# AP Computer Science A Course No. 10157 Credit: 1.0

|  |  |  |  |
| --- | --- | --- | --- |
| **Student name:** |  | **Graduation Date:** |  |

Pathways and CIP Codes:Programming & Software Development (11.0201)

Course Description: **Application Level:** Following the College Board’s suggested curriculum designed to mirror college-level computer science courses, AP Computer Science A courses provide students with the logical, mathematical, and problem-solving skills needed to design structured, well documented computer programs that provide solutions to real-world problems. These courses cover such topics as programming methodology, features, and procedures; algorithms; data structures; computer systems; and programmer responsibilities.

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 1: Click or tap here to enter text.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Demonstrate knowledge of different programming language paradigms. (E.g. object oriented programming, functional programming.) |  |
| 1.2 | Read and understand a problem description, purpose, and goals. |  |
| 1.3 | Read and understand class i n s t a n t i a t i o n s and relationships among the classes (i.e. “is-a,” and “has-a” relationships). |  |
| 1.4 | Design and implement a class. |  |
| 1.5 | Demonstrate a knowledge and show application of encapsulation. |  |
| 1.6 | Demonstrate a knowledge and show implementation of inheritance. |  |
| 1.7 | Demonstrate a knowledge and show implementation of abstract classes. |  |
| 1.8 | Demonstrate a knowledge of polymorphism. |  |
| 1.9 | Show implementation of method overloading and overriding. |  |
| 1.10 | Understand and implement a given class hierarchy. |  |
| 1.11 | Identify reusable components from existing code using classes and class libraries. |  |
| 1.12 | Demonstrate a proficiency for using libraries as defined by the AP Java Subset. |  |
| 1.13 | Understand and explain the difference between static and dynamic data types. |  |
| 1.14 | Demonstrate a knowledge and show application of recursion. |  |
| 1.15 | Identify edge cases and generate appropriate test data. |  |
| 1.16 | Employ and understand various debugging techniques. |  |
| 1.17 | Demonstrate knowledge of the three types of programming errors: compile or syntax, run-time, and logic. |  |
| 1.18 | Understand error handling and how to throw and catch exceptions. |  |
| 1.19 | Representations of numbers in decimal, binary, and hexadecimal. |  |
| 1.20 | Understanding and implementation of primitive data types int, Boolean, and double. |  |
| 1.21 | Demonstrate and show implementation of one dimensional static arrays. |  |
| 1.22 | Demonstrate and show implementation of two dimensional static arrays. |  |
| 1.23 | Knowledge of row-major ordering of two dimensional static arrays. |  |
| 1.24 | Demonstrate and show implementation of dynamic arrays. |  |
| 1.25 | Understanding of the differences between static and dynamic arrays. |  |
| 1.26 | Knowledge of selection, insertion, merge, and quick sort. |  |
| 1.27 | Demonstrate and show implementation of compiler directives. |  |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

CTE Pathways Help Desk

(785) 296-4908

[pathwayshelpdesk@ksde.org](mailto:pathwayshelpdesk@ksde.org)



900 S.W. Jackson Street, Suite 102

Topeka, Kansas 66612-1212

[https://www.ksde.org](https://www.ksde.org/)

The Kansas State Department of Education does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities and provides equal access to any group officially affiliated with the Boy Scouts of America and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: KSDE General Counsel, Office of General Counsel, KSDE, Landon State Office Building, 900 S.W. Jackson, Suite 102, Topeka, KS 66612, (785) 296-3201.