Michigan Tech

Office Memo

Office of the Provost and
Senior Vice President for Academic Affairs

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TO: Richard Koubek, President

FROM: Jacqueline E. Huntoon, Provost & Senior Vice President for Academic Affairs Jacqueline E Huntoon

DATE: April 21, 2022

SUBJECT: Senate Proposal 44-22

Attached is Senate proposal 44-22, “Proposal to Change Degree Title from ‘Bioinformatics’ to ‘Computational Biology,’” and a memo stating the Senate passed this proposal at their April 20, 2022 meeting. I have reviewed this memo and recommend approving this proposal.

I concur X do not concur _____ with the provost’s recommendation as stated in this memo.

Richard Koubek, President

4/22/22
Date

Michigan Tech

University Senate

DATE:	April 21, 2022
TO:	Richard Koubek, President
FROM:	Sam Sweitz University Senate President
SUBJECT:	Proposal 44-22
COPIES:	Jacqueline E. Huntoon, Provost & Senior VP for Academic Affairs

At its meeting on April 20, 2022, the University Senate approved Proposal 44-22, "Proposal to Change Degree Title from 'Bioinformatics' to 'Computational Biology'". Feel free to contact me if you have any questions.

The University Senate of Michigan Technological University

Proposal 44-22

(Voting Units: Academic)

Proposal to Change Degree Title from "Bioinformatics" to "Computational Biology"

(SCB, College of Science and Arts)

Developed by the Department of Biological Sciences (SBL)
Contacts: Dr Stephen Techtmann (Associate Professor) and Dr. C.P. Joshi (Professor and Chair)

Latest Revision – 02/14/2022

1.General description and characteristics: This proposal is to change the title of the "Bioinformatics (SBI)" B.S. degree program to "Computational Biology (SCB)"

2. Proposed new title: "Computational Biology"

3. Rationale: In 2018 the undergraduate programs in the Department of Biological Sciences underwent an external review. One of the recommendations from the external reviewers was to consider ways to grow and diversify the major in Bioinformatics to better educate students at the interface of biological sciences, computer science and math, including applications in genomics, molecular biology, ecology and evolutionary biology, and human health. To facilitate this, the external reviewers recommended that we change the name of the major from Bioinformatics to Computational Biology, which our department has discussed and would like to request at this time.

In addition to the recommendations from the external review, there are two major drivers for this name change. First, the name Computational Biology more accurately describes how computational approaches are being employed across biology. The term bioinformatics is typically restricted to dealing with data related to molecular biology (nucleic acid and protein sequences). As computational approaches now pervade most disciplines in biology, we have

included new courses into the curriculum and have updated many courses to include more computational components throughout the biological sciences curriculum. We have also updated the degree program with a new introductory course (BL2700 – Principles of Computational Biology), which provides an overview of the broad applications of computational approaches to biology. We have also added an upper-level synthesis course (BL5300) that is aimed at integrating the knowledge gained in computer science, math, and biology courses.Therefore, it is important to have a degree program whose name accurately reflects the applications of computation to ecology, evolutionary biology, human health as well as molecular biology. The new name would more accurately describe the core concepts of the degree program which extend beyond the application of computational approaches to molecular biology.

Second, the proposed name change would be more recognizable to prospective students. We hope that this name change builds off the University's investments in the Tech Forward Initiative in the Data Revolution and Sensing and allows for further integration with the College of Computing. The current degree structure is such that with one additional course, the students can earn a minor in computer science. We believe that changing the name of the degree program to Computational Biology will enhance the appeal of the degree program to prospective students. Our current degree requirements are similar to other Computational Biology programs at peer institutions. Furthermore, the international professional society in this discipline is the International Society for Computational Biology (https://www.iscb.org/).

4. Related programs: Computational Biology is a common name of similar degrees that combine coursework from Biological Sciences, Computer Science and Mathematics at schools that are considered our peer institutions:

1. Rensselaer Polytechnic a BS in Computational Biology https://science.rpi.edu/biology/programs/undergrad/bs-computational-biology . This degree program has two concentrations: biomolecular systems and ecological systems.
2. Rochester Institute of Technology has a BS in Bioinformatics and Computational Biology https://www.rit.edu/study/bioinformatics-and-computational-biology-bs
3. SUNY Buffalo has a BS in Bioinformatics and Computational Biology https://arts-sciences.buffalo.edu/biological-sciences/undergraduate/programs/bioinformatics.html
4. Carnegie Mellon University has a BS in Computational Biology http://cbd.cmu.edu/education/undergraduate/bs-computational-biology/index.html
5. Iowa State has a BS in Bioinformatics and Computational Biology https://catalog.iastate.edu/collegeofliberalartsandsciences/bioinformaticsandcomputationalbiology_undergraduate/

