

SEACOAST SCHOOL OF TECHNOLOGY
Student Competency Profile
Biomedical Science & Technology – CIP 261201

Student: _____

YOG/Completed Program:

 Michael Murphy, Instructor

 Margaret E. Callahan, Principal

Technical Competencies & Performance Indicators

Understand through principles and practices laboratory safety concepts, procedures, and protocols to operate in a safe laboratory environment and demonstrate general lab practices, including protocols and sterile procedures to use, care for, and maintain lab instruments.	
1.	Apply proper safety and disposal practices while utilizing chemical and biological agents.
2.	Demonstrate an ability to utilize SDS appropriately and be able to recognize universally recognized hazard symbols.
3.	Prepare and Utilize SOPs (Standard Operating Procedures).
4.	Utilize and apply principles of measurement.
5.	Perform serial dilutions and calculate concentration.
6.	Practice aseptic technique.
7.	Develop and utilize a standard curve.
8.	Practice precise and accurate micropipetting.
9.	Employ proper centrifugation techniques.
10.	Maintain and operate lab equipment properly.
11.	Differentiate between the different types of microscopes and describe and demonstrate their uses.
12.	Discuss and explain the principals of proper cryogenic techniques.

Understand scientific process and designs in order to successfully complete a scientific inquiry.	
13.	Demonstrate the ability to utilize the scientific method.
14.	Demonstrate technical reading and writing by: <ul style="list-style-type: none"> • <i>Reading a variety of scientific writing (academic journal writing), and demonstrating knowledge of databases (PubMed, ERIC, etc.),</i> • <i>Writing lab reports, reading and interpreting charts/graphs in journal articles, generating graphs, and using Excel or other graphing software</i>
15.	Apply proper experimental design.

Understand concepts and techniques for cGMP (current good manufacturing practices), GLP (good lab practices), and GDP (good documentation practices).	
16.	Define and differentiate GLP, GMP, GDP.
17.	Demonstrate an understanding of quality assurance, quality control, and regulatory practices.
18.	Explain role of various regulatory agencies, and demonstrate an understanding of compliance requirements related to approvals required by those agencies.

Understand concepts, techniques, and diagnostic procedures in microbiology that are critical for prokaryotic identification, cultivation, and the impact on the community.	
19.	Practice and demonstrate culturing techniques.
20.	Employ identification techniques.
21.	Determine cell concentrations, evaluate culture conditions, and assess growth kinetics.
22.	Apply appropriate concepts in relation to disease, disease spread and prevention.

Understand eukaryotic cellular structure and function and growth factors.	
23.	Demonstrate an ability to properly identify cells and their parts.
24.	Interpret interaction of cell and its environment.
25.	Demonstrate culture skills.

Understand concepts and techniques used in immunology in order to assist in the development of a cell-based assay.	
26.	Employ immunological techniques.
27.	Explain techniques for mono/polyclonal antibody production.
28.	Describe the role of antibodies.

Understand concepts, techniques, and methodologies in chemistry and biochemistry in order to work in a biotechnology laboratory.	
	29. Apply concepts and/or techniques of analytical chemistry.
	30. Predict and/or manipulate chemical reactions.
	31. Illustrate and employ enzymatic reactions.
	32. Trace the flow of energy and matter through a system.
	33. Utilize and demonstrate biomolecules and their interactions.
	34. Explain principals of protein structure and function.
	35. Utilize and apply analytical and purification techniques.

Understand concepts and techniques in molecular biology in order to successfully perform various genetic manipulations.	
	36. Explain the relationship between nucleic acids and protein.
	37. Utilize bioinformatics technology.
	38. Explain and apply techniques in molecular biology.

Understand and apply principles of bioethical conduct.	
	39. Summarize and explain the larger ethical, moral, and legal issues related to biotech research, product development, and use in society (animal use/ human research, etc.).
	40. Discuss bioethical case studies, including animal handling, human subject research, and GMOs.

Career Readiness: Understand the necessary employability and career readiness skills in order to achieve success in today's workplace.	
	41. Identify trends in the field of biotechnology. Predict how nanotechnology, bioinformatics, proteomics, genomics, and transcriptomics will create new career opportunities and their impact on society.
	42. Explain the various departments in a business model of a biotech company, and identify the role of biotech skills in hospitals, universities, pharmacies, research centers, etc.
	43. Communicate effectively by: <ul style="list-style-type: none"> • <i>Organizing oral and written information</i> • <i>Interpreting and communicating information, data, and observations</i> • <i>Presenting formal and informal presentations and adjusting presentation for audience</i> • <i>Applying active listening skills to obtain and clarify information</i> • <i>Listening to and speaking with a variety of individuals from diverse backgrounds</i>
	44. Discuss, practice, and demonstrate the knowledge and skills to be an effective student and/or employee.

45. Develop, practice, and demonstrate skills through participation in biotechnology events, including those offered through professional and student organizations.
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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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