

From: [Smith, Randy](#)
To: [Manouchehri, Azita](#)
Cc: [Sutherland, Sue](#); [Reed, Katie](#); [Smith, Randy](#); [Greenbaum, Rob](#); [Duffy, Lisa](#); [Hunt, Ryan](#); [Miranda, Antoinette](#); [Locascio, Pete](#); [Snyder, Anastasia](#)
Subject: Proposal to revise the STEM-Science Education Program
Date: Friday, February 21, 2025 12:48:39 PM
Attachments: [image001.png](#)

Azita,

The proposal from the Department of Teaching and Learning to revise the STEM-Science Education program leading to the Bachelor of Science in Education degree, was approved by the Council on Academic Affairs at its meeting on February 19, 2025. Thank you for attending the meeting to respond to questions/comments.

No additional level of internal review/approval is necessary. This action will be included in the Council's next [Annual Activities Report](#) to the University Senate (July 2025).

The Office of the University Registrar will work you with any implementation issues.

Please keep a copy of this message for your file on the proposal and I will do the same for the file in the Office of Academic Affairs.

If you have any questions please contact the Chair of the Council, Professor Sue Sutherland (.43), or me.

I wish you success with this important program development.

Randy



W. Randy Smith, Ph.D.

Vice Provost for Academic Programs

Office of Academic Affairs

University Square South, 15 E. 15th Avenue, Columbus, OH 43201

614-292-5881 Office

smith.70@osu.edu

Assisted by:

Katie Reed

Executive Assistant

(614) 292-5672

Memo

January 21, 2025

To: W. Randy Smith, Vice Provost – Council on Academic Affairs

From: Pete Locascio, Executive Director of Undergraduate Education, EHE

RE: PROGRAM REVISION REQUEST: **STEM-Science Education BS program**, Department of Teaching and Learning.

Please find materials included in this proposal related to a revision of the STEM-Science Education BS program. In its current curriculum, STEM-Science students needed to take three additional courses as pre-requisites that were not listed on the curriculum sheet to pursue Integrated Science licensure. This was not the intention of the AU22 GE-N curriculum.

The department proposes:

- Adding PHYSICS 1200 and 1201 as options alongside PHYSICS 1250 and 1251 in Content Core
- Replacing BIOCHEM 4511 with BIOCHEM 2210 in Integrated Science Content Choice
- Removing PHYSICS 2300 from Integrated Science Content Choice
- Adding MATH 2153 to Physics Content Choice
- Updating ENR 2501 to 4 credits in Earth Science Content Choice

Percent of change varies based on a student's content licensure choice. However, any particular Content choice either adds or subtracts one course, or does not change. The overall percent change is less than 5%.

This was approved by the EHE Curriculum Committee on December 12, 2024.

If there are any questions, please contact me at Locascio.7@osu.edu



January 21, 2025

Dr. W. Randy Smith, PhD
Vice Provost for Academic Programs
The Ohio State University

Dear Vice Provost Smith,

I am writing on behalf of the College of Education and Human Ecology's (EHE) Office of Academic Affairs. EHE supports the recent curricular change that was approved by the EHE Curriculum Committee on January 16, 2025:

- Revise the prerequisite courses for the STEM-Science major. The proposed changes are to prerequisites in the Core Content, Integrated Sciences and Physics areas.

We anticipate that these changes will improve the curriculum in the BS in STEM-Science by reducing the credit hours required and providing students more options to complete the degree.

Sincerely yours,

Anastasia R. Snyder, PhD
Associate Dean for Faculty Affairs
College of Education and Human Ecology



THE OHIO STATE UNIVERSITY

College of Education and Human Ecology

Department of Teaching and Learning

333 Arps Hall
1945 N. High Street
Columbus, OH 43210-1120

ehe.osu.edu

December 12, 2024

Dear T&L Undergraduate Studies Committee members,

This request pertains pre-requisite changes regarding STEM-Science and does not include changes to the major coursework or GEs.

The proposed changes (please see the attachment) would allow students to progress through the major without additional credits. To avoid extra courses, the proposed versions allow substitutions/alternatives for students. Currently, students are taking additional courses because of pre-requisites for required courses.

For Content Core:

- Adding Physics 1200 as an alternative to Physics 1250
- Adding Physics 1201 as an alternative to Physics 1251

In the current version, all students take PHYSICS 1250 and 1251 in the Content Core area. It means that students also need to take MATH 1152 (Calc II) as a pre-req to PHYSICS 1251. The proposed alternative provides option for those students as they navigate the content course curriculum.

