

Date submitted to SSCPR: October 18, 2023

Date Self-Study Report approved by SSCPR: September 21, 2022

Date of External Review: March 14-16, 2023

SUMMARY OF PROGRAM STENGTHS, CHALLENGES AND OPPORTUNITIES FOR IMPROVEMENT

Strengths of the Brewing and Brewery Operations Program:

The Diploma in Brewing and Brewery Operations started in 2014 and was tailored to fill a need for a trained and skilled workforce within the booming craft brewing industry. The program provides students with a solid foundation in brewing science and brewery operations while giving the students the opportunity to develop their practical skills within the experiential context of the KPU brewery. The success of the program is confirmed by the high employment rate of the graduates and the brewing awards that have been won by both the KPU Brewing and Brewery Operations students and by the alumni working in the industry. The Brewing and Brewery operation program has been well received by the brewing industry as is evidenced by the recognition that was awarded from the Master Brewers Association of the Americas, the scholarships that are provided by the brewing industry for the KPU brewing students, the support of our program advisory committee and finally by the support of the external review panel which was composed of industry experts.

Program Challenges and Threats:

1. The program has seen a decline in enrollment since the Covid 19 pandemic.
2. There has been an increase in the number of institutions that are offering brewing courses, thus students have more options when selecting a brewing school.
3. There is a lack of dedicated space for standard brewery quality control activities, and this is preventing the students from doing activities that are considered best practice in the industry.
4. There is insufficient storage space in the brewery for materials and equipment. This lack of space is limiting new offerings and expansions to the curriculum.
5. People resources are needed to fulfill the operational and legal requirements of running a brewery. People resources would be needed to expand the current program offerings.
6. The high cost of the program relative to the remuneration in the brewing industry. Cost of the program is about \$20,000 in tuition for domestic students in the diploma and the salaries in the industry are ranging from \$36,000 to \$70,000.



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Opportunities for improvement:

1. Strengthen relationships with industry partners and within KPU- Develop a framework for student internships by partnering with local breweries and distilleries. Continue to foster collaborations within KPU. For example, working with the Applied Genomic Centre on hop research or with Sustainable Agriculture to grow ingredients used in brewing.
2. Develop a pathway that would allow students in the KPU Brewing and Brewery Operations to write the Institute of Brewing and Distilling (IBD) Diploma Brewing Exam. This would help with international recognition as the IBD is well known in the brewing industry.
3. Outline the different career paths as well as the growth and income potential in the beverage industry.
4. Including information about non-alcoholic beer and other fermented or non-fermented beverages into the curriculum.
5. Develop a course on brewery maintenance or integrate more brewery maintenance items in the curriculum.
6. Teach and model quality management practices as well as sustainable practices in the KPU Brewery.

RECOMMENDATIONS THE QUALITY ASSURANCE PLAN DOES NOT ADDRESS

The Recommendations from the Self-Study Report and External Review Report that this Plan does not address as provided below, with a brief rationale for why these Recommendations cannot be addressed.

Recommendations	Indicate Self-Study Report (SSR) or External Review Report (ERR) and page number	Rationale for Not Addressing
Facility not having a DE or Perlite filter is a lost opportunity for training for the students. Steinecker and Bucher-Denwel both make brewing quality small beer filters along with the lower quality wine filters that are common in craft breweries.	ERR page 3	Diatomaceous Earth (DE)/perlite are carcinogenic, and their mining is detrimental to the environment. Using DE in the KPU brewery would increase the health and safety risks for students and employees. We will not purchase a DE/perlite filter



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QUALITY ASSURANCE FIVE-YEAR ACTION PLAN

The Quality Assurance **Goals** for improving or maintaining program quality over the next five years are:

MONTH/YEAR WHEN THE FIVE-YEAR ACTION PLAN BEGINS: October 2023

GOAL 1: Grow enrollment in the program by reducing barriers to application and increase annual enrollment to a minimum of 24 students.

