-based learning class, we strongly suggest that each section of the course be limited to a *maximum* of 25 students. The course is dependent on the teacher providing feedback and reviewing student work. The course requires that teachers have adequate time to interact with each student.