Canvas Course Curriculum:

Intro to Computer Science

C/C++ Programming

Introduction to Computers

• Basic hardware and software concepts.

• The different types of programming languages.

• C/C++ Integrated Development Environment (IDE).

• Demonstration ( Installation (PC, Mac, online compiler).

• Test driving a C++ application.

• Writing a simple program in C++.

The Structure of C/C++ Program

• main(), #include, using namespace std.

• Output and Input: cout, cin.

• numeric data, character data, string data.

• data types: int, float, double, char.

• arithmetic operators: +, -,\*, /, %

• Memory Concepts.

• Demonstration.

• Lab exercise.

Decision Making: Equality and Relational Operators

• Relational operators: >, <, >=, <=

• Equality operators: ==, !=

• Lab exercise

• Programming project.

Control Statement in C/C++

• Algorithms

• Logical operators: &&, ||

• Decision/Selection constructs: if, if...else statements.

• Repetition: while statement, sentinel-controlled repetition.

• An introduction to counter controlled repetition, the increment and

decrement operators.

• Lab exercise.

• Programming project.

Control Statements

• The essentials of counter-controlled Repetition.

• The for repetition statement.

• Examples using the for statement.

• do...while repetition statement.

• switch multiple selection statement.

• Lab exercise.

• Programming project.

Functions in C/C++

• Software reusability.

• Math Library functions.

• User-defined functions.

• Function Definitions.

• Demonstration.

• Lab exercise.

• Programming project.

Functions in C/C++

• Lab exercise

• Graphics library demonstration.

• Using a graphics library.

• Drawing on the computer.

• Student programming project.

Graphics Programming

Student programming project.

*Competency: What are the key critical pieces that I think my students should have as a result of the* ***process*** *they’ve been engaged in? → these are the things that would become badges*

*Benchmarks: The steps within each competency*

*Evidence: Student demonstration of the competency*

# Competency-Based Assessment Tool

# Intro to Programming

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Competency** | **Benchmarks** | **Evidence**  *Portfolio, Project-Based, Evaluation, Summative, Formative, Observation* | **Rating**  0-*Not Yet Demonstrated*  *1 - Emerging*  *2 - Competent*  *3 -Highly Competent* | **Narrative Feedback for Student**  *Faculty, Mentor, Peer, Self* |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

# Competency-Based Assessment Tool

# SAMPLE: SIPP Summer Curriculum

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Competency** | **Benchmarks** | **Evidence**  *Portfolio, Project-Based, Evaluation, Summative, Formative, Observation* | **Rating**  0-*Not Yet Demonstrated*  *1 - Emerging*  *2 - Competent*  *3 -Highly Competent* | **Narrative Feedback for Student**  *Faculty, Mentor, Peer, Self* |
| *Fluency using CAD software to develop working prototypes of assigned projects* | *Develop CAD models of moderate complexity using a variety of sketch and modeling tools in novel ways*  *Develop assemblies and sub-assembly using to defined tolerance*  *Develop engineering drawings to workplace standard*  *Refine model, integrating feedback from multiple sources.* | *Student Work from Week 1 Project* |  |  |
| *Demonstrate ability to program microcontrollers to interact with the physical world* | *Attain fundamental concepts of programming: syntax,, language, conditional statements, variables,*    *Develop strategies for Debugging and troubleshooting* | *Series of projects completed using*  *CPX*  *and*  *Arduino* |  | *Checklist /rubric* |
| *Demonstrate ability to build working prototypes in conjunction with physical computing devices* | *Devise plans*  *Use tools and materials for construction*  *Test*  *Iterate on design / troubleshoot* | *Series of projects completed using*  *CPX*  *and*  *Arduino* |  |  |
| *Consistently demonstrating a growth mindset during assigned projects and activities* | *Embrace challenges*  *Persist through setbacks*  *View failures as opportunity for growth*  *Maintain effort & strong work ethic*  *Learn when to ask for help*  *Take inspiration from the setbacks of others* | *Week 1: end of week check-in, reflection*  *Continually evaluated at end of week check-ins* |  | *Checklist/rubric* |
| *Successfully communicates and collaborates with others* | *-Communicates needs, wants, information, negotiates, resolves conflict, and asks for help when needed*  *-Understands giving and receiving feedback and constructive criticism*  *-Develops positive relationships with supportive peers and adults*  *-Participates in group/team activities using teamwork and* [*collaborative problem-solving*](https://www.mediate.com/articles/BernsteinS1.cfm) | *Week 6: end of week check-in*  *Continually evaluated during any group/team activities* |  |  |

Except where otherwise noted, this work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/)

To view a copy of this license, visit

http://creativecommons.org/licenses/by-nc-sa/4.0/ or send a

letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA

Spectrum Innovates

Spectrum Innovates Program

Spectrum Innovates Pathway Program

Spectrum Innovates Pathway Program at Vaughn College

**©** Eleanore Bednarsh 2015-2022

# 