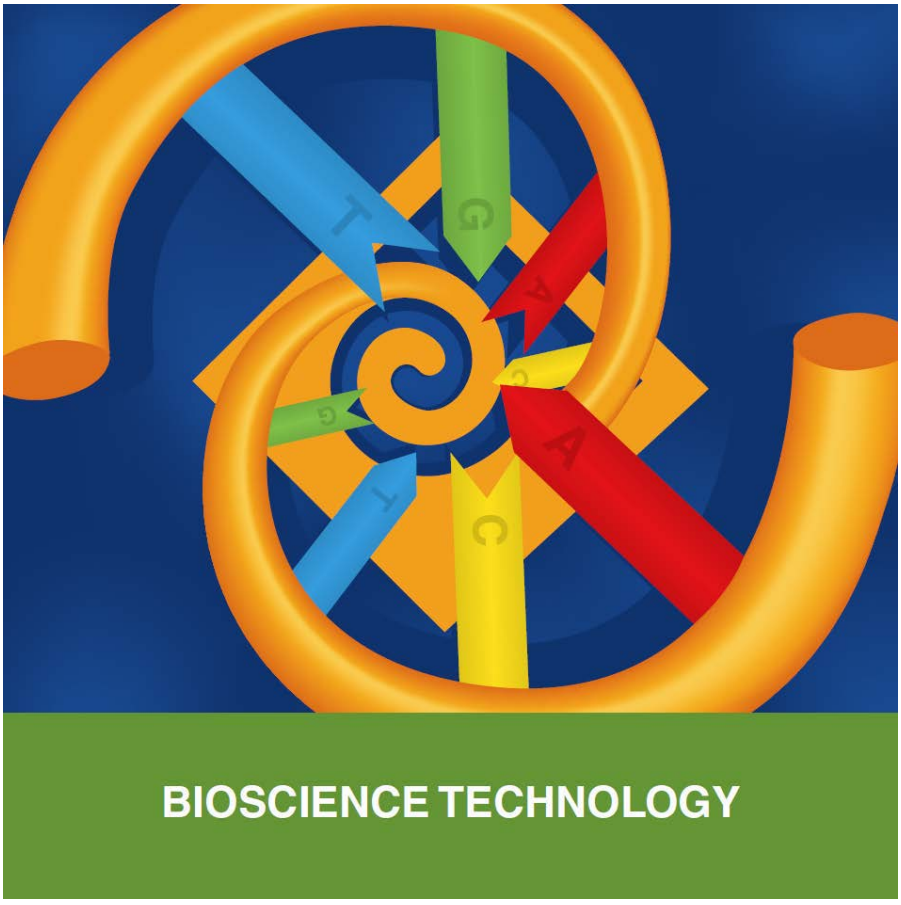
Bioscience Technology

Program Review

May 3, 2019



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Purpose of Program/Discipline Review

- Inform the college community about a Career and Technical Education (CTE) program or a Lower Division Collegiate (LDC) or a Developmental Education (DE) discipline.
- Give Subject Area Committees (SACs) an opportunity to study specific topics related to the enhancement of student learning.
- Provide a forum for each SAC's findings to be communicated to Administration, during which the SAC and Administration can explore and determine ways to address the recommended improvements (including timelines and "check-in" points for follow-up actions between reviews).
- Create written records of what is working well, what can be improved, and specific plans for implementing chosen improvements.
- Collect information that will contribute to institutional accreditation and institutional assessment and improvement.

History of PCC Bioscience Technology program

• 1994	Program launch; Kendra Cawley, Faculty Department Chair
• 2004	Program on hiatus due to budgetary issues
• 2006 to 2008	BIT faculty Kendra Cawley and Josephine Pino, with support of Genentech and other industry partners, rebuild program and create Bioscience Technician certificate
• 2008	Josephine Pino serves as chair from program reinstatement until 2014, with Trish Willy serving as co-chair from 2011 - 2013
• 2014	Program Review: Josephine Pino, Faculty Department Chair
• 2014	Full-time faculty Kendra Hill hired
• 2015 to 2016	No full-time staff in BIT department; adjunct instructor Josh Cary and instructional support technician Carla Moentenich carry department leadership roles
• 2016 to 2017	Full-time faculty Josh Cary, student resource specialist Jenny Kirchler, and many adjunct instructors join the program

Current Bioscience Technology Faculty and Staff (with appointment date):

- Full-time Instructor, Faculty Department Chair, SAC Chair: Josh Cary (2016)
- Instructional Support Technician: Carla Moentenich (2008)
- Student Resource Specialist: Jenny Kirchler (2017)
- Rock Creek Science & Technology Division Dean: Matthew Altman (2017)
- Adjunct Instructors:
    - Patty Ayala (2014)
    - Farin Hajarizadeh (2016)
    - Alyssa Thomas (2016)
    - Steve Gatton (2016)
    - Meghna Pant (2017)

1. Program/Discipline Overview:

A. What are the educational goals or objectives of this program/discipline?

The Bioscience Technology (BIT) program at PCC prepares students to work in the bioscience field with a goal of placing program graduates in entry-level positions within the industry or continuing education towards this eventual goal. The bioscience industry, both locally and nationally, is broad and continues to grow to encompass a wide variety of companies and research institutes which create products and services based on practical applications of living organisms and the life sciences. Sectors within the bioscience industry include biopharmaceuticals, medical devices, biomedical research, and agriculture. The knowledge and skills students develop in the BIT program which are required for entry into bioscience are also applicable to related industries which include high-tech manufacturing and the food industry.

In order to address the breadth of opportunity within the bioscience industry and the needs of diverse students enrolling in the program, the BIT program includes a foundation of knowledge and technical skills through two available certificate options of 19 and 29 credits as well as a 90-credit AAS degree in which students build more advanced skills. Certificate coursework covers an overview of the industry, basic laboratory skills, equipment calibration, measurement and applied mathematical skills, laboratory and industrial safety, and an introduction to quality systems and the principles of working in a regulated environment. The objective of the BIT program is that all students acquire these skills in preparation to join the bioscience workforce.

The BIT AAS degree builds on this foundation with additional basic science courses for further knowledge base and additional technical courses which train students in more advanced laboratory protocols in areas including cell culture, protein purification, immunochemical methods, and recombinant DNA techniques. Throughout these courses, instructors emphasize workplace competencies such as communication, teamwork, thorough documentation, and facilities maintenance alongside technical skills and ability to complete protocols. The goal for BIT degree holders is to be well-rounded with both the “hard” and “soft” skills required for a career in bioscience.

How do these compare with national or professional program/discipline trends or guidelines?

PCC’s BIT program is closely aligned with national and professional trends in bioscience education. The educational objectives of the program are informed by both our advisory board of local employers and industry members as well as the national NSF-funded Bio-Link network (www.bio-link.org).

Regarding local and regional trends in the bioscience profession, the BIT program is connected to the Oregon Bioscience Association (www.oregonbio.org) and works closely with many members of this organization to inform industry members of the training our students receive, align our curriculum with industry needs, and develop internship and other job pathways for students. Faculty and staff from the program meet with industry representatives at our quarterly advisory board meetings, at individual meetings throughout the year with new employers seeking to hire BIT students, and at site visits conducted during evaluation of student performance in co-operative education experiences (see Appendix #1). Faculty then use this feedback to revise or develop new lecture material, assignments, and other learning activities to remain current with industry practices.

The program also remains closely aligned with national skills standards (https://www.biotechworkforce.org/pdf/Core%20Skills%20Booklet%20SCREEN-mid%20Final%20June%201,%202016.pdf). Our certificate coursework closely reflects the six work functions identified in a national survey of bioscience employers as critical for entry-level technicians: maintain a safe and productive work environment, provide routine facility support, perform measurements / tests / assays, comply with applicable regulations and standards, manage and communicate information, and perform mathematical manipulations. Instructors in the BIT program meet to discuss and review these work functions and integrate these into the assignments, assessments, and teaching practices in courses throughout the program. In addition, faculty department chair, Josh Cary, has had two opportunities, in 2016 and 2018, to attend the Bio-Link Summer Fellows program to network with faculty from Bio-Link programs across the country and learn about the experience of other colleges in integrating core skills throughout their educational programs. These connections benefit the BIT program by maintaining status as a Bio-Link program and facilitate collaboration on curriculum, recruitment strategies, and other program resources. PCC has also been invited to participate in additional grants, currently in the application process, to sustain the relationships and innovative legacy of the Bio-Link network. These grants will further collaborative efforts to engage local employers in bioscience education via development of curriculum which embraces cutting edge technologies and new training pathways such as apprenticeships with national and global employers.

Have they changed since the last review, or are they expected to change in the next five years?

The educational objectives of the BIT program remain largely the same since the last program review. As stated in the 2014 report, the goal is "to help students achieve learning outcomes that will enable them to obtain jobs, be successful in their jobs, and to continue learning in accordance with their educational and career goals." Towards this goal, some components of the program have been revised to meet changes in student demographics. Primarily, growth in enrollment has occurred among younger students who frequently have little to no work history, necessitating a heavier emphasis on soft skills, job applications, and professionalism in order to meet employment goals.

Over the next five years, it is expected that the educational objectives of the program will evolve along with local employer needs. For instance, consideration of increasing automation implemented in bioscience production facilities could lead to changes in BIT curriculum and program outcomes. Our surveys of students reveal increasing employment in recent years in manufacturing technician roles, and our surveys of employers indicate ongoing automation at both large and small companies. The foundational components of our curriculum in the certificate courses will remain relevant for technician positions across the industry. However, the elective options within the program, which at present focus on advanced lab techniques, may be expanded and revised to meet the latest industry needs. The BIT program is currently evaluating mechatronics courses as potential new electives and it is expected that course selection and program objectives may shift in the next five years to include more focus on machine use and maintenance.

B. Briefly describe curricular, instructional, or other changes that were made as a result of your SAC's recommendations in the last program review and/or the administrative

response. *(The administrative response can be found opposite your SAC's listing at the web page where the Program Reviews are posted – look for the "AR" pdf.)* Note: Any changes NOT made as a result of the last program review should be described in the appropriate section elsewhere in this template.

Few changes were made in 2014 through 2016 as a result of turnover in the single full-time faculty position in the BIT program. Since Josh Cary entered into the faculty chair position in 2016, several changes have been incorporated into the program which address the 2014 program review's suggestions and administrative responses. The specific recommendations and corresponding program changes include:

1. *The BIT SAC is committed to using assessment of learning outcomes in a variety of forms as a driver for program change and progress. We support your recommendations and look forward to learning more about the outcomes and assessment.*
    a. In addressing this administrative recommendation, the BIT program has developed additional assessments of both hard and soft skills. These include a new technical skill assessment developed in BIT 109 which evaluates student performance on a variety of lab tasks, such as ability to take accurate and reliable measurements, and a teamwork peer assessment rubric developed in BIT 126 (see appendices #2, 3, 4, 6, and 8.)

2. *Maintaining Current Curriculum: We support your recommendations to assess the curricula of BIT 203 and 223 and to reevaluate the BIT 207 curriculum. We are aware of the challenges of space and the size of the equipment. We look forward to hearing more about the plan to rotate equipment in the classroom. Regarding the need to continue to develop and maintain written teaching materials to promote consistency, we understand the need to increase the instructional support technician's weekly hours. Given the current and near term budget environment, adding additional hours to staff is difficult. Please continue to dialog with your division dean and dean of instruction about potential incremental changes to the hours.*
    a. In addressing this administrative recommendation, the BIT program has been able to increase the hours for our instructional support technician, Carla Moentenich, from 0.5 to 0.75 FTE. This has aided the program in many important ways, one of which includes maintenance of the curriculum for BIT 207, Cell Culture. With Carla's assistance, the course now includes more hands-on activities for open bench work, aseptic technique, plant culture, and other project-based learning. This has also allowed the enrollment to increase from 12 to 18 students with little additional equipment. An efficient rotation of students through the biosafety cabinets in the cell culture room combined with the additional projects at the bench in the main lab are possible with Carla's presence and guidance during instructional hours as well as open lab hours offered by other faculty.

3. *Professional Development: We concur that professional development is essential for faculty and staff in a Career and Technical Education program. We support the request to ensure both full-time and part-time faculty have an opportunity to network with others in the industry. Please consider applying for curriculum development funds to develop in-house lab manuals. You should also consider exploring grant opportunities by contacting the PCC Grants Office and discussing the needs of the BIT program.*

a. In addressing this administrative recommendation, the faculty of the BIT program, both full-time and part-time, have engaged in many professional development activities during the past three years, including:
    i. Teaching Squares: Four of our seven current faculty members have participated in this TLC-sponsored program, which allows faculty in diverse disciplines to visit each other's classrooms and reflect on their own teaching practices.
    ii. TLC Workshop "Embedding and Assessing Teamwork in CTE Courses": Five of our faculty members participated in this half-day workshop in September 2017. We collaborated with other CTE programs on campus to discuss and develop methods for bringing teamwork into our courses. Through this work, we have brought new collaborative teaching methods into many BIT courses, as well as a formal teamwork peer evaluation rubric in our Quality Systems course.
    iii. Online faculty training: Three of our faculty have participated in the training offered by the Online Learning Department. One of our faculty members, Farin Hajarizadeh, now teaches BIT 102 online in summer, expanding access to this course and the BIT program. Patty Ayala teaches online courses for the Biology department, which some of our BIT students enroll in. This preparation within the BIT staff has also positioned the department for further development of online courses in the future.
    iv. Other on-campus training: Our faculty have participated in the Flipped Learning Institute, Hybrid Course Design workshop, and other TLC events.
    v. Other resources offered through PCC: Faculty in the program regularly discuss NISOD materials, including webinars, articles, and innovation abstracts. These are shared at our SAC meetings and some NISOD materials, such as the article *Creating Socially, Emotionally, and culturally Response Environments to Improve Conditions for Learning* have been incorporated into course instruction and engagement techniques. Our faculty find this resource to be very valuable in generating new ideas and strategies for teaching and student success.
    vi. Conference participation: Our faculty have attended several conferences, including Bio-Link Summer Fellows, League of Innovations, NISOD International Conference on Teaching and Leadership Excellence, Teaching T.A.L.K.S. (Today's Academics Linking Knowledge & Skills), Achieving the Dream, and Distance Learning Completion Conference.

4. *Student Access and Success: We support your recommendation to create a post-baccalaureate certificate option in Bioscience Technology. We support the development of an articulation agreement with PSU. We support your strategies for increasing enrollment, creating a visual academic roadmap, creating marketing materials, and increasing awareness of the program both at campus events and in the community.*
    a. In addressing this administrative recommendation, the BIT program solidified an articulation agreement with PSU's Biology department which allows for efficient transfer and advising from PCC to PSU. We have also greatly expanded access to the program through numerous marketing and outreach efforts on campus and in the community. These

efforts began with Josh Cary creating significant additions to the program website, a program flyer for prospective students and program handbook for newly admitted students, and outreach presentations to share in Biology and Chemistry courses on campus. This work has been greatly assisted by the addition of Jenny Kirchler as our Student Resource Specialist for CTE in the Science & Technology division. Jenny devotes approximately a third of her time to the BIT program, offering info sessions, campus tours, science classroom BIT program presentations, presentations in Career Guidance classes for Future Connect, Beaverton Early College, CAMP and Brighter Future, participation in PCC Preview Day, career fairs and other events at area high schools, working with dual credit high school instructors offering workshops and activities to promote Bioscience education and careers, advising prospective and current students and referring students to appropriate resources. She also encourages students to build community by chartering and forming the Bioscience student club each year. Students complete community services like participating in the Solve Beach Cleanup, volunteering at RC Harvest Festival or working in the Learning Garden.

5. *Responsiveness to Community Needs: We concur and support your strategies to continue to build strong ties with the bioindustry. We support your plan to schedule an annual BIT open house event.*
    a. In addressing this administrative recommendation, the faculty and staff of the BIT program have continued to develop strong connections to the local bioscience industry. We have focused on increasing representation on our industry advisory board, including recruitment of new members from companies deepening their involvement in the program and hiring students. Part-time faculty have assisted in raising industry awareness of the program through advisory board participation. Through the BIT 181 course, Exploring Bioscience, instructor Carla Moentenich has developed strong industry ties through tours, guest speakers, and mock interviews which bring industry representatives on campus to practice interview skills with students and provide authentic feedback on their readiness. In the same course, we now instruct and support students in developing LinkedIn profiles to both develop their professional network and to stay connected with students following graduation. We also introduce and encourage student participation in networking events hosted by groups such as Women in Science PDX and the Oregon Bioscience Association. Our efforts towards sustaining contact with our graduates through LinkedIn and other means has been a valuable way to deepen our connection with industry as well as help with future recruitment and intern placement.
    b. Regarding the annual open house event, BIT program has implemented an annual event for prospective students held in mid-March. These guests are invited into the BIT 126, Applied Quality Systems, classroom in order to validate a DNA extraction kit designed by current BIT students. The event provides opportunity for prospective students to visit the lab, participate in a hands-on activity, and speak with current students, faculty and staff about the BIT program. These guests report that the event increases their interest in the BIT program and likelihood to apply. The event also provides our current students with user feedback on the quality of their kits and associated documentation as well as opportunity to practice speaking about their experience and skills developed in the program.

6. *Resources: We recognize the need to hire a Learning Skills Specialist for the Bioscience Technology program. Given the current and near term budget environment, adding additional staff is difficult. Please continue to dialog with your division dean and dean of instruction about potential new staff at the college. We also recognize the need to increase the hours of the instructional support technician. Please continue to dialog with your division dean and dean of instruction about potential incremental changes to the hours of the instructional support technician.*
    a. In addressing this administrative recommendation, the BIT program has been able to increase staff hours as noted above. The increase in FTE from 0.5 to 0.75 for Instructional Support Technician Carla Moentenich and the hiring of Student Resource Specialist Jenny Kirchler have benefitted the recruitment of qualified students with a good personal fit for training towards a career in bioscience and sustained higher enrollment in our courses.

