

Agendum
Oakland University
Board of Trustees Formal Session
June 26, 2023

Bachelor of Arts in Integrated Science
A Recommendation

1. **Division and Department:** Academic Affairs; College of Arts and Sciences, Department of Physics

2. **Introduction:** The new Bachelor of Arts in Integrated Science is being proposed primarily to substitute the current Secondary Teacher Education Programs (STEP) in Biology, Chemistry, and Physics. This change is required to remain in compliance with changes in education standards implemented by the Michigan Department of Education. These new standards require an “Integrated Science” education for future middle and high school teachers, rather than the field-specific education that is currently in use. Additionally, an Integrated Science curriculum could better prepare students to address grand challenges (e.g., climate change, disease epidemiology, development of science policies) that do not reside in a single scientific domain. Thus, we believe this program will be attractive to students interested in becoming educators and students that are broadly interested in the sciences and their applications to policies, law, ethics and other fields.

3. **Previous Board Action:** None.

4. **Budget Implications:** The primary source of funding for this program will be undergraduate tuition. Based on our projected enrollment, the program will generate revenue even with minimal enrollment because the program will rely on current resources (e.g., faculty, courses) used by the STEP Biology, Chemistry, and Physics programs that are being discontinued. We also expect to update marketing materials to appropriately reflect the new program and current university communication campaigns.

5. **Educational Implications:** The degree program will graduate students with the knowledge and skills required to be successful secondary education teachers or scientists. It will allow students to transfer into the Combined BA to MAT Integrated Science program to pursue their career in education.

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6. **Personnel Implications:** The curriculum of this new program is currently taught by Oakland University faculty. Advising and assessment needs will also be fulfilled by current faculty. The attached proforma includes budget for one part-time faculty to teach two new 2000-level physics courses that are expected to replace two 3000-level physics courses currently on the curriculum. This update to the curriculum, which will simplify the requirements for students, is expected in Fall 2024.

7. **University Reviews/Approvals:** Approved by CAS COI December 13, 2022. Approved by the University Committee on Undergraduate Instruction on March 21, 2023. Approved by the Oakland University Senate on May 18, 2023.

8. **Recommendation:**

WHEREAS, the Bachelor of Arts in Integrated Science degree program is consistent with the objectives contained in Oakland University's Institutional Priorities; and

WHEREAS, the Bachelor of Arts in Integrated Science degree program will build on the academic and research strengths in the College of Arts and Sciences and provide new educational and community engagement opportunities in the field of education; now, therefore, be it

RESOLVED, that the Board of Trustees authorizes the College of Arts and Sciences to offer a Bachelor of Arts in Integrated Science degree program; and, be it further

RESOLVED, that the Executive Vice President for Academic Affairs and Provost will complete annual reviews of the Bachelor of Arts in Integrated Science degree program to evaluate academic quality and fiscal viability to determine whether the program should continue.

9. **Attachments:**

- A. Proposal for Bachelor of Arts in Integrated Science
- B. Proforma budget for Bachelor of Arts in Integrated Science

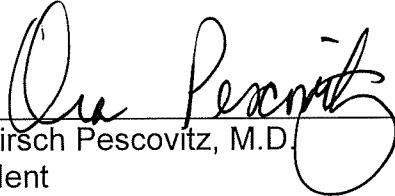
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Submitted to the President
on 06/22, 2023 by



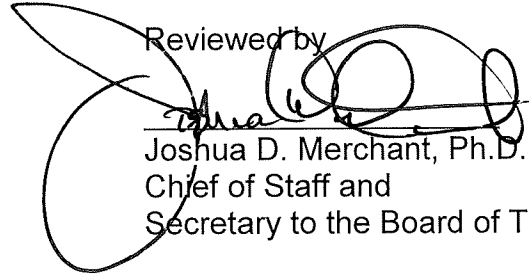
Britt Rios-Ellis, M.S., Ph.D.
Executive Vice President for
Academic Affairs and Provost

Recommended on 6/22, 2023
to the Board for approval by



Ora Hirsch Pescovitz, M.D.
President

Reviewed by



Joshua D. Merchant, Ph.D.
Chief of Staff and
Secretary to the Board of Trustees

Attachment A

Program Degree: Bachelor of Arts in Integrated Science

Requested Program Implementation Term: Fall 2023

Department of Biological Sciences

Date Submitted: 11/12/20

Date Approved: 12/8/20

Department of Chemistry

Date Submitted: 11/11/20

Date Approved: 12/14/20

Department of Physics

Date Submitted: 11/12/2020

Date Approved: 12/20/2020

School or College Governance

Date Submitted: 04.07.2022

Date Approved: 12.9.2022 (*Amended 12.13.22*)

University Committee on Undergraduate Instruction

Date Submitted: With Undergraduate Education on 01.05.2023.