Recommendation(s) this Goal Addresses	Indicate Report & Page Number
Encourage people with a diverse background to apply for the program	SSR pg. 47
Highlight the awards that are available to people from a diverse background to help reduce the financial barriers	SSR pg. 47
Remove the portfolio requirement from the application process	SSR pg. 47
Allow enrolment until the start of classes	SSR pg. 47
We were not aware of any brochure (Web or otherwise) is available for recruitment of potential students. If this is indeed the case, then it should be developed to aid in student enrollment.	ERR pg. 5

Action(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Notes
Faculty will fill out the program change form to suspend the portfolio requirements from the application process	Chair	Oct. 2023	March 2024	
Faculty will work with the Dean’s office to survey alumni to better understand career trajectories post-graduation and integrate into recruitment communications	Chair	Oct. 2023	June 2024	

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Action(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Notes
Laddering <ul style="list-style-type: none"> - Faculty will work with academic advising in the Faculty of Science and Horticulture to identify laddering pathways within KPU wherein graduates can pursue additional credentials after completing this diploma. Communicate this in outreach materials 	Chair	Dec. 2023	June 2024	
Accessibility -Faculty will email with KPU’s Lead Advisor on Disability, Accessibility, and Inclusivity to investigate barriers to participation from various minority groups: <ul style="list-style-type: none"> - Gender (I.e. seeking gender balance – the program is currently skewed male) - Disability – identify how to improve the ability of the program to accommodate people with disabilities - Race (currently white-skewed) 	Chair	Oct. 2023	July 2025	In addition to the moral necessity of pursuing equity and inclusivity, expanding our pool of applicants and students would also increase enrollment.
Indigenization <ul style="list-style-type: none"> - Meet with AVP Indigenous Leadership to discuss the brewing program and how best to approach the subject of Indigenization - Invite Indigenous breweries to send members to participate in the PAC so that they can provide guidance to the Brewing and Brewery Operations program - Invite Indigenous alumni to the PAC to obtain their perspectives on the challenges they experienced within the program and the brewing industry. Get feedback on how some barriers could be removed or reduced. 	Chair	Nov. 2023	June 2024	
Event attendance: <ul style="list-style-type: none"> - Develop rubric for evaluating merit of external events 	Chair	Oct. 2023	June 2024	Brewing department presently has a large event footprint. Objective here is to develop framework to assess which

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Action(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Notes
- Use this rubric to design an annual event plan, highlighting which events the program will ensure a presence at				events to attend and why and have goals for each one.

Resource Requirements (if applicable)
Resources required to achieve this Goal: Support from AVP Indigenous Leadership and consultations with KPU’s Lead Advisor on Disability, Accessibility, and Inclusivity
When resources will be required: December 2023
Faculty and/or Institutional support required: Support from AVP Indigenous Leadership and KPU’s Lead Advisor on Disability, Accessibility and Inclusivity.

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GOAL 2: Improve the quality of experiential learning within the program. We want our brewery and laboratory equipment to reflect the best practice and use.

Recommendation(s) this Goal Addresses	Indicate Report & Page Number
The KPU Brewing and Brewery Operations Program must strive to deliver a learning environment where the students are given an opportunity to apply the knowledge gained in lecture courses in the experiential context of the KPU brewery.	SSR pg. 46
Alumni, students, and discipline sector representative all indicate that more practical skill development in the brewery and laboratories would be beneficial.	SSR pg. 46
It is recommended that the brewing department looks at how the current HOPS courses are delivered and see if there are opportunities to increase the practical skills that the students are acquiring.	SSR pg. 46
The instructional team shared challenges around not having a dedicated sensory space. Certainly, a space designed for this work with considerations for avoiding aromas and sounds that can affect results are important along with equipment for proper sample preparation and cleaning of glassware. The program seems to be well equipped and served by the existing brewery. However, it was noted that addition of a pilot centrifuge and autoclave would allow for more efficient operation of the program.	ERR pg. 7
KPU Brewing and Brewery Operations program should continue to be involved in collaborations that benefit the students and the brewing industry	SSR pg. 46
KPU has an opportunity to make connections with breweries and breweries allied trades who are looking to offer internships for the summer break. It would be the students and employers' responsibility to manage the employment/hiring process and KPU only facilitates the connections thus minimizing the workload and any responsibility but enable a large growth opportunity	ERR pg. 3
Regular meetings to discuss and align assessments and supports for students	SSR pg. 47
Having a dedicated laboratory space inside of the brewing facility (separate from the food production floor), for chemical and microbiological analysis of beer would allow the supervision of more practical activities under the same roof. One possible option would be to convert the current office space in the brewery to a laboratory facility.	SSR pg. 47