2. Outcomes and Assessment: Reflect on learning outcomes and assessment, teaching methodologies, and content in order to improve the quality of teaching, learning and student success.

A. Course-Level Outcomes: The college has an expectation that course outcomes, as listed in the CCOG, are both assessable and assessed, with the intent that SACs will collaborate to develop a shared vision for course-level learning outcomes.

i. What is the SAC process for review of course outcomes in your CCOGs to ensure that they are assessable?

Few changes have been made to BIT CCOGs in the two years since Josh Cary began serving as department chair. A more systematic review of CCOGs is scheduled for the next academic year after this year's curriculum review with our advisory board partners. Following industry input, BIT faculty will review current CCOGs to evaluate gaps and make corresponding updates to course outcomes and subsequent assessment of these outcomes.

Given that BIT is a small program with one full-time faculty member, the review of course outcomes and assessment of those outcomes occurs more intensively during onboarding of new part-time faculty. There is no need for a broader review of course outcomes because there is one faculty member who teaches each individual course in the department. In their first term of teaching, department chair Josh Cary meets with the new faculty member to review the CCOGs and assessment strategies for their course. Weekly meetings are scheduled in order to discuss teaching and assessment strategies and outcomes. Josh works with new and continuing part-time faculty individually in each course to facilitate the customization or revision of assessment approaches.

In addition, assessment is discussed at SAC meetings twice per year. At these meetings, faculty discuss consistency in assessment of common outcomes across courses in the program. These discussions lead to standardized assessment tools such as laboratory notebook guidelines and rubrics (see Appendix #2) and presentation evaluation rubrics (Appendix #3) which are used by faculty across the program. These are reviewed periodically when a revision is suggested by an individual faculty member or potential inconsistencies are identified within the program.

ii. Identify and give examples of changes made in instruction, to improve students' attainment of course outcomes or outcomes of requisite course sequences (such as are found in in MTH, WR, ESOL, BI, etc.), **that were made based on the results of assessment of student learning**.

One example of a change to BIT instruction based on student assessment is an increased focus on job readiness based on self-reflection assignments. This has resulted in the creation of a new course, BIT 279.

In the 2016-2017 academic year, self-reflection was selected as the focal outcome for BIT program assessment. In winter term, students were presented with self-reflection of program outcomes in a worksheet categorizing progress in five areas: academic progress, technical skill, job readiness, personal

effectiveness, and interpersonal effectiveness (see Appendix #4). Students provided a numerical evaluation (5 = excellent, 4 = very good, 3 = adequate, 2 = aware of problem and working on it, 1 = in need of more awareness and improvement) as well as comments on each of the five areas regarding awareness of their need for improvements, what they have learned about themselves through the program so far, what courses have challenged them in that area, and what they can do to improve.

Following the self-reflection assignment, Josh Cary met individually with each student to review their assessment and provide feedback. The worksheet was used to facilitate discussions about new strategies to use in the classroom and lab, as well as access to additional resources, including referrals to other campus centers as needed. In addition to individual student guidance, the data was aggregated to identify the relative ranking of the five progress areas among students. The data indicated that students tended to rate personal effectiveness (planning, organization, responsibility, integrity, professionalism, life-long learning) as their strongest area and job readiness (updated resume, preparation for job interviews, networking, research and applications to internships and jobs) as their weakest area (see Appendix #5). In discussions at SAC meetings, BIT faculty largely agreed with the student self-reflections and observed that students demonstrated strong work ethic and responsibility yet were hesitant in applying for jobs.

In the 2017-2018 academic year, self-reflection was re-evaluated using the same tool. Additionally, during this year, Josh Cary maintained an online spreadsheet listing opportunities for networking and job and internship positions. This spreadsheet was referenced multiple times during class and students encouraged to apply for positions as they were announced. The goal was to include greater discussion of job opportunities during instruction in order to ensure that students were aware of the variety of existing options and would take initiative in applying.

In this second year of evaluation, job readiness was again identified by students as their progress area most in need of improvement. Additionally, students reported completing few job applications, despite awareness of available job opportunities. In the follow-up individual meetings with each student following the self-reflection, a common theme that emerged among students was a focus on academic coursework and consequent delay in applying to jobs and internships and other networking and job search activities outside of academic responsibilities.

Following the assessment and the low enrollment in co-operative education (BIT 280A) in 2018, BIT faculty decided to adjust the program coursework to bring a greater emphasis on job readiness into the classes. BIT 280B (seminar concurrent with co-operative education) was inactivated in 2018-19, and a new course, BIT 279 – Work Experience Preparation, was created. This 1 credit seminar course includes instruction on informational interviews and tailoring resumes and cover letters to specific job applications. By providing instructor and peer support for the job application process, and holding students accountable for taking weekly actions leading to securing a job site, the BIT 279 course is expected to facilitate greater enrollment in co-operative education and aid students in overcoming hesitation or concerns about job applications. This course is especially needed given the increased enrollment in the BIT program by younger students without much work experience who will benefit greatly from more instruction and support in applying for jobs. The course is offered for the first time in Spring 2019 and the impact of the course will be assessed following completion of this initial offering.

A second example of a change to BIT instruction based on student assessment is more thorough evaluation of student technical skill performance. This has been accomplished through a new series of assessments in fall term BIT 109 (see Appendix #6).

BIT109, Basic Laboratory Techniques and Instruments, taught in the fall term, is a critical course for student progress in the BIT program. The course serves as the major laboratory course for the certificate program as well as the co- or pre-requisite for all other advanced (200-level) BIT lab courses. The course covers a wide variety of knowledge and skills that students must acquire in order to be successful in subsequent laboratory courses, including technical skills in taking measurements using balances, glassware, pipets, and pH meters, ability to create common laboratory solutions and verify proper buffer preparation, and knowledge of device calibration and accuracy and precision of data.

In order to facilitate instruction across this skill set, a new technical skill assessment (TSA) was developed in 2017. This assessment rubric combines the evaluation of student performance across three lab practical exams into one score which summarizes student performance and identifies areas for improvement. This rubric was added to the program handbook in 2018 and presented at the new student orientation event in September to set students expectations for lab performance at the beginning of the term. Additionally, the BIT 109 instructor meets individually with each student at the end of fall term to review the TSA score and identify actions required for improvement, including additional instructor demonstrations of equipment use, additional student practice, or retesting additional samples to evaluate consistent performance and check for random errors. By reviewing the assessment with students before, during, and at the end of the term, instructors are able to keep students on track towards the goal of acquiring all foundational technical skills. The pass rate for this evaluation has been 95% in both 2018 and 2019, and all students were able to increase mastery of technical skill performance via the feedback from this assessment.

B. Addressing College Core Outcomes

i. Update the Core Outcomes Mapping Matrix. http://www.pcc.edu/resources/academic/core-outcomes/mapping-index.html For each course, choose the appropriate Mapping Level Indicator (0-4) to match **faculty expectations for the Core Outcome for passing students**. (You can copy from the website and paste into either a Word or Excel document to do this update, and embed it in your report or provide as an appendix. Or, you may send the revised matrix to Susan Wilson, swilson@pcc.edu, in advance of your program review due date so she can update the web page; then, you can insert a link to the web page in the body of your report).

See Appendix #7.

C. Assessment of Core Outcomes (LDC) or Degree and Certificate (CTE) Outcomes.

i. Reflecting on the last five years of assessment, provide a brief summary of one or two of your best assessment projects, highlighting efforts made to improve students' attainment of the Core Outcomes (LDC-DE disciplines) or Degree and Certificate Outcomes (CTE programs). *(If including any summary data in the report or an appendix, be sure to redact all student identifiers.)*

The 2016-17 and 2017-18 assessment of self-reflection of program outcomes, leading to the creation of BIT 279, was described in section 2.A.ii. This assessment is considered one of the most effective projects in the past two years. In providing an avenue to discuss degree and certificate outcomes with students, this

project specifically addresses the outcome for students to "*make informed decisions about career options, job readiness, and related education and training choices for the bioscience field*" in a more comprehensive and systematic way with each student.

An additional assessment project in development is teamwork assessment in BIT 126 (see rubric and peer evaluation form in Appendix #8). Through the implementation of an anonymous peer review system, we hold students accountable for team outcomes which include: attendance and contribution to meetings, facilitating the contribution of each team member and listening effectively, completing tasks on time, fostering a constructive team climate, and responding to conflict and accepting criticism leading to solutions. This method mirrors "360 review" and other methods of performance review used in industry and prepares students for accountability not only for their own grades but also for their behaviors which contribute to the success of team efforts, a critical ability needed for success in the workplace.

ii. Do you have evidence that the changes made were effective by having reassessed the same outcome? If so, please describe briefly.

Yes, see section 2.A.ii in describing the assessment and reassessment of self-reflection in recent years. The evidence for success of these changes is anecdotal, given the small size of the BIT program and the idiosyncratic nature of working with different cohorts undergoing demographic changes each year. Through this self-reflection assessment project, we continue to observe that students find job readiness (resume and cover letter preparation, interview skills, networking, applying for jobs) to be challenging. We have incrementally addressed this through creation of and revisions to the student handbook, creation of BIT 279, increased social media networking on LinkedIn, and other instructional and relational approaches with students and graduates. We also address this during outreach and advising prospective students so that applicants understand the philosophy of a career technical education program and make an informed choice to join a training program which emphasizes behavioral skills and technical ability along with knowledge. The challenge in training job ready students will continue to grow as we receive applications from younger students each year, including many who are intellectually prepared yet lack experience with professional behavior in the workplace. BIT faculty will continue to reassess our approach to prepare students for entry into the bioscience industry.

iii. Evaluate your SAC's assessment cycle processes. What have you learned to improve your assessment practices and strategies?

The BIT SAC assessment cycle is shaped by our enrollment model of one cohort of 22 students per year. With the exception of BIT 102, we offer one section per year for each course, and each course is taught by a single instructor. Thus, much of our assessment work focuses not on consistent assessment across multiple sections of a course, but rather on assessment across various courses to address the learning outcomes and student results for a cohort. At SAC meetings, we share our experiences with students and note common observations and challenges in working with specific groups or tasks.

As a SAC, BIT faculty have been learning to improve our assessment approaches through culturally responsive teaching – using pedagogical approaches that include feedback from students and instructor observation of performance for specific groups of students to address gaps in their preparation for the

professional workplace. Each cohort of BIT students is unique and presents unique strengths and challenges for instructors to train students appropriately.

As noted in previous sections, we have emphasized job readiness based on survey results from students. Our degree of emphasis each year will depend on the demographics of our cohort, their reported strengths and weaknesses, and their progress in career exploration and securing work opportunities in the field. We are developing assessment tools that allow us to better gauge the needs of our students and respond accordingly.

Another assessment practice we have expanded based on our assessment cycles over several past cohorts is the use of lab practical assessments. We have incorporated more of these assessments of individual student technical proficiency in multiple courses, including BIT 109, 201, and 207. We have observed that some groups of students become very proficient in teamwork and dividing tasks efficiently; however, in a learning environment this can become problematic if students specialize and divide work in such as a way that individuals miss certain technical tasks. Thus, the lab practical assessments are incorporated to balance out our emphasis on teamwork and group dynamics with technical skill to make every student personally responsible for each technical skill taught in a course.

An additional element of assessment that we have incorporated throughout our lab courses is a greater degree of documentation and reporting of equipment use, equipment maintenance, and lab cleaning. This has taken the form of logbooks for many pieces of equipment in the lab as well as a poster in the front of the lab listing assigned lab duties (see Appendix #12). We have found that some groups of students may focus on individual tasks such as purification protocols, and lack awareness of or attention to the impact of their work on the lab supplies and lab equipment. The use of logbooks and posted facility duties reflects industry practices and holds students accountable for proper equipment use (such as turning off equipment after final use) and facilities care (cleaning surfaces, restocking supplies, and other general lab support tasks). These documents are used in assigning participation scores in lab courses.

A final example of assessment which has been added to lab courses involves the use of online spreadsheets (primarily Google Sheets) for sharing student-generated lab data. Use of these tools increases students' skill in using online spreadsheets, in collaborating in real time with colleagues, and in time management, since students can observe data accumulating as others report in. This approach is also used in assigning participation scores, since it systematically captures student activity in the lab. An alternate approach used was to instruct students at the end of lab to share their data with two or three classmates in order to compare results and interpret variation and sources of error. Providing class-wide results to students and holding each student accountable for producing the assigned data is a more consistent approach which also incorporates technology use and collaboration.

With each new cohort in the BIT program, the faculty and staff learn new ways to respond to unique student needs and develop assessment strategies that systematically evaluate students in meeting course and program outcomes.

iv. Are there any Core Outcomes that are particularly challenging for your (LDC-DE) SAC to assess, or difficult to align and assess within your (CTE) program? If yes, please identify which ones and the challenges that exist.

The two core outcomes which are most difficult to assess within BIT courses are "community and environmental responsibility" and "cultural awareness." The other four core outcomes are assessed heavily within the majority of our laboratory courses.

Community and environmental responsibility is most directly assessed in BIT 105 - Safety in the Bioscience Workplace and BIT 126 – Applied Quality Practice. These courses include content which covers the safety practices and the regulatory aspects that govern responsible actions in a bioscience lab or facility, and the resulting impacts of technician behavior on the community and environment. However, these can be difficult to assess directly. While we test student knowledge of safety and regulatory practices, we have less ability to assess their skill in applying these in a real work setting. For example, while students are responsible for knowledge of hazardous waste disposal and use of proper waste streams, they are not responsible for the removal of hazardous waste from the lab and campus. Thus, students do get exposure to knowledge related to this outcome, yet are not assessed on performance and behavior as is the case for the technical skills taught in the program.

Cultural awareness is most directly assessed in BIT 181 – Exploring Bioscience. In this course, students interact with industry representatives in tours, through guest talks, and during mock interviews on campus. This interaction provides an opportunity for students to develop greater awareness of the manner in which these professionals conduct themselves at work and how they operate within culture of their company. This aids students in understanding and developing professional behaviors as they prepare to enter the bioscience workforce. However, exposure is not equivalent to direct assessment, and it is difficult to assess students' professionalism in a work setting when instructors observe them in an educational setting. Ultimately, it is up to each student to apply their awareness and understanding of culture to their work settings once they are employed.

v. CTE only: Briefly describe the evidence you have, determined by direct assessment, that students are meeting your Degree and/or Certificate outcomes.

The BIT degree and certificate outcomes and corresponding assessment strategies include the following:

Apply knowledge of safety principles, quality and regulatory issues, teamwork and good business practices to work in a bioscience laboratory or manufacturing environment.

- Students are assessed on safety principles in BIT 105 – Safety in the Bioscience Workplace. Assessments include quizzes, exams, a centrifuge SOP assignment, and a spill incident report assignment.
- Students are assessed on quality and regulatory issues, teamwork, and good business practices in BIT 125 – Quality Systems in Bioscience Technology, and BIT 126 – Applied Quality Practice. Assessments include a written quality manual assignment, a group presentation on a device complaint, and anonymous peer assessments of teamwork (see Appendix #8).

Carry out routine laboratory tasks and commonly used techniques with confidence, quality and appropriate documentation in a bioscience laboratory or manufacturing environment.

- Students are assessed in BIT 109 through the TSA (see Appendix #6.)

Apply knowledge of measurement and assay principles and strategies, purification principles, and the scientific method to laboratory situations.

- Students are assessed in knowledge of measurements and assay principles and strategies in BIT 109 through the TSA and exams.
- Students are assessed in purification principles and scientific method in BIT 215 through the final written report and oral presentation. In these assignments, students report out the analysis of each step of a purification project and describe troubleshooting and alternate techniques to reach purity and yield targets.

Apply principles learned in courses to troubleshoot laboratory and manufacturing problems and devise and execute appropriate solutions

- Students are assessed on troubleshooting in every lab course based on documentation in the lab notebook (see Appendix #2). Guidelines for documentation include "describe potential sources of error with suggestions for improvement" in the discussion section of each notebook entry. As an example, in BIT 205 – Bioseparations, students perform SDS-PAGE once, review the troubleshooting section of the manufacturer user guide, and suggest specific changes to implement when repeating SDS-PAGE a second time.

Plan and organize tasks to allow efficient completion of complex procedures, including planning and executing multiple procedures that proceed simultaneously. Coordinate with others to work as part of a team.

- Students are assessed on ability to complete procedures according to efficient plans in every lab course. Most lab courses involve a combination of procedures completed individually and those completed with a lab partner, requiring students to effectively plan their time to complete protocols within the class period when working by themselves and with classmates. Students are assessed on their participation and lab practical performance.

Effectively, clearly and succinctly communicate the procedures, results and interpretations of laboratory activities to other staff in the bioscience workplace, using both informal and formal forms of scientific communication, including casual conference, the laboratory notebook, forms, memoranda, written reports and formal presentations.

- Students are assessed on written communication in every lab course based on documentation in the lab notebook (see Appendix #2) and oral communication based on presentations in the majority of BIT courses (see Appendix #3 for examples). Students are also assessed based on ability to informally report results based on shared online Google Sheets for collecting and distributing data produced in the lab and by individual consultations with instructors regarding their progress during project-based learning activities, such as the enzyme purification project in BIT 215 – Protein Purification.

3. Other Instructional Issues (Note: for questions A-C, specific information can be found at: https://www.pcc.edu/ir/factsheet/Factbook/201617/swrafte201617.html)

A. Please review the data for course enrollments in your subject area. Are enrollments similar to college FTE trends in general, or are they increasing or decreasing at a faster rate? What (if any) factors within control of your SAC may be influencing enrollments in your courses? What (if any) factors within control of the college may be influencing enrollments in your courses?

Enrollment in BIT has been relatively consistent over the past few years, with a total annual FTE of approximately 37 (see Appendix #9). (The FTE was slightly lower, at 29, during the 2016-17 academic year due to the fact that there were no full-time faculty in the program during the prior 2015-16 academic year and thus very little active recruitment by program staff for the 2016-17 year.) With our current program model of enrolling one cohort of students per year, we are capped at 22 students per year due to space and equipment availability in the lab. With an enrollment cap of 22 students in our existing courses, we are at full capacity with an annual FTE of approximately 37.

The enrollment in BIT compares favorably to Rock Creek campus and collegewide FTE trends, which have experienced decreases in each of the past five years. BIT has maintained steady enrollment near or at capacity in most of the past five years.

Continued outreach and recruitment efforts, especially by program advisor Jenny Kirchler, will allow BIT to maintain or increase enrollment levels. By receiving additional applications, the program can accept students who have completed all prerequisites and are strong candidates to succeed in the bioscience industry based on their preparation, interests, and fit. The number of applications received is the primary factor within SAC control that is influencing enrollment.

If the BIT program receives a sustained increase in the number of applicants to the program and the local industry also sustains growth, the addition of a second annual cohort of certificate-seeking students can be considered in future years. Adding a second section of our 100-level courses would add minimal cost since the Bioscience lab room could be utilized during currently unused hours, although it would increase costs for instruction, lab supervision, and reagents. Furthermore, night or online sections could expand access to students who currently are unable to enroll in our day-time program. There is support for the BIT program from both academic partners (university transfer and research assistant positions) and industry partners (primarily manufacturing and quality control positions), which could in the future support two cohorts per year serving diverse student goals following completion. A factor within control of the college that could influence enrollment growth is the staffing of the program for outreach and recruitment as well as lab support. The BIT program currently has an instructional support technician (0.75 FTE) and a student resource specialist (approximately 0.3 FTE devoted to BIT). Additional support staff hours may be needed to sustain higher enrollment levels.

B. Please review the grades awarded for the courses in your program. What patterns or trends do you see? Are there any courses with consistently lower pass rates than others? Why do you think this is the case, and how is your SAC addressing this?

Across the 15 different courses offered in BIT in the past five years, the rate of passing grades (A/B/C/P) for individual courses has ranged from 65% to 100%. For most courses, the pass rate was relatively consistent over the past five years, and, with one exception, all BIT courses have a pass rate above 80% in most of the past five years.

The course with the lowest pass rate, ranging from 65% to 77% over the past five years, is BIT 102 – Current Topics in Bioscience Technology. This is to be expected as this is the only course in the program that is open to non-majors. All other BIT classes are only open to students who have applied and been accepted into a BIT certificate or degree program or petitioned the instructor and department chair for permission to enroll in an individual course. The BIT 102 course is designed as an introduction to current topics in the field of bioscience technology in order to provide initial exposure to the range of technologies and careers to new BIT students as well as any student exploring the field. The course serves as a recruitment tool in which non-major students may then apply to the following year's cohort if the field of bioscience matches their interests. However, a number of non-major students decide that bioscience technology is not a match and subsequently drop or fail the course. It has frequently been observed that non-majors enroll in the course and stop attendance within the first several weeks. In order to address this challenge and assist students in making an informed enrollment decision, the BIT 102 instructor provides information about the course purpose in the syllabus and recommended science preparation by email before the course start, as well as discussion of the same information on the first day of class. Additionally, we offer an info session for BIT 102 enrolled non-majors during the early weeks of fall term. With these ongoing efforts to communicate the intention and value of the course and program, especially to non-majors, we continue to observe that approximately 30% of the students who enroll in BIT 102 do not pass the course.

C. Which of your courses are offered online and what is the proportion of on-campus and online? For courses offered both via DL and on campus, are there differences in student success? If yes, describe the differences and how your SAC is addressing them.

The only BIT course which is currently offered online is BIT 102. The course is taught once per year on campus, in fall term, and once per year online, in summer. In recent years the course has been taught in the online format one time, in summer 2018. The rate of student success in this course was similar for the online section compared to the on campus section. The primary difference for the online section is that students are more responsible for managing their time, paying attention to deadlines and participating weekly in course activities. The instructor provides reminders and it is up to the student to log in the course website or email to view those reminders. On campus, the instructor can remind students in class directly. In both on campus and online sections of this course we have observed some students enroll in the course and then cease to attend or participate in later weeks.

D. Has the SAC made any curricular changes as a result of exploring/adopting educational initiatives (e.g., Community-Based Learning, Internationalization of the Curriculum, Inquiry-Based Learning, etc.)? If so, please describe.

Many BIT courses incorporate Inquiry-Based Learning. The final presentation in BIT 181 serves as one example. Students choose a local bioscience company, perform online research regarding many aspects of the company, including products, history, culture, mission, management, and growth projections, and share the results of their research in a presentation at the end of the term. This assignment allows students to explore local bioscience companies that pique their interest, research the topic during class time with the assistance of the instructor, share results to practice their presentation skills and build awareness of various companies and technologies among their peers. Students then reflect on these presentations when later applying for jobs and asking for input from classmates who had researched various companies. Other BIT lab courses also include project-based learning in which students chose topics, evaluate options, and present those to their peers.

An increasing number of BIT courses use open educational resources (OER). In addition to continuing to develop our own lab protocols and teaching materials, we have expanded our use of online textbooks and industry materials for instruction. Both BIT 201 (Immunochemical Methods) and BIT 207 (Cell Culture) use free online reference texts.

Other educational initiatives have been explored with our cohort outside of formal curriculum. During BIT ASPCC club meeting times, typically on lunch hours in between classes, faculty and staff have facilitated several workshops and activities to address student needs and build skills. One example was a stress management workshop, which reflected BIT's commitment to diversity, equity, and inclusion by providing access to counselors, peer community building, and acknowledgement and acceptance of differences and unique talents of each student. (At this event, some students shared personal stories about their lives and how that impacted their stress levels, and other students shared how they could support each other.) A second example is a Speed Culturing activity in which BIT students met students from an ESOL class to discuss their cultural and educational experiences, which represented an opportunity to involve our students in PCC's internationalization initiative, learn about cultures, and practice speaking about their technical skills to diverse conversational partners without the same technical background.

E. Are there any courses in the program that are offered as Dual Credit at area high schools? If so, describe how the SAC develops and maintains relationships with the HS faculty in support of quality instruction.

Currently, BIT offers dual credit for BIT 102 (Current Topics in Bioscience Technology) and BIT 105 (Safety in the Bioscience Workplace) though Hillsboro High School, and BIT 102 through Madison High School. The BIT SAC maintains relationships with the high school faculty by participating in the fall term dual credit symposium, through site visits and teaching observations conducted by the part-time faculty who teach those same courses at PCC, and through review of syllabus, course content, and assessment strategies. BIT faculty have collaborated to create an extensive library guide page (https://guides.pcc.edu/bioscience-tech) that includes individual pages for BIT 102, BIT 105, and other courses. High school faculty are given this resource and encouraged to have their students utilize these guide pages in order to facilitate alignment of content as well as participation in PCC resources such as library database access when writing papers. Additionally, BIT offers annually for the high school classes to come to PCC to tour the lab and other campus facilities, or to bring an info session regarding the BIT program out to the high school.

F. Please describe the use of Course Evaluations by your SAC. Have you created SAC-specific questions? Do you have a mechanism for sharing results of the SAC-specific questions among the members of your SAC? Has the information you have received been of use at the course/program/discipline level?

The BIT SAC currently uses the standard questions for course evaluations. The information from course evaluations is considered by individual instructors to inform changes to teaching strategies in subsequent terms. The evaluations are also used by the Department Chair in faculty assessments and suggesting professional development or updates to instructional practices. Course evaluations have been discussed at SAC meetings; however, these have not yet been used at the program level.

4. Needs of Students and the Community

A. Have there been any changes in the demographics of the student populations you serve? If there have been changes, how have they impacted curriculum, instruction, or professional development, and, if so, in what way?

Yes, we are experiencing increased enrollment among younger students. The most pronounced demographic change is an increase in program enrollment among students within 0 to 2 years after high school graduation. This demographic in the past typically comprised a small percentage of our cohort. Our 2018-2019 cohort, however, has seven out of 22 students in this demographic. The number of older students applying to the program has remained relatively steady, with most of the growth in enrollment seen among younger students. The age profile for the program (see Appendix #10), which does not include the most recent cohort, shows the five year trend in which students aged 24 and younger comprise an increasing percentage of our headcount each year.

This change in demographic does have implications for instruction and professional development. Most of our students aged 25 and older have held several jobs and many have not taken classes in years, apart from a small number of prerequisites at PCC. Within this group, students are often proficient in behavioral skills such as professionalism and communication. The key part of their training involves the acquisition of technical skills and reinforcing associated workplace competencies. These students sometimes struggle with the academic skills such as testing, yet written exams do not comprise a central part of our program. These students are often ready to succeed in the industry once they achieve course and program outcomes.

On the other hand, the students aged 24 and younger frequently experience inverse challenges. These students, typically, are well prepared academically and ease into the academic requirements of the program such as studying for and taking exams. However, without much work experience, they can at times misunderstand the importance of behavioral skills such as teamwork, networking, and communication. They often do not realize the importance of professional behavior and the impact this can have on their success within the bioscience community in Oregon. For this group, additional instruction and support in becoming job ready is critical to prepare them for entry into the bioscience industry.

B. What strategies are used within the program/discipline to facilitate success for students with disabilities? If known, to what extent are your students utilizing the resources offered by Disability Services? What does the SAC see as particularly challenging in serving these students?

The availability of disabilities accommodations is discussed with students at the new student orientation in September and described in our student handbook and each syllabus. Accommodations are also mentioned on the first day of class in fall term. Throughout the year, faculty meet individually with students to review their performance and in some cases, when appropriate, provide a reminder about the Disabilities Services office and suggest a consultation.

A small number of students each year request and utilize DS accommodations. The most common requests involve extra testing time, peer notetaking, and preferential seating or standing within the classroom. Most frequently, these requests are easily accommodated.

One challenge arises when students request accommodations in individual courses without going through the formal DS accommodation process. For instance, students may request not to work in groups or not to give a class presentation. In these cases, the students' requests are denied since teamwork and communication are key course outcomes, not incidental operations within the classroom. Students are encouraged to speak with a DS counselor about those concerns, yet not all students take that step.

C. What strategies are used within the program/discipline to facilitate success for online students? What does the SAC see as particularly challenging in serving online students?

See response to question 3C. With only one online section per year for one course, which sees similar success levels to its equivalent on campus section, there is not much emphasis on strategy or challenge to address within online education for BIT. This may change if we add online sections for additional courses in the future.

D. Has feedback from students, community groups, transfer institutions, business, industry or government been used to make curriculum or instructional changes (if this has not been addressed elsewhere in this document)? If so, describe.

Curricular and instructional changes made in response to feedback from students and our industry advisory board are discussed in sections 2A.ii and 7A.

5. Faculty: reflect on the composition, qualifications, and development of the faculty

A. Provide information on how the faculty instructional practices reflect the strategic intentions for diversity, equity and inclusion in PCC's Strategic Plan, Theme 5. What has the SAC done to further your faculty's inter-cultural competence and creation of a shared understanding about diversity, equity, and inclusion?

Midway through each fall term, the faculty department chair surveys students about their initial program experience. The survey includes questions about number of hours per week spent on preparation and studying outside of class time, number of hours spent per week working apart from schoolwork, which course is most challenging, and whether the student is utilizing open labs, office hours, and instructor support.

At the beginning of each winter term, the BIT 181 instructor surveys students on their educational and career goals over the next one and five years, anticipated barriers to reaching goals, and plan for overcoming these barriers. The instructor will then meet individually with students to discuss the potential barriers and connect to campus and community resources as needed.

The surveys from these terms are discussed at SAC meetings to ensure that all faculty are aware of the types of challenges faced by our students and to discuss equitable plans for supporting course completion and career preparation for our diverse cohorts of students.

The completion rate for students entering our fall cohort remains above 90% in recent years, in part due to an inclusive approach to student support.

B. Report any changes the SAC has made to instructor qualifications since the last review and the reason for the changes. Current Instructor Qualifications are available at: http://www.pcc.edu/resources/academic/instructor-qualifications/index.html

No changes have been made to instructor qualifications in recent years.

C. How have professional development activities of the faculty contributed to the strength of the program/discipline? If such activities have resulted in instructional or curricular changes, please describe.

Recent BIT faculty participation in professional development is described in section 1B. These activities have resulted in instructional change in the program, especially in regards to teaching and assessing soft skills such as teamwork, including a greater number of self-reflection activities for students, instilling a growth mindset framework, and allowing for efficient instruction with full enrollment.

Faculty professional development is critical for the BIT program for new instructors. Many of our new instructors bring extensive industry experience and knowledge, and these instructors value professional development that helps them develop teaching strategies suited to their course topics. Professional development through activities described in 1B have resulted in instructional and curricular changes to BIT 125 and 126, both general and specific. As described previously, the teamwork rubric was developed based on information from the teamwork workshop and conference. The curriculum for BIT 126 was also updated

with lecture materials from the workshop, which includes information on team roles and phases of a team. Besides completing the rubric for assessing their peers, students are asked to assess their role, team phases and reflection on how they can support efficient team function. The main focus of additional changes to BIT 125 and 126 is related to engagement of the students, due to the fact that quality system regulations and standards can be a dry subject. The use of real-world examples of the lack of quality systems and other engagement activities learned from NISOD webinars and articles are used to keep students involved in learning. Ideas learned from the article titled "*Creating Socially, Emotionally, and culturally Response Environments to Improve Conditions for Learning*" are used to introduce class communication expectations and desire to ensure engaging, interesting discussions. Games like Kahoot, questioning games and the use of SQ3R (Survey, Question, Read, Recall & Recite) are used to help reinforce or instill complex quality system topics.

Professional development is also crucial for experienced instructors in responding to varied student populations. Each year, a new cohort of students brings new strengths and weaknesses and instructors learn with experience and training how to best harness these to achieve learning outcomes. One technique gleaned from class observations through the TLC Teaching Squares involves changes to lecture openings that have been implemented in BIT 102. To meet the needs of all students and support learning growth, the instructor begins by reviewing prior week's assignments and key points before moving on to new material. Changing the teaching pace to address student questions and concerns and connect to previous material is important, especially in an introductory course, to support student learning and establish classroom engagement before launching into new topics.

Finally, professional development for faculty is essential to support growing enrollment. In some courses, the BIT program has been able to sustain increased enrollment by two, four, or even more students without additional space or equipment due to precise classroom management strategies and assignment design. One of the largest challenges for instructors in laboratory courses is efficiently guiding students through lab activities and ensuring that each student has access and feedback when working with equipment and completing protocols. These classroom management skills require time, practice, and training for faculty to develop.

6. Facilities, Instructional, and Student Support

A. Describe how classroom space, classroom technology, laboratory space, and equipment impact student success.

For Bioscience Technology students to successfully develop technical skills, is it critical that our laboratory space and equipment are fully available to each student and produce a learning environment which operates authentically as a working lab. Our current lab room provides sufficient space for 22 students, and we have a sufficient number of common lab devices, such as micropipets, for each student to be assigned a personal set. Larger and more expensive equipment is allocated around the periphery of the room, allowing efficient shared access to students. The current ratio of students to space and equipment is at maximum capacity.

A challenge inherent to the lab equipment in use is maintaining functional and sufficiently modern devices to achieve learning outcomes. Following tours at OHSU and other labs, many students report their delight to learn that the equipment in these labs is recognizable and familiar to them based on their experience in BIT labs. However, some of our equipment is aging and we may not be able to maintain and repair these effectively. Additionally, our equipment may be out of date for some applications, such as larger scale manufacturing and production environments, and newer equipment may better prepare students for roles in those environments. Modernizing our laboratory space and equipment is an ever-present opportunity and challenge for the program.

B. Describe how students are using the library or other outside-the-classroom information resources (e.g., computer labs, tutoring, Student Learning Center). If courses are offered online, do students have online access to the same resources?

Students take great advantage of the Student Learning Center, often studying in groups there in between classes. The Rock Creek SLC piloted support services for Bioscience Technology in 2017-2018 and was able to continue support into 2018-2019. This pilot was a new way of supporting BIT students, who traditionally did not have resources available in the SLC. Since 2018, the SLC has funded several BIT part-time faculty to serve as tutors and hold sessions in our laboratory for students to gain additional laboratory hours or review documentation. These tutoring sessions are well attended by BIT students and are requested every term. From September 2017 through April 2019, BIT students have checked in to the SLC center or BIT open labs for 1,228 sessions, totaling 1,455 hours of use.

The BIT lab shares a computer lab with the adjacent Biology lab, and students frequently use these computers whenever they are made available.

BIT textbooks are held in course reserves at the library and students utilize this resource, especially at the beginning of the term while waiting to purchase textbooks.

C. Does the SAC have any insights on how students are using Academic Advising, Counseling, Student Leadership, and Student Resource Centers (e.g., the Veterans, Women's, Multicultural, and Queer Centers)? What opportunities do you see to promote student success by collaborating with these services?

The BIT program promotes student use of these resource centers. This begins during the application process, when prospective students meet for info sessions or individual advising appointments. Our application form states that all students should undergo advising before submitting an application. Then, at our new student orientation event in September, we include a scavenger hunt in which students locate the various resource centers, take a picture of themselves in front of the building or room, and introduce themselves to the staff and the center. Some of our students work or volunteer at various centers and are encouraged to promote campus events to their peers. At SAC meetings, faculty discuss resource centers and how to refer students. Finally, when surveys indicate that a number of students within a cohort experience similar challenges, workshops or other club events are scheduled during lunch hours to bring resource center staff out for a talk or exercise with the students.

Note to LDC-DE SACs: In your report, put N/A for Section 7 and continue with Sections 8 and 9.

7. <u>Career and Technical Education (CTE) Programs only:</u> To ensure that the curriculum keeps pace with changing employer needs and continues to successfully prepare students to enter a career field…

A. Evaluate the impact of your program's advisory committee on curriculum and instructional content methods, and/or outcomes. Please include the minutes from the last three advisory committee meetings in the appendix.

The advisory committee has provided and continues to provide significant contributions to BIT curriculum and instruction. Some examples of the recent activities of our advisory board members include:

- Forming a curriculum review subcommittee in 2018 which recruited 20 industry members to attend a half-day meeting and provide input on current and anticipated need for entry-level positions at the represented companies. Attendees were asked to describe the knowledge, skills, and abilities of an ideal job candidate. PCC faculty then reviewed our current curriculum and the group held a discussion about areas to expand upon in training graduates ready for work.
- Serving as guest speakers in multiple BIT classes, including BIT 181, 125, and 126.
- Attending our mock interview event in winter term, providing our students with the opportunity for direct practice and feedback from industry members on their interviewing skills.
- Providing input on candidates for new part-time faculty when the need arises for new instructors.
- Introducing program faculty and staff to other industry and community members to facilitate student recruitment and internships.

See Appendix #11 for recent advisory board meeting minutes.

B. Describe current and projected demand and enrollment patterns for your program. Include discussion of any impact this will have.

Current demand for enrollment in the BIT program is high. The 2017-2018 cohort enrolled 21 students and the 2018-2019 cohort enrolled 22 students, which is our maximum capacity. In 2018, the program received applications from more eligible students than could be admitted and maintained a wait list of prospective students.

Demand is projected to continue to increase. As described in section 4A, the program has seen steady enrollment from students aged 25 and older and increases every year in students aged 24 and younger. With continued outreach efforts at local high schools and increased enrollment in Dual Credit programs, we expect the number of younger applicants to continue to increase.

The increase in enrollment has several impacts. Most importantly, we must maintain all of our laboratory equipment. We are currently equipped for 22 students in BIT109 and 18 students in our 200-level lab courses, although in some cases we have made exceptions to enroll up to 20 students in certain 200-level courses. It is essential that our equipment remains operational as equipment failure would present

significant disruptions to learning outcomes. See section 8B for further discussion of equipment needs. Secondly, increased applicant numbers allow not only for full cohorts, but cohorts full of students likely to succeed in the bioscience industry. The program is able to more selectively admit those students with thorough preparation in writing, math, and science foundation coursework, and with a specific drive to enter the bioscience industry based on their interest and fit. Finally, steady increases in number of applicants combined with sustained increases in hiring by local bioscience companies would present the opportunity to offer certificate courses twice per year and open enrollment to two cohorts annually.

C. How are students selected and/or prepared (e.g., prerequisites) for program entry?

Students are selected for program entry based on the following criteria in their application to the BIT program:

- Successful completion of prerequisite coursework (grade C or better) in WR 121, MTH 95, CH 151 or 221 or higher, BI 112 or 211 or higher.
- Completion of additional preparatory coursework: CAS 170, basic science electives, and general education.
- Personal statement indicating interest in the BIT program, goals and experiences which demonstrate ability to be successful in the program, and plans for work or further education after the program. We look for individuals who have assessed their fit for work in the bioscience industry, as well as a balanced cohort that includes students who aim to for entry-level positions upon completion at PCC and those who aim to continue education.
- Reference letter from an instructor or supervisor which addresses the applicant's academic, professional, and personal attributes and potential for success in the program.
- If needed, an individual interview with the department chair is offered. Some applicants present indications in their personal statement or reference letter that another program or line of work may be a better fit. Interviews are an opportunity to meet with the applicant to confirm their plans, answer questions, and offer admission to the BIT program or referral to other educational and training opportunities.

D. Review job placement data for students over the last five years, including salary information where available. Forecast future employment opportunities for students, including national or state forecasts if appropriate.

See Appendix #13 for job placement data for recent program graduates. The large majority of program graduates are employed in the industry within six months of program completion. Entry-level wages typically range from $14 to $25 per hour, with most offers falling in the $15 to $20 range.

Future employment in the bioscience industry is promising. According to Bureau of Labor Statistics (BLS) data from the US Department of Labor (https://data.bls.gov/projections/occupationProj), employment projections for biological technicians are expected to grow 10.2% nationally from 2016 to 2026, representing an increase in 8,400 technician jobs and a faster expansion rate than the 7.4% growth in all occupations over the same time period. Reports from the State of Oregon Employment Department

https://www.qualityinfo.org/projections#1) indicate even larger growth projections for the state, with an 11.8% growth rate in biological technician positions in Oregon between 2017 and 2027. More locally, many bioscience companies, including those represented on our advisory board, are hiring rapidly. This growth spans the range of large firms (200+ employees at sites within the Portland metro region) to small firms (5 to 50 employees), with some employers in both categories looking to expand their workforce by 50-100% in the next two to five years.

In addition to rapid job growth, the bioscience industry offers high wages. According to Bio's 2018 report "The Value of Bioscience Innovation in Growing Jobs and Improving Quality of Life" (https://www.bio.org/value-bioscience-innovation-growing-jobs-and-improving-quality-life-2018), the average annual wage in Oregon for bioscience industry sectors ranges from $52,389 for drugs and pharmaceuticals up to $78,493 for medical devices and equipment, with an average annual wage of $68,781 across the bioscience industry – compensation that exceeds the $48,854 average annual wage across all private sector employment in the state.

E. Present data on the number of students completing degree(s) and/or certificate(s) in your program. Analyze any barriers to degree or certificate completion that your students face, and identify common reasons why students may leave before completion. If the program is available 100% online, please include relevant completion data and analysis.

See Appendix #14 for number of certificates and AAS degrees awarded in BIT over the past 5 years.

In the past five years, the completion rate for students admitted into the BIT program has increased, remaining above 90% since 2016. The large majority of students who enter the program complete the educational goal indicated in their application of earning a certificate or degree. In fact, some students who enter seeking the certificate decide to continue enrolling in classes to further build their skills and complete the AAS degree. In recent years, only one or two students per year leave the program without completing at least the certificate coursework.

Common barriers to completion include finances, work schedules, and family responsibilities. It is uncommon for students to leave the program due to academic reasons. BIT students are surveyed each term about potential barriers in meeting their education and career goals and meet individually with instructors to discuss resources to address these barriers.

Reasons students may leave before completion include:

- Lack of fit – some students decide that bioscience is not a match for their interests. The number of students leaving for this reason has decreased due to increased advising efforts before, during, and after application to the program.
- New interests – some students develop new interests during their education, such as the desire to start their own business. In these cases, the department chair meets with the student to better understand the new interest and discuss retention in the program or transferrable skills for the new career prospect. When applicable, students are referred to PCC's career resource center, small business development center, and other college resources to support the new direction.

- Job offer – some students receive a job offer before completion of the program. This most frequently involves students with a prior degree who enroll in the BIT certificate program. In some cases, the students may qualify for certain positions before completing the certificate. With greater individual advising for program applicants, we have at times referred a student to other programs or resources that may be a good fit for their career path.
- Family or health issue – some students leave education to care for themselves or a family member for medical or other reasons. In these cases, students are advised to maintain contact with the program department chair and advisor regarding potential re-entry into the program in future years.

F. Is the program Perkins-eligible? If so, answer the questions below. If not, put N/A for F.

i. With which secondary school(s) does the program have aligned Programs of Study? Do PCC faculty meet with these HS program faculty on a regular basis?

The BIT program maintains programs of study with Hillsboro High School and Madison High School, as discussed in section 3E. PCC faculty meet regularly with teachers from these two high schools. Meetings include the annual Dual Credit Symposium, annual teaching observations and site visit, tours at PCC, and email and phone contact regarding course content alignment and other curricular and instructional issues.

ii. Please describe the Technical Skill Assessments (TSAs) that are reported annually. Include information about the nature of the assessment, content covered, alignment of degree and certificate outcomes, when the assessment is taken by students, the number of completers, and the percentage of students meeting the identified benchmark(s) for the last 5 years.

Refer to BIT's TSA in Appendix #6.

The TSA for BIT was developed in 2017. The 2017-2018 and 2018-2019 cohorts were assessed across three lab practical exams in BIT 109 in fall term. The assessment includes an evaluation of accuracy in measurements using many common lab devices, ability to calibrate and use pH meters and conductivity meters, thorough documentation of the protocol steps involved in preparing a buffer solution, ability to prepare serial dilutions, and performance and interpretation of data from a protein quantitation assay. These skills broadly cover the technical content in BIT 109 and assesses two critical degree and certificate outcomes: "*carry out routine laboratory tasks and commonly used techniques with confidence, quality and appropriate documentation in a bioscience laboratory or manufacturing environment*" and "*apply knowledge of measurement and assay principles and strategies*."

In fall 2017, 20 students completed the TSA and 19 students (95%) met the benchmark passing score.
In fall 2018, 22 students completed the TSA and 21 students (95%) met the benchmark.

iii. What does the SAC consider to be the most impactful use of Perkins funding for your program?

Perkins funding has been most impactful in supporting faculty professional development, supplementing the funding offered through PCC Professional & Organizational Development for full-time faculty and staff, and extend the funding to part-time faculty. As described in section 1B, many BIT faculty have had the opportunity to attend conferences and other professional development events with the support of Perkins funding.

Additionally, Perkins funding has provided the department with some materials for high school outreach activities. With this funding available, we have been able to provide on campus events, including lab activities, which help generate interest in bioscience and a future pipeline of applicants to the program.

Finally, Perkins funding will be considered to support laboratory equipment upgrades. See section 8.

G. Describe opportunities that exist or are in development for graduates of this program to continue their education in this career area or profession.

Opportunities for further education in bioscience are plentiful and varied. Many of our students pursue co-operative education through BIT 280A and earn their final credits towards the AAS degree by completing 240 hours working on site at a local bioscience company or research lab. This capstone experience allows students to translate the skills gained in the BIT program to a real work environment, receive feedback from a work supervisor and PCC instructor on their job readiness, and, in many cases, earn a full-time position at the work site following the completion of the co-operative education experience.

The majority of our students enter the BIT program with no prior college degree. Many of these students consider immediate or eventual transfer to four-year universities. BIT has a specific articulation agreement with the Biology program at PSU, allowing students to efficiently transfer and continue towards a bachelor's degree following the BIT AAS degree. Students also transfer to OSU and other universities by applying their science foundation courses as well as other laboratory elective courses towards their four-year degree.

For students who enter with a prior degree or complete a four-year degree following enrollment at PCC, there are additional opportunities to continue education in science or healthcare, including the master's degree and Ph.D. in molecular biology and related disciplines and the M.D. and other professional degrees in medicine.

For students who do not want to continue in higher education towards additional degrees, there are many other educational and training opportunities following the BIT certificate or AAS degree. These include apprenticeships currently in development at local bioscience companies which would allow BIT program graduates to continue their training across multiple departments and learn complex processes from start to finish, positioning them for permanent positions and advancement within the company.

Additionally, students who begin a career in bioscience can enroll in BioPro and other workforce training offered through the Oregon Bioscience Association (https://www.oregonbio.org/biopro/). These

workshops, typically a half-day in length, allow incumbent workers to advance their skills, learn from industry experts, and bring a positive impact to company operations and competitiveness.

8. Recommendations

A. What is the SAC planning to do to improve teaching and learning, student success, and degree or certificate completion, for on-campus and online students as appropriate?

The BIT SAC has several goals in place to improve teaching, learning, and student success over the coming years. Regarding degree and certificate completion, given our completion rate above 90% for recent cohorts, we will continue our efforts to provide thorough advising, individual student support, and responsive teaching, though we cannot expect that completion will increase further beyond the current rate.

1. Continue to develop robust assessments of certificate and degree outcomes.

- Add technical assessments to laboratory courses that do not yet include an assessment of student hands-on technical performance, and continue to refine technical assessments for courses that currently include them. Ensure that each individual student has mastered critical course outcomes that relate to technical performance, even in environments in which students work with lab partners and share equipment.
- Review behavioral expectations for students with ongoing feedback from our advisory board to ensure that upon completion students are job-ready and demonstrate professional behavior. Add more course activities like the current mock interviews, equipment demonstrations, and project presentations in which students demonstrate and are assessed on their behavioral abilities.

2. Maintain and revise our curriculum based on industry needs.

- Continue the work of the curriculum review subcommittee of our advisory board to obtain feedback from industry members regarding the knowledge, skills, and abilities required for entry-level bioscience positions and evaluate our curriculum in light of this feedback.
- Bring more awareness of manufacturing processes into the classroom.
- Explore the use of mechatronics electives, facilities at other PCC sites such as the Willow Creek Center, and employer apprenticeships as routes for further training, especially in equipment use and maintenance.
- Continue to track the progress of BIT program graduates to inform future changes to curriculum. Evaluate the effectiveness of BIT teaching and learning on student placement and advancement in diverse roles including manufacturing, quality control, and research positions, as well as transfer to universities and other higher education.

3. Upgrade our equipment and facilities.

- Maintain authentic technical training through access to a broad range of standard lab equipment. Replace aging devices in the lab, many of which are decades old and in use past anticipated lifespan and ability to be supported by the manufacturer. Provide uninterrupted instruction by avoiding equipment failure during the academic term.

- Update procedures and upgrade equipment, when determined to be out of date, in order to provide learning outcomes relevant to current industry practices.
- Explore the use of facilities at Willow Creek Center and other PCC and community resources to provide further access to technical training beyond the BIT lab.

4. Enhance our network to grow enrollment and student job placement.

- Strengthen our connections with program graduates through LinkedIn and other social media, invitations to campus and community events, and networking with instructors and current students. Draw on these relationships to deepen connections with local companies and as opportunities for future student employment.
- Continue and expand our outreach to local high schools in order to recruit students to PCC and the BIT program. Disseminate information about career technical education, job skills that transfer across industries, and the bioscience industry to high school students, parents, and counselors. Additionally, continue and expand our outreach within PCC to improve college retention and recruit students enrolled in introductory science courses to CTE programs. Provide thorough information and advising to prospective students to set expectations and improve outcomes for students who apply to and enroll in the BIT program.
- Continue our efforts to connect with new employers in bioscience and related fields and prepare internship and job pathways for our students with these employers.
- Consider offering online and/or evening certificate (100-level) BIT courses in winter, spring, or summer terms. This would expand access to bioscience training to prospective students currently unable to attend our day-time classes or start the certificate or degree program in fall term. Offering these sections would depend on multiple factors, which include: additional staff support, additional applications to the program, and sustained growth in local industry to support increased program enrollment and job placement.

B. What support do you need from administration in order to carry out your planned improvements? (For recommendations asking for financial resources, please present them in priority order. Understand that resources are limited and asking is not an assurance of immediate forthcoming support. Making the administration aware of your needs may help them look for outside resources or alternative strategies for support.)

The BIT SAC recommends additional support and resources from administration in order to accomplish our goals. In priority order, these include:

1. Support for replacing aging laboratory equipment and scaling equipment for increased enrollment.

- Biosafety cabinets. Two of our three biosafety cabinets are 23 years old, having served well beyond their rated lifespan of 15 years. Following the failure and required replacement of one biosafety cabinet in 2018, it will be necessary to replace the two other cabinets to avoid interruption of instruction in BIT 207, Cell Culture, in fall term. With enrollment at capacity at 18 students, it is essential to have three functioning biosafety cabinets in order to offer this course.

- Spectrophotometer. Our Beckman spectrophotometer is decades old, has broken down in the middle of previous terms, and requires an expensive annual maintenance contract to operate. Two spectrophotometers are required in order to allow efficient access in courses with up to 22 students. It is important to replace this aging device with a more modern and reliable one, such as our newer Shimadzu.
- Inverted microscope. We currently have three microscopes, and as our enrollment increases, student wait time for microscope use increases. Having one additional microscope would be appropriate for our enrollment levels and allow more efficient laboratory operation.

2. Support for increased staff hours.

- The BIT program has benefitted greatly from the increase in FTE for Carla Moentenich, our Instructional Support Technician, and hiring of Jenny Kirchler, our Student Resource Specialist serving BIT, MT, and VT in the Science & Technology Division. These two staff members have allowed the program to recruit additional students and support learning outcomes in lab courses at higher enrollment levels.
- Additional recruitment and enrollment would require additional FTE for instructional support and student advising.

3. Support for curriculum expansion.

- We aim to align the proposed one-year mechatronics certificate with BIT program outcomes by adding mechatronics courses to the BIT electives list or developing a specific pathway of mechatronics courses for BIT students. The process of alignment and offering sections available for BIT student enrollment may require college administrative support or funding.

4. Support for equipment upgrades.

- Our chromatography equipment is essential for several learning outcomes in winter and spring term labs. Current equipment is functional yet outdated. Newer chromatography equipment would support additional learning objectives, such as software use to input protocol parameters, which would better prepare students for modern applications of chromatography.
- Chromatography and other equipment upgrades in the lab could be considered collaboratively within the Science & Technology division to identify equipment which would benefit biology, chemistry, veterinary technology, or other departments as well as BIT.

5. Support for networking, professional development, internal alignment, and external partnerships.

- Continue to provide funding for faculty networking and professional development, including participation in industry events such as those hosted by the Oregon Bioscience Association, attendance at conferences and other professional development events to improve teaching, and training in new technology to inform curriculum change.
- Provide support for internal alignment of PCC resources such as customized training and community education to optimize training for BIT students and partnerships with external associations.

9. Assurances

Please put X's next to all three boxes to verify that…

☑ faculty and FDCs at all of the campuses offering courses in this discipline/program have received a late-stage draft of the Program Review document.

☑ all of the division deans offering courses in this discipline/program have been sent the late-stage draft.

☑ the SAC administrative liaison has reviewed and had the opportunity to provide feedback on the final report.

Appendix #1

Co-operative Education Cover Letter for Employers

Portland Community College

Bioscience Technology – Cooperative Education

Information for Employers

Thank you for your interest in Portland Community College and the Cooperative Education program. Cooperative Education, or Co-op, is a credit-for-work experience program that many PCC programs include in their curriculum. Students earn credit while gaining work experience and/or training. Employers gain motivated and skilled workers for part-time or short term employment. Many companies find Co-op an excellent way to get acquainted with potential future employees.

The steps for participating employers are:

1) Provide a job description, including necessary skills, work schedules and preferred time commitment.
2) Interview student applicants - we advise employers to ask students to provide references (typically from program instructors) and to contact those references.
3) Once a student is selected, designate a work site supervisor for that student.
4) Complete two forms at the outset of the Co-op: Training Agreement and Learning Objectives. *
5) Meet with a faculty member who will come to the workplace to review student progress.
6) Complete one form at the end of the term: Employer Evaluation.

* More information on PCC's co-operative education program, including links to training paperwork, is available at: www.pcc.edu/resources/careers/internships/start.html

Students enrolled in the Bioscience Technology Associate of Applied Science (AAS) degree program have the option to earn up to 8 credits upon completion of 240 hours of Co-op work experience. The Co-op program requires a minimum of thirty work hours per credit. Students may participate on a full-time or part-time schedule over one or more terms. Most students enroll in Co-op upon completion of their other formal coursework required for the degree. Employers who consider hiring a student following Co-op work are advised to check with the student and program staff regarding degree completion.

More information about PCC's Bioscience Technology program is available at: www.pcc.edu/bio

Program contacts:

Carla Moentenich	Jenny Kirchler	Josh Cary
Co-op Education Instructor	Program Advisor	Faculty Department Chair
carla.moentenich@pcc.edu	jenny.kirchler@pcc.edu	josh.cary@pcc.edu
971-722-7468	971-722-7288	971-722-7254

Please let us know what skills your employees need and how we can best partner with you to create a successful training program for students and future employees.

Appendix #2

BIT Lab Notebook Guidelines

Documentation and Keeping a Laboratory Notebook

Unless otherwise directed by the instructor, in this class you will keep a detailed, up-to-date laboratory notebook according to the following content requirements and documentation rules. This notebook will be an essential resource as you work in the lab and study for classes. You may take the notebook carbons from the lab, but the notebooks must be kept in the laboratory at all times and may be collected for grading at any time. If a notebook is not in the laboratory when they are collected for grading, the grade will be a zero.

Required Components of Each Entry

I. Introduction / Purpose of the Procedure or Experiment

This includes a description of why the procedure is to be performed. Please summarize in your own words instead of copying directly from lab handouts. Please note that some of your laboratory activities will be procedures, not experiments. For an experiment, this section will include a statement of the hypothesis and the purpose is to test the hypothesis. For a procedure, such as learning to use a centrifuge, the purpose may stated simply, such as "to perform procedure X in order to separate Y and Z." Strive to describe specific purpose(s) and give significant detail.

II. Materials and Methods

Materials: List reagents and equipment used, including sufficient information to identify and trace the materials. This identifying information may include chemical or equipment name and manufacturer, serial numbers, catalog numbers, lot numbers, calibration dates, received date, and/or expiration date.

Methods: This is a record of how the procedure was actually performed. The methods you perform must be recorded in real time and indicate what you actually did, not what you *should have p*erformed. If you are following an SOP, refer to it by number and title and record any deviations from the procedure, regardless of how trivial they may seem.

A note about teamwork: In some situations, you will need to record methods that you did not perform yourself. Do not omit these methods from your notes. Simply record the methods with reference to the name of the person who performed it. For example: "Josh prepared Buffer Z per the following recipe… (page 1)."

III. Data / Results

Record your data, analyses such as graphs, and verbal and visual descriptions of observations in this section. In some situations it is appropriate to securely attach your raw data in the form of a photo or table. Do not write interpretations and conclusions here. The results section is where you *objectively* record your data and observations.

IV. Discussion / Conclusions

Interpretations, questions and conclusions should be stated in this section. A good rule of thumb is that this section should clearly connect back to the original purpose and hypotheses. If applicable, suggest interesting future experiments that logically relate to the report. Also, describe potential sources of error with suggestions for improvement.

Documentation Rules (Adapted from *Industrial Biotechnology: a Training Manual* by Moorpark College, sponsored by Amgen and the National Science Foundation)

When recording in your notebook **DO**:

- Use only black or dark blue, indelible, ball-point ink
- Make all entries legible
- Initial and date all entries
- Document each step before moving to the next
- Record numbers less than one with a zero before the decimal point
- Draw a line through large unused spaces or pages, and initial and date on the line
- Initial and date across the edge in the lower right corner of any materials taped into notebook

When recording in your notebook **DO NOT**:

- Overwrite or scribble out over anything written in the notebook
- Use liquid correction fluid
- Backdate
- Record data before the action or event has occurred
- Use ditto marks
- Leave data spaces blank (see above)
- Attach large inserts which extend beyond the edge of the notebook or fold out
- Use post-it notes (all inserted materials must be securely attached)
- Verify or review your own performance (this is done by someone else)

Additional rules:

- When making a correction: Place a single line (cross-out) through the incorrect information. Initial and date the correction next to the cross-out. Enter the correct information adjacent.
- Sign and date all notebook entries (initials ok). For this class, please sign and date on the line at the bottom of each page. Have a lab mate countersign and date your notebook on the other line.
- If you deviate from a written procedure, you must document the deviation.
- When dealing with data, follow these rounding off rules:

- In a series of calculations, carry the extra digits through to the final result, and then round off.
- If the digit to be removed is < 5, the preceding digit stays the same. For example, 1.84 rounds to 1.8.
- If the digit to be removed is greater than or equal to 5, the preceding digit is increased by 1. For example, 1.85 rounds to 1.9.

Additional References:

° Table 2.2 in the Laboratory Manual for Biotechnology (page 50)
° Tables 6.3 and 6.4 in the Basic Laboratory Methods textbook (pages 93-95)

Appendix #3

Presentation Rubrics

BIT 125 Presentation 2 (Device Complaint) Rubric **PRESENTING TEAM #**_____ - Team Members _____, _____, _____, _____

Criteria Category	Excellent	Good	Satisfactory	Needs Improvement	Missing
Audience Question (or Attention Getter): Team uses at least one question (rhetorical or non-rhetorical) or other means to engage with or gain the attention of the audience	5 points Audience is engaged throughout the presentation by multiple questions or various methods	4 points Presentation engages the audience at various points, through a question or another method	3 points Presentation includes a failed attempt at including a question or method to grab audience's attention	1 point Presentation does not include a question to the audience or a method for grabbing audience's attention	0 points
Required Content: • Show/review Company & Device Info (Branding • Respond to items listed in Week 9 slides for content • Explains how response was determined (thought process)	10 points Answers & Explains "How" Decided (all listed below): - If it's a complaint & why - Missing info - Add'l questions to ask - If it is FDA reportable - CAPA activities - Actions to be taken	8 points Answers All & Explain 'How" Decided (some listed): - If it's a complaint & why - Missing info - Add'l questions to ask - If it is FDA reportable - CAPA activities - Actions to be taken	7 points Answers Required Content Question (bare minimum): - If it's a complaint & why - Missing info - Add'l questions to ask - If it is FDA reportable - CAPA activities - Actions to be taken	4 points Does NOT Answer All Required Content: - If it's a complaint & why - Missing info - Add'l questions to ask - If it is FDA reportable - CAPA activities - Actions to be taken	0 points
Answer the Questions: Does this seem like a real, actual complaint? Was it difficult for the team to agree on investigation response (interpretation)?	10 points Answers questions well & explains thoughts (effort given).	8 points Answers questions & explains thoughts.	7 points Answers questions. Does not explain thoughts.	4 points Answers a portion of the questions and does not explain thoughts.	0 points Does not answer questions (missing from presentation).
Time Limit: 6 – 10 minutes, with an additional few minutes for questions	10 points 8.5 – 10 minutes	8 points 6.5 – 8.5 minutes	7 points Right around 6 minutes	6 points Over 10 minutes	5 points Under 5 minutes
Quality of Visuals: PowerPoint slides are well designed and	10 points	9 points	7 points	4 points	

Criteria Category	Excellent	Good	Satisfactory	Needs Improvement	Missing
organized to communicate the info. Images & text are clear. There is an appropriate amount of text.	Visuals are very well designed & organized, shows device & company info. Images & text are clear. Appropriate amount of text. Excellent communication	Visuals are well designed & organized, shows device & company info. Images & text are clear. Not wordy. Good Communication	Visuals are satisfactory in design and organization (did not go to extra effort). Image & text are acceptable. Satisfactory Communication	Visuals are lacking & do not communicate well. Very little effort was put into image, text & slides. Communication Needs Improvement	
Presentation Skills: Presenters communicate effectively w/audience through eye contact, body language & by speaking at the appropriate volume & pace.	5 points All team members present. All presenters use various means for effective communicate.	4 points All team members present. All presenters communicate effectively.	3 points All presenters communicate effectively. Not all team members contribute to presentation.	2 points Presentation is not effective—limited audience engagement, speaking too quietly and no eye contact.	

COMMENTS:

_____

_____

_____

_____

_____

_____

_____

EVALUATING TEAM #_____, Team Members _____, _____, _____, _____

BIT126 Kit Marketing & Lessons Learned Presentation Rubric Team # _____ Students Names: _____, _____, _____

Grading Criteria	Excellent	Good	Satisfactory	Needs Improvement	Not Present
Audience Engagement (attention getter or questions, etc.): Introduction includes an attention getter that effectively gets the audience's attention. Team engages with the audience & keeps the audience's attention. 6	6 points Audience is engaged throughout the presentation by multiple questions and/or various methods	5 points Presentation engages the audience at various points, through questions and/or other methods	3.5 points Presentation includes an attempt at using a question or method to grab audience's attention with some success	3 points Presentation includes a failed attempt at including a question or method to grab audience's attention	0 points Presentation does not include a question to the audience or attention getter
Required Content: <u>MARKETING KIT</u> – • Company Introduction • Kit explanation--indications for use, design, packaging & labeling • Marketing/Sales – sell the benefits of your kit. Kit's key design benefits • Who is your target market & why? • How during this kit "device development" project did the company ensure compliance with all regulation and best practices? • Add'l Mktg Methods, if applicable <u>LESSONS LEARNED</u> – • Start, Stop, Continue—what went well & what did not go well? • What was learned during this term—most valuable, least valuable & most interesting? • Did the "device development" project help in learning quality system (QS)? If not, give suggestions for alternatives ways to learn QS.	20 points Presentation includes information and excellent explanations of all required content plus additional thoughts and insights related to the course, kit, quality system, medical industry, and/or additional relevant topics. The kit marketing and lessons learned are exceptionally presented, well thought-out and described.	17 points Presentation includes information, insight and good explanations of all required content. The kit marketing and lessons learned are well presented, thought-out and described.	14 points Presentation includes information and explanation of all required content. The kit marketing and lessons learned information is presented and described.	12 points Presentation is lacking in content or information is poorly described. The kit marketing and lessons learned information are lacking, limited and/or poorly presented.	8 points Presentation is lacking most of the required content. The kit marketing and lessons learned are not evident or clear. The presentation does not meet the general requirement for content.

BIT126 Kit Marketing & Lessons Learned Presentation Rubric Team # _____ Students Names: _____, _____, _____

Grading Criteria	Excellent	Good	Satisfactory	Needs Improvement	Not Present
• Anything new learned this term vs. last term? • In what manner did you "lean" your kit or your kit mfg process? • What did you learn about your kit from the Design Validation of your kit (i.e. guest demonstrations)? • Reflections/Thoughts on the course 20					
Answer the Questions: MARKETING – What is your kit pricing? What makes your kit unique & worth the purchase (claims)? How will you support the kits & customers after the sale? LESSONS LEARNED (LL) - Did having the discussion about team rules help the teamwork activities? Was communication better? Was it easy or difficult for teammates to agree on roles & tasks to complete? 6	6 points Presentation answers all questions and provides additional thoughts/insight that fully explains the team's perspective on kit development, teamwork, and team dynamics lessons	5 points Presentation answers all questions and provides thoughts/insight that explains the team's perspective on kit development, teamwork and team dynamics lessons	3.5 points Presentation answers all questions and explains the team's perspective on kit development and teamwork lessons	3 points Presentation does not answer all questions and/or provides an explanation on the team's perspective on kit development and teamwork lessons	0 points Presentation does not include answers or explanation on the questions.
Time Limit: Team presenters remained within the time allocation of 10 – 20 minutes, with an additional 3 - 5 minutes for questions. 6	6 points 14 – 20 minutes	5 points 12 – 14 minutes	3.5 points 10 – 12 minutes	3 points 7 – 10 minutes	2 points Less than 8 mi. Over 20 minutes
Quality of Visuals: PowerPoint slides are well designed and organized to communicate the information to the audience. Images and text are clear; and there is an appropriate amount of text.	6 points Visual are professionally designed and organize to	5 points Visual are well designed and organized, communicating	3.5 points Visual include appropriate text and communicate presentation message	3 points Visual do not include appropriate amount of text & require	2 points Visual do not communicate well

BIT126 Kit Marketing & Lessons Learned Presentation Rubric Team # _____ Students Names: _____, _____, _____

Grading Criteria	Excellent	Good	Satisfactory	Needs Improvement	Not Present
6	support presenters' message	the presentation message		improvement to communicate	
Presentation Skills: Presenters (each person on the team) communicate effectively with audience through eye contact, body language and by speaking at the appropriate volume and pace. Appropriate level of formality is used during the presentation. Please consider this presentation a practice for a professional presentation and dress and behave for that scenario. 6	6 points All team member present exceptionally and effectively through use of skills listed	5 points All team member present effectively through use of skills listed	3.5 points All team member present through use of skills listed	3 points Not all team members participate, presentation lacks effectiveness and/or use of skills is limited	2 points Not all team members participate, and presentation skills are lacking
TOTAL – 50 Points					

Physical Kit Grade (Total = 50 points):

- KIT: As I have said through-out the term – "**Re-Cap–>The goal of this term project is "**To design, develop, and manufacture a DNA Extraction Kit for Use**" – A COMPLIANT kit (being compliant w/regulations count)!**"
- Compliant and well-designed kit
- Use of tools and/or information learned from BIT 125 and/or BIT 126 in kit design and development (i.e. labeling content, IFU content, lean, etc.)
- Kit Function – Kit functions efficiently and extracts a generous amount of DNA
- Kit would sell to the intended market

Appendix #4

Student Midyear Self-Evaluation Rubric

Bioscience Technology - Midyear Self Reflection **Name: _____**

Progress Area	Criteria			
I. Academic	Maintain strong grades	Complete all assignments	Attend all classes	Consistently meet all course outcomes
II. Technical	Document all work according to established standards	Write and follow procedures	Use equipment properly (incl. calibration/verification)	Perform measurements with accuracy and precision
	Maintain safe and productive work environment	Correctly perform calculations to support lab work	Troubleshoot equipment and methods	Advanced lab techniques *(SDS-PAGE, cloning, etc)*
III. Job Readiness	Update and strengthen resume	Prepared for job interviews	Engage in Networking / Social Media	Researched / applied for internships and/or jobs
IV. Personal Effectiveness	Planning / Organization	Responsibility / Integrity	Professionalism (punctual, dedicated, wise decision making)	Life-long learning
V. Interpersonal Effectiveness	Verbal Communication with instructors and peers	Written Communication with instructors and peers	Teamwork	Reliability

Provide a self-evaluation for each of the above criteria.				
5 Excellent	4 Very good	3 Adequate	2 Aware of problem and working on it	1 In need of more awareness and improvement

Bioscience Technology - Midyear Self Reflection	**Name: _____**
Progress Area	Comments
I. Academic	
II. Technical	
III. Job Readiness	
IV. Personal Effectiveness	
V. Interpersonal Effectiveness	

Provide 1 or more comments for each of the progress areas (2+ comments for technical areas).
Think back on your progress in the first half of the year and identify the program outcome in each area in which you have the most room for improvement. What have you learned about yourself during the program so far? Which class or assignment challenged you the most in this area? What do you need to do in order to improve? Attach additional pages if needed.

Appendix #5

Student Midyear Self-Evaluation Results

2017 Student Self-Reflection Results

Academic	Technical	Job Readiness	Personal	Interpersonal
3.8	3.8	3.8	4.0	5.0
4.8	4.8	4.0	4.5	4.3
4.0	3.4	4.8	4.0	4.0
4.5	3.8	3.8	4.3	4.0
4.5	4.3	2.0	4.8	4.3
3.8	3.8	3.3	4.3	3.8
2.8	4.1	3.5	3.5	2.8
2.3	4.0	3.3	3.0	2.8
4.5	3.8	4.8	4.8	4.5
5.0	5.0	3.8	5.0	4.0
3.5	4.4	3.3	4.3	4.3
4.3	3.4	2.5	3.8	3.5

2018 Student Self-Reflection Results

Academic	Technical	Job Readiness	Personal	Interpersonal
4.5	4.5	4.0	3.8	4.3
4.4	4.1	2.0	3.7	4.3
4.3	4.3	4.3	3.8	4.8
4.3	4.6	2.3	3.8	4.3
5.0	3.8	3.3	4.8	4.3
4.5	3.8	3.0	4.6	4.4
3.5	3.9	3.1	4.0	5.0
4.3	4.4	3.8	4.5	4.8
4.0	3.5	2.3	3.0	3.0
4.5	3.9	3.3	4.0	4.0
4.5	4.3	2.3	3.3	3.3
4.8	4.6	4.5	5.0	4.8
4.3	3.9	2.0	4.3	4.5
3.8	4.4	3.3	4.5	3.5
4.3	4.1	4.3	4.3	5.0
4.0	3.6	3.3	3.8	4.0
5.0	4.5	5.0	3.8	2.8
4.0	4.5	3.8	4.8	5.0
3.8	4.0	3.5	4.0	4.0

2019 Student Self-Reflection Results

Academic	Technical	Job Readiness	Personal	Interpersonal
4.5	4.5	4.0	4.8	4.8
4.9	4.8	4.0	4.8	5.0
3.5	3.4	3.3	3.8	3.0
4.9	4.6	4.0	4.8	4.6
5.0	4.5	3.8	5.0	4.5
4.0	4.4	3.5	3.8	4.1
4.5	4.0	4.0	4.3	4.0
3.3	4.6	3.5	3.5	4.3
4.8	4.4	3.3	4.5	3.3
4.3	4.8	3.1	4.6	4.8
4.0	4.0	3.3	4.0	3.5
5.0	4.8	4.5	4.5	5.0
4.6	4.6	3.9	4.5	4.8
3.9	3.2	4.9	4.3	4.0
4.3	4.3	4.5	3.8	4.5
4.5	4.5	4.5	5.0	4.0
3.0	3.9	2.5	3.8	4.0
4.0	4.8	5.0	4.0	4.8
4.0	3.4	2.5	3.5	2.8
4.3	4.3	2.5	3.5	3.8

Appendix #6

TSA

Bioscience Technology - Technical Skill Assessment - Fall 2018

Name: **G#:**

Skill #	Description of technical skill	Performance indicator	Points
1	**Accurately measure a quantity of NaCl**	obtain quantities within 5% of true value	2
		obtain quantities with deviation of 5 - 10%	1
		obtain quantities with greater than 10% deviation	0
2	**Accurately read volume in a graduated cylinder**	obtain quantities within 0.5mL of true value	2
		obtain quantities with deviation of 0.5 to 1.0 mL	1
		obtain quantities with greater than 1.0 mL deviation	0
3	**Accurately transfer a volume with a serological pipet**	obtain quantities within 0.2mL of true value	2
		obtain quantities with deviation of 0.2 to 0.4 mL	1
		obtain quantities with greater than 0.4 mL deviation	0
4	**Accurately transfer a volume with a micropipet**	choose correct micropipet and transfer a volume within 5% of true value	2
		choose correct micropipet and transfer a volume with a deviation of 5 - 10%	1
		choose the wrong pipet, or obtain a greater than 10% deviation	0
5	**Calibrate a pH meter and measure the pH of an unknown solution**	observed pH values are within 0.2 pH units of true value	2
		observed pH values are within 0.3 pH units of true value	1
		observed pH values have deviations greater than 0.3 pH units	0
6	**Use a conductivity meter to identify among unknown solutions**	correctly identify salt solution vs water based on conductivity	2
		(score not assigned)	1
		incorrectly identify sample corresponding to salt solution	0
7	**Evaluate buffers and non-buffered solutions**	correct identification and pH change within 1 unit of expected	2
		correct identification but with large pH deviations above 1	1
		incorrect identification of buffered solution	0
8A	**Documentation: Complete materials list for preparing a buffer**	record equipment and chemical list with all required identifying information	2
		record equipment and chemical list with some of the required ID info	1
		record minimal amount of ID info or does not include the equipment	0
8B	**Documentation: Correctly perform calculations**	grams of each solute correctly calculated and sig fig rules followed	2
		grams of each solute correctly calculated though lacking required precision	1
		grams of solute incorrectly calculated	0
8C	**Documentation: Protocol steps for preparing buffered solution**	correct protocol with all required steps included	2
		correct protocol with 1 or 2 missing or incorrect steps	1
		more than 2 missing or incorrect steps	0
8D	**Documentation: Follow notebook standards**	follow all documentation standards	2
		1 significant deviation from documentation standards	1
		2 or more deviations from accepted documentation standards	0
9	**Accurately measure absorbance of unknown solutions**	observed absorbance values within 5% of true value	2
		observed absorbance values with a deviation of 5 - 10%	1
		observed absorbance values with greater than 10% deviation	0
10	**Prepare serial 1/10 dilutions**	correct set up and A517 values correspond to correct dilution factor	2
		correct set up with deviations from expected A517 values	1
		incorrect set up for serial dilutions	0
11	**Perform Bradford assay on standards and unknowns**	correctly ID sample in 500-1000 ug/mL range, obtain expected A595 values	2
		correctly ID sample in 500-1000 ug/mL range, obtain inaccurate A595	1
		incorrectly identify the sample in the 500-1000 ug/mL range	0
12	**Use a standard curve to interpolate concentration of unknowns**	differentiate interpolation vs extrapolation; calculates correct value	2
		calculate via extrapolation and/or without considering dilution factor	1
		incorrect calculation of unknowns	0

Score of 21 to 30 points:	Pass
Score of 0 to 20 points:	Fail

Total Score:

Appendix #7

BIT Core Outcomes Map

Core Outcomes Mapping

SAC - BIT: Bioscience Technology

Mapping Level Indicators:

0: Not Applicable.

1: Limited demonstration or application of knowledge and skills.

2: Basic demonstration and application of knowledge and skills.

3: Demonstrated comprehension and is able to apply essential knowledge and skills.

4: Demonstrates thorough, effective and/or sophisticated application of knowledge and skills.

Core Outcomes:

1. Communication.
2. Community and Environmental Responsibility.
3. Critical Thinking and Problem Solving.
4. Cultural Awareness.
5. Professional Competence.
6. Self-Reflection.

Course #	Course Name	CO1	CO2	CO3	CO4	CO5	CO6
BIT 102	Current Topics in Bioscience Technology	3	3	3	3	1	4
BIT 105	Biotechnology Lab Safety	2	4	2	0	3	2
BIT 107	Laboratory Mathematics	2	0	3	0	3	2
BIT 109	Basic Laboratory Techniques and Instruments	3	2	3	1	3	3
BIT 125	Quality Systems	4	3	3	3	3	2
BIT 126	Applied Quality Practices	4	4	4	3	4	3
BIT 181	Exploring Bioscience	4	2	2	4	3	4
BIT 201	Immunochemical Methods	4	2	4	2	4	3
BIT 203	Recombinant DNA	4	2	4	2	4	3
BIT 205	Bioseparations	4	2	4	2	4	3
BIT 207	Cell Culture	3	3	3	2	3	2
BIT 215	Protein Purification	4	2	4	2	4	4
BIT 223	Advanced DNA Techniques	4	2	4	2	4	4
BIT 280A	Work Experience	4	4	4	3	4	4
BIT 280B	Work Experience - Seminar	4	0	4	1	4	4

Appendix #8

Teamwork Rubric and Peer Evaluation Form

PCC Bioscience Technology (BIT) Teamwork Rubric

Criteria	Excellent	Good	Satisfactory	Needs Improvement	Unsatisfactory	Missing
Attends & Contributes to Team Meetings	Attends all meetings. Always helps the team move forward by providing solutions and bringing new ideas	Attends all meetings. Often provides solutions and new ideas	Attends all meetings. Shares ideas and suggestions	Attends most meetings. Shares ideas but does not advance the work of the group	Occasionally attends meetings, does not provide ideas or suggestions	Rarely attends meetings or contribute to the team
Facilitates Contribution of Team Members & Listens Effectively	Always engages teammates in a way that facilitates their contribution. Builds on contributions of others, as well as notices lack of participation to invite engagement	Often engages teammates in a way that facilitates their contribution by building or synthesizing the contribution of others	Sometimes engages teammates by restating their views and/or asking questions for clarification	Does not engage teammates on the team and/or monopolizes time by presenting mostly their ideas	Rarely listens to teammates and/or ignores their ideas and does not try to build on their ideas	Does not listen to teammates or contribute to team discussion
Individual Contributions to the Team (completes assigned tasks on time)	Completes all assigned tasks by deadline. Work accomplished is thorough, comprehensive & advances the project.	Completes all assigned tasks by deadline. Work consistently advances the project.	Completes all assigned tasks by deadline. Work usually advances the project.	Completes some assigned tasks to help advance the project.	Rarely completes assigned tasks to help advance the project.	Does not complete assigned tasks.
Fosters Constructive Team Climate	Does all of the following: - Treats teammates respectfully - Positive attitude - Motivates - Provides assistance &/or encouragement	Does 3 of the following: - Treats teammates respectfully - Positive attitude - Motivates - Provides assistance &/or encouragement	Does 2 of the following: - Treats teammates respectfully - Positive attitude - Motivates - Provides assistance &/or encouragement	Does 1 of the following: - Treats teammates respectfully - Positive attitude - Motivates - Provides assistance &/or encouragement	Exhibits some of the following: - Disrespectful - Negative attitude - De-motivator - Non-supportive	Causes problems within the team
Responds to Conflict & Accepts Criticism Gracefully (engaging debate that leads to best solution)	Addresses destructive conflict directly & constructively, finds resolution that strengthens overall team. Accepts criticism gracefully & works with teammate for understanding.	Identifies & acknowledges conflict & stays engaged with it to resolve. Accepts criticism well and works with teammate	Redirects focus toward common ground, toward task at hand (away from conflict).	Passively accepts alternate viewpoints/ ideas/opinions	Ignores conflict and does not respond to criticism	Does not resolve conflict and continues to worsen conflict.
Total Score out of 100	90 or more	80 or more	70 or more	55 or more	40 or more	0 or more

PCC Bioscience Technology (BIT) Teamwork Evaluation Form

Your Name: Date:

Criteria (each criterion is worth 20 points)	**Teammate #1**	**Teammate #2**	**Teammate #3**
	Name: _____	Name: _____	Name: _____
Attends & Contributes to Team Meetings	Rating: _____ Comments:	Rating: _____ Comments:	Rating: _____ Comments:
Facilitates Contribution of Team Members & Listens Effectively	Rating: _____ Comments:	Rating: _____ Comments:	Rating: _____ Comments:
Individual Contributions to the Team (completes assigned tasks on time)	Rating: _____ Comments:	Rating: _____ Comments:	Rating: _____ Comments:
Fosters Constructive Team Climate	Rating: _____ Comments:	Rating: _____ Comments:	Rating: _____ Comments:
Responds to Conflict & Accepts Criticism Gracefully (engaging debate that leads to best solution)	Rating: _____ Comments:	Rating: _____ Comments:	Rating: _____ Comments:
Total Score (out of 100):			

Rating: Excellent = 20 points; Good = 17 points; Satisfactory = 14 points; Needs Improvement = 11 points; Unsatisfactory = 8 points; Missing = 0 points

NOTE: Refer to “Teamwork Rubric – BIT…” for description of performance indicators for each of the criteria.

BIT 126, Winter Term

Appendix #9

Enrollment Data

Program Review Data Profiles
Collegewide and Campus FTE and Headcount by Subject

Institutional Effectiveness Office, 2018-19 Program Profiles 5 Year Trend

Subject
Bioscience Technology-BIT

FTE Totals by Subject Area and Percent Difference from Previous Year

	Year									
	2013-14		2014-15		2015-16		2016-17		2017-18	
Campus	FTE	Percent Change	FTE	Percent Change	FTE	Percent Change	FTE	Percent Change	FTE	Percent Change
Collegewide	29.51	10.7%	37.56	27.3%	36.16	-3.7%	28.89	-20.1%	37.41	29.5%
RockCreek	29.51	10.7%	37.56	27.3%	36.16	-3.7%	28.89	-20.1%	37.41	29.5%

Headcount Totals by Subject Area and Percent Difference from Previous Year

	Year									
	2013-14		2014-15		2015-16		2016-17		2017-18	
Campus	Headcount	Percent Change	Headcount	Percent Change	Headcount	Percent Change	Headcount	Percent Change	Headcount	Percent Change
Collegewide	40.00	2.6%	58.00	45.0%	48.00	-17.2%	31.00	-35.4%	37.00	19.4%
RockCreek	40.00	2.6%	58.00	45.0%	48.00	-17.2%	31.00	-35.4%	37.00	19.4%

Notes:
FTE is "full time equivalency", and calculated with the following formula;
(# of contact hours x # of weeks) / 510 = FTE.
Percent Change is calculated from comparison to previous year totals.
Headcount for collegewide is an unduplicated number, a student is counted one time, regardless of the number of campuses they attend in one year.
Campus headcounts, get counted at each campus a student attended, therefore the sum of campus headcounts will not equal collegewide headcount.
Source reports; SWRPRFT, SWRPRHC.
Source name; FTE & Headcount by Subject.
Author; nbr.

Appendix #10

Student Demographic Data

Program Review Data Profiles
Collegewide and Campus Demographics by Subject

Institutional Effectiveness Office, 2018-19 Program Profiles 5 Year Trend.

Subject
Bioscience Technology-BIT

Campus
Collegewide

Demographics by Subject; Age

	2013-14		2014-15		2015-16		2016-17		2017-18	
Age Group	Headcount	% of Total Headcount	Headcount	% of Total Headcount	Headcount	% of Total Headcount	Headcount	% of Total Headcount	Headcount	% of Total Headcount
Under 20	1	2.5%	4	6.9%	1	2.1%	5	16.1%	5	13.5%
20-24	5	12.5%	11	19.0%	14	29.2%	9	29.0%	13	35.1%
25-49	30	75.0%	37	63.8%	29	60.4%	16	51.6%	17	45.9%
50+	4	10.0%	6	10.3%	4	8.3%	1	3.2%	2	5.4%
Grand Total	**40**	**100.0%**	**58**	**100.0%**	**48**	**100.0%**	**31**	**100.0%**	**37**	**100.0%**

Note:
Source reports; SWRPRAG.
Source name: Age by Subject.
Author; nbr.

Appendix #11

Advisory board meeting minutes

Bioscience Advisory Committee Meeting

May 5th, 2018

Sent to Academic Services 11/15/18

Introductions:

Naomi Allen	Genentech, Inc.
Matthew Altman	PCC, Division Dean - Science & Technology
Shawna Bechtel	PCC, Administrative Assistant
Gordon Brown	Biotechnology Industry Professional
Paul Brown	Cinder Staffing
Elizabeth Bunger	BSK Associates, Laboratory Operations Manager
Anne Carlson	OHSU, Technology Development Manager
Josh Cary	PCC, Chair Bioscience Technology
David Horowitz	MolecularMD
Jenny Kirchler	PCC, Student Resource Specialist
Carla Moentenich	PCC, Support Tech & Instructor
Steve Gatton	PCC, Instructor
Haydee Goldenberg	PCC, Career Services
Joseph Raven	JS Raven Biomedical Consulting, Principal Consultant
Kristi Smith	PCC, Alum & MolecularMD
Steve Thompson	Automation Solutions
John Tortorici	Biotechnology Industry Professional
Taku Tsukamoto	Chemica Technologies, Inc.
Scott Zellmer	Arpeggiate Consulting Group

Meeting called to order at 5:14 PM.

Minutes: Scott Zellmer motioned to approve minutes, Naomi Allen seconded and Committee approved.

Student News:

2017 - 2018 Cohort

- 22 program students
  - 3 hired at Vitaligence
  - 2 hired at Intel
  - 18 students have completed Career Pathway Certificate: Advanced Bioscience Technologist
    - https://www.pcc.edu/pathway/?id=299

2018 - 2019 Cohort

- Change to application process
- Priority deadline May 15th

    - 5 students already have applied and accepted
    - 9 students are pending acceptance (missing 1 or 2 courses to be completed)
    - 3 students to be interviewed – pending acceptance
- Goal of 10 more applications through Summer term

Program News:

Curriculum Sub-Committee

- 10 -15 Volunteers from BIT Industry Partners
    - What knowledge/skills needed for entry level employees
        - soft skills, critical thinking, care of facilities, technical skills, etc.
    - What skills needed for foreseeable future needs
        - compare with current curriculum
        - request for input/feedback from BIT Industry Partners for future updating to courses
- First Meeting Fall Term
    - half day meeting
    - 2 follow up meetings during academic year

Dual Credit Articulation

- Currently 2 High schools Participating
    - Madison High School
    - Hillsboro High School
    - 120 students exposed to BIT program through Dual Credit classes between these sites

Articulation agreements/transfer pathways

- PSU will accept 24 BIT credits towards BS in Biology
- Transfer Grants
    - 4 students applied for Intel grant
    - 2 students applied for NIH grant
    - 2 students applied for Build Exito grant

Outreach (Jenny Kirchler)

- Presenting at Career Fairs/High School Outreach Events
- Weekly Info Sessions
    - Spring Term weeks 2 though 10
        - Tuesdays 5 PM – 6 PM Rock Creek Campus
- BIT Presentations during Biology and Chemistry classes as requested by Instructors

Meeting Adjourned at 6:37 PM

Next Meeting:
Thursday, October 11th, 2018 5:00 PM RC Bldg 9 122 C Event Center

Bioscience Advisory Committee Meeting

October 11th, 2018

Sent to Academic Services 01/23/2019

Introductions:

Naomi Allan	Genentech, Inc.
Matthew Altman	PCC, Division Dean - Science & Technology
Patti Ayala	PCC, Instructor
Shawna Bechtel	PCC, Administrative Assistant
Josh Cary	PCC, Chair Bioscience Technology
Steve Gatton	PCC, Instructor
Haydee Goldenberg	PCC, Career Services
Farin Hajarizadeh	PCC, Instructor
Kendra Hill	RevMedx
Elaine Huang	OHSU
Jenny Kirchler	PCC, Student Resource Specialist
Ron Mink	Sedia Biosciences Corporation
Carla Moentenich	PCC, Support Tech & Instructor
Anita Pandit	Genentech, Inc.
Meghna Pant	PCC, Instructor
Kristi Smith	PCC, Alum & MolecularMD
Brie Stoianoff	The FDA Group, LLC
Emily Stump	Acumed
Alyssa Thomas	PCC, Instructor
Steve Thompson	Automation Solutions
Charla Triplett	FutureBrand Speck
Taku Tsukamoto	Chemica Technologies, Inc.
Scott Zellmer	Arpeggiate Consulting Group

Meeting called to order at 5:17 PM.

Minutes: Brie Stoianoff motioned to approve minutes, Steve Thompson seconded and Committee approved.

Student News:

Historic Data

- Degrees Earned (see graph below)

- Employer Placement (see graphs below)
    - Student employment tracked from 2013
    - 5 categories
        - Production/Manufacturing
        - Research & development
        - Continuing Education
        - Quality Control/Regulatory
        - Process Technician

2018 Cohort Demographics

- Full Cohort at 22 students
- Mix of prior education levels:
    - 15 with no prior degree
        - prerequisites have been met
    - 5 with prior Bachelors
        - science related degrees
    - 2 prior Masters
        - received outside United States
- Youngest age cohort yet
    - 7 graduated High School in the last 2 years
    - Median high school graduation year for cohort is 2011
- 18 students pursuing AAS degree, 4 students pursuing 29-credit advanced certificate
- Student plans at time of enrollment in fall term include:
    - 12 students who want to apply for jobs after completing the program
    - 4 students who want to transfer to higher education immediately after the program
    - 6 students who want to work and then continue education within several years, or are undecided about plans after completing the program
- 30 applicants
    - Started waitlist
    - Unable to admit all students
    - Exploring possibility to add another cohort
        - To begin in Winter or Spring term

Program News:

Curriculum Update

- Course Revisions
    - Updates to add specific skills
- New Course Creation
    - BIT 279 – Work Experience Seminar
        - preparation course for working in industry
            - informational interviews
            - employer research
- All BIT courses available for Audit
    - Great resource for employees/employers in industry to gain hands on experience without becoming a program student
    - Case by case admission

Curriculum Development Sub Committee

- Met on September 19th
- Identified companies for input
    - Branching out to non-bioscience companies
        - Coke has shown interest
        - Intel has hired graduates from program
- Needs have changed for employers
    - Curriculum was developed in 2007 primarily influenced by Genentech R&D
    - Skills need to be directed more towards manufacturing
        - more hands on experience learning how to create a product
        - skills developed for quality control
- November 2nd facilitating workshop

Program Review

- May 3rd, 2019
- Recurring every 5 year
- 2 hour presentation
    - Showcase of current program
    - Former students will be invited to attend
    - Industry partners to be invited to attend

Surveys

- Preview email sent prior to meeting

- Surveys sent to graduates
    - all graduates from 2013 to present
- Will send to employers for feedback
    - How well are students prepared for industry?
    - What are the unmet needs?
- Information may be used for Curriculum Review or Program Review

Dual Credit

- Currently 2 High schools Participating
    - Madison High School
        - BIT 102
        - BIT 105
    - Hillsboro High School
        - BIT 102
- Approached by 2 High Schools for BIT courses
    - Possibly added by next year (2019)

Outreach

- Continuing High School visits
- Utilizing PCC programs for outreach to younger populations
    - Beaverton Early College
        - Early College High School is an options program available to students in the Beaverton School District and partner districts. Juniors and eligible seniors may apply during the fall, winter, and spring terms. It is an opportunity for students to blend high school and college in a coherent, personalized and rigorous education program at Portland Community College.
        - https://www.pcc.edu/beaverton-early-college/
    - Future Connect
        - Future Connect is a scholarship and support program for students who identify as first-generation or low-income. We focus on eliminating barriers to college, and provide students with on-going support throughout their time at PCC.
        - https://www.pcc.edu/future-connect/
- Classroom presentations
    - Biology
    - Chemistry
- Flyers sent to other campuses to be posted in Advising and ASPCC areas

Industry News:
Sedia Biosciences Corporation looking to fill 10 positions
MolecularMD 2 positions open
Genentech new personalized cancer vaccine
High School to High Tech program – collaboration between Genentech and Hillsboro High School
TAO will draft merger with Oregon Bio Association

Meeting Adjourned at 6:37 PM

Next Meeting:
Thursday, February 28th, 2018 5:00 PM RC Bldg 9 122 C Event Center

Bioscience Advisory Committee Meeting

February 28, 2019

Sent to Academic Services 04/18/2019

Introductions:

Nancy Lime	Arpeggiate Consulting Group, Chair
Naomi Allan	Genentech
Matthew Altman	PCC Dean of Science & Technology
Michaele Armstrong	Oregon Bioscience Association
Cheryl Bondurant	CAI Compliance Consulting
Elizabeth Bunger	BSK Associates
Ann Carson	OHSU Tech Transfer
Josh Cary	PCC Bioscience Technology Chair
Steve Gatton	PCC Instructor
David Horowitz	ICON, former Molecular MD
Jenny Kirchler	PCC Student Resource Specialist
Aaron Phariss	Micro Systems Engineering Inc.
Kristi Smith	ICON, former Molecular MD, PCC Alumnus
Emily Stump	Acumed
Alyssa Thomas	PCC Instructor
Steve Thompson	Digital Health Collaborative
John Tortorici	Biotechnology Industry Professional
Taku Tsukamoto	Chemica Technologies, Inc.
Susan Lipski	PCC Instructional Administrative Assistant

Meeting called to order at 5:10 pm.

Minutes: Motion to approve the minutes, seconded and approved

Student News:

- Full cohort of 22 students this year
- Intel interviews held in January for students in Bioscience, Microelectronics, and other PCC programs. This year seven current BIT students and one previous BIT student interviewed. Of those interviewed, five were offered positions, two will have follow-up interviews and one was not offered a position.
- Majority of students (~14) are seeking internships for the summer. This course is a highly encouraged elective option, but no longer mandatory.
    - MSEI, BSK and Genentech open to hosting internship
- New BIT 279 Work Experience Preparations course offered in spring term. This is a revision of a previous seminar course offered in the summer term.
    - 1 credit peer-learning/mentoring seminar course designed to get students into internships.
    - Career exploration - encourage and support students in applying for both internships and jobs.
    - This course includes three information interviews and job applications.
    - Students will be asked to reach-out to industry and to conduct a 15 minute informal

interviews.
    - The advisory board was asked to help field these calls. The board supported this idea and offered help the students.
    - The suggestion was made to have industry participate in round-robin panel type interview campus.
    - David Horowitz, Aaron Phariss, Elizabeth Bunger and Naomi Allan volunteered to participate in the informational interviews.

- Recruitment update
    - Last two years BIT has had a full cohort of students in the fall. Recruiting starts in winter term and runs through summer term.
    - Recruits current PCC student from biology and chemistry classes.
    - Recruits in Future Connects and Beaverton Early College programs.
    - Both Hillsboro and Madison High School have Dual Credit programs with Bioscience Technology. High school students are able BIT 102 Current Topics in Bioscience Tech and BI 105 Bioscience Workplace Safety classes.
    - Most of the enrollment success comes from efforts recruiting current PCC students who are already here but do not sure of what they want.
    - Advising is strong successful component to the BIT program. Able to give personal advice to students who are considering this career. This is part of a PCC wide YESS initiative – Yes to Equitable Student Success. PCC as a whole is redesigning advising so that every student will have an assigned advisor.

Program News:

- Curriculum Review
    - Summary of November 2, 2019 Workshop
        - Knowledge – current curriculum covers knowledge base requirements fairly well. This may be an opportunity to bring some more manufacturing focus into certain classes.
        - Skills – could use more development in equipment, mechanical, material control, validation. Perhaps in troubleshooting manufacturing. Most active area for potential curriculum development.
            - Automation execution systems and SAP tools are now common in industry. These tools enquire both automation and software knowledge which student are not as familiar with them as they could be.
            - Feedback from industry indicates they would like to take the next steps and help develop these kinds of classes.
        - Abilities – complete repetitive tasks, investigate failures, attention to detail, follow instructions. Internships are a great way for student and employer to determine fit.
        - Character - work ethic, work etiquette, willing to learn, can do attitude, coachable. To what extent can we teach this vs screen for this?

- Working collaboratively within PCC to see what is available already, to meet skill gaps. The Mechatronics program at Willow Creek is in development may fill some of those gaps. Some of the courses, based on the feedback, could be integrated into our curriculum as electives or otherwise.
    - A list of possible MT classes was shared with the committee. They included tool kit course, ion machine,
- Program Review on Friday, May 3, 2019 from 9-11am at PCC Rock Creek Bldg7 room 110.

Industry News:

- Molecular MD was acquired by Icon PLC.
- Micro Systems Engineering Inc. is growing and continually hiring. New products will hit the market both this year and next year.
- Biotronik just received FDA approval for a new stent.
- Oregon Bioscience Association has two network events coming. On March 19, 2019 the Portland event is focus is on the legislative process. The May event is in Bend Oregon is a Workforce based programing
- Acumed offered facility tours to the board and student. They would like information on the BIT internship program.
- Genentech has new business and moving very fast. Will be hiring and moving quickly. They are relying on PCC to be a feeder. They are working on setting up a sustainable pathway for PCC students.
- Digital Health Collaborative received a $150,000 grant to do a digital health economic impact study.
- OHSU's new hospital is opening on the south waterfront.
- Sedia is growing and looking to hire 10 positions. Most of the positions are in manufacturing and quality control.
- Oregon Bioscience offered to list open jobs on their career page located in www.oregonbio.org

Other items:

- PCC Willow Creek facility was offered as an option to hold the next Bioscience Advisory Board meeting.
- National Institute for Staff and Organizational Development (NISOD) provides budget friendly, high quality faculty focused programs for community colleges. It recognizes people who are excellent in contributing to community colleges. The NISOD Excellence Award was awarded to PCC's Josh Cary. This award is given to someone who demonstrated outstand commitment and contribution to their students and colleagues and the institutions where they work. Josh will travel to Austin Texas in May.

Next Meetings:

Official Meeting: Thursday, May 23, 2019 at the PCC Willow Creek Campus located at 241 SW, Suite 320, Edgeway Dr. Beaverton, OR 97006

Unofficial Meeting: Thursday, April 11, 2019 at Twigs Bistro located at in Bridgeport Village 17003 SW 72nd Ave, Tigard, OR 97224

Meeting adjourned at 6:50 pm

Appendix #12

BIT Lab Duties Assignments

Weekly Duties Checklist Student Assignments Effective: January 6, 2019

Cleaning Tasks BIT Lab Rm 134	**Initials**	**Date Completed**
Clean Perimeter Counters / replace bench paper where needed on counters only		
Refill Disinfectant CiDecon bottles / SANIhol 70 bottles		
Clean Sinks/Refill DI H_2O carboys		
Biohazard waste disposal / mini biohazard bag replacement		
Clean Fume Hood #1		
Clean Fume Hood #2		
Safety shower/eyewash check		
Put away clean glassware / supplies		
Satellite Waste Storage check/inspection		
Glassware Cleaning / storage		
Chemical storage and secondary containment management / inspection/ labeling *(daily)*		
Equipment Inspection/Maintenance tasks BIT Lab Rm 134	**Initials**	**Date Completed**
pH meter / pH probe inspection /maintenance *(daily)*		
Weigh Balance Inspection / maintenance		
Pipet Aid inspection/maintenance		
Water Bath Cleaning		
End of Day Equipment Shutdown: Microscopes, stir/heat plates, centrifuges, heat blocks, etc *(daily)*		
Re-Stocking Supplies BIT Lab Rm 134	**Initials**	**Date Completed**
Nitrile Gloves/Lab Labeling Tape		
Micro-Pipette Tips restock in cabinet / refill boxes as needed		
Serological Pipet Stock /Eppendorf Tubes		

pH meter Accumet Basic Inspection/maintenance

Portland Community College RC | Document Number:1.1

17705 NW Springville Rd. | Revision Number: 4

Portland, OR 97229 | Page 1

Preparer: Carla Moentenich | **Date:** 09/28/2015

1. **Purpose:**
   1.1 To provide instruction on how to inspect the pH meter and pH probe

2. **Responsibilities:**
   The pH meters and pH probes need to be inspected and cared for on a weekly basis.

3. **References:** Fisher Scientific Accumet Basic user manual:
   Fisher Scientific combination probe instructionscat.#13-620-183A accu TupH double junction, Ag/AgCl reference
   Accumet Plastic body, double junction, gel-filled electrode cat# 13-620-299A

4. **Materials:**
   4.1 Fisher Scientific pH buffer solution pH 4.0
   4.2 Fisher Scientific pH buffer solution pH 7.0
   4.3 Fisher Scientific pH buffer solution pH 10
   4.4 Electrode Storage Buffer cat# 13-300-178
   4.5 50 mL conical tubes for buffer solution
   4.6 dI water squirt bottle
   4.7 kimwipes
   4.8 reference electrode filling solution (KCl solution) cat# SP138-500 only for refillable pH probe cat# 13-620-183A.
   4.9 waste beaker

5. **Procedure for Inspection/Maintenance:**
   ***special note* the combination electrode allows you to measure the pH of Tris based solutions. pH probe cat # 13-620-183A with fill hole or pH probe cat# 13-620-299A no fill hole.**
   5.1 Check that the pH meter is in standby mode when not in use.
   5.2 pH meter does not need to be cleaned often. If needed, wipe using kimwipe and DI H_2O.

   Cleaning the Electrode:
   5.3 Make sure the accumet combination pH electrode is stored in storage solution in the electrode storage bottle any time it is not in use.
   5.4 If needed, top off the electrode storage buffer bottle with cat# SP138-500 Saturated KCl.

5.5 Inspect the pH probe for dried, white salt deposits. If salt deposit is present, proceed to cleaning steps.
5.6 Retrieve a 50mL conical of warm tap water. Immerse electrode into the conical tube and soak to dissolve white salt crystals.
5.7 Once the crystals are dissolved, transfer the pH probe to a 50mL conical containing pH buffer 4 solution and soak for 2-5 minutes.
5.8 Remove the electrode from the pH buffer 4 solution and rinse with DI H_2O. Gently pat the electrode dry with Kimwipes and if not continuing on to use the pH meter for measuring pH, please put the electrode back into the storage buffer bottle for longer term storage.

Pipet Aid Inspection and cleaning

Author: Carla Moentenich**:** Bioscience Technology Lab Manager

Effective Date: 06/27/2018

Date Written: 06/27/2018

PURPOSE:

Provide instruction on how to inspect and clean Pipet Aids.

SAFETY:

1. Wear gloves in case of pipet aid contamination.

RESPONSIBILITIES:

The Pipet Aids need to be maintained, cleaned, and charged on a weekly basis.

MATERIALS AND EQUIPMENT:

1. Pipet Aid
2. SANIhol 70 disinfectant
3. Kim wipes
4. New Drummond Filter when necessary

PROCEDURE:

1.0 Nosepiece Inspection/pipet aid maintenance

1.1 Visually inspect the inside of the nosepiece to make sure that it is clean and that there is no obstruction such as cotton plugging it. (cotton plugs can be sucked into the nosepiece from a serological pipet)

1.2 If you find cotton in the nosepiece, you can remove it using forceps and toss the cotton in the regular trash.

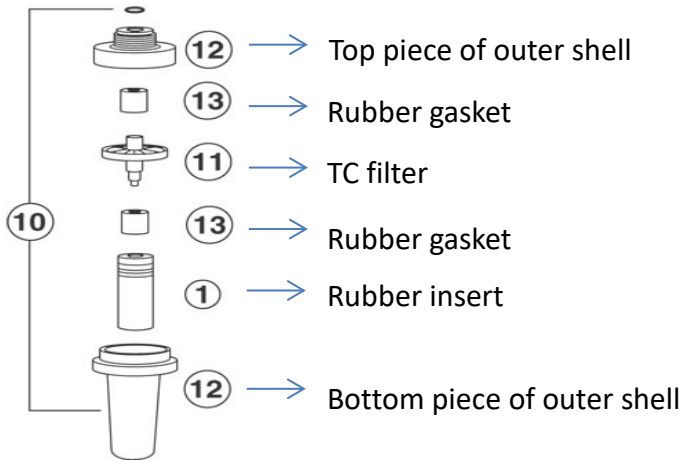
1.3 If liquid has been sucked up into the nosepiece, compromising the integrity of the inside filter and suction, follow the cleaning procedures outlined below.

1.4 When not in use plug in the Pipet Aid to recharge the battery.

2.0 **<u>Cleaning Procedures</u>**

2.1 Unscrew the nosepiece from the Pipet Aid.

2.2 The nosepiece consists of 6 parts (2 Tc rubber gaskets, 1 disposable filter, 1 rubber insert, 2 pieces of the outer shell)



2.3 The TC filter is disposable and can be thrown away in trash.

2.4 Wash the nosepiece parts with 1% liquinox laboratory detergent and rinse thoroughly with DI H_2O. Let dry.

2.5 If the nosepiece has been contaminated with a biohazard, it can be autoclaved.

2.6 Wipe the handle and the rest of the pipe aid with SANIhol 70 to clean. DO NOT USE acetone or other organic solvents!

2.7 When the nosepiece is dry, get a new filter and put the nosepiece back together and plug in the pipet aid for use.

Cleaning Water Baths SOP

Author: Carla Moentenich**:** Bioscience Technology Lab Manager

Effective Date: 06/27/2018

Date Written: 06/27/2018

PURPOSE:

Provide instruction on how to clean the water baths in Lab room 134 and Cell Culture Rooms.

SAFETY:

2. Wear normal PPE (personal protective equipment) at all times: (gloves, lab coat, eyewear)
3. Use precaution when moving water baths. Use a cart and do not carry them. For the large water bath in Cell Culture room 2, please use a siphon to empty most of the water out into the sink.

RESPONSIBILITIES:

Water Baths are to be cleaned at least 1/month or as often as needed. It is the responsibility of lab personnel or students assigned to the task to clean the water baths.

MATERIALS AND EQUIPMENT:

1. Paper towels
2. 70% SANIhol disinfectant
3. DI H_2O
4. Water Bath Treatment

PROCEDURE:

3.0 Cleaning the Water Bath

3.1 Remove any items in the water bath to a safe location while cleaning.

3.2 Unplug the water bath.

3.3 Retrieve an empty cart from the prep room and gently transfer the water bath to the cart for transport to the nearest sink.

3.4 Stabilize the water bath on an empty counter space and you can either gently dump the water into the sink or you can use a large beaker to transfer the dirty water to the sink for disposal. Caution: DO NOT DROP THE WATER BATH.

3.5 Wipe the water bath dry and using clean paper towels.

3.6 Spray down the water bath with SANIhol 70 and let sit for 5 min. Then wipe out the water bath with clean paper towels.

3.7 Transfer the cleaned water bath back to the transport cart and move back to its initial location.

3.8 Use a carboy filled with DI H_2O and fill the water bath about 1/5 full with DI H_2O.

3.9 Label the lid using labeling tape with your initials and date.

4.0 Weekly Check of Safety Shower and EyeWash Station

Author: Carla Moentenich**:** Bioscience Technology Lab Manager

Effective Date: 06/27/2018

Date Written: 06/27/2018

PURPOSE:

Provide instruction on how to test the safety shower and eyewash station.

SAFETY:

4. Wear normal PPE (personal protective equipment) at all times: (gloves, lab coat, eyewear)

RESPONSIBILITIES:

The Safety Shower and Eyewash are to be checked at least 1/week. It is the responsibility of lab personnel or students assigned to the task to perform this task.

MATERIALS AND EQUIPMENT:

1. Large bucket
2. Sink for water disposal.
3. Mop to clean up the water overflow.

PROCEDURE:

5.0 Testing the Safety Shower and Eyewash

5.1 Retrieve an empty bucket from
5.2 Use a large, empty bucket and hold up to the safety shower so that the safety shower head sits inside the bucket.
5.3 Gently pull down on the safety shower until water flushes into the bucket ½ way full.
5.4 Empty the bucket into a nearby sink
5.5 Repeat 3-4 times until the water is clean.
5.6 Clean up any wet areas on floor.

6.0 Testing the Eyewash station

6.1 Remove the green caps from the eyewash.
6.2 Push the eyewash lever down to turn on the eyewash.
6.3 Let run for 1-2min to flush water.
6.4 Pull lever up to turn off.
6.5 Replace green caps.
6.6 Sign, initial, and date the laminated log sheet.

Satellite Waste Storage Inspection
Portland Community College Rock Creek Waste Storage Area

Portland Community College RC

17705 NW Springville Rd.

Portland, OR 97229

Document Number:1.1

Revision Number: 4

Page 1

Preparer: Carla Moentenich

Date: 07/03/2018

1. **Purpose:**
   1.1 To Provide Instruction on Inspection of Satellite Waste Storage Area

2. **Responsibilities:**
   The Satellite Waste Storage Area needs to be inspected weekly and if there are any corrective actions that need to occur, they need to be taken care of and marked off on the inspection form.

3. **References:** 40 CFR 265.174

4. **Materials:**
   Waste storage area inspection form

5. **Procedure for Inspection/Maintenance:**
   5.1 Check that containers have hazardous waste labels or Waste labels on them.
   5.2 Please inspect storage bottles to makes sure that they are closed tightly and that none are leaking.
   5.3 Inspect containers to ensure that the waste containers are in good condition.
   5.4 Make sure waste is placed in the waste storage bins and not on the counter.
   5.5 Is the satellite waste storage area clean and accessible?
   5.6 Fill out the Satellite Waste Storage Inspection check sheet, date and sign.

Satellite Waste Storage Inspection
Portland Community College Rock Creek Waste Storage Area

Date of Inspection: _____ Inspector Signature: _____

Items to Be Inspected	**RESULTS**		**CORRECTIVE ACTIONS**	
	Yes	No	Needed	Date Accomplished
Area				
Housekeeping				
Containers in good condition/no leaks				
Warning signs present and legible				
Satellite area access unblocked				
Containers labeled with Waste labeled				
Container Lids Secured				
Other				
Secondary Containment				
Area is free of spills/leaks				
Containment area in good condition				

Comments:

Micropipette Tip Stock/Refill

Portland Community College RC

17705 NW Springville Rd.

Portland, OR 97229

Document Number:1.1

Revision Number: 4

Preparer: Carla Moentenich

Date: 07/11/2018

1. **Purpose:**
   1.1 To Provide Instruction on refilling and stocking micropipette tips

2. **Responsibilities:**
   Micropipette tips need to be restocked as needed or at the end of each week.

3. **Materials:**
   Pipet Tip Refills (Space Saver Refill Packs)

4. **Procedure for Filling Pipet Tip Boxes:**
   4.1 Check that pipet tip boxes being refilled are in good condition. No cracks, clean, and not discolored.
   4.2 If the pipette tip box is dusty or dirty, please wash with 1% Liquinox lab detergent and rinse very well with DI H_2O. Let dry thoroughly before filling with tips.
   4.3 When boxes are clean and dry, retrieve a space saver pack of tips that correlate with the correct tip boxes. There are GPS-UNV-A-1000µL, cat #: 30389281, GPS-UNV-A-250µL-/S-960/10, Cat#: 30389289, GPS-UNV-A-10µL-/G/S-960/10 Cat #: 30389285.
   4.4 Remove the plastic wrap and paper sleeve from the space saver tips. Discard.
   4.5 Place the space saver pack of tips on a table and lift up to release the bottom box of tips. The lid for this box is on the top of the space saver pack. Place the lid on the pipette box.
   4.6 Place the space saver pack over an empty pipette tip rack so that the tips are inserted into each empty 96 tip slot. Gently push down on the top of the sleeve to dispense all 96 tips into the empty rack. Lift up the sleeve and place a clean lid on the rack.
   4.7 Repeat Step 4.6 until all space saver tip are filled in racks.
   4.8 Place a clean lid on each box and tape both sides of the lid with labeling tape to the bottom of the box to help prevent accidental spillage.

Inspection and Cleaning Fume Hoods

Portland Community College RC

17705 NW Springville Rd.

Portland, OR 97229

Document Number:1.1

Revision Number: 4

Page 1

Preparer: Carla Moentenich

Date: 07/11/2018

1. **Purpose:**
   1.1 To Provide Instruction on inspecting and cleaning the fume hoods in Lab Room 134

2. **Responsibilities:**
   It is the responsibility of the designated student to perform inspection checks and general cleaning of the laboratory fume hoods in rm 134.

3. **Materials and Equipment:**
   1. General PPE: gloves, lab coat, safety goggles when needed.
   2. Bench paper
   3. Scissors
   4. Lab Tape

4. **Procedure for Inspection and cleaning the fume hoods:**
   4.1 Check that fume hoods are free of clutter and that reagent and waste bottles are closed and put away at the end of the day.
   4.2 Make sure that chemicals are not being stored in the fume hoods.
   4.3 Remove any bottles, reagents, or garbage that are not being used and put away in the proper storage location.
   4.4 Remove the bench paper in the fume hood and discard in the regular trash (black garbage
   4.5 bag) waste bin.
   4.6 Retrieve new bench paper from the right hand cabinet under Fume Hood #1.
   4.7 Cut bench paper to the appropriate size and tape all four corners down in the fume hood. Label the tape with your initials and the date.
   4.8 Put back anything in the fume hood that needs to remain in the hood.

Biohazard Bag Waste Disposal and Replacement

Portland Community College RC | Document Number:1.1

17705 NW Springville Rd. | Revision Number: 4

Portland, OR 97229 | Page 1

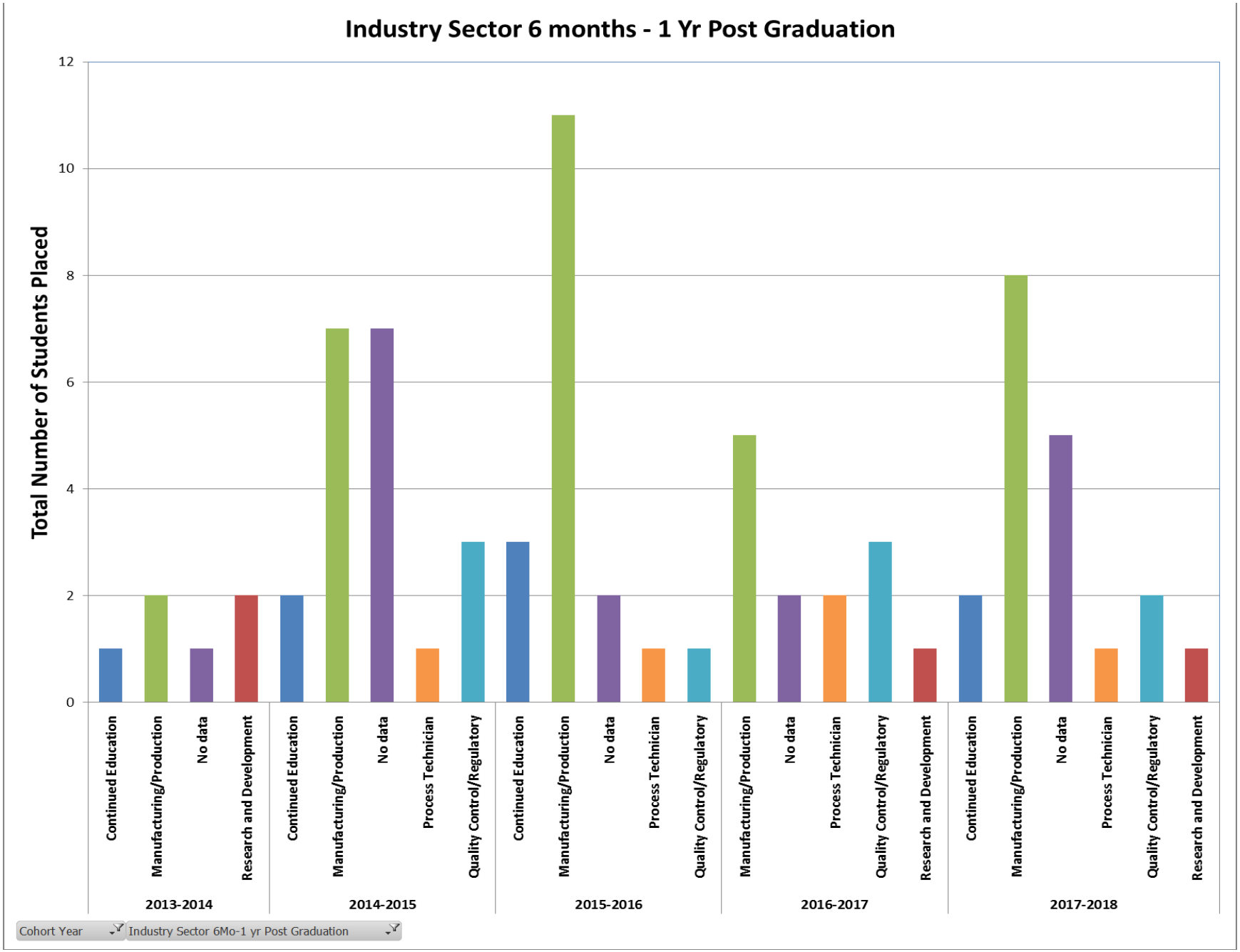
Preparer: Carla Moentenich | **Date:** 07/11/2018

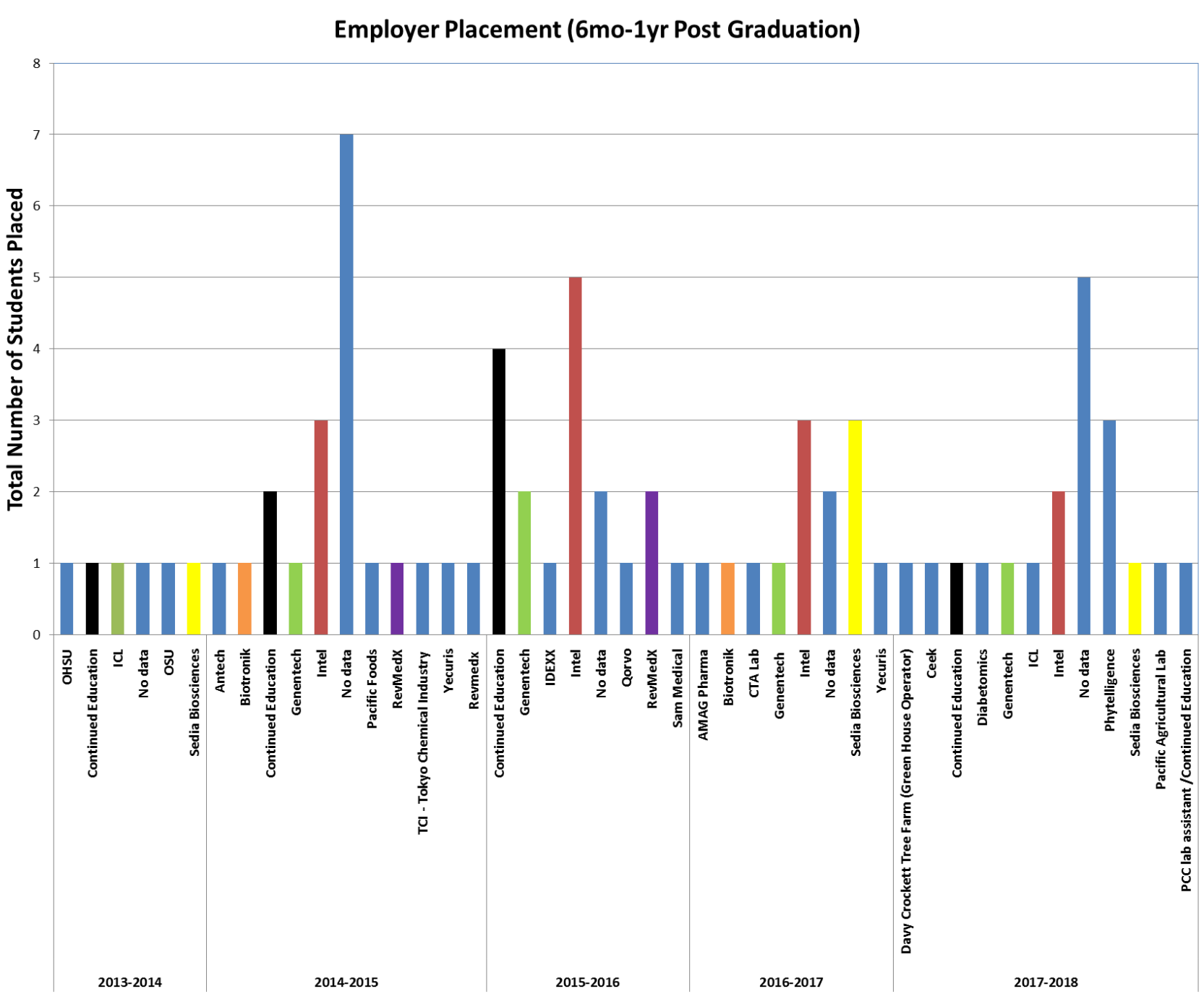
1. **Purpose:** To provide instruction on how to change the biohazard waste bags
2. **Responsibilities:**
   It is the responsibility of the designated student to monitor the waste levels of the biohazard bags in lab room 134.
3. **Materials and Equipment:**
   1. General PPE: gloves, lab coat, safety goggles when needed.
   2. New Biohazard bags (benchtop bags and large waste bin bags)
   3. In addition to wearing your normal PPE, please where the **butyl gloves** provided to help prevent pokes from any serological pipettes or sharper objects within the waste bins.

4. **Procedure for Inspection and cleaning the fume hoods:**
   4.1 Check biohazard waste bags and change bags when needed. Waste bags should be changed when they are full or otherwise deemed necessary.
   4.2 Please find new biohazard bags located in lab room 134 in the top drawer next to fume hood #1.
   4.3 The benchtop, small biohazard waste bags can be thrown into the larger biohazard waste bins that are to be collected for autoclave sterilization.
   4.4 Please tie the top of the large waste bags that are being changed out and place the bags near the autoclave in the prep lab room 122 labeled to be autoclaved. Our biohazardous waste is autoclaved and then thrown into the regular garbage waste stream for disposal.
   4.5 Replace the empty biohazard bins and table top stands with new biohazard bags.

Appendix #13

BIT Graduate Job Placement Data


Industry Sector 6 months - 1 Yr Post Graduation
Total Number of Students Placed
12
10
8
6
4
2
0
Continued Education
Manufacturing/Production
No data
Research and Development
Continued Education
Manufacturing/Production
No data
Process Technician
Quality Control/Regulatory
Continued Education
Manufacturing/Production
No data
Process Technician
Quality Control/Regulatory
Manufacturing/Production
No data
Process Technician
Quality Control/Regulatory
Research and Development
Continued Education
Manufacturing/Production
No data
Process Technician
Quality Control/Regulatory
Research and Development
2013-2014
2014-2015
2015-2016
2016-2017
2017-2018
Cohort Year
Industry Sector 6Mo-1 yr Post Graduation


Employer Placement (6mo-1yr Post Graduation)
Total Number of Students Placed
0
1
2
3
4
5
6
7
8
OHSU
Continued Education
ICL
No data
OSU
Sedia Biosciences
Antech
Biotronik
Continued Education
Genentech
Intel
No data
Pacific Foods
RevMedX
TCI - Tokyo Chemical Industry
Yecuris
Revmedx
Continued Education
Genentech
IDEXX
Intel
No data
Qorvo
RevMedX
Sam Medical
AMAG Pharma
Biotronik
CTA Lab
Genentech
Intel
No data
Sedia Biosciences
Yecuris
Davy Crockett Tree Farm (Green House Operator)
Ceek
Continued Education
Diabetomics
Genentech
ICL
Intel
No data
Phytelligence
Sedia Biosciences
Pacific Agricultural Lab
PCC lab assistant /Continued Education
2013-2014
2014-2015
2015-2016
2016-2017
2017-2018

Appendix #14

Program Completion Data

5 Year PCC Degrees & Certificates Awarded by Subject

Year
All

Certificate/Degree
All

Major Description
Multiple values

5 Year Trends of Degrees & Certificates Awarded

			Year				
Major	Description	Degree	2013-14	2014-15	2015-16	2016-17	2017-18
BIT	Bioscience Technology	AAS	9	10	13	10	15
BST	Biosci Tech: Bioscience Techni	ACERTP	14	19	16	15	19
Grand Total			23	29	29	25	34