**Course Syllabus**

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

**Spring 2024**

**(Dual Credit BSU CS121)**

**Instructor:** Ms. Susie Cunningham

**Email:** scunningham@bsu.edu

**Office: Elliott 008-C**

**Classroom: BU115**

**Office Hours:**

**Mondays: Noon – 1:00 p.m. (in Elliott 008-C)**

 **3:00 -4:00 p.m. (in Elliott 008-C)**

**Tuesdays: Noon – 1:00 p.m. (in Elliott 008-C)**

 **4:00 – 5:00 p.m. (in Elliott 008-C)**

**Wednesdays: Noon – 1:00 p.m. (in Elliott 008-C)**

 **3:00 – 4:00 p.m. (in Elliott 008-C)**

**Thursdays: 1:00 – 3:00 p.m. (via Zoom)**

**Fridays: Noon – 1:00 p.m. (in Elliott 008-C) 3:00 – 4:00 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**

 **soloLearn Web Site**

 **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)**, **7 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 (46%)

 Final Project 100 (31%)

 Homework Assignments 75 (23%)

 **Total Points 325**

 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 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.

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

**Communication:**

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. Students possessing an educational 504 or IEP should contact the instructor as soon as possible to arrange for any accommodations that may be needed. Likewise, if you feel that you could benefit from an educational 504 or IEP, feel free to contract the instructor to this regard.

**LLM and other AI Fair-Use Policy:**

Basic AI tools (spell-check, word-count, grammar, etc.) that assist with correcting errors and gathering information about your own work is not only accepted, but also encouraged!

More advanced AI tools such as LLMs (ChatGPT, LLaMa, Phi-1, etc.) that generate information or code may be used as a starting point for research or creative projects, but generated material should not (for several reasons!) be turned in as your own work. Using these LLMs can be very useful in helping you create a project and/or learn complex topics, but diligence is required to:

* \*Completely\* verify that all information provided by the LLM is accurate (this is a major problem, especially in the sciences!). Remember that these models pull non-vetted information from the internet, which will include non-expert, and sometimes malicious, sources.
	+ You (and your grades) are responsible for any and all errors gathered in this manner.
* resist turning in LLM produced material as your own work. The point of being at the Academy is to use provided information as a spring-board for your own intellect and creativity. Using these tools to help you gather ideas, or to find alternate ways to express your ideas, is both welcomed and encouraged. But make sure that you are not falling for temptation to use likely-erroneous data or logic that LLMs often provide. In other words, treat LLM generated material as you would other non-expert sources of material.
	+ Presenting AI-generated material as your own will count as plagiarism, and will be dealt with accordingly (see Academic Dishonesty Policy, above).

**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).

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

**Indiana Academy Unexcused Absence Policy:**

It is the policy of the Indiana Academy that any absence from class is unexcused, except for illness, death in the family, college or school-related activities, and extenuating circumstances. When a student is absent from a class, the instructor reports the student absence to the Faculty Attendance Coordinator in the Office of Academic Affairs. Unless the absence is excused by a school official, it is considered unexcused. The decision as to whether an absence is excused is not determined by the instructor.

The student is expected to attend every class. The student is allowed one unexcused absence without penalty. Each additional unexcused absence will be penalized as follows: Unexcused absence (1) = 1-point subtraction from final grade. Unexcused absence (2) = 3-point subtraction from final grade. Unexcused absence (3) = 5-point subtraction from final grade. (For example, if you have an 89 final average with (3) unexcused absences your final grade will be 84). Four (4) or more unexcused absences will lead to academic and residential consequences beyond the scope of this class determined by the Office of Academic Affairs (i.e., residential groundings, parent/principal conference, and/or detention).

Any minor assignment/test/project/presentation missed due to an unexcused absence will be handled according to the late work policy of this class. A student will be given an opportunity to retake any missed assignment/test/project/presentation worth more than 20% of the final grade but will be docked a full letter grade as a result.

**Personal Computer Devices:**

A student’s personal computer/device is their responsibility for downloading and installing class software and maintaining the hardware.  If a student’s personal computer/device has hardware issues, they will need to get the hardware issues resolved.  If a student’s personal computer/device is not able to run or is not compatible with the software needed for the class, there will be school computers available in the classroom setting for the student’s use.

**Tentative Class Activity and Assignment**

**Data Structures – CS 121**

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

**Week of January 5th and 8th, 2024:**

The topic of strings and memory will be introduced. Learn about JavaFX Basics, Event-Driven Programming, Animations, Controls, and Multimedia.

**HW #1 (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: January 12, 2024 (by 11:59 p.m.)**

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

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

**Chapters #14-#17**

**Week of January 15th and 22nd , 2024:**

No classes on Martin Luther King Day.

The topic of dynamically linked lists will be introduced.

**HW #2 (15 pts.) will be due on January 24, 2024. (Creating a Linked List using pointers.)**

**HW #3 (5 pts.) will be due on January 26, 2024. (Take HW #2 and rewrite program using Linked List class.)**

**Complete reading assignment:**

**Chapter #24**

**Week of January 29, 2024:**

The topics of stacks, and queues will be introduced.

**HW #4 (10 pts.) will be due on February 2, 2024. (Stacks and Queues)**

 **Part A: Using Stacks**

 **Part B: Using Queues**

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

**Week of February 5, 2024:**

Extended Weekend : No classes on Monday.

The topic of sorting and recursion will be reviewed.

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

**Due: February 9, 2024 (by 11:59 p.m.)**

**Complete reading assignment: Chapter #18**

**Week of February 12, 2024:**

The topic of trees and binary searching will be introduced.

**HW #6 (10 pts.) will be due on February 16, 2024. (Binary Tree)**

**Complete reading assignment: Chapter #25**

**Week of February 19, 2024:**

Review of the class material will be made. (Monday)

**February 20, 2024- Test #1 (25 pts.) – Multiple Choice**

**February 21, 2024 – Test #1 (25 pts.) – Free Response Programming Part**

**Week of February 26, 2024:**

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

**HW #7 (10 pts.) will be due on March 1, 2024. (Card Game using maps and sets)**

**Complete reading assignment: Chapter #21 and #27**

**March 4, 2024:**

## SPRING BREAK!!

**Week of March 11, 2024:**

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

**HW #8 (10 pts.) will be due on March 15, 2024. (Hashing)**

**Week of March 18, 2024:**

A review of the class material will be made. (Monday)

**March 19, 2024 - Test #2 (25 pts.) Free Response Programming Part**

**March 19, 2024 - Test #2 (25 pts.) Multiple Choice**

**Weeks of March 18, March 25, April 1, and April 8th, 2024:**

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

[Extended weekend is on March 29th.]

**Week of April 15, 2024:**

**Major Programming Project (100 pts.) will be due on April 15, 2024! 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.**

**Week of April 22, 2024:**

A review of the class material will be made. (Monday)

**March 23, 2024 - Test #2 (25 pts.) Free Response Programming Part**

**March 24, 2024 - Test #2 (25 pts.) Multiple Choice**

**Students will review for AP exam with practice exam questions.**

**May 8th is AP Computer Science A test!**

**Week of May 1st, 2024:**

**May 1st students will take AP Computer Science A test!**

**Rest of week students will play games they developed during the course and possible field trips.**