**Course Syllabus**

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

 **JAVA Programming**

 **2024 Fall**

*I am excited to have you join this class!*

*Programming is a true joy!*

**Instructor: Ms. Susie Cunningham**

**Email:** scunningham@bsu.edu

 **Office: Elliott 008-C**

 **Classroom: BU115**

**Office Hours:**

**Mondays: 10:00 – 11:00 a.m.**

 **Noon – 2:00 p.m.**

**Tuesdays: 2:00 – 3:00 p.m.**

**Wednesdays: 10:00 – 11:00 a.m.**

 **Noon – 2:00 p.m.**

**Fridays: 10:00 – 11:00 a.m.**

 **Noon – 2:00 p.m.**

**Other times for offices hours may be made by appointment. Also, can email me at scunningham@bsu.edu.**

**Course Description:**

This course uses a high-level, object-oriented programming language. You will learn syntax and the development of algorithms. The emphasis is on developing problem-solving skills and programming techniques. This course is designed for you 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.

 **The fourth day (Tuesday) will be used to allow you to work on projects, practice for quizzes, and completing AP Classroom assignments 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. You 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., 2024.

 **AP Classroom**

 **soloLearn Web Site (Extra Practice)**

 **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 **6 quizzes**, **10 homework assignments, w3schools interactive activities, AP Classroom Unit Modules,** and **a major final programming project.**

**Method of Grading:**

Grades will be based on a point system.

 **Points**

 Quizzes #1 - 6 300

 Final Project 100

 Online Lab w3School Projects 60

 AP Classroom Assignments 50

 Homework Assignments 85

 **Total Points 595**

 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:** If you arrive more than 5 minutes late to class, you will be marked tardy. After arriving 20+ minutes late, you 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**. You will be allowed to ask for help from other students if they are

working on a preannounced 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.

You cannot use **AI** to write your programs for you! You can use **AI** to help debug your programs.

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 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. As a reflection of Ball State’s commitment to respect, civil discourse, and the Beneficence Pledge, Inclusive Excellence at the Indiana Academy emerges as one of the priorities of our living and learning community. We strive to exist together respectfully and compassionately, creating an environment where every member can thrive. Unfortunately, there might be occasions when something occurs that disrupts our progress toward meeting these objectives. In this case, we encourage any member of the Academy community to file a Campus Climate Report (CCR) https://bsu.qualtrics.com/jfe/form/SV\_6mbRbL5acAntUTI. All reports will be taken seriously, and appropriate responses will be carried out by the Academy administration.

**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 accommodation 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, you will need to be working on items relating to the classroom homework/topic during the class time.

## Indiana Academy Wireless Device Policy:

Pursuant to Indiana Code 20-26-5-40.7, The Indiana Academy for Science, Mathematics and Humanities prohibits student use of wireless communication devices for non-instructional purposes in the classroom. As such, any and all portable wireless devices, that have the capability to provide voice, messaging, or other data communication between two or more parties, must only be used for academic purposes directly tied to the classroom activity or related educational task. Exceptions to this wireless device policy are eligible through academic accommodations, individualized education programs, or with instructor approval permitting the use of a wireless device for justification related to health, safety, and/or well-being. The improper use of a wireless device in an active classroom setting is subject to disciplinary action including but not limited to; a verbal warning, temporary seizure of said device by a school official, an unexcused absence for the class in question, written communication to parent/guardian, among other elevated consequences for repeated improper use.

**No game-playing, movie-watching, e-mail, or IM’ing will be allowed in class -- doing so will result in a recorded absence for that day.**

** Class Activity and Assignments**

**Java Programming Course**

**Week of August 12, 2024:**

You will be introduced to information-based systems, the history of computers, and language translation.

You will be allowed to open personal computers, take out basic computer parts and put personal computers back together. During this hands-on process, you will learn how basic components and how they interact.

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

You will begin programming basics and learn how to use variables, objects, primitive data, basic concepts of methods, using object-oriented programming. You 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. You will write a basic Java program.

**Monday - You will participate in robot simulation.** (Download IDE on their computers.)

Nightly Assignment: w3schools.com – Complete **Java Home** and **Java Get Started.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Tuesday - During Lab Time Learn about Binary.**

**HW #1 (10 pts.) – Convert decimal to ASCII and vice versa.**

**Due: August 15, 2024 (by 11:59 p.m.)**

Nightly Assignment: w3schools.com – Complete **Java Syntax. Try it Yourself - Change “Hello world”.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Wednesday - Learn how to write a Java program.**

**HW #2 (5 pts.) – Program first Java program. You will program an ASCII Art picture.**

**Due: August 16, 2024 (by 11:59 p.m.)**

**Thursday – Finish up ASCII Art picture.**

Nightly Assignment: w3schools.com – Complete **Java Output – Print text. Print Numbers. Try it Yourself – Add 2 more System.out.print statements. One using text. One using numbers.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Friday – Show off ASCII Art pictures in class!**

**Complete reading assignment: Chapter #1**

**Week of August 19, 2024:**

You will be introduced to the different Java components and if/else statements.

