UMBC UGC Program Changes & Other Request:

Program Name: Bioinformatics Track of UMBC Translational Life Science Technology (TLST) Program

Date Submitted: Feb. 4, 2021

Proposed Effective Date: Fall 2021 Semester

Contact Information:

	Name	Email	Phone	Dept
Dept Chair or UPD	Dr. Annica Wayman	awayman@umbc.edu	301-738-6092	TLST
Bioinformatics Track/Course Developer	Dr. Jeffrey Robinson	jrobin2@umbc.edu	301-335-4851	TLST

Specifics:

See the associated TLST current curriculum document for all current course requirements.

Course	Credits	Semester	
BTEC350 Biostatistics	4	Fall	Core classes required for all TLST students
BTEC330 Software Applications	3	Spring	
BTEC395 Bioinformatics	4	Fall	
BTEC362 Python Programming	3	Fall	TLST elective, required for Bioinformatics Track
BTEC423 Capstone 1 (Machine Learning)	(4)	Fall	Bioinformatics track capstone course STUDENTS SELECT ONE OF THE TWO COURSES
BTEC424 Capstone 2 (Image Analysis)	(4)	Spring	
BTEC495 Bioinformatics Internship	3		
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Students take an internship in which they participate in a bioinformatics research project, as approved by the Bioinformatics Track advisor.

Tracks represent a commitment of 24 credits or less. The TLST core bioinformatics (BTEC 330, BTEC 350, and BTEC395) classes represent 11 credits. In addition to the 3 core courses, students will take 2 additional courses (1 Python programming and 1 Bioinformatics Capstone course), and 1 3-credit bioinformatics-oriented BTEC495 internship for 21 total credits for the bioinformatics track. Two bioinformatics track Capstone courses will be offered by the TLST program.

Students will select one of the two offered capstone courses, which will serve to consolidate and reinforce knowledge from the bioinformatics core curriculum, and build a foundation in areas undergoing rapid advancements in Machine Learning/AI -based applications.

Prerequisites for advancement to the Bioinformatics Track:

Grades of C or better in each of the three core classes BTEC 330, BTEC 350, and BTEC395 and instructor's recommendation.

Rationale:

This proposed bioinformatics track will provide students with an option for additional advanced coursework to increase bioinformatics and data science skills, background, and proficiency above what is found in the base TLST BS major requirements. Graduates will be prepared for bioinformatics- and biomedical data science-oriented careers in industry, government, or academia.

Bioinformatics analysis and data science methods have become important and revolutionary tools for biotechnology, biomedical research, and translational science. Machine Learning and AI applications are becoming incorporated into almost every aspect on the translational science spectrum. Bioinformatics are particularly relevant for analysis of OMICS datasets, which have become increasingly common due to lowered costs of sequencing, and large public databases. The translational workforce therefore requires workers who are trained and familiar with these methods and applications. As automation and artificial intelligence begin to dominate operations in all industry sectors in the upcoming decades, re-training of workers who previously did not have specific backgrounds in computational applications will also become critically important.

The TLST program requirements include a core of basic training in bioinformatics, biostatistics, and software applications in an applied, hands-on curriculum preparing students for jobs in the biotech industry. In addition, the TLST Bioinformatics track curriculum courses do not overlap with those offered at the main UMBC campus Biology Department, and provide additional diversity of content for Biological Sciences majors. This is confirmed in the accompanying support letter.

Letters of Support:

As the entire proposed curriculum will be run internally in the TLST program, letters of support regarding cross-listed courses are not necessary. Refer to the accompanying letter of support from the UMBC Biological Sciences department chair.