Maine Community College System
Five Year Program Review

College: Central Maine Community College
Program: Building Construction Technology (BCTA)
CIP: 46.0415
Credential: Associate in Applied Science (AAS)
Review Team: Betsy Libby, Margaret Brewer, Brianna Doyle, Curry Caputo, Pete Coffin, Anne St. Pierre, Jen Lyons, Eric Berg
Date: September 2021
Period of Review: AY 2016/2017-2020/2021

Program Overview:

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

The Associate in Applied Science Degree in Building Construction Technology prepares the student for successful employment. No longer are the simple construction techniques of old acceptable in today's energy conscious marketplace. While never losing sight of ever-changing materials, methods, and technology associated with the construction field, this program focuses on fundamental skills applicable to either residential or commercial construction. Through a combination of classroom study, mock-ups, and live projects, students obtain hands-on experience and become broadly familiar with methods, standards, and codes commonly associated with the construction industry. While concentrating on core communication and construction skills, students progress at an individual rate matching individual growth. Fundamental construction skills are assessed periodically through competency testing giving students multiple opportunities to demonstrate comprehension and proficiency. Assigned projects based on student abilities will allow project time to more closely follow job-site practices. Growth and accomplishments will be archived in a working ePortfolio throughout the program, which will serve as the foundation for an eResume illustrating the strengths, commitments, and focus prospective employers are looking for.

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
1. Interpretation of construction documents, print reading, sketches and associated communication skills. 2. Estimate project costs from working drawings and blueprints including MUBEC code requirements. 3. Demonstrate understanding of basic building science. 4. Demonstrate understanding of basic design load path considerations. 5. Use of transits and laser levels applied to construction projects. 6. Meet core competencies including but not limited to: tool safety, construction math, floor/wall/roof layout, fastener/adhesive technology, lumber characteristics and milling.	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	AY1617	AY1718	AY1819	AY1920	AY2021
AAS	5	7	8	5	--

4) Program Graduates Employed: Data unavailable for first year earnings.

Number of Completers with any Wage Data	12
% of Completers with any Wage Data	75%
# 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)

Date(s) of Meeting	*# of college attendees*	*# of Non-college attendees*
11/08/2018	2	9
11/07/2019	2	7
11/18/2020	2	5

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

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

	AY1617	AY1718	AY1819	AY1920	AY2021
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):					
Program Curriculum	--	--	--	--	4.6
Technical currency of the program	--	--	--	--	4.6
Preparation of program graduates for work in the field	--	--	--	--	4.4
Communication from program administration/faculty	--	--	--	--	4.8
Overall quality of the program	--	--	--	--	4.6
Other (please specify): Major equipment purchased	--	--	--	--	3.6

7) Student demographics:

Admissions					
	AY1617	AY1718	AY1819	AY1920	AY2021
Fall Applications	53	44	57	62	--
% chg in Fall Applicants from PY	--	-17%	30%	9%	--
Enrolled (Yield)	16	12	15	26	--
% chg in Enrolled from PY	--	-25%	25%	73%	--

Student Enrollment[1]					
	AY1617	AY1718	AY1819	AY1920	AY2021
Unduplicated Headcount Enrolled in Program	27	28	34	40	35
% chg in Headcount from PY	--	4%	21%	18%	-13%
Enrolled Credit Hours	392	370	413	518	428
% chg in Credit hours from PY	--	-6%	12%	25%	-17%
FTE	26	25	28	35	29
% chg in FTE from PY	--	-4%	12%	25%	-17%

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

Student Success					
Cohort Year	AY1617	AY1718	AY1819	AY1920	AY2021
Cohort Enrollment	19	15	22	31	--
Retained to the next semester	63%	80%	59%	65%	--
Retained to the next year	58%	60%	41%	61%	--
Graduation Rates					
100% of program time	37%	20%	23%	16%	
150% of program time	47%	20%	23%		
200% of program time	47%	27%			
Transfer Rate (non-graduates)[2]	11%	7%			
Transfer Rate (graduates) [2]	5%	0%			
Enrolled in Another Program[2]	0%	0%			
Graduated from Another Program[2]	5%	0%			

[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:

- Programming is delivered by two highly dedicated full-time faculty members and two adjuncts well versed in their respective fields.
- Strong and consistent student-employment participation.
- A new interdisciplinary partnership with the Plumbing and Heating Technology (PHT) program benefits both programs by utilizing the BCT outdoor lab space. The lab provides a real-life experience in construction from start to finish. The trades work together to simulate the construction scheduling and completion process.
- Well-equipped workshop with materials, tools and mock-up stations that benefit students with real-life experiences. A few of the mock-up stations include roof framing, coffered ceilings, kitchen cabinetry, roofing, dormer and water proofing.
- Student shop projects allow students to build sheds, timber frames and kitchen cabinetry. These products are sold to the local community and help generate program revenue while providing real-life experience.
- Competency-based assessment system successfully recreated and streamlined in new Brightspace learning management system. This system is currently incorporated in first year curriculum.
- ePortfolios fully integrated into first and second year curriculum. These showcase student work through a collection of journal entries and digital images.
- The department maintains strong and stable agreements with Career and Technical Education Centers throughout Maine, New Hampshire and Vermont through the BCT 101 Tool Safety concurrent course.

