

Maine Community College System
Five Year Program Review

College: Central Maine Community College

Program: Life Science

CIP: 26.0101

Credential: Associate in Science (AS)

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Date: June 2021

Period of Review: AY1516-AY1920

Program Overview:

1) **Program description** *(from the most recent college catalog):*

The Associate in Science Degree in Life Science is designed to provide students with a broad general survey of scientifically accumulated knowledge. Students completing this degree could enter the workforce as scientific technicians or transfer into science, technology, engineering and math (STEM) majors at baccalaureate institutions with a primary focus on biological and life sciences. The A.S. in Life Science degree provides appropriate course sequencing for efficient transfer, reinforces and deepens core learning across the curriculum, and supports and strengthens the STEM infrastructure of the College.

2) **Program Learning Outcomes: all program learning outcomes are expected to be assessed within the five-year cycle. Please attach an Assessment Data and Reflection Template for each program learning outcome. Explain how the department used the assessment results to improve teaching, learning, and the curriculum.**

List the program learning outcomes:	Method of assessment: list the courses and activities/assignments used to assess the learning outcomes
<ol style="list-style-type: none"> 1. Demonstrate knowledge of the major chemical and biological topics in Life Sciences. 2. Effectively communicate scientific ideas, assumptions, observations and results in oral and written formats. 3. Demonstrate critical thinking and problem-solving skills by applying scientific principles. 4. Use appropriate laboratory procedures to generate and analyze quantitative and qualitative data to form conclusions. 5. Demonstrate the safe and proper use of scientific instrumentation, measuring devices, chemical reagents, media and tools to collect relevant and quality data. 6. Understand the relationship of the Life Sciences to other areas of study and be able to make informed ethical choices. 	Please see attached Five-Year Assessment Plan for Student Learning Outcomes.

3) Credentials Awarded within the IPEDS year, i.e. July 1-June 30:

Credentials Awarded					
Credential	AY1516	AY1617	AY1718	AY1819	AY1920
AS	2	6	11	10	11

4) Program Graduates Employed: There are not enough graduates in the cohort for wage data comparison.

Number of Completers with any Wage Data	--
% of Completers with any Wage Data	--
# of Completers with First Year Earnings	--
Median First Year Earnings	--

5) Partnerships, collaborations, associations and memberships

a) Advisory Meeting Dates and Attendance (past 3 years):

The Life Sciences program currently does not have a program advisory board but plans to build one. Historically transfer degrees haven't had advisory boards.

b) Program external accreditation, associations, and memberships (if applicable):

The four-year universities Life Sciences students most often transfer to are: Husson University, University of Maine, University of Maine Farmington, University of New England and University of Southern Maine. The four-year majors Life Sciences students most often transfer to are: biology, chemistry, health sciences, marine biology and medical biology. Students are also eligible to transfer to graduate degree programs in pharmacy, a terminal degree program PharmD.

6) Other Indicators of student success, direct and/or indirect, which may include:

	AY1516	AY1617	AY1718	AY1819	AY1920
Licensure/certification pass rates (if applicable)	n/a	n/a	n/a	n/a	n/a
Program Advisory Committee Member Survey (on scale of 1-5 averaged):	n/a	n/a	n/a	n/a	n/a
Program Curriculum	n/a	n/a	n/a	n/a	n/a
Technical currency of the program	n/a	n/a	n/a	n/a	n/a
Preparation of program graduates for work in the field	n/a	n/a	n/a	n/a	n/a
Communication from program administration/faculty	n/a	n/a	n/a	n/a	n/a
Overall quality of the program	n/a	n/a	n/a	n/a	n/a
Other (please specify):	n/a	n/a	n/a	n/a	n/a

7) Student demographics:

Admissions					
	AY1516	AY1617	AY1718	AY1819	AY1920
Fall Applications	30	67	65	87	72
% chg in Fall Applicants from PY	--	123%	-3%	34%	-17%
Enrolled (Yield)	11	25	15	19	19

% chg in Enrolled from PY	--	127%	-40%	27%	0%
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Student Enrollment ¹					
	AY1516	AY1617	AY1718	AY1819	AY1920
Unduplicated Headcount Enrolled in Program	13	43	44	42	48
% chg in Headcount from PY	---	231%	2%	-5%	14%
Enrolled Credit Hours	181	492	520	495	535
% chg in Credit hours from PY	--	172%	6%	-5%	8%
FTE	12	33	35	33	36
% chg in FTE from PY	--	175%	6%	-6%	9%

