

# SEACOAST SCHOOL OF TECHNOLOGY

## Student Competency Profile

### Computer Science – CIP 110201

Student: \_\_\_\_\_

YOG/Completed Program: 2020

Norm Messa, Instructor

Sharon Wilson, Principal

### Technical Competencies & Performance Indicators

#### **Understand the basic principles of computer program development in order to create a foundation on which to base more complex software design.**

1. Perform analysis of application requirements to develop a computer program.
2. Perform program design functions in developing an application that meets specified requirements.
3. Develop algorithms to implement program design.
4. Write a technical description of the tasks that the software program performs individually and as part of a team.
5. Discuss and demonstrate knowledge of the Software Development Life Cycle.
6. Use software debugging tools and techniques to insure verification of programs operations both individually and as part of a software development team.
7. Demonstrate the ability to design an intuitive software user interface that possesses a high degree of usability.

#### **Understand the fundamentals of programming languages that are critical to the creation of methods and the concept of structured programming.**

8. Discuss and demonstrate knowledge of the program creation process including the concepts of source code, object code, and executable code.
9. Demonstrate the ability to write computer programs using both compiled and interpreted programming languages.
10. Discuss and apply fundamental concepts of programming language..
11. Demonstrate and use a variety of software development tools for program implementation.
12. Write computer programs utilizing the structured programming paradigm.
13. Write computer programs utilizing the object oriented programming paradigm.

14. Write programs using modularization techniques to reduce program complexity and improve program maintainability.
15. Discuss and demonstrate the fundamental level of object oriented design principles including the use of classes and objects in the context of program design.
16. Discuss and demonstrate the fundamental level of instantiation, encapsulation, inheritance, and polymorphism as it applies to object oriented program design.
17. Write a program that involves the design and implementation of a custom class.
18. Discuss and demonstrate knowledge of the relationship between class definition and a class implementation.

#### **Understand event handling and user interaction in order to understand data flow and control.**

19. Write programs that use events to cause program execution to react to the event by writing the appropriate event handler code.
20. Write programs that use a graphical user interface to provide user interaction with a program.
21. Discuss and develop a good user interface design.
22. Conduct usability testing of software.
23. Write programs that access external data files..
24. Write programs that input from and output to external devices.
25. Discuss and demonstrate the different file formats and structures.

#### **Understand the basic common algorithms of computer science to show how they affect ways to solve mathematical or programming problems.**

26. Write programs that sort data.
27. Write programs that search data.
28. Write programs to solve mathematical problems through numerical analysis concepts.

	29. Demonstrate and write programs that simulate physical processes.
	30. Demonstrate general problem solving techniques to solve a variety of computational problems.

**Understand the basic concepts of computer networks and security to reinforce knowledge of ethical computing.**

	31. Discuss computer security and its relationship to the computer programmer.
	32. Explain and demonstrate principles of computer networks.
	33. Discuss the ethical issues involved in computer programming.
	34. Discuss computer hacking and cracking and how it relates to the computer programmer.

**Understand the fundamental concepts of entrepreneurship and how entrepreneurship influences the economy.**

	35. Discuss and assess venture creation possibilities and identify the steps in planning the venture.
	36. Identify the resources needed for venture startup and operation.
	37. Discuss the options in planning the venture's future (growth, development, demise).
	38. Identify and discuss the traits and behaviors of an entrepreneur (leadership, personal assessment, personal management).
	39. Demonstrate personal growth, community leadership, democratic principles and social responsibility by participating in activities/events offered through student organizations.
	40. Decision-Making & Problem-Solving - Demonstrate and apply good decision-making and problem-solving skills by outlining issues in situations/problems and determining, collecting, and organizing information needed in order to formulate a solution.
	41. Self-Management - Demonstrate and apply self-management skills by adhering to regulations, being responsible, and following through on commitments.
	42. Communication Skills - Demonstrate and apply effective communication skills: verbal, written, visual, and listening.
	43. Ability to Work with Others - Demonstrate and apply the necessary skills in order to work effectively with others.
	44. Information Use – Research, Analysis & Technology - Demonstrate and apply the use of information through research, analysis, and technology.

	45. Mathematical Concepts - Demonstrate mathematical and computation skills as applied to real world situations.
	46. General Safety - Demonstrate and apply safe practices and procedures in the workplace.
	47. Career Development - Demonstrate personal/career development skills by completing a career plan.

**Rating Scale**

1. No Exposure
2. Novice – Learner requires significant supervision.
3. Proficient – Learner demonstrates skills regularly.
4. Mastery – Learner demonstrates skills numerous times without supervision

**Career Ready Practices (CRP)**

1. Demonstrate creativity and innovation.
2. Model integrity, ethical leadership and effective management.
3. Attend to personal health and financial well-being.
4. Consider the environmental, social and economic impacts of decisions.
5. Act as a responsible and contributing citizen and employee.
6. Communicate clearly, effectively, and with reason.
7. Apply appropriate academic and technical skills.
8. Employ valid and reliable research strategies.
9. Use technology to enhance productivity.
10. Work productively in teams while using cultural/global awareness.
11. Utilize critical thinking to make sense of problems and persevere in solving them.
12. Plan education and career path aligned to personal growth.

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