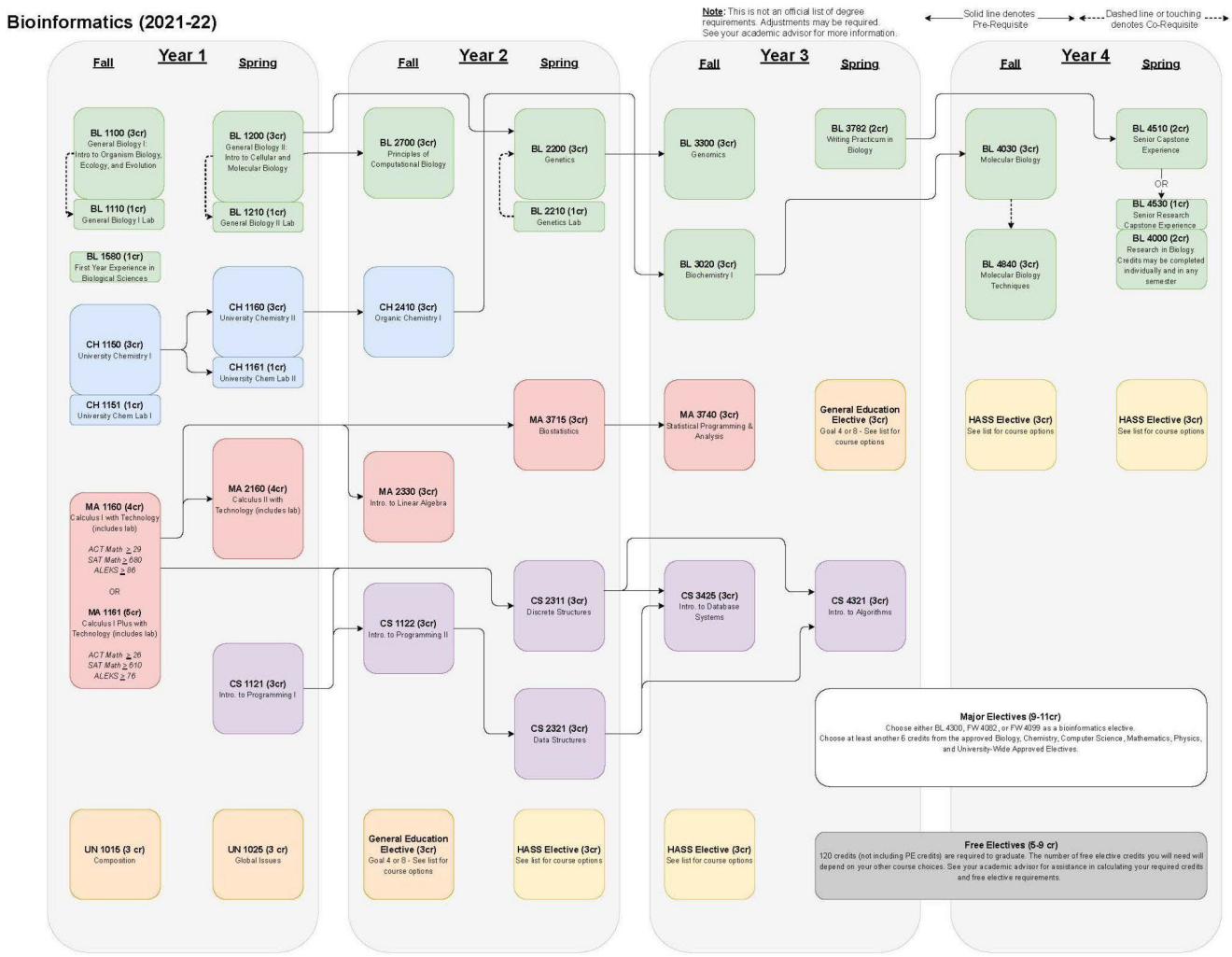
5. Projection of number of students - enrollment in the SBI major has grown in recent years, with 7-10 students enrolled 2015 - 2018 and 13-16 students enrolled 2019 - 2021 (preliminary). We

anticipate that this name change will be the first step to increasing enrollment in this major, with a goal of enrolling 10 students/year (40 students total) by 2026. This would be similar in size to the SEEB major in our department.

6. Curriculum design - we are proposing no change in degree audit; the current SBI audit is enclosed as Appendix A.

7. New course description - no new courses are proposed as part of this name change.

8. Model schedule - example from current SBI degree - will not change with name change:



9. Library and learning resources - no additional resources are required for this name change

10. Equipment - no new equipment is required for this name change.

11. Program costs -the only anticipated costs are those to revise and reprice recruiting and advancement material for the SCB program, as well as to provide information to university-level recruiters. There will be additional advising time and potential additional time for student meetings and prospective student visits if enrollment increases.