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Action(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Notes
<p>The department chair will liaise with the Dean’s office and the KPU space committee to see if it is feasible to gain dedicated laboratory space to increase quantitative data collection</p> <p>-Investigate the feasibility of renovating the office space in the brewery to convert it to a dedicated lab space</p>	Chair	Oct. 2023	August 2026	
<p>Equipment:</p> <ul style="list-style-type: none"> - At present, the brewery primarily has equipment that mirrors the craft brew industry. Where possible, the faculty will advocate for the procurement of industry-standard equipment that would be found at large scale breweries, e.g. canning line, yeast propagation equipment. The faculty will fill out capital budget requests advocating for improvements of the instructional equipment. - Where procuring such equipment is not possible, review current suite of field trips and ensure that students are exposed via field trips to working breweries that possess this equipment 	Chair	Oct. 2023	August 2026	
<p>Lab space:</p> <ul style="list-style-type: none"> - Review space needs to perform sensory evaluation and store equipment, and additionally to conduct lab work - Faculty will inquire with the space committee to see if it is feasible to allocate a specific room to perform sensory evaluation, and store equipment safely - Additionally, faculty will inquire with the space committee to see if it is feasible to renovate the office space in the brewery to conduct laboratory work. Food safety 	Chair	Oct. 2023	August 2026	Separate food production area from chemical area. The department chair will liaise with the Dean’s office and the KPU space committee to see if it is feasible to gain dedicated laboratory space

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Action(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Notes
requires that food production and chemical analyses be in separate locations to avoid cross-contamination.				
Operations: <ul style="list-style-type: none"> - Hold regular (biweekly or monthly) departmental meetings to coordinate cross-class activities - Collaboration with Teaching and Learning to create more effective experiential learning activities 	Chair	Oct. 2023	Sept. 2026	
Research: <ul style="list-style-type: none"> - Have students participate in small research projects funded by student research and innovation grants 	Faculty led would be determined for specific research projects	Sept 2024	Sept 2026	

Resource Requirements (if applicable)
Resources required to achieve this Goal: Funding to improve lab space and equipment. Time release for research projects
When resources will be required: May 2024-Sept. 2028
Faculty and/or Institutional support required: Interior designer. Funding to improve lab space and equipment. Time release for research projects. The department chair will liaise with the Dean’s office and the KPU space committee to see if it is feasible to gain dedicated lab or storage space.



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GOAL 3: Improve operations of the physical brewery to align with industry best practices.

Recommendation(s) this Goal Addresses	Indicate Report & Page Number
Having a dedicated laboratory space inside of the brewing facility (separate from the food production floor), for chemical and microbiological analysis of beer would allow the supervision of more practical activities under the same roof. One possible option would be to convert the current office space in the brewery to a laboratory facility.	SSR pg. 47
The feedback from the industry also indicates the importance for students to understand the economics, sustainability, and the environmental impacts of brewing.	SSR pg. 46
Staff resources are needed to operate the KPU Brewery	SSR pg. 47
Hire a Facility Manager to enable maintenance, upkeep, program hands on assistance and free up teaching faculty to further develop program and value for students. This position could also assist with the organization of student placements during the summer break to pair the students with industry.	ERR pg. 7
Additional people and equipment resources will be required for new program offerings. Examples of new offering could be CPS courses, a brewery maintenance course, a distilling course, the production of ready to drink beverages and non-alcoholic beer production.	SSR pg. 47
Having a dedicated laboratory space separate from the food safe brewing facility for chemical and microbiological analysis of beer are required to meet the program needs	SSR pg. 47
The instructional team shared challenges around not having a dedicated sensory space. Certainly, a space designed for this work with considerations for avoiding aromas and sounds that can affect results are important along with equipment for proper sample preparation and cleaning of glassware.	ERR pg. 7
The program seems to be well equipped and served by the existing brewery. However, it was noted that addition of a pilot centrifuge and autoclave would allow for more efficient operation of the program.	
Collaboration with other departments within KPU maximizes available equipment, instrumentation, and expertise	SSR pg. 47
Have dedicated space for storage of cans and promotional material	SSR pg. 48
Have the appropriate chiller installed that meets capacity year around	SSR pg. 48

