Program-Level Assessment Plan

Program: Bioinformatics and Computational Biology	Degree Level (e.g., UG or GR certificate, UG major, master's program, doctoral program): Master's program
Department: **Biology/Computer Science/Chemistry/Mathematics and Statistics**	College/School: College of Arts and Sciences
Date (Month/Year): Submitted 09/17	Primary Assessment Contact: Maureen Donlin

Note: Each cell in the table below will expand as needed to accommodate your responses.

#	Student Learning Outcomes What do the program faculty expect all students to know or be able to do as a result of completing this program? Note: These should be measurable and manageable in number (typically 4-6 are sufficient).	Curriculum Mapping In which courses will faculty intentionally work to foster some level of student development toward achievement of the outcome? Please clarify the level at which student development is expected in each course (e.g., introduced, developed, reinforced, achieved, etc.).	Assessment Methods	
			Artifacts of Student Learning (What) 1. What artifacts of student learning will be used to determine if students have achieved this outcome? 2. In which courses will these artifacts be collected?	**Evaluation Process (How)** 1. What process will be used to evaluate the artifacts, and by whom? 2. What tools(s) (e.g., a rubric) will be used in the process? Note: Please include any rubrics as part of the submitted plan documents.
1	***Design and implement*** *in silico experiments for biological problems*	Course work and internships	***Direct Measures:*** 1. *The 2 semester course sequence of Bioinformatics I & II has been designed to incorporate problem-based modules that explore specific biological questions with corresponding computational approaches. Students will be assessed by their ability to solve problem sets related to these modules.* 2. *The strength and appropriateness of hypotheses of student research*	*Assessment results will be analyzed annually against a rubric standardized across courses. The Program Director and Executive Committee will make recommendations for changes in the curriculum, pedagogy and/or assessment, and provide these to faculty instructors.* *Assessments from research mentors and industry partners will be used to evaluate the strategy used for placing students in labs and internships.*

			projects will be evaluated by faculty and internship mentors ***Indirect Measures*** *1. End-of-course student surveys will solicit self-evaluations of the student's ability to design and implement computational approaches to biological problems.* *Surveys of research mentors and internship mentors will assess the student's overall understanding of designing in silico experiments.*	
2	*Apply and combine existing tools for the **processing and analysis***	Course work and internships	**Direct Measures:** 1. *The core course (Bioinformatics I & II, Algorithms and Genomics courses) requirements all heavily involve processing and analysis. Thus, performance on assignments and exams will be used to assess this SLO.* 2. *The outcome of the required research experience will also be a direct measure of this SLO.* **Indirect Measures** 3. *End-of-course student surveys will solicit self-evaluations of the student's ability to use computational approaches to process and analyze biological problems.* *Surveys of research mentors and industry employers will assess the student's overall understanding and skills associated with this SLO. Key questions will relate to the student's understanding of the fundamental skills and their ability to adapt to new approaches- both biological and*	*Assessment results will be analyzed annually against a rubric standardized across courses. . The Program Director and Executive Committee will make recommendations for changes in the curriculum, pedagogy and/or assessment, and provide these to faculty instructors.* *Assessments from research mentors and industry partners will be used to evaluate the strategy used for placing students in labs and internships. Importantly, in order to stay contemporary, the External Advisory Committee will be solicited annually for recommendations on the skills that should be incorporated into coursework.*

			computational.	
3	*Use small- and large-scale quantitative data sets to **model** complex biological systems*	Course work and internships	**Direct Measures:** 1. *The core courses (Bioinformatics I & II, Algorithms and Genomics courses) will each involve a modest amount of modeling, and the performance of students on assignments and exams will be used to assess this SLO.* 2. *Depending on the research project, the outcome of the research experience will also be a direct measure of this SLO.* **Indirect Measures** 3. *End-of-course student surveys will solicit self-evaluations of the student's ability to model biological phenomenon using computational approaches.* *If appropriate, surveys of research mentors and industry employers will assess the student's overall understanding of this SLO.*	*Assessment results will be analyzed annually against a rubric standardized across courses. . The Program Director and Executive Committee will make recommendations for changes in the curriculum, pedagogy and/or assessment, and provide these to faculty instructors.* *Depending on the research project, assessments from research mentors and industry partners will be used to evaluate the strategy used for placing students in labs and internships*
4	*Work as part of multidisciplinary **teams** in corporate or academic environments*	Internships	**Direct Measures:** **Indirect Measures** 1. *Surveys of research mentors and corporate employers will assess the student's overall ability to work with others and collaborate on research projects* 2. *Following the completion of the research project, self-evaluations of the student's ability to work in*	*Assessments from research mentors, industry partners and alumni will be used to evaluate the preparations students are given before being placed in faculty labs and internships. The External Advisory Committee will be solicited annually for recommendations on ways to assist students in working to achieve team-oriented goals.*

			multidisciplinary teams will be evaluated. *Survey of alumni (3 years after graduation)*	
5	*Effectively **communicate** research approaches and findings*	Course work, internships and informal meetings or conferences with other bioinformatics related groups in the St. Louis area.	**Direct Measures:** 1. *A seminar on the research project will be evaluated by peers, faculty and industry partners.* 1. *Oral presentations in courses will be evaluated by faculty instructors.* 2. *Research reports will be evaluated to gauge the students written communication skills.* **Indirect Measures** *Students may also participate in the SLU Graduate Student Symposium or Senior Legacy competitions and subject to evaluation from faculty mentors and instructors.*	*Assessments from peers and faculty will be used to evaluate the overall effectiveness of the scientific communication training in required courses. The Program Director and the Executive Committee will make recommendations for changes in the curriculum, pedagogy and/or assessment, which will be provided to faculty instructors.*

Use of Assessment Data

1. How and when will analyzed data be used by program faculty to make changes in pedagogy, curriculum design, and/or assessment practices?

2. How and when will the program faculty evaluate the impact of assessment-informed changes made in previous years?

Additional Questions

1. On what schedule/cycle will program faculty assess each of the program's student learning outcomes? (Please note: It is <u>not recommended</u> to try to assess every outcome every year.)

2. Describe how, and the extent to which, program faculty contributed to the development of this plan.

IMPORTANT: Please remember to submit any rubrics or other assessment tools along with this plan.