Date Approved: Approved with updated documents on 03.21.2023

Senate

Date Submitted: May 9, 2023

Date Approved: May 18, 2023

Board of Trustees

Date Submitted

Date Approved

Abstract:

The Department of Physics, Chemistry, and Biological Sciences propose a new Bachelor of Arts in Integrated Science. This proposal is aligned with a restructuring of current Secondary teacher Education (STEP) programs in these three departments that aims at meeting new requirements from the Michigan Department of Education for middle and high school teacher preparation programs. These new standards require a combined approach across the three disciplines with the addition of an Earth Sciences component. The proposed program meets these requirements through a rigorous curriculum that will guide students to develop competencies in each scientific discipline, their interdisciplinary connections, and in laboratory and technical skills. These skills will also be valuable in alternative careers focusing on science policy and law, science ethics, and other fields that require a broad scientific knowledge.

Introduction:

The new Integrated Science, B.A. is being proposed primarily to substitute the current Secondary Teacher Education Program (STEP) in Biology, Chemistry, and Physics. This change is required to remain in compliance with changes in education standards implemented by the Michigan Department of Education. These new standards require an "Integrated Science" education for future middle and high school teachers, rather than the field-specific education that is currently in use. Additionally, an Integrated Science curriculum could better prepare students to address grand challenges (e.g., climate change, disease epidemiology, development of science policies) that do not reside in a single scientific domain. Thus, we believe this program will be attractive to students interested in becoming educators and students that are broadly interested in the sciences and their applications to policies, law, ethics and other fields.

Program plan:

To earn a Bachelor of Arts in Integrated Science students must complete a minimum of 120 credits and meet the following requirements:

- General education – Per University Requirements
- Biological Sciences – minimum 21 credits
- Chemistry – 18 credits
- Mathematics – 8 credits
- Physics – 18 credits
- Earth Sciences – minimum 11 credits
- 4000-level – minimum 3 credits
- Education – 1 credit
- Electives – 12 credits
- No single major course grade may be below C
- SED 1000 must be completed with a grade of B or higher

Overview of the Major Curriculum

1. Required Biology Courses

- BIO 1200 Biology I (4)
- BIO 1201 Biology Laboratory (1)
- BIO 1300 Biology II (4)
- BIO 3340 Evolutionary Biology (4)

2. One anatomy/physiology elective selected from:

- BIO 2100 Human Anatomy (4)
- BIO 2600 Human Physiology (4)
- BIO 2640 Comparative Physiology (4)

3. One ecology elective selected from:

- BIO 3330 Ecology (5)
- BIO 3332 Field Biology (4)
- BIO 4310 Conservation Biology (4)
- BIO 4330 Ecology of Streams and Rivers (4)
- BIO 4336 Topics in Community and Population Biology (4)
- BIO 4380 Ecological Problem Solving (4)

4. Required Chemistry courses

- CHM 1440 General Chemistry I (4)
- CHM 1450 General Chemistry II (4)
- CHM 1470 General Chemistry Laboratory I (1)
- CHM 1480 General Chemistry Laboratory II (1)
- CHM 2340 Organic Chemistry I (4)
- CHM 3250 Analytical Chemistry (4)

5. Required Mathematics courses

- MTH 1554 Calculus I (4)
- MTH 1555 Calculus II (4)

6. Required Physics courses

- PHY 1010 General Physics I (4) or PHY 1510 Introductory Physics I (4)
- PHY 1100 General Physics I Laboratory (1)
- PHY 1020 General Physics II (4) or PHY 1520 Introductory Physics II (4)
- PHY 1110 General Physics II Laboratory (1)
- PHY 3660 Vibrations and waves (4)
- PHY 3710 Foundations of Modern Physics (4)

7. Required Earth Science courses

- ENV 3080 Introduction to Environmental Studies (4)
- ENV 3090 Principles of Geology (3) or PHY 1060 Earth Science (4)
- PHY 1040 Astronomy (4)

8. One 4000-level course selected from:

- BIO 4970 Scientific Inquiry and Communication (4)
- BIO 4972 Integrative Biomedicine and Disease (4)
- CHM 4257 Biochemistry Lab (3)
- CHM 4996 Independent Research (3)
- PHY 4970 Undergraduate Seminar (3)
- PHY 4995 Independent Research (3-6)

9. Required Education course

- SED 1000 Careers in Teaching and Learning (1)

10. Complete 12 elective credits in biology (BIO), chemistry (CHM), environmental science (ENV), mathematics (MTH) or physics (PHY).

Faculty qualifications:

The curriculum of this program is currently being taught regularly by qualified faculty. The same courses and faculty will be used in the new program.