Integrated Science Area:

Replacing BIOCHEM 4511 with BIOCHEM2210

- BIOCHEM 4511 is currently included in the Integrated Science content area. The course pre-requisites are CHEM 1220 or 1250, and CHEM 2510 (O-Chem).
 - Issue: CHEM 2510 is not included in the Content Core requirements, so students who are part of Integrated Science will not have the O-Chem course as a pre-req to BIOCHEM 4511
- Removing Physics 2300

For students who are part of the Integrated Sciences, students currently take PHYSICS 2300, which has MATH 2153 (Calc III), and BIOCHEM 4511, which has a pre-req of Organic Chemistry (CHEM 2510).

Physics Area:

- Add MATH 2153 Calculus III because it is a pre-req for Physics 2300, which is a required course for Physics licensure.

The overall changes mean students will take 119-147 hours instead of 120-145. The above proposed changes, as noted earlier, allow students more options regarding courses to complete the degree and overall students would need fewer credits.

Sincerely,

Lin Ding, PhD.

Professor and Section Head of InSTEAM

STEM Education

Bachelor of Science in
Education



THE OHIO STATE UNIVERSITY
COLLEGE OF
EDUCATION AND HUMAN ECOLOGY

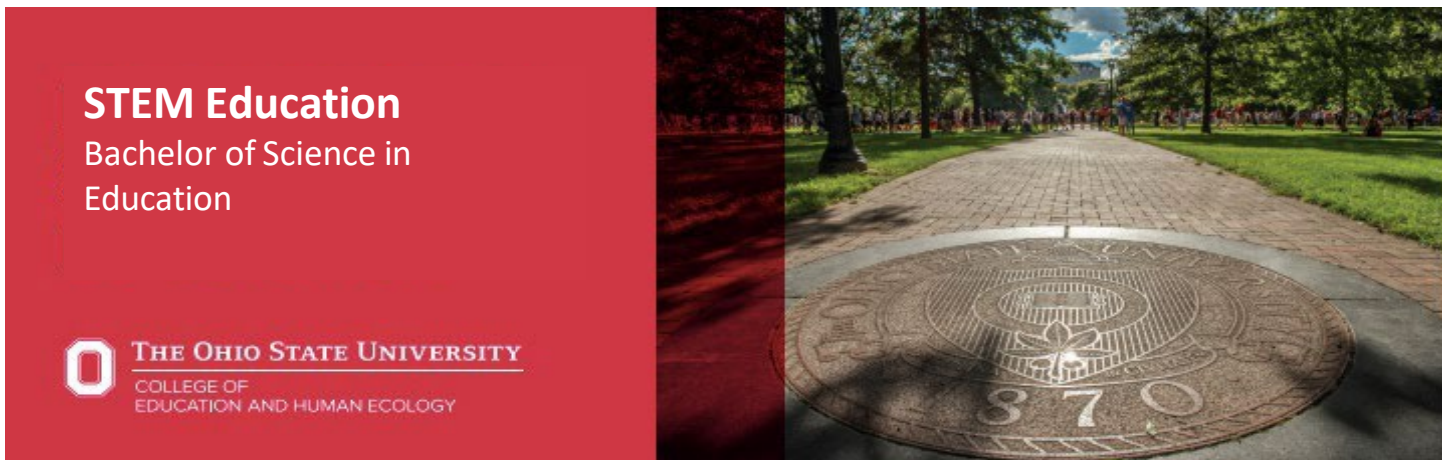


Effective for students admitted to the College of Education and Human Ecology beginning **Autumn 2025**

| General Education Requirements (32-39 Hours) | | HOURS |
|---|--|-----------------------------------|
| Launch Seminar | | 1 |
| Reflection Seminar | | 1 |
| Foundations (22-25 Hours) | | |
| Writing & Information Literacy | | 3 |
| Mathematical & Quantitative Reasoning or Data Analysis | | 3-5 |
| Literary, Visual & Performing Arts | | 3 |
| Historical & Cultural Studies | | 3 |
| Natural Science | | 4-5 |
| Social & Behavioral Sciences | | 3 |
| Race, Ethnic & Gender Diversity | | 3 |
| Thematic Pathways (8-12 Hours) | | |
| Take 4-6 hours from Citizenship for a Diverse & Just World and 4-6 hours from another Thematic Pathway of choice. | | |
| Citizenship for a Diverse & Just World | | 4-6 |
| Choice of 4-6 hours from one additional Thematic Pathway: | | 4-6 |
| Lived Environments Sustainability Health & Wellbeing | Origins & Evolution Traditions, Cultures, & Transformations Number, Nature, Mind | Migration, Mobility, & Immobility |
| EHE 1100 College Survey | | 1 |

| Pre-Major Requirements (12 Hours) | | HOURS |
|--|--|-----------|
| EDUCST 2189S First Education Experience Program (FEED) | | 3 |
| ESPHE 3206 School & Society (can overlap with GE Race, Ethnic, & Gender Div.), or ESPHE 4280 History of Modern Edu. | | 3 |
| ESEPSY 2309 Psychological Perspectives on Education | | 3 |
| ESEPSY 5401 Adolescent Learning & Dev. