**Course Syllabus**

**AP Computer Science A - Dual Credit BSU CS120**

**JAVA Programming**

**2023 Fall**

**First semester course**

**Instructor:** Ms. Susie Cunningham

**Email:** scunningham@bsu.edu

 **Office: Elliott 008-C**

 **Classroom: BU115**

**Office Hours:**

|  |
| --- |
|  **Mondays: Noon – 1:00 p.m. (Elliott 008-C)** **2:00 – 4:00 p.m. (Elliott 008C or BU115)** **Tuesdays: 11:30 a.m. – 1:00 p.m. (Elliott 008-C)** **3:30 – 4:00 p.m. (BU115)** **Wednesdays: Noon – 1:00 p.m. (Elliott 008-C)** **2:00 – 4:00 p.m. (Elliott 008-C or BU115)** **Fridays: Noon – 1:00 p.m. (in Elliott 008-C)** **2:00 – 3:00 p.m. (Elliott 008-C or BU115)** **(Other appointment times may be made as needed.)** |

**Description:**

This course uses a high-level, object-oriented programming language. Students will learn syntax and the development of algorithms. The emphasis is on developing problem-solving skills and programming techniques. This course is designed for students with a computer programming background who desire a more challenging programming course. Semester 1 topics will include defining variables, primitive data types, objects, methods, strings, if/else conditionals, loops (for, while, and do while), one and two dimensional arrays, arrayLists, inheritance, basic input/output files, error handling, testing and debugging.

Semester 2 topics will include using data structures such as abstract classes, interfaces, linked lists, stacks, queues, binary trees, sequential and binary searching, sorting, traversing trees, hashing, Big O Notation and introduction to GUI.

 Laboratory activities include the required AP Computer Science A lab exercises. **The fourth day (Tuesday) will be used to allow students to work on projects/labs in class.**

Successful completion of this course will prepare the student for the Advanced Placement Computer Science A exam.

\*Ball State University offers 4 college credit hours in CS120 (semester 1) and CS121 (semester 2) to students who complete this course for the whole year. Students will enroll for Dual Credit in August for CS120 and January for CS121. Refer to the Dual Credit section of course catalog for details on enrollment and fees.

**Text:**

 **Introduction to Java Programming and Data Structures**, Y. Daniel Liang, Pearson, 2022.

 **Barron’s How to Prepare for the AP Computer Science Advanced Placement Examination**  **Java Version,** Teukolsky, Barron’s Educational Series, Inc., 2023.

 **AP Classroom**

 **soloLearn Web Site**

 **w3Schools**

**Course Methodology:**

 Course methodology will include **hands-on and group activities, lectures, outside readings, classroom discussion, and programming projects.**

**Student Evaluation:**

There will be **3 tests**, **11 homework assignments (including Lab Homework), soloLearn Practice Sets, AP Classroom Unit Modules, Discussion Questions** and **a major final programming project.**

**Method of Grading:**

Grades will be based on a point system.

 **Points**

 Tests 1 - 3 250

 Final Project 100

 Online Lab Projects 75

 Homework Assignments 90

 **Total Points 515**

 Accumulated totals are then distributed into letter grades as follows:

 **A (93% - 100%)**

 **A- (90% - 92.9%)**

 **B+ (87% - 89.9%)**

 **B (84% - 86.9%)**

 **B- (80% - 83.9%)**

 **C+ (77% - 79.9%)**

 **C (73% - 76.9%)**

 **C- (70% - 72.9%)**

 **D\* (69% and below)**

**Classroom Policies:**

**Homework Assignments:** **Homework assignments** must be **turned in by the due date**. Assignments may be turned in earlier than the due date. **Any late homework** will **result** in a **reduced** **grade.** **(25% off for each day late.) Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday all count as days. A timeframe for a day constitutes from 12:01 a.m. – Midnight.**

**Absence prior to due Date:** Missing class (excused or not) prior to a test, or other due dates for homework assignments does not exempt the student from preparing and taking the test and/or submitting the required homework assignment on the due date. Exceptions may be granted in advance of class time and must be discussed with the instructor.

**Tardiness:** Students arriving more than 5 minutes late to class are marked tardy. Students arriving 20+ minutes late will be marked absent. **A student sleeping in class will be counted as an absence.**

**Academic Dishonesty:** (Refer to the Indiana Academy Handbook.)

In the event, a student turns in a computer program for a homework assignment or test that was not

originally written by the student, the homework or test will fall under the category of plagiarism. This will be considered a **serious offense**. Students will be allowed to ask for help from other students if they are

working on a preannounce group project or the student needs assistance finding a syntax error or minor errors.