Needs and costs:

A Proforma has been submitted.

Implementation plan and timeline:

The proposed program is based on courses currently offered. Thus, the implementation of the curriculum will continue as it is now.

The proposed start of the program is the Fall 2023 semester

Program delivery:

The program will be offered in person. Fully online (50% or more of the courses with 75% or more of the content online) or blended (50% or more of the courses with content that is 10-74% online) delivery methods are not applicable.

Assessment plan:

An Assessment Plan has been submitted.

Attachment B

SBRC Proforma Template

FY2024

Most Likely Scenario

	Year 1	Year 2	Year 3	Year 4	Year 5
Est. New Students to Program	5	8	8	10	10
1st Year Cohort Revenue	\$ 77,720	\$ 124,352	\$ 124,352	\$ 155,440	\$ 155,440
2nd Year Cohort Revenue	\$ -	\$ 77,720	\$ 124,352	\$ 124,352	\$ 155,440
3rd Year Cohort Revenue	\$ -	\$ -	\$ 84,628	\$ 135,404	\$ 135,404
4th Year Cohort Revenue	\$ -	\$ -	\$ -	\$ 67,500	\$ 108,000
Gross Tuition Revenue	\$ 77,720	\$ 202,072	\$ 333,332	\$ 482,696	\$ 554,284
Less: Avg Financial Aid (30%)	\$ (23,316)	\$ (60,622)	\$ (99,999)	\$ (144,809)	\$ (166,285)
Net Tuition Revenue	\$ 54,404	\$ 141,450	\$ 233,332	\$ 337,887	\$ 387,999
Expenses					
Salaries					
Faculty Salaries	6101				
Visiting Faculty	6101				
Administrative Professionals	6201				
Clerical Technical	6211				
Administrative IC	6221				
Faculty Inload/Replacement Costs	6301				
Faculty Overload	6301				
Part-Time Faculty	6301	\$ 11,024	\$ 11,024	\$ 11,024	\$ 11,024
Graduate Assistant	6311	\$ -	\$ -	\$ -	\$ -
Casual/Temp	6401				
Out of Classification	6401				
Student Labor	6501				
Total Salary Expense		\$ 11,024	\$ 11,024	\$ 11,024	\$ 11,024
Fringe Benefits	6701	\$ -	\$ 882	\$ 882	\$ 882
Total Compensation		\$ 11,024	\$ 11,906	\$ 11,906	\$ 11,906
Operating Expenses					
Supplies and Services	7101		\$ 756	\$ 1,080	\$ 1,080
Graduate Tuition	7101	\$ -	\$ -	\$ -	\$ -
E-Learning Support	7102				
Travel	7201				
Equipment	7501	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000
Maintenance	7110				
Recruitment and advertising	7101				
Library	7401	\$ -	\$ -	\$ -	\$ -
Total Operating Expenses		\$ 4,000	\$ 4,756	\$ 5,080	\$ 5,080
Total Expenses		\$ 15,906	\$ 16,662	\$ 16,986	\$ 16,986
Net Income (Loss)		\$ 125,544	\$ 216,670	\$ 320,901	\$ 371,013

SBRC Proforma Template

FY2024

Best-Case Scenario

	Year 1	Year 2	Year 3	Year 4	Year 5
Est. New Students to Program	6	10	10	12	12
1st Year Cohort Revenue	\$ 93,264	\$ 155,440	\$ 155,440	\$ 186,528	\$ 186,528
2nd Year Cohort Revenue	\$ -	\$ 93,264	\$ 155,440	\$ 155,440	\$ 186,528
3rd Year Cohort Revenue	\$ -	\$ -	\$ 101,553	\$ 169,255	\$ 169,255
4th Year Cohort Revenue	\$ -	\$ -	\$ -	\$ 81,000	\$ 135,000
Gross Tuition Revenue	\$ 93,264	\$ 248,704	\$ 412,433	\$ 592,223	\$ 677,311
Less: Avg Financial Aid (30%)	\$ (27,979)	\$ (74,611)	\$ (123,730)	\$ (177,667)	\$ (203,193)
Net Tuition Revenue	\$ 65,285	\$ 174,093	\$ 288,703	\$ 414,556	\$ 474,118

Expenses

Salaries

Faculty Salaries

6101					
6101					
6201					
6211					
6221					
6301					
6301					

Visiting Faculty

Administrative Professionals

Clerical Technical

Administrative IC

Faculty Inload/Replacement Costs

Faculty Overload

Part-Time Faculty

Graduate Assistant

Casual/Temp

Out of Classification

Student Labor

Total Salary Expense

Fringe Benefits

Total Compensation

Operating Expenses

Supplies and Services

Graduate Tuition

E-Learning Support

Travel

Equipment

Maintenance

Recruitment and advertising

Library

Total Operating Expenses

Total Expenses

Net Income (Loss)