**Sunday -** Nightly Assignment: w3schools.com – Complete **Java Comments and Java Operators. Try It Yourself – Add more comments and TEST Yourself with Java Operators.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Monday - You will be introduced to comments and variables.**

Nightly Assignment: w3schools.com – Complete **Java Variables, Java Data Types, Java Strings, and Java Boolean. Test Yourself with Exercises. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Tuesday – Start on HW #3.**

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

**Due: August 23, 2024 (by 11:59 p.m.)**

**Complete AP Classroom Unit #1 – Primitive Data Types. (+5 pts.) Due: August 22, 2024**

Nightly Assignment: w3schools.com – Complete **Type Casting and Operators. Test Yourself with Exercises. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Wednesday –** Introduction of type casting, math operators, and if/else statements.

**Thursday – Finish Madlib homework assignment.**

Nightly Assignment: w3schools.com – Complete **Type Casting and Operators and Java User Input. Test Yourself with Exercises. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Friday – Walk around and try out other students’ MadLibs in class!**

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

**Week of August 26, 2024:**

You will be introduced to switch case statements, math functions, and the random generator. The minimum and maximum values will be discussed.

**Sunday -** Nightly Assignment: w3schools.com – Complete **Java If/Else statements and Java Switch Statements. Test Yourself with Exercises. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Monday - You will be introduced to switch case statements and math functions.**

Nightly Assignment: w3schools.com – Complete **Java Math. Test Yourself with Exercises. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Tuesday – Learn about random generator.**

**Tuesday Lab: Complete AP Classroom Unit #3 – Boolean Expressions and if Statements. (+5 pts.) Due: August 29, 2024**

Nightly Assignment: w3schools.com – Complete **Java While Loop. Test Yourself with Exercises. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Wednesday –** Introduction of loops will be introduced. Loops will include for, while, and do while loops.

**Thursday -** Nightly Assignment: w3schools.com – Complete **For Loop and Break/Continue. Test Yourself with Exercises. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Friday – Learn how to play BUNCO!!**

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

**Weeks of September 2nd and 9th, 2024:**

Labor Day Extended Weekend: September 2nd and 3rd.

You will be introduced to methods, 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. You will study how information is physically stored in memory and on a hard drive.

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

**You 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 11, 2024 (by 11:59 p.m.)**

**Thursday -** Nightly Assignment: w3schools.com – Complete **Java Methods. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Sunday -** Nightly Assignment: w3schools.com – Complete **Java Method Parameters. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Tuesday -** Nightly Assignment: w3schools.com – Complete **Java Method Overloading. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Thursday -** Nightly Assignment: w3schools.com – Complete **Java Scope. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

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

**You 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 17, 2024**

**Tuesday Lab (10th): Complete AP Classroom Unit #4 – Iteration. (+5 pts.) Due: September 12, 2024**

**Complete reading assignment: Chapter #6**

**Week of September 16, 2024:**

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

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

**Sunday -** Nightly Assignment: w3schools.com – Complete **Java OOP. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Tuesday -** Nightly Assignment: w3schools.com – Complete **Java Classes/Objects, Java Class Attributes, and Java Class Methods. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Thursday -** Nightly Assignment: w3schools.com – Complete **Java Constructors and Java Modifers. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Hw #6 (10 pts.) – You will program a Virtual Pet using Inheritance.**

**You 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 You 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.**

**Due: September 20, 2024**

**Tuesday Lab : Complete AP Classroom Unit #5 – Writing Classes. (+5 pts.) Due: September 19, 2024**

(With all programming projects, You will be expected to check for invalid data input and handle corresponding exceptions. You will need to try and throw exceptions. You 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, You are encouraged to test each other’s projects to find computer bugs or logic errors.)

**Week of September 23, 2024:**

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

**Wednesday: Quiz #1 (50 pts.)**

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

**Sunday -** Nightly Assignment: w3schools.com – Complete **Java Encapsulation and Java Inheritance. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Tuesday -** Nightly Assignment: w3schools.com – Complete **questions assigned from AP Classroom as a practice quiz.**  (+2 points)

**Thursday -** Nightly Assignment: FREE NIGHT!

**Week of September 30, 2024:**

You 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. You 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.