If a student does use code in a programming homework assignment or project that was obtained from the Internet, another programming source, or writing code that is similar in nature, the student **must put in a comment in the computer program with the source of where the code was obtained, otherwise this will be considered under the category of plagiarism.**

Furthermore, if a student writes a computer program for another student, the student “knowingly permitting one’s work to be submitted by another person as if it were the submitter’s original work” will also be penalized.

Penalties will be assessed in accordance to the Indiana Academy Handbook.

**Communication- Come See Me:**

The best way to communicate with me is through email at **scunningham@bsu.edu**. My phone dings when I receive an email and I can answer back via email through my phone. Generally, I do answer back almost immediately during work hours (unless I am teaching a course or on my way to class). I will always respond back within 24 hours. (This does include the weekends.) Generally, I am more available late at night. Office hours will be posted

**Diversity and Inclusion:**

Ball State University aspires to be a university that attracts and retains a diverse faculty, staff, and student body. We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse as expressed in our Beneficence Pledge and through university resources found at <http://cms.bsu.edu/campuslife/multiculturalcenter>.

**Accommodations:**

If you need course adaptations or accommodations because of a disability, please contact me as soon as possible.  Ball State’s Disability Services office coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability Services can be contacted at 765-285-5293 or dsd@bsu.edu.

**Canvas Accessibility:**

Canvas provides a user experience that is easy, simple, and intuitive. Special attention has been paid to making Canvas screen-readable. The Rich Content Editor encourages users to create accessible content pages (i.e. text formatting is accomplished using styles). Canvas is designed to allow limited customization of colors and schemes to be accessible for all users. The National Federation of the Blind granted Canvas the Gold Level Web Certification in 2010.

Find more information by visiting the [Canvas Voluntary Product Accessibility Template (VPAT)](https://www.canvaslms.com/accessibility). <https://community.canvaslms.com/t5/Accessibility/Accessibility-within-Canvas/ba-p/261501>

**Indiana Academy Mask Policy:**

The Indiana Academy will follow [Ball State University’s mask policy](https://www.bsu.edu/-/media/www/departmentalcontent/emergencypreparedness/covid19/recovery%20plans/student%20return%20to%20campus%20plan_11-16-2020_full.pdf?la=en&hash=C46E28697410544B454D667609AA24BE6C7BAA9F) (see Section IV). This may change throughout the year.

## Class Participation: Unless instructed otherwise, students need to be working on items relating to the classroom homework/topic during the class time.

** Class Activity and Assignments**

**Java Programming Course**

**Week of August 14, 2023:**

Students will be introduced to information based systems, history of computers, and language translation.

Students will open personal computers, take out basic computer parts and put personal computers back together. During this hands-on process, students will learn how basic components and how they interact.

Students will begin to work with data on a binary level (base 2 and hexadecimal) and will convert data to ASCII formats.

Students will begin programming basics and learn how to use variables, objects, primitive data, basic concepts of methods, using object-oriented programming. Students will be introduced to how the Java classes are imported and where the actual classes and methods are located in the corresponding directories on a personal computer. Students will actually write a basic Java program.

**HW #1 (5 pts.) – Program first Java program. Students will program an ASCII Art picture.**

**Due: August 21, 2023 (by 11:59 p.m.)**

**Complete reading assignment: Chapter #1**

**Tuesday Lab:**

 Students will download Java IDE and write a Hello World program to test out IDE.

**Week of August 21, 2023:**

Students will be introduced to the different Java components, loops (for, while, and do/while), if/else and switch statements.

**HW #2 (10 pts.) – Convert decimal to ASCII and vice versa.**

**Due: August 22, 2023 (by 11:59 p.m.)**

**HW #3 (5 pts.) – Madlib homework assignment.** (Students will use int,double, Boolean, char, and String variable types.)

**Due: August 23, 2023 (by 11:59 p.m.)**

**Complete reading assignment: Chapters #2 - 3**

**Tuesday Lab:**

 **Practice soloLearn Modules: - *Turn in a screen shot that these modules are complete.***

 **Due: August 23, 2023 (by 11:59 p.m.) - 5 pts.**

Introduction to Java

 Hello World Program

 Java Comments

 **w3schools – Java Tutorial**

 **Due: August 23, 2023 (by 11:59 p.m.) – 5 pts.**

 **Complete Java Home through Java Typecasting**

**Week of August 28, 2023:**

Students will be introduced to math functions, the random generator and methods. The minimum and maximum values will be discussed.