6301		\$ 11,024	\$ 11,024	\$ 11,024	\$ 11,024
6311	\$ -	\$ -	\$ -	\$ -	\$ -
6401					
6401					
6501					
	\$ -	\$ 11,024	\$ 11,024	\$ 11,024	\$ 11,024
6701	\$ -	\$ 882	\$ 882	\$ 882	\$ 882
	\$ -	\$ 11,906	\$ 11,906	\$ 11,906	\$ 11,906
7101			\$ 972	\$ 1,296	\$ 1,296
7101	\$ -	\$ -	\$ -	\$ -	\$ -
7102					
7201					
7501		\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000
7110					
7101					
7401	\$ -	\$ -	\$ -	\$ -	\$ -
	\$ -	\$ 4,000	\$ 4,972	\$ 5,296	\$ 5,296
	\$ -	\$ 15,906	\$ 16,878	\$ 17,202	\$ 17,202
	\$ 65,285	\$ 158,187	\$ 271,825	\$ 397,354	\$ 456,916

SBRC Proforma Template

FY2024

Worst-Case Scenario

	Year 1	Year 2	Year 3	Year 4	Year 5
Est. New Students to Program	3	3	3	3	3
1st Year Cohort Revenue	\$ 46,632	\$ 46,632	\$ 46,632	\$ 46,632	\$ 46,632
2nd Year Cohort Revenue	\$ -	\$ 46,632	\$ 46,632	\$ 46,632	\$ 46,632
3rd Year Cohort Revenue	\$ -	\$ -	\$ 50,777	\$ 50,777	\$ 50,777
4th Year Cohort Revenue	\$ -	\$ -	\$ -	\$ 40,500	\$ 40,500
Gross Tuition Revenue	\$ 46,632	\$ 93,264	\$ 144,041	\$ 184,541	\$ 184,541
Less: Avg Financial Aid (30%)	\$ (13,990)	\$ (27,979)	\$ (43,212)	\$ (55,362)	\$ (55,362)
Net Tuition Revenue	\$ 32,642	\$ 65,285	\$ 100,828	\$ 129,178	\$ 129,178

Expenses

Salaries					
Faculty Salaries	6101				
Visiting Faculty	6101				
Administrative Professionals	6201				
Clerical Technical	6211				
Administrative IC	6221				
Faculty Inload/Replacement Costs	6301				
Faculty Overload	6301				
Part-Time Faculty	6301	\$ 11,024	\$ 11,024	\$ 11,024	\$ 11,024
Graduate Assistant	6311	\$ -	\$ -	\$ -	\$ -
Casual/Temp	6401				
Out of Classification	6401				
Student Labor	6501				
Total Salary Expense		\$ -	\$ 11,024	\$ 11,024	\$ 11,024
Fringe Benefits	6701	\$ -	\$ 882	\$ 882	\$ 882
Total Compensation		\$ -	\$ 11,906	\$ 11,906	\$ 11,906
Operating Expenses					
Supplies and Services	7101		\$ 108	\$ 540	\$ 540
Graduate Tuition	7101	\$ -	\$ -	\$ -	\$ -
E-Learning Support	7102				
Travel	7201				
Equipment	7501	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000
Maintenance	7110				
Recruitment and advertising	7101				
Library	7401	\$ -	\$ -	\$ -	\$ -
Total Operating Expenses		\$ -	\$ 4,000	\$ 4,108	\$ 4,540
Total Expenses		\$ -	\$ 15,906	\$ 16,014	\$ 16,446
Net Income (Loss)		\$ 32,642	\$ 49,379	\$ 84,814	\$ 112,732

**Integrated Science,
B.A.**

*To be presented by Fabia
Battistuzzi, Associate
Dean, CAS
(battistu@oakland.edu)*

New program in Integrated Science

- Current Bio, Chm, Phy STEP programs will be replaced by Integrated Science, B.A. to satisfy new MDE standards
- 120 minimum credits
 - Science content: CHM: 18 cr, BIO: min 21 cr, PHY: 18 cr, Earth Sci: min 11 cr, MTH: 8 cr, 4000-level: min 3 cr
 - Future teachers: 12 elective cr in education (transfer into Combined Integrated Science BA to MAT)
 - Alternative: 12 elective cr in science

Advantages and targeted student population

Future teachers

- Remain compliant with new standards
- Prepare future science teachers with strong scientific content
- Competitive with other Integrated science for education programs

Future scientists

- Broad science training more suited to address “grand challenges”
 - Climate change
 - Science policy
 - Science ethics
- Training in laboratory techniques/research