# Introduction to Physical Computing Course No. 31002 Credit: 0.5

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

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

Course Description: **Application Level:** Students develop an understanding of programming for the physical world, including but not limited to the Internet of Things (IoT), microcontrollers, robotics, and other physical computing devices that are in use in our world.

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 | Compare different algorithms that may be used to solve the same problem, but one might be faster than the other. (e.g., different algorithms solve the same problem, but one might be faster than the other). [Clarification: Students are not expected to quantify these differences.] |  |
| 1.2 | Interpret the flow of execution of algorithms and predict their outcomes. [Clarification: Algorithms can be expressed using natural language, flow and control diagrams, comments within code, and pseudocode.] |  |
| 1.3 | Decompose a problem into parts and create solutions for each part. |  |
| 1.4 | Use an iterative design process (e.g., define the problem, generate ideas, build, test, and improve solutions) to solve problems, both independently and collaboratively |  |
| 1.5 | Analyze the relationship between a device’s computational components and its capabilities. [Clarification: computing systems include not only computers, but also cars, microwaves, smartphones, traffic lights, and flash drives.] |  |
| 1.6 | Use a systematic process to identify the source of a problem within individual and connected devices (e.g., follow a troubleshooting flow diagram, make changes to software to see if hardware will work, restart device, check connections, swap in working components). |  |
| 1.7 | Explain the processes used to collect, transform, and analyze data to solve a problem using computational tools (e.g., use an app or spreadsheet form to collect data, decide which data to use or ignore, and choose a visualization method.). |  |
| 1.8 | Represent data using different encoding schemes (e.g., binary, Unicode, Morse code, shorthand, student-created codes). |  |
| 1.9 | Explain how computer science fosters innovation and enhances nearly all careers and disciplines. |  |
| 1.10 | Describe ethical issues that relate to computing devices and networks (e.g., equity of access, security and plagiarism), hacking, intellectual property, copyright, Creative Commons licensing. |  |

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

Instructor Signature:

For more information, contact:

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