12. Accreditation requirements. There are no accreditation requirements for this program.

13. Planned implementation. We plan to implement the name change in Fall 2022. All current students will complete the program with the current name, but no new students will be enrolled in the current degree name once the new name has begun.

Appendix A: Current SBI degree audit

Michigan Technological University
Registrar's Office

Academic Year 2021-22
Bachelor of Science in Bioinformatics
SBIUG

Student Name and ID Number

Estimated Graduation Date

Major Requirements: 76 - 77 Credits		
Course Number	Credits	Course Status Code M, R, P, WVD, SUB*
Biology Requirements (30 Credits)		
BL 1580	1	
BL 1100 and BL 1110	3/1	
BL 1200 and BL 1210	3/1	
BL 2200 and BL 2210	3/1	
BL 2700	3	
BL 3020	3	
BL 3300	3	
BL 3782	2	
BL 4030	3	
BL 4840	3	
Chemistry Requirements (11 Credits)		
CH 1150 and CH 1151	3/1	
CH 1160 and CH 1161	3/1	
CH 2410	3	
Computer Science Requirements (18 Credits)		
CS 1121	3	
CS 1122	3	
CS 2311	3	
CS 2321	3	
CS 3425	3	
CS 4321	3	
Mathematics Requirements (17 - 18 Credits)		
MA 1160/1161	4/5	
MA 2160	4	
MA 2330	3	
MA 3715	3	
MA 3740	3	

Biology Capstone Requirement (2-3 Credits)		
Biology Capstone Requirement (2-3 Credits) *Select either Biology Capstone option. Research credits in Biology (BL 4000/4001) may be taken individually and require arrangement with the instructor. Additional research credits beyond the capstone requirement count as free elective credits.*		
BL 4510	2	
BL 4000 or BL 4001 and	2	
BL 4530	1	

Major Electives: 9 - 11 Credits		
Course Number	Credits	Course Status Code M, R, P, WVD, SUB*
Bioinformatics Elective (3 Credits)		
BL 4300	3	
FW 4082	3	
FW 4099	3	
Approved Electives: *Select at least 6 credits of approved electives from the lists below. Some courses may have additional prerequisite requirements.*		
Biology Approved Electives		
BL 3210 or	4	
BL 3310	3	
BL 3820	2	
BL 4020	3	
BL 4370	3	
Chemistry Approved Electives		
CH 3510	3	
CH 5560	3	
Computer Science Approved Electives		
CS 1142	3	
CS 3141	3	
CS 3311	3	
CS 3331	3	
CS 4811	3	
CS 4821	3	
CS 5811	3	
CS 5821	3	
CS 5841	3	
Mathematics Approved Electives		
MA 3160	4	
MA 3720	3	
MA 4710	3	
MA 4720	3	
MA 4760	3	
MA 4770	3	
MA 4780	3	
MA 4790	3	
Physics Approved Electives		
PH 2100	3	
University-Wide Approved Electives		
UN 3002	2	
UN 5390	3	

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General Education Requirements: 24 Credits		
Course Number	Credits	Course Status Code M, R, P, WVD, SUB*

Courses used to complete General Education may not be used to complete other degree requirements.

Core: 12 Credits		
UN 1015	3	
UN 1025 or upper level modern language	3	
Critical and Creative Thinking	3	
Social Responsibility and Ethical Reasoning	3	
HASS: 12 Credits		
✓ Students must complete 12 credits of HASS course work ✓ Six of the 12 credits must be at the 3000- or 4000- level* ✓ At least three credits each in the following: Communication/Comp, Humanities and Fine Arts, and Social & Behavioral Sciences. ✓ No more than three credits may come from the Restricted List		
Communication/ Composition	minimum 3	
Humanities and Fine Arts	minimum 3	
Social and Behavioral Sciences	minimum 3	
Course from any list above or Restricted List	0-3	

*an upper division language course in place of UN1025 does not meet this requirement.

Free Electives: 5 - 9 Credits		
Course Number	Credits	Course Status Code M, R, P, WVD, SUB*

*M-Passed with valid grade, transfer, or Advance Placement credit; Registered in course; Plan to take in future, WVD-Waived course or credit (does not reduce total degree credits required), SUB-Petitioned as substitute course.

Co-Curricular Activities: 3 Credits		
Required for graduation, but not included in the GPA calculation or in the overall credits required for the degree.		

Advisor Use Only	
Total Credits Required	120
Total Credits Completed	
Total Credits Needed	

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