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Action(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Notes
The faculty will advocate with the Dean's office to establish a new staff position of brewery coordinator (or other appropriate title) to take on the administrative tasks required in operating a brewery. This would allow the educational faculty and staff to focus on curriculum improvements.	Chair	Jan. 2024	July 2024	This position would free up instructors to focus on improving the courses and course offerings. This new hire would be instrumental in developing new course offerings that could in turn increase enrolment.
The faculty will work with facilities to complete the installation of a working chiller	Chair	Has started	Dec. 2023	Work is in progress
The faculty will email the Dean's office and facilities to explore opportunities for decarbonization within the brewery, e.g. improving energy efficiency, capturing CO ₂ , using low global warming potential coolant	Chair	Has started	Sept. 2028	Quotes from a vendor has indicated that CO ₂ capture is not feasible given the small amount of CO ₂ generated in the brewery. Using low global warming potential coolant is currently cost prohibitive for the size of the brewery.
The department chair will liaise with the Dean's office and the KPU space committee to see if it is feasible to gain dedicated lab or storage space. (e.g. room 1370)	Chair	Oct. 2023	April 2024	For sensory + storage.
The faculty will fill out capital budget requests to acquire equipment to conduct yeast propagation	Brewing Microbiology Faculty	Oct. 2023	Sept. 2025	

Resource Requirements (if applicable)
Resources required to achieve this Goal: New hire to coordinate operations of the brewery and teach courses that are currently being taught by contract instructors. This new instructor would be instrumental in the development and delivery of new offerings in the Brewing and Brewery Operations program.
When resources will be required: May 2024
Faculty and/or Institutional support required: Ongoing budget support to a new faculty position

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GOAL 4: Improve the curriculum to maintain relevance with changes in the industry and increase the development of applied skills for the students.

Recommendation(s) this Goal Addresses	Indicate Report & Page Number
It is recommended that the brewing department looks at how the current HOPS courses are delivered and see if there are opportunities to increase the practical skills that the students are acquiring	SSR pg. 46
Facility primarily using dried yeasts and while convenient this is not best practice in brewing industry due to microbiologic contamination of dried yeast. While hopefully not beer spoilers, still using dried yeasts miss opportunities to build yeast propagation and clean yeast handling skills needed in a modern brewery. There are resources for low-cost manual propagation systems and a medium sized autoclave will make sterilization of Cornelius kegs simple and effective.	ERR pg. 4
The brewing department should investigate the feasibility of teaching more about brewery maintenance and determine if a course on brewery maintenance could be added to the curriculum	SSR pg. 46
Curriculum review should investigate if the elective courses are benefiting the students and the program. Would it be beneficial to remove one of the elective courses for a course on brewery maintenance or should a course on brewery maintenance be offered as a continuing and professional studies (CPS) offering	SSR pg. 46
Additional people and equipment resources will be required for new program offerings	SSR pg. 48
Hire a Facility Manager to enable maintenance, upkeep, program hands on assistance and free up teaching faculty to further develop program and value for students. This position could also assist with the organization of student placements during the summer break to pair the students with industry.	ERR pg. 7
There are many ways to take a program to a higher level in skill building and knowledge potential. The following are some possible approaches and other alternative paths that can be explored: 1) Ensure the syllabus covers all (or most) of the IBD Diploma Brewing Exam. 1a) This way students can choose to sit the exam(s) during or at the end of the program. 1b) KPU responsibility is to only meet the syllabus (or be clear what areas will be missed to students) and inform students of opportunity. 1c) KPU can track success rate and use as a means of communication of value of program. 2) KPU can choose to treat the brewing program as a minor and make a path for a BS major in a degree like Biology or Engineering. 3) KPU could choose to create a full 4-year BS degree in Brewing Science or consider a food science program	ERR pg. 4