**HW #4 (10 pts.) – Students will program the dice game Bunco.**

**Students will be expected to incorporate the different Java components, loops (for, while, and do/while), if/else statements, math functions, and create their own methods in the homework project.**

**Due: September 8, 2023 (by 11:59 p.m.)**

**Complete reading assignment: Chapters #4 & #5**

**Tuesday Lab:**

 **Practice soloLearn Modules: - *Turn in a screen shot that these modules are complete.***

 **Due: August 31, 2023 (by 11:59 p.m.) - 5 pts.**

Variables

 Primitive Operators

 **w3schools – Java Tutorial**

 **Due: August 31, 2023 (by 11:59 p.m.) – 5 pts.**

 **Complete Java Operators through Java Break/Continue**

**Weeks of September 4th and 11th, 2023:**

Labor Day Extended Weekend: September 4th – 5th

Students will be introduced to passing variables and objects to methods, using global variables (along with a discussion of the advantages and disadvantages of using global variables), and the static modifier. Students will study how information is physically stored in memory and on a hard drive.

**Complete reading assignment: Chapter #6**

**Tuesday Lab (September 12th):**

 **Practice soloLearn Modules: - *Turn in a screen shot that these modules are complete.***

 **Due: September 12, 2023 (by 11:59 p.m.) - 5 pts.**

Increment and Decrement

 Strings

 Getting User Input

 Module Quiz #1

 **w3schools – Java Tutorial**

 **Due: September 12, 2023 (by 11:59 p.m.) – 5 pts.**

 **Complete Java Methods and Java Parameters**

**Week of September 18, 2023:**

Students will be introduced to inheritance and polymorphorism, class hierarchies and creating their own classes. Students will use instance variables, getters (accessors), and setters (mutators).

Students will be introduced to a discussion about maintaining computer programs. Also, topics of ethics and how students would handle different business situations will be presented.

**Tuesday Online Lab:**

 **Practice soloLearn Modules: - *Turn in a screen shot that these modules are complete.***

 **Due: September 19, 2023 (by 11:59 p.m.) - 5 pts.**

Conditonals and Loops

 **AP Classroom Units:**

 **Due: September 19, 2023 (by 11:59 p.m.) – 5 pts.**

 **Unit #2**

 Personal Progress Check MCQ (Multiple Choice Questions) questions – Unit #5

**HW #5 (10 pts.) – Students will program an RPG game.**

**Students will be expected to incorporate the different Java components, loops, if/else statements, math functions, and create their own methods passing back and forth information through parameters in the homework project.**

**Due: September 25, 2023**

(With all programming projects, students will be expected to check for invalid data input and handle corresponding exceptions. Students will need to try and throw exceptions. Students are challenged to see if they can turn in a project for a first pass that the instructor cannot break through a data entry. Also, students are encouraged to test each other’s projects to find computer bugs or logic errors.)

**Week of September 25, 2023:**

**Monday: Review for Test #1 (Over AP CSA Units #1 - #5)**

**Tuesday Lab:**

 **Practice soloLearn Modules: -**

*No modules for this week.*

 **AP Classroom Units:**

*Practice Questions for test.*

**Wednesday: Test #1 – September 28, 2023 - Multiple Choice Section (50 pts.)**

**Friday: Learn how to do an FRQ** (Free Response Question) **question.**

**Week of October 2, 2023:**

Students will learn how to read and write to a file and work with string manipulation. The topic of encryption will be discussed and using csv files. Students will also learn about sequential and binary searching techniques. A topic of converting data files from one computer system to another computer system will be presented.

**Tuesday Lab:**

 **Practice soloLearn Modules: -**

*No modules for this week.*

 **w3schools – Java Tutorial**

 **Due: October 4, 2023 (by 11:59 p.m.) – 5 pts.**

 **Complete Java File Handing Section**

 *Start working on HW #6.*

**HW #6 (10 pts.) – Students will be asked to design their own encryption algorithm. The students will then write a program to encrypt a login and password. Save the encrypted login and password to a csv file. Write another program to have a user type in a login and password. This login and password will then be compared to the decrypted login and password from the csv file.**

**Due: October 5, 2023 (by 11:59 p.m.)**

**Week of October 9, 2023:**

**Extended Weekend: 9th & 10th (Monday and Tuesday)**

Students will learn about arrays and ArrayLists.

