UNIVERSITY OF SAN FRANCISCO | College of Arts and Sciences

ASSESSMENT REPORT REMOTE/DISTANCE LEARNING

PROFESSIONAL SCIENCE MASTER'S IN BIOTECHNOLOGY GRADUATE PROGRAM

ACADEMIC YEAR 2019 - 2020

REPORT DUE DATE: December 4, 2020

This is an alternative template.
Given the unusual circumstances of the 2019-2020 academic year, each program/department/major/minor/certificate has two options of assessment:
(a) Usual assessment report based on attached template OR
(b) Alternative assessment reflections on distance learning pivot based on this template
Every program/department/major/minor/certificate can choose ONE of the two report formats to submit

Please make sure to fill out Page 1 – Questions 1 and 2

- **Who should submit the report? – All majors, minors (including interdisciplinary minors), graduate and non-degree granting certificate programs of the College of Arts and Sciences.**
- **Programs can combine assessment reports for a major and a minor program into one aggregate report as long as the mission statements, program learning outcome(s) evaluated, methodology applied to each, and the results are clearly delineated in separate sections. If you choose to submit a remote learning reflections document, it should also have separate segments for major and minor**
- **Undergraduate, Graduate and Certificate Programs must submit separate reports. An aggregate report is allowed only for major and minor of the same program**
- **It is recommended that assessment report not exceed 10 pages. Additional materials (optional) can be added as appendices**
- **Curriculum Map should be submitted along with Assessment Report**

Some useful contacts:

1. Prof. Alexandra Amati, FDCD, Arts – adamati@usfca.edu
2. Prof. John Lendvay, FDCD, Sciences – lendvay@usfca.edu
3. Prof. Mark Meritt, FDCD, Humanities – meritt@usfca.edu
4. Prof. Michael Jonas, FDCD, Social Sciences – mrjonas@usfca.edu
5. Prof. Suparna Chakraborty, AD Academic Effectiveness – schakraborty2@usfca.edu

Academic Effectiveness Annual Assessment Resource Page:

https://myusf.usfca.edu/arts-sciences/faculty-resources/academic-effectiveness/assessment

Email to submit the report: assessment_cas@usfca.edu

Important: Please write the name of your program or department in the subject line.

For example: FineArts_Major (if you decide to submit a separate report for major and minor); FineArts_Aggregate (when submitting an aggregate report)

I. LOGISTICS

1. **Please indicate the name and email of the program contact person to whom feedback should be sent (usually Chair, Program Director, or Faculty Assessment Coordinator).**

Program: PSM in Biotechnology
Submitter: Christina Tzagarakis-Foster, Program Director, ctzagarakis@usfca.edu
Additional individuals who should receive feedback: Brian Young, Associate Director, byoung3@usfca.edu and Moira Gunn, Director of BioEntrepreneurship, gunn@usfca.edu

2. **Please indicate if you are submitting report for (a) a Major, (b) a Minor, (c) an aggregate report for a Major and Minor (in which case, each should be explained in a separate paragraph as in this template), (d) a Graduate or (e) a Certificate Program.**
   Please also indicate which report format are you submitting –Standard Report or Reflections Document

I am submitting this report for the Professional Science Masters in Biotechnology program.
This will be a Remote/Distance Learning Reflections document.

3. **Have there been any revisions to the Curricular Map in 2019-2020 academic year? If there has been a change, please submit the new/revised Curricular Map document.**

No revisions have been made to the Curricular Map in the 2019-2020 academic year. We plan to review the Curricular Map over the Summer of 2021.

II. MISSION STATEMENT & PROGRAM LEARNING OUTCOMES

1. **Were any changes made to the program mission statement since the last assessment cycle in October 2019? Kindly state "Yes" or "No."**

   No

   Please provide the current mission statement below. If you are submitting an aggregate report, please provide the current mission statements of both the major and the minor program

   Mission Statement (Major/Graduate/Certificate):

Mission Statement (no changes made since October 2018):
Our Mission is to provide motivated students with the knowledge and skills needed to successfully enter a career in the biotechnology industry.

2. **Were any changes made to the program learning outcomes (PLOs) since the last assessment cycle in October 2019? Kindly state "Yes" or "No."**

No - no changes were made to the PLOs. The most recent revisions were approved in the Spring 2019 and were included in last year's assessment report.

Please provide the current PLOs below. If you are submitting an aggregate report, please provide the current PLOs for both the major and the minor programs.

Note: Major revisions in the program learning outcomes need to go through the College Curriculum Committee (contact: Professor Joshua Gamson, gamson@usfca.edu). Minor editorial changes are not required to go through the College Curriculum Committee.

PLOs (Major/Graduate/Certificate):

PSM in Biotechnology Program Learning Outcomes

1. Review and evaluate concepts from multiple disciplines (biology, bioinformatics, business) within biotechnology.
2. Interpret and execute best practices in biotech-related lab techniques as well as exhibit an ability to assess the novelty of research and prioritize protocols.
3. Comprehend the need for ethics in science and technology-based business/research/industry.
4. Critically review scientific papers and demonstrate science communication skills necessary to attain professional level employment in science and technology-based research/industry.
5. Demonstrate effective teamwork, team leadership, business communication skills, and networking skills, including exposure to industry members in molecular biology and biotechnology-based business/research/industry.

III. REMOTE/DISTANCE LEARNING

1. What elements of the program were adaptable to a remote/distance learning environment?

For the spring semester, we were able to adapt the lecture only portions of our curriculum to a remote learning environment. Specific details are provided below:

1. BTEC 600 - Graduate Seminar in Molecular Biology

The BTEC 600 seminar course was shifted to a remote-format relatively easily. All the seminars were given by our external speakers synchronously over Zoom. We may choose to continue to hold some of our courses remotely such as BTEC 600 after the pandemic. The remote-format does offer some advantages, such as the possibility of scheduling speakers from other parts of the country or the world much more easily. Also, students can avoid commuting in to attend a short class. Students do lose out on the chance to meet with the speakers face-to-face though - these meetings can be valuable networking opportunities.

2. BTEC 697 – Internship in Biotechnology

The BTEC 697 internship capstone course was shifted to a remote-format relatively easily as well. Most of the student work for this class is done off campus already, so only a few in-person meetings, like the final student presentations given at CARD, needed to be moved to an online format. Some of the internship students continued working onsite with their biotech employers whereas some employers shifted the internships to remote as well.

3. Lecture-based electives - BTEC 605 - Molecular Medicine & BTEC 623 - Disease, Physiology & Immunology

BTEC 605 and BTEC 623 were readily adaptable to synchronous remote/distance learning. Zoom breakout rooms facilitated student discussion, debate and group problem solving. One advantage of these breakout rooms is they allow quick generation of random student groups—enabling students to engage in discussion with a wider variety of classmates than would be feasible in a physical classroom setting. This stimulates learning and strengthens networking connections between students. The principal disadvantage of the distance format is that the time needed for students to enter/exit breakout rooms slows the pace at which material can be presented.

4. **BTEC 612 Local, National, Global Biotech**

The normally 8-week BTEC 612 Local, National, Global Biotech course in late spring was re-formatted to 7 weeks due to the cancellation of classes due to COVID-19. In addition, the course design was transitioned to the remote modality, which required syllabus revisions. All learning objectives were met in this compressed/remote format.

5. **BIOL 690 Ireland/Northern Ireland AGI**

Due to travel restrictions, the Ireland/Northern Ireland AGI scheduled for late May was cancelled. It is tentatively re-scheduled for 2021-2022 Academic Year.

2. What elements of the program were not adaptable to a remote/distance learning environment?

1. **Hands-on training in the laboratory course**

   The BTEC 685/686 laboratory-based course was the most difficult to shift to a remote delivery. Students were no longer able to conduct experiments in-person. This hands-on training is an essential part of their education that cannot be easily replaced. We substituted some of the missed labs with video recordings, Labster (online laboratory simulations), online tutorials, and data analysis projects, but the hands-on experience was still missed.

2. **Networking opportunities**

   Less important but also suboptimal, the shift to social distancing decreased student opportunities for extracurricular events, socials, etc. to allow students to expand their networks and hear informally about the field of biotech. To supplement this, the program provided Zoom social events and meet-ups.

3. **Cancellation of BIOL 690 Ireland/Northern Ireland AGI**

   While some consideration was given to potentially transforming the Ireland/Northern Ireland AGI to a remote format, the learning objectives could not be met. To satisfy this degree requirement, a "Special Topics" course (BIOL 680) was created that will cover biotechnologies response to COVID-19. This will allow students to complete their degree in a timely manner (since travel is still not allowed).

3. **What was the average proportion of synchronous versus asynchronous learning for your program or parts thereof? A rough estimate would suffice.**

For the Biotechnology science-based courses, including both lectures and labs, greater than 90% was taught synchronously after the shift to remote learning. Meeting in real time allowed students to ask clarifying questions, or slow the pace of learning. The only asynchronous components were some recorded video lectures and web-based tutorials used for BTEC 685/686.

The course redesign for BTEC 612 - Local, National, Global Biotech course for the remote modality was 75% synchronous and 25% asynchronous. Those portions which could be conducted asynchronously were the BioTech Nation podcasts and their BIEM 2.0 Model analysis and several speakers whose presentations were previously recorded on Zoom.

The BIOL 690 - Ireland/Northern Ireland AGI course could not be conducted either synchronously or asynchronously as it was cancelled.

4. **For what aspects of learning is synchronous instruction effective and for which ones is asynchronous instruction more effective?**

Synchronous instruction for most of our Biotechnology classes is preferred. Our classes are small and students are encouraged and expected to ask questions and participate in class discussions (frequently done in breakout rooms on Zoom). Synchronous attendance is also very important anytime a guest speaker is used, for example during our BTEC 600 seminar class.

For our Biotechnology classes, asynchronous instruction is best used to teach more basic concepts - for example a slide presentation of a lab technique that is normally delivered in a straight lecture format.

BioEntrepreneurship lectures (BTEC 612 – Local, National, Global Biotech) are necessarily best to give synchronously, as they are interspersed with student interaction. Furthermore, graded weekly quizzes are proctored during each class session to ensure that students are covering the work. Also, preferably in the synchronous mode are student presentations, and the feedback and discussions which follows, and obviously, the small group sessions which conducted early in each class to determine potential problems and recommended preferences.

In terms of the scheduled Ireland/Northern Ireland AGI (BIOL 690), it was determined that neither synchronous nor asynchronous remote modalities could achieve the learning objectives. As indicated earlier, this course was cancelled.

5. As remote/distance learning continues in the current environment, what changes has the program instituted based on experiences with remote instruction?

In the course of scheduling remote socials, networking events, board meetings, etc, the program has noticed it has been significantly easier to draw our advisory board members to participate and share their experiences with students in the virtual format. These working biotech professionals have a rich store of practical knowledge to share informally with students. This has prompted us to consider ways of working such virtual events into the program post-COVID.

For the Spring 2020 semester, we are planning to carry out part of the two lab-based courses in the program (BTEC 685/686 - Molecular Genetics and Biotechnology and BTEC 688/689 – Advanced Research Methods in Biotechnology) to be held in person. A protocol adhering to the San Francisco Department of Public Health guidelines has been prepared and submitted to USF leadership for approval. We expect that the lab portions (not the lecture, which will continue to be delivered remotely) will be held in person on campus in a de-densified format.

Because we had to create a substitution for the required Academic Global Immersion (AGI) course, the special topics (BIOL 680) course *"Biotech's Response to the COVID-19 Pandemic" was created*. This course will first be offered in the Spring of 2021 and will be offered twice (first half of the spring semester and second half of the semester). Following the spring semester, we intend to submit this course for approval as a permanent alternative to the AGI.

Additionally, we have initiated plans to submit the BioEntrepreneurship courses (BTEC 610 – Global & US Regulatory Affairs, BTEC 611 – Legal-Social-Ethical Biotechnology, BTEC 612 – Local-National-Global Biotechnology and BTEC 615 – Bioinnovation Management) for approval for a professional certificate program. The remote modality for BioEntrepreneurship courses is great for anyone who works in California - from San Diego up through San Francisco - the largest and most innovative biocluster in the world. This would also elevate awareness of our PSM in Biotechnology program for those students who are unable to invest in a 2-year program or who already have a strong background in the laboratory aspect of biotechnology but would benefit from a BioEntrepreneurship certificate for their professional career.

OPTIONAL ADDITIONAL MATERIALS

(Any relevant tables, charts and figures, if the program so chooses, could be included here)