

# 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:

<b>Unit 1: Creativity</b>	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.
<b>Unit 2: Abstraction</b>	By exploring simple models and simulations, students learn to identify patterns in natural phenomena and reason about them using suitable abstractions.
<b>Unit 3: Data and Information</b>	Students work with data using different tools and techniques to better understand how data transforms into information used by society.
<b>Unit 4: Algorithms</b>	Students develop and express original algorithms, implement algorithms and analyze them.
<b>Unit 5: Programming</b>	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.
<b>Unit 6: The Internet</b>	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.
<b>Unit 7: Societal impact of computing</b>	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.



## **SURVEY OF COMPUTER SCIENCE**

### **1. Materials**

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

- index cards (4 packs of 100 count)
- m&m packets (1 for every 2 students)
- chocolate bars (1 for every 2 students)
- paperclips (8 packs 100 count)
- playing cards (1 deck for every 4 students)
- sticky notes ( 12 packs 100 count)
- envelopes (5 boxes 100 count)
- copy/ printer paper throughout the year
- set of pens (black, blue, red) per student
- pack of colored pencils (per group of 4 students)

### **2. Required software, networking access, and access to LSU/BRBytes 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/BRBytes servers using several Internet protocols including but not limited to HTTPS and SSH.
- Students and teachers will access the curriculum and teaching materials through the LSU and BRBytes servers.
- Teachers will need to share student data with their designated LSU Pathway Point-of-Contact.
- 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/BRBytes servers in the lsu.edu, brbytes.org or lsupathways.org domains on any port. In addition to the sites mentioned above, students will need web access to:

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|--------------------------------|--|--|
| ○ 20q.net                      | ○ policy.hu  | ○ www.ftc.gov  |
| ○ aboutmyinfo.org              | ○ rapidtables.com  | ○ www.geogebra.org   |
| ○ allthingsd.com               | ○ Repl.it  | ○ <a href="http://www.googlefight.com">www.googlefight.com</a>                       |
| ○ apcentral.collegeboard.org   | ○ thingful.net   | ○ <a href="http://www.informationisbeautiful.net">www.informationisbeautiful.net</a> |
| ○ bjc.edc.org                  | ○ tonystrains.com  | ○ <a href="http://www.inventwithpython.com">www.inventwithpython.com</a>             |
| ○ checkpagerank.net            | ○ <a href="http://www.barefootcomputing.org">www.barefootcomputing.org</a> | ○ www.iplocation.net   |
| ○ Code.org                     | ○ <a href="http://www.bbc.com">www.bbc.com</a>                             | ○ <a href="http://www.mathsisfun.com">www.mathsisfun.com</a>                         |
| ○ Computer.howstuffworks.com   | ○ www.braingle.com   | ○ www-math.ucdenver.edu  |
| ○ crypto.interactive-maths.com | ○ <a href="http://www.colorcodepicker.com">www.colorcodepicker.com</a>     | ○ <a href="http://www.mediashift.org">www.mediashift.org</a>                         |
| ○ curriculum.csmatters.org     | ○ www.digitalattackmap.com   | ○ www.nationalarchives.gov.uk  |
| ○ Libguides.mit.edu            | ○ <a href="http://www.dummies.com">www.dummies.com</a>                     | ○ www.nytimes.com  |
| ○ m.wikihow.com                | ○ www.e-cartouche.ch   | ○ www.pbs.org  |
| ○ Pingtool.org                 | ○ <a href="http://www.explainthatstuff.com">www.explainthatstuff.com</a>   |  |



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- [www.prchecker.info](http://www.prchecker.info)
- [www.sorting-algorithms.com](http://www.sorting-algorithms.com)
- [www.string-functions.com](http://www.string-functions.com)
- [www.ted.com](http://www.ted.com)
- [www.time.com](http://www.time.com)
- [www.us.norton.com](http://www.us.norton.com)
- [www.w3schools.com](http://www.w3schools.com)
- [www.webgamesonline.com](http://www.webgamesonline.com)
- [www.worksheetworks.com](http://www.worksheetworks.com)
- [www.youtube.com](http://www.youtube.com)
- [www.zooniverse.com](http://www.zooniverse.com)
- [zdnet.com](http://zdnet.com)

3. Required teacher collaborations

Teachers will communicate with LSU instructors via emails and apps hosted on the LSU/BRBytes servers.

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

All required materials and instruments will be either posted in the LSU/BRBytes servers or their location announced via email with the teacher/instructor group for this course.

5. Course Work

Teachers must present the course material in sequence or as approved by collaboration with the LSU Pathway Point-of-Contact. The teacher is responsible for utilizing the LSU/BRBytes servers based system to release, acknowledge, provide student feedback, and grade student work. The LSU/BRBytes servers will track and notify the teacher as students near the required 75% attainment mark for certification.

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.