

## SEACOAST SCHOOL OF TECHNOLOGY Pre-Engineering Competencies

| <b>Technical Competencies</b>   |
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| 1. Demonstrate and apply safe practices and procedures in the workplace.  |
| 2. Describe the engineering design process and how it impacts the various engineering and engineering technology disciplines.   |
| 3. Demonstrate an understanding and application of the methodologies involved in the engineering design process.  |
| 4. Develop a design for a product, process, or project. Describe the manufacturing, construction or procedural methods used to convert the design into a finished product, process, or project. |
| 5. Demonstrate various engineering product and project planning methodologies.  |
| 6. Demonstrate the effective use of design refinement in the engineering design process.  |
| 7. Demonstrate the use mathematics and models (physical and virtual) as applied to the engineering design process.  |
| 8. Demonstrate the use of cost analysis in the engineering design process.  |
| 9. Demonstrate the use of human resources and facility requirements in the engineering design process.  |
| 10. Demonstrate what is meant by a multi-disciplinary design team.  |
| 11. Demonstrate the effective use of design teams as applied to the engineering design process.   |
| 12. Describe quality assurance and quality control and their applications in production and engineering design environments.  |
| 13. Demonstrate the ability to apply problem solving and decision making methods to an engineering problem.   |
| 14. Demonstrate the use of a variety of written and oral communication techniques to resolve engineering problems (brainstorming, conference calls, consult experts, internet searches, etc.)   |
| 15. Create an engineering case study.   |
| 16. Create a product design using computer based tools (CAD, spreadsheets, simulation packages, etc.)   |
| 17. Demonstrate an understanding of the interrelationships of the various engineering disciplines as applied to engineering projects.   |
| 18. Demonstrate an understanding of the concept of open and closed loop systems.  |

| 19. Demonstrate an understanding of engineering systems (control, electrical, fluid and mechanical).  |
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| 20. Demonstrate an understanding of material characteristics as applied to engineering projects.  |
| 21. Demonstrate the ability to present and defend project information in a formal presentation.   |
| 22. Demonstrate an understanding life cycles (product, sustainability, obsolescence, etc.).   |
| 23. Demonstrate how engineering impacts society at a local, national, and global level.   |
| 24. Demonstrate an understanding of what is meant by infrastructure.  |
| <b>Core Competencies</b>  |
| 25. Demonstrate an understanding of professional ethics and how they apply to the engineering professions.  |
| 26. Demonstrate an understanding of the value of professional organizations in the engineering disciplines and their relationship to career develop.  |
| 27. Describe the educational pathways for various careers in engineering, engineering technologies and related fields.  |
| 28. Describe career and employment opportunities in engineering (including entrepreneurship).   |
| 29. Prepare a proper portfolio of exemplary work.   |
| 30. Demonstrate personal growth, community leadership, democratic principles, and social responsibility by participating in activities/events offered through student, industry and/or community organizations. |
| 31. Act as a responsible and contributing citizen and employee.   |
| 32. Apply appropriate academic and technical skills.  |
| 33. Attend to personal health and financial well-being.   |
| 34. Communicate clearly, effectively and with reason.   |
| 35. Consider the environmental, social and economic impacts of decisions.   |
| 36. Demonstrate creativity and innovation.  |
| 37. Employ valid and reliable research strategies.  |
| 38. Utilize critical thinking to make sense of problems and persevere in solving them.  |
| 39. Model integrity, ethical leadership and effective management.   |
| 40. Use technology to enhance productivity.   |