Challenges:

- Maintaining and increasing enrollment is difficult in this strong economy. Existing and potential students choose to enter the workforce directly. There is an anticyclical relationship between enrollment and the current state of the construction industry.
- It is difficult to balance instruction, department chair duties, general administrative tasks, concurrent enrollment site visits, workshop maintenance and material inventory; there is limited time available to focus on each area.
- The number of female students enrolled in BCT programs and working in the construction industry is minimal. It is challenging to attract females into the program due to gender stereotypes.
- Attracting higher-aptitude high school students with strong math and writing skills is difficult. Some students enter the program unprepared for the rigor of the courses. BCT and other trades departments worked with math faculty to create MAT 104 Technical Mathematics; this course focuses on topics relevant to trades and technical disciplines. Study habits and poor time management skills could be improved from student usage of tutoring and the Student Learning Commons resources.
- Incorporation of competency testing into the second year curriculum is not yet completed. Time constraints impede test creation and LMS integration.
- Maintaining material and tool inventory, tool maintenance and routine shop/storage building maintenance is cumbersome.
- Strengthening program from enrollment, curriculum and physical plant perspective is problematic given the new department chair and full-time faculty learning curve.
- Volatile construction materials market creates difficulties with budgeting and request for bids.

Planned Steps for Continuous Improvement:

- Continue construction and marketing of new building on existing foundation to expand lab space allowing for full scale hands-on student experiences.
- Expand the BCT and PHT partnership to include the Electromechanical Technology (ELT) program.
- A plan for creating an onramp to encourage the enrollment of female students is in development. A few of these ideas include female-specific marketing, connecting with the National Association of Women in Construction, and utilizing the Gender Equity Coordinator as a resource.
- Develop a pipeline for women in the workforce by attracting new female students, providing a safe and appropriate learning environment and connecting graduates with women-owned/operated businesses.
- Expand competency-based assessment to the second year program.
- Integration of professional certificate programs into curriculum, i.e. Building Performance Institute, International Code Council.
- Creation of new learning opportunities outside the BCT Program—Carpentry Club, Carpentry Summer Camp, Carpentry Workshop Series. This potentially adds value for current students, faculty and staff (Carpentry Club), and attracts prospective students to BCT Program (summer camp, workshop series).
- Expand dual enrollment offerings to Career and Technical Education Centers—Competency-based Assessments (Comp Testing). Increase center visits to strengthen partnerships and recruit prospective students.
- Review program curriculum map and adjust course descriptions and outcomes as needed to accurately reflect current courses and employer needs.
- Increase BCT Program exposure through Social Media (YouTube, Facebook, Instagram).

Five-year Assessment Plan for Student Learning Outcomes

Building Construction Technology — Name of Program or General Education Domain

September 2021 — 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	Method(s) to be used for assessing artifact(s)	Assessment Goal (targets/criteria) for direct measure	Assessment Outcome *(Percent of Students Achieving an "acceptable" or better*)	Assessment Goal was:		
						Met	Not Met	Pending Review
1. Interpretation of construction documents, print reading, sketches and associated communication skills.	2nd	BCT 152 Construction Document Reading and Cost Estimating BCT 251 Construction Business and Site Management	BCT 152: evaluation of instructor assigned project (Fall 2020) BCT 251: evaluation of instructor assigned homework and final exam (Spring 2021)	Achieve 75% final course grade	Final Project 68% Homework/Final Exam 84%	 x	X	
2. Estimate project costs from working drawings and blueprints including MUBEC code requirements.	2nd	BCT 152 Construction Document Reading and Cost Estimating BCT 251 Construction Business and Site Management	BCT 152: evaluation of instructor assigned project (Fall 2020) BCT 251: evaluation of instructor assigned homework and	Achieve 75% final course grade	Final Project 68% Homework/Final Exam 92%	 x	x	

			final exam. (Spring 2021)					
3. Demonstrate understanding of basic building science.	1st	BCT 152 Construction Document Reading and Cost Estimating BCT 180 Introduction to Building Science	BCT 152: evaluation of instructor assigned project (Fall 2020) BCT 180: evaluation of instructor assigned homework and final exam (Spring 2021)	Achieve 75% final course grade	Final Project 68% Homework/Final Exam 82%	X	X	
4. Demonstrate understanding of basic design load path considerations.	2nd	BCT 128 Basic Strength of Materials	BCT 128: evaluation of instructor assigned homework and final exam (Spring 2021)	Achieve 75% final course grade	Homework/Final Exam 58%		X	
5. Use of transits and laser levels applied to construction projects.	1st	BCT 145 Building Concepts IV BCT 126 Construction Site Surveying	BCT 145: instructor observation and evaluation of lab project (Spring 2021) BCT 126: instructor observation and evaluation of field	Achieve 75% final course grade	Observation and Evaluation of lab project 56%		X X	

			exercises (Fall 2020)		Observation and evaluation of field exercises 63%			
6. Meet core competencies including but not limited to: tool safety, construction math, floor/wall/roof layout, fastener/adhesive technology, lumber characteristics and milling.	2nd	BCT 255 Interior Finish II	BCT 255: instructor observation and evaluation of skills application on mock-up and lab projects, and evaluation of competency testing results (Spring 2021)	Achieve 75% final course grade	Observation and evaluation of skills 60%		X	

- Math skills fall short or on par with industry standards. Students are pre-assessed for math skills, given opportunities to practice skills, provided written and verbal feedback on attempts, and retested repeatedly to foster skills improvement.
- Core competencies require frequent formative assessments followed by reevaluation of student's performance and periodic summative assessments. Students who excel at core math and shop competencies are continually challenged to apply knowledge in new ways. New competency-based tests are periodically developed to provide a new challenge to advanced students.
- More communication with students needed prior to the final project to make sure they are on track.