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Action(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Notes
The faculty and instructional staff will continue to teach students to make decisions based on measured quantitative metrics	Chair	Oct. 2023	Oct. 2027	
The faculty and instructional staff will evaluate current curriculum to determine content that can be reviewed, creating room for new content	Chair	May 2024	May 2025	
The faculty will review current pre-requisites to determine whether each criterion is a valid predictor of success in the program	Chair	Oct 2023	June 2024	
The faculty will conduct review of course evaluation schemes and make changes to ensure authentic assessment of learning, in consultation with FSH T&L liaison	Chair	May 2024	May 2026	
The faculty will investigate whether a course on brewery maintenance is needed. If so, the faculty will advocate with the provost office to fund the resources needed to create and deliver the course.	Faculty teaching the Equipment and Technology class	May 2024	May 2027	
Map the Brewing and Brewery Operations Program curriculum to see if it supports students to complete the Institute of Brewing and Distilling (IBD) examination. Encourage students to write the IBD exam at the end of the diploma program.	Chair	May 2025	May 2027	
Review necessary transferrable skills, such as critical thinking, problem solving, writing, and communications, and ensure presence in curriculum. - Ensure support is present for English Language Learners	Chair	May 2024	May 2026	
The faculty will email the Provost's office to inquire if there is interest within KPU for the creation of a bachelors in food science degree	Chair	May 2026	May 2028	

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Resource Requirements (if applicable)
Resources required to achieve this Goal: Funding would be required to investigate and develop expanded course offerings. For example, a one course time release in fall of 2024 would be used to investigate the development of a brewery maintenance course. Funding would then be required to train or hire faculty to teach a brewery maintenance course. Funding would also be required to purchase equipment (pumps, tools, etc.) that students would dismantle and fix. A shop space to run a maintenance course would also be required. Funding in terms of a course time release in the fall of 2026 would be needed to investigate the feasibility of creating a bachelors in food science.
When resources will be required: May 2024
Faculty and/or Institutional support required: Hire Faculty/Brewery Coordinator to support expanding the course offerings

GOAL 5: Investigate whether we should incorporate non-alcoholic beer into our curriculum, and if so, implement it

Recommendation(s) this Goal Addresses	Indicate Report & Page Number
The feedback from industry and students also indicates that some information about other fermented beverages would be useful.	SSR pg. 46

Actions(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Notes
Review Program Learning Outcomes (PLOs) and Course Learning Outcomes (CLOs) to Investigate the feasibility of including non-alcoholic brewing in the current curriculum or decide if a new course would need to be developed. <ul style="list-style-type: none"> - Review – Technology and processes currently used in industry - New curriculum that would be required (I.e. would we adapt existing courses or create new ones? Would a new credential be needed?) - Assess industry demand for this training 	Chair	Jan. 2024	June. 2024	
If feasibility study validates this content, then design and implement		Sept. 2024	Sept. 2026	



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Resource Requirements (if applicable)

Resources required to achieve this Goal: Course release to conduct feasibility study. If deemed feasible, funding would be required to purchase necessary equipment to safely produce non-alcoholic beverages.

When resources will be required: Spring, 2024.

Faculty and/or Institutional support required: One course release and funding for equipment

PLAN SUPPORTED BY:

Diane Purvey

Provost's Name

Provost's Signature

Dec 21 2023

Date

Brett Favaro

Dean's Name

Dean's Signature

Dec 14 2023

Date