**Week of October 16, 2023:**

**HW #7 (10 pts.) – Students will create a Yahtzee program using the concept of Arrays and ArrayLists.**

**Due: October 20, 2023 (by 11:59 p.m.) This will be a two-person homework assignment.**

**Complete reading assignment: Chapters #7 & #8**

**Week of October 23, 2023:**

**Monday:** Students will practice working on FRQs and review for Test #2.

**Tuesday Lab:**

 **Practice soloLearn Modules: - *Turn in a screen shot that these modules are complete.***

 **Due: October 25, 2023 (by 11:59 p.m.) - 5 pts.**

Arrays and ArrayLists

 **w3schools – Java Tutorial**

 **Due: October 25, 2023 (by 11:59 p.m.) – 2.5 pts.**

 **Complete Arrays and ArrayLists**

 **AP Classroom Units:**

 **Due: October 25, 2023 (by 11:59 p.m.) – 2.5 pts.**

 **Unit #6 & 7:** Arrays and ArrayLists

Complete Personal Progress Check for Unit #6 & #7 MCQ

**Wednesday:** Students will finish up Tuesday Lab assignments and finish reviewing for test.

**Friday: Test #2:** Students will complete 20 MCQs. (50 pts.)

**Week of October 30, 2023:**

**Monday: Test #2:** Students will complete 2 FRQs. (50 pts.)

**Tuesday Lab:**

 **HW #8 (5 pts.) – Students will need to submit ideas for final project with design.**

 **Due: October 31, 2023 (by 11:59 p.m.)**

**After final project idea is approved, students will BEGIN work on FINAL**

 **PROJECT.**

 **AP Classroom Units:**

 **Due: October 31, 2023 (by 11:59 p.m.) – 5 pts.**

 **Unit #8: 2D Arrays**

**HW #9 (15 pts.) – Maneuvering Around 2D Homework – Modifying Pixels in a Green Screen Picture**

**Due: November 6, 2023 (by 11:59 p.m.)**

**Week of November 6, 2023:**

Students will be reintroduced to inheritance and polymorphism and the word super.

**Tuesday Lab:**

 **Unit #9:** Inheritance

Complete Personal Progress Check for Unit #9 MCQ (2.5 pts.)

**Due: November 7, 2023 (by 11:59 p.m.)**

**w3schools – Java Tutorial**

 **Due: November 7, 2023 (by 11:59 p.m.) – 2.5 pts.**

 **Complete Inheritance**

**HW #10 (10 pts.) – Virtual Pet Homework**

**Due: November 10, 2023 (by 11:59 p.m.)**

**Students will program a Virtual Pet program. A group discussion will be encouraged as to what a general pet would do (i.e. eats, sleeps, etc.). From this discussion a general Pet class is created with suggested methods. Then, the students will need to discuss what kind of pet (dog, cat, cow, etc.) to create, the specific actions their pet will do, and which ones can be used (inherited) from the main Pet class.**

**Friday:**

Students will be introduced to recursion. Students will try out various “mystery” recursion questions.

**Week of November 13, 2023:**

**Monday:**

**HW #11 (5 pts.) – Students will be asked to program various sequences for counting boxes or a similar Fibonacci recursion homework.**

**Due: November 14, 2023 (by 11:59 p.m.)**

**Tuesday Lab:**

 **Practice soloLearn Modules: - *Turn in a screen shot of your certificate of completion. Congratulations!***

 **Due: November 14, 2023 (by 11:59 p.m.) - 5 pts.**

More on Classes

 Exceptions, List, Threads and Files

 **w3schools – Java Tutorial**

 **Due: November 14, 2023 (by 11:59 p.m.) – 2.5 pts.**

 **Complete Recursion**

 **AP Classroom Units:**

 **Due: November 14, 2023 (by 11:59 p.m.) – 5 pts.**

 **Unit #10:** Recursion

Complete Personal Progress Check for Unit #10 MCQ

**Friday:** Review for Test #3 – Comprehensive

**Week of November 20th:**

*(Thanksgiving break week)*

**Week of November 27th:**

**Monday: Test #3:** Students will complete 20 MCQs. (50 pts.)

**Tuesday Lab: Work on practice FRQs.**

**Wednesday: Test #3:** Students will complete 2 FRQs. (50 pts.)

*Students will finish Final Projects!*

**The final project is due by December 4, 2023!!**