**Course Syllabus**

**AP Computer Science A – Data Structures – CMP4502**

**Spring 2025**

**(Dual Credit BSU CS121)**

**Instructor:** Ms. Susie Cunningham

**Email:** [scunningham@bsu.edu](mailto:scunningham@bsu.edu)

**Office: Elliott 008-C**

**Classroom: BU115**

**Office Hours:**

**Mondays: 10:00 – 11:00 a.m. (in Elliott 008-C)**

**Noon – 2:00 p.m. (in Elliott 008-C)**

**4:00 -5:00 p.m. (in BU115)**

**Wednesdays: 10:00 – 11:00 a.m. (in Elliott 008-C)**

**Noon – 2:00 p.m. (in Elliott 008-C)**

**Fridays: 10:00 – 11:00 a.m. (in Elliott 008-C) Noon – 2:00 p.m. (in Elliott 008-C)**

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

**Description:**

The **Computer Science Data Structures – CMP4601** course is an introduction to a high level, structured programming language and will entail syntax, grammar, and its popular usage in the development of algorithms and data structures. Advanced placement topics will include **linked lists, stacks, queues, binary trees, sequential and binary searching, recursion, sorting algorithms, insertion, deletion, and traversal operations, hashing, heapsort, interfaces, sets (HashSet and TreeSet), maps (HashMap and TreeMap), binary files and file organization, data structures, internal and external storage, and system analysis methods.**

**Student Learning Objectives Learned from this course:**

**- Students learned the basics of the Java programming language.**

**- Students learned program design, debugging, and problem solving.**

**- Students learned how to design a large project on a white board and then took the ideas and programmed these ideas.**

**- Students learned how to work in a large group with other students and how their part of a programming project had to integrate into another student’s project.**

**- Students learned how to integrate their ideas into a project and be respectful of other students’ ideas.**

**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**

**w3Schools**

**Graphics will be introduced from various sources.**

**Course Methodology:**

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

**Student Evaluation:**

There will be **3 tests (in written style)**, **nightly w3schools.com homework assignments, 8 homework assignments,** and **1 major programming project**.

**Method of Grading:**

Grades will be based on a point system.

**Points**

Tests 1 – 3 (50 points each) 150

Final Project 100

w3Schools.com Nightly Homework 10

Homework Assignments 85

**Total Points 345**

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](mailto: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.**

**Tentative Class Activity and Assignment**

**Data Structures – CS 121**

Class will be on Mondays, Tuesdays (Lab Days), Wednesdays and Fridays

**Week of January 6, 2025:**

Dynamically linked lists will be introduced.

**Complete reading assignment: Pages 388 – 400. (Strings)**

**Chapter #12 – File Handling and Exceptions**

**Chapters #14-#17**

Monday Nightly Assignment: w3schools.com – Complete **Java Linked List.** Submit screenshot with your name on it in OneDrive. (+2 points)

**Week of January 13, 2025:**

**HW #1 (15 pts.) will be due on January 17, 2025. (Creating a Linked List using pointers.)**

**Complete reading assignment: Chapter #24**

**Week of January 20, 2025:**

No classes on Martin Luther King Day.

The topic of sorting and recursion will be reviewed.

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

**HW #2 (5 pts.) will be due on January 24, 2025. (Take HW #2 and rewrite program using Linked List class.)**

**HW #3(10 pts.) will be due on January 27, 2025. (Sorting and recursion)**

**Week of January 27, 2025:**

The topics of interfaces, abstract classes, stacks, and queues will be introduced.

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

**HW #4(10 pts.) will be due on January 31, 2025. (Stacks and Queues)**

**Part A: Using Stacks**

**Part B: Using Queues**

**HW #5 (10 pts.) will be due on February 3, 2025 (Interfaces and Abstract Classes)**

**Complete reading assignment: Chapter #24 (cont.)**

**Week of February 3, 2025:**

Monday is part of an extended weekend.

The topic of trees and binary searching will be introduced.

**HW #6 (10 pts.) will be due on February 5, 2025. (Binary Tree)**

**Week of February 10, 2025:**

Review of the class material will be made.

**February 11, 2025- Test #1 (25 pts.) – Multiple Choice**

**February 12, 2025 – Test #1 (25 pts.) – Free Response Programming Part**

February 14, 2025 – Go over test.

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

**Week February 17, 2025:**

The topics of Big O notation, sets, maps, heap data structures, lambdas, and algorithms will be introduced.

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

**HW #7 (10 pts.) will be due on February 21, 2025. (Card Game using maps and sets)**

**Complete reading assignment: Chapter #18 & #25**

**Week of February 24, 2025:**

Hashtables will be introduced. Students will discuss and program different hash algorithms.

**HW #8 (10 pts.) will be due on February 28, 2025. (Hashing)**

**Week of March 3, 2025:**

**SPRING BREAK!!!**

**Week of March 10, 2025:**

A review of the class material will be made.

**March 11, 2025 – Test #2 (25 pts.) Multiple Choice**

**March 12, 2025 - Test #2 (25 pts.) Free Response Programming Part**

**Weeks of March 17th through April 21, 2025:**

Students will complete work on the major programming project and will study for the big AP exam.

[Extended weekend is April 21, 2025.]

**April 15, 2025 – Test #3 (25 pts.) Multiple Choice**

**April 16, 2025 - Test #3 (25 pts.) Free Response Programming Part**

**Week of April 28, 2025:**

**Major Programming Project (100 pts.) will be due on April 28, 2025 Students will present their major programming projects to the class. During this week, the students will be able to utilize the other students’ major projects.**

**May 7th, 2025 at Noon: AP Computer Science A Test!**