

2.3. Essential Skill Development

This section explains how well the Brewing and Brewery Operations program is helping students attain the following essential skills:

Table 3 Mapping of program learning outcomes (PLOs) relative to the essential skill development

PLOs	Essential Skills												
	1. Creative Thinking and Problem Solving Skills	2. Oral Skills	3. Interpersonal Skills	4. Teamwork and Leadership Skills	5. Personal Management & Entrepreneurial Skills	6. Writing Skills	7. Reading and Information Skills	8. Visual Literacy	9. Mathematical Skills	10. Technological Skills	11. Intercultural Skills	12. Citizenship and Global Perspective	13. Independent Learning
1. Demonstrate and evaluate safe work practices based on hazard analysis		✓	✓	✓			✓	✓		✓			
2. Demonstrate the fundamental techniques of beer production.	✓	✓	✓	✓			✓	✓	✓	✓			✓
3. Apply knowledge of beer chemistry and microbiology in brewery operations	✓	✓	✓	✓			✓	✓	✓	✓			✓
4. Evaluate appropriate process technology practices in brewery operations.	✓	✓					✓	✓	✓		✓		
5. Evaluate and control the consistency and quality of beer using chemical, microbiological and sensory analysis.	✓						✓	✓	✓	✓			
6. Relate the history and evolution of the beer industry to today's market, beer styles and regulations.		✓	✓	✓			✓	✓			✓	✓	✓
7. Develop a product portfolio that addresses consumer needs.	✓				✓		✓	✓					
8. Discuss and apply business principles and strategies related to running a brewing company.	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓

Statements below list how the Brewing and Brewery Operations Program helps to develop the essential skills.

Creative Thinking and Problem-Solving Skills

Students are developing their creative thinking and problem-solving skills throughout the program. Students practice and apply problem solving techniques in a variety of ways, they learn to solve mathematical problems, interpret data, to write reports and make recommendations based on the data they have collected during laboratory activities. Moreover, in the brewing program students have a final capstone project where they must plan and design a beer as well as the marketing strategy, showcasing their creative thinking.

Oral Skills

Students practice oral skills within class presentations. Students also receive oral assessments of their brewing knowledge during the practical brewing classes.

Interpersonal Skills

Students are often asked to work in pairs and small groups thus helping to develop interpersonal skills.

Teamwork and Leadership Skills

Students are often placed in working teams to complete projects during the HOPS courses. Students must work as a team to complete their capstone project of a student signature beer.

Personal Management & Entrepreneurial Skills

Sociability and adaptability are practiced during a career fair. Students are given opportunity to network with the brewing industry and to highlight the skills they are learning in the program.

Writing Skills

Writing and communication skills are developed when students write chemistry, microbiology, sensory evaluation, beer judging, and advanced packaging laboratory reports, analyse and make recommendation on brewing and fermentation data, and produce written reports and assignment for HOPS courses, Introduction to Professional Communication and Business Ethics. In addition, students have written final exams.

Reading and Information Skills

Students are asked to read class notes, textbooks and to do research projects during the program.

Visual Literacy

Students are asked to graph and interpret the data. This is particularly important for interpreting fermentation profiles. They create visual ways of presenting Key Performance Indicators in running a business.

Mathematical Skills

Problem solving and computation skills are reinforced in multiple HOPS classes that require students to do calculations and problem solving.

Technological Skills

Students use a variety of technologies such as analytical instruments, brewing equipment, data management technologies and multimedia tools for classroom presentations.

Intercultural Skills

The cohorts in the HOPS courses are usually very diverse in terms of the learners age, background, and ethnicities. Students learn to work together and respect individual differences.

Citizenship and Global Perspective

Students learn how the brewing industry has been shaped by various regulations, customs, and governmental organisations from around the globe.

Independent Learning

Individual assignments and learning activities help to develop independent learners and foster a practice of continual learning.

2.4. Curriculum Assessment

Program Learning Outcomes

Upon completing the Brewing and Brewery Operations Program, graduates will be able to:

1. Demonstrate and evaluate safe work practices based on hazard analysis.
2. Demonstrate the fundamental techniques of beer production.
3. Apply knowledge of beer chemistry and microbiology in brewery operations.
4. Evaluate appropriate process technology practices in brewery operations.
5. Evaluate and control the consistency and quality of beer using chemical, microbiological and sensory analysis.
6. Relate the history and evolution of the beer industry to today's market, beer styles and regulations.
7. Develop a product portfolio that addresses consumer needs.
8. Discuss and apply business principles and strategies related to running a brewing company.

To help determine if the program learning outcomes were still relevant to the brewing industry, the department members looked at current job postings from seventeen different breweries and mapped how well the brewing PLOs aligned with job requirements/descriptions. (See Appendix D) The job descriptions were categorized according to industry competencies, regulatory body competencies, future studies competencies, enriched civic and personal life competencies. It was found that: 27 statements from the job descriptions were attributed to industry competencies, 26 statements were attributed to enriched civic and personal life competencies, 9 statements were attributed to regulatory body competencies, and 1 statement was attributed to future studies competencies. The analysis of the job descriptions to PLOs revealed that all PLOs could be linked to statements in the job descriptions and that 44 of the statements in the job descriptions were attributed to PLO # 8 Discuss and apply business principles and strategies related to running a brewing company.