¹ = students within the program in the fall of the academic year

Student Success					
Cohort Year	AY1516	AY1617	AY1718	AY1819	AY1920
Cohort Enrollment	18	37	25	39	40
Retained to the next semester	83%	76%	60%	41%	48%
Retained to the next year	61%	62%	40%	23%	25%
100% of program time	50%	27%	32%	13%	
150% of program time	50%	27%	40%		
200% of program time	50%	30%			
Transfer Rate (non-graduates) ²	33%	38%			
Transfer Rate (graduates) ²	39%	22%			
Enrolled in Another Program ²	0%	3%			
Graduated from Another Program ²	11%	35%			

². Determined at the maximum graduation point in this table, i.e. 200%

8) Strengths, challenges, and planned steps for continuous improvement: In your summary assessment you should reference sections of this review that informs the plan.

Program Strengths:

- This is the most rigorous program for entry at the College. Students must be able to start in College Writing and College Algebra or higher.
- The Life Science program currently has 21 articulation agreements with the University of New England and University of Southern Maine.
- The program boasts a state of the art chemistry lab which has made it possible for the College to offer organic chemistry.
- The Math & Science Center and the Writing Center are available for academic assistance and tutoring. Tutoring is available online with synchronous and asynchronous options, and in times outside of COVID-19, all tutoring is available face-to-face in a group or individual setting. Additionally, the Centers provide a paid work opportunity for students who excel in these subject areas, further strengthening those students' connection to the College.
- Online and on-ground delivery methods are available for many courses. This provides students with flexible options to attend school while balancing work, family and other commitments.
- Undergraduate research experiences, visiting guest speakers and other informal opportunities, such as taco Tuesdays, have increased student program engagement. The students also participate in Citizen Scientist, the voluntary involvement of the public in scientific research to address real-world problems.
- Recently updated microbiology and other science courses were improved to be multidisciplinary covering a wide range of science topics.
- Program faculty set high academic standards and courses are consistently rigorous. This has contributed to high transfer rates and helps prepare students for the next level in their academic careers.

Challenges:

- Admissions activities and program recruitment efforts were limited during the past year due to the COVID-19 pandemic restrictions.
- The COVID-19 pandemic made in-person classes and experiential learning more challenging. Adjusted lab schedules, online lectures, and decreased capacities were used to maintain social distancing.
- The Life Science program has committed full-time and adjunct faculty members. However, the percentage of courses taught in 2021AY by adjuncts was 65%; this is significantly higher than the campus average of 48%. The program would benefit from an additional full-time faculty member.
- Some students enter the program unprepared for the rigor of the courses. Faculty suspect that ineffective study habits and poor time management skills could be improved from student usage of tutoring and the Student Learning Commons resources, and will promote these opportunities.

Planned steps for continuous improvement:

- Expand undergraduate research experiences and citizen scientist projects to increase student engagement.
- Explore the creation of an Associates in Science Degree in Chemistry to provide students transfer opportunities to the University of Maine in related programs.
- Continue to acquire high-tech instrumentation to increase students' hands on experience.
- Host a regional high school science fair to increase recruitment and community involvement.
- Encourage students to join professional organizations like the American Chemical Society student chapter to help with networking, outreach and career preparation.
- Utilize Brightspace to collect and organize assessment data in an electronic format.

Five-year Assessment Plan for Student Learning Outcomes

Life Science

June 2021

Name of Program or General Education Domain

Date

Learning goal:

Student learning outcomes:	Academic year during which assessment will occur	Source(s) and type of assessment artifact(s) that will be collected (e.g.: embedded questioning, capstone assignments, standardized testing, performance observation, portfolio reviews, etc.)	Method(s) to be used for assessing artifact(s)	Assessment Goal (targets/criteria) for direct measure	Assessment Outcome (Number of Students Achieving an "acceptable" or better)	Assessment Goal was:		
						Met	Not Met	Pending Review
Demonstrate knowledge of the major chemical and biological topics in Life Sciences	Ongoing, each semester	BIO 110/111 Fund. of Environmental Science BIO 115/116 Anatomy & Physiology I BIO 117/118 Anatomy & Physiology II BIO 121 Nutrition BIO 131/132 Biology I BIO 133 Biology II BIO 211/212 Microbiology BIO 222/223 Genetics BIO 231 Pathophysiology CHY 121/122 General Chemistry I CHY 123/124 General Chemistry II CHY 221/222 Organic Chemistry CHY 251/252 Organic Chemistry II	Exams/Lab Practical Quizzes Case Studies Learner Driven Projects Observation of mastery of skills Discussions Lab Reports Research Papers	80%			✓	