**HW #7 (10 pts.) – You will be asked to design their own encryption algorithm. The You 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 11, 2024 (by 11:59 p.m.)**

**Sunday -** Nightly Assignment: w3schools.com – Complete **Java Files. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Tuesday -** Nightly Assignment: w3schools.com – Complete **Java Create/Write Files and Java Create/Read Files. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Thursday -** Nightly Assignment: w3schools.com – Complete **Java Delete Files. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Week of October 7, 2024:**

**Extended Weekend: 7th & 8th (Monday and Tuesday)**

**Wednesday: Practice FRQs for Quiz #2 for Friday.**

**Thursday – Study for Quiz #2!**

**Friday: Quiz #2 – FRQ Question #1 & #2. (50 pts.)**

**Week of October 14, 2024:**

You will learn about arrays and ArrayLists.

**HW #8 (10 pts.) – You will create a Yahtzee program using the concept of Arrays and ArrayLists.**

**Due: October 21, 2024 (by 11:59 p.m.) This will be a two-person homework assignment.**

**Sunday -** Nightly Assignment: w3schools.com – Complete **Java Arrays and Loop through Array. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Tuesday -** Nightly Assignment: w3schools.com – Complete **Java ArrayList. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Thursday -** Nightly Assignment: w3schools.com – Complete **Java Wrapper Classes. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Tuesday Lab : Complete AP Classroom Unit #6 – Arrays. (+5 pts.) Due: October 17, 2024**

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

**Week of October 21, 2024:**

**Monday and Tuesday:** You will practice working on MCQs and FRQs and review for Quiz #3 and Quiz #4.

**Tuesday Lab : Complete AP Classroom Unit #7 – ArrayLists. (+5 pts.) Due: October 24, 2024**

**Wednesday: Quiz #3 with MCQs. (50 pts.)**

**Friday: Quiz #4 with FRQs. Questions #3 and #4 (50 pts.)**

**Week of October 28, 2024:**

You will be introduced to 2D Arrays.

**Sunday -** Nightly Assignment: **Come up with Final Project Idea.** Put idea with your name on it in OneDrive. (+2 points)

**Tuesday -** Nightly Assignment: w3schools.com – Complete **Java Array with MultiDimensional Arrays. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Tuesday Lab : Complete AP Classroom Unit #8 – 2D Arrays. (+5 pts.) Due: October 31, 2024**

**Thursday - After final project idea is approved, You will BEGIN work on FINAL PROJECT.**

**HW #9 (10 pts.) – You will be asked to program a projects based on seating for an airplane using 2D Arrays.**

**Due: November 4, 2024 (by 11:59 p.m.)**

**Students will work on final projects in class!**

**Week of November 4, 2024:**

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

**Sunday –** Free Night!

**Tuesday -** Nightly Assignment: w3schools.com – Complete **Java Recursion. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Thursday -** Nightly Assignment: w3schools.com – Complete **Java Exceptions. Screenshot the last screen of the exercises demonstrating completion.** Submit screenshot with your name on it in OneDrive. (+2 points)

**After final project idea is approved, You will BEGIN work on FINAL PROJECT.**

**Tuesday Lab : Complete AP Classroom Unit #10 – Recursion. (+5 pts.) Due: November 7, 2024**

**HW #9 (5 pts.) – You will be asked to program various sequences for counting boxes or a similar Fibonacci recursion homework.**

**Due: November 4, 2024 (by 11:59 p.m.)**

**Weeks of November 11th and 18th , 2024:**

**Monday and Tuesday:** You will practice working on MCQs and FRQs and review for Quiz #5 and Quiz #6.

**Tuesday Lab (11th): Complete AP Classroom Unit #2 – Using Objects. (+5 pts.) Due: November 14, 2024**

**Wednesday: Quiz #5 with MCQs. (50 pts.)**

**Friday: Quiz #6 with FRQs. Questions #2 and #4 (50 pts.)**

**Tuesday Lab (18th): Complete AP Classroom Unit #9 – Inheritance. (+5 pts.) Due: November 21, 2024**

**You will continue working on your final project.**

**Week of November 25th:**

*(Thanksgiving break week)*

**Week of December 2nd:**

**You will finish up your final project! Test out your final project with other peers and teacher.**

**Week of December 9th:**

**The final project is due by December 9, 2024 !!**

***You will present your final project in class! 😊***