Effectively communicate scientific ideas, assumptions, observations and results in oral and written formats	Ongoing, each semester	BIO 110/111 Fund. of Environmental Science BIO 115/116 Anatomy & Physiology I BIO 117/118 Anatomy & Physiology II BIO 121 Nutrition BIO 131/132 Biology I BIO 133 Biology II BIO 211/212 Microbiology BIO 222/223 Genetics BIO 231 Pathophysiology CHY 121/122 General Chemistry I CHY 123/124 General Chemistry II CHY 221/222 Organic Chemistry CHY 251/252 Organic Chemistry II	Exams/Lab Practical Quizzes Case Studies Learner Driven Projects Observation of mastery of skills Discussions Lab Reports Research Papers	80%				✓
Demonstrate critical thinking and problem-solving skills each applying scientific principles	Ongoing, each semester	BIO 110/111 Fund. of Environmental Science BIO 115/116 Anatomy & Physiology I BIO 117/118 Anatomy & Physiology II BIO 121 Nutrition BIO 131/132 Biology I BIO 133 Biology II BIO 211/212 Microbiology BIO 222/223 Genetics	Exams/Lab Practical Quizzes Case Studies Learner Driven Projects Observation of mastery of skills Discussions Lab Reports	80%				✓

		BIO 231 Pathophysiology CHY 121/122 General Chemistry I CHY 123/124 General Chemistry II CHY 221/222 Organic Chemistry CHY 251/252 Organic Chemistry II	Research Papers					
Use appropriate laboratory procedures to generate and analyze quantitative and qualitative data to form conclusions	Ongoing, each semester	BIO 111 Fund. of Environmental Science BIO 116 Anatomy & Physiology I BIO 118 Anatomy & Physiology II BIO 132 Biology I BIO 134 Biology II BIO 212 Microbiology BIO 223 Genetics CHY 122 General Chemistry I CHY 124 General Chemistry II CHY 221 Organic Chemistry CHY 251 Organic Chemistry II	Exams/Lab Practical Quizzes Case Studies Learner Driven Projects Observation of mastery of skills Discussions Lab Reports	80%				✓
Demonstrate the safe and proper use of scientific instrumentation, measuring devices, chemical reagents, media and tools to collect relevant and quality data.	Ongoing, each semester	BIO 111 Fund. of Environmental Science BIO 116 Anatomy & Physiology I BIO 118 Anatomy & Physiology II BIO 132 Biology I BIO 134 Biology II BIO 212 Microbiology	Exams/Lab Practical Quizzes Case Studies Learner Driven Projects Observation of mastery of skills	80%				✓

		BIO 223 Genetics CHY 122 General Chemistry I CHY 124 General Chemistry II CHY 222 Organic Chemistry CHY 252 Organic Chemistry II	Discussions Lab Reports					
Understand the relationship of the Life Sciences to other areas of study and be able to make informed ethical choices	Ongoing, each semester	BIO 110/111 Fund. of Environmental Science BIO 121 Nutrition BIO 131/132 Biology I BIO 133 Biology II BIO 211/212 Microbiology BIO 222/223 Genetics BIO 231 Pathophysiology CHY 121/122 General Chemistry I CHY 123/124 General Chemistry II CHY 221/222 Organic Chemistry CHY 251/252 Organic Chemistry II	Exams/Lab Practical Quizzes Case Studies Learner Driven Projects Observation of mastery of skills Discussions Lab Reports Research Papers	80%				✓

Most significant assessment findings? (Pedagogical, instructional, curricular changes). Please report on actions taken and on ongoing assessment plans.

- It was discovered that further action is needed to combine and disseminate the data in a useful electronic form. Assessment outcome information will need to be reported and assessed to determine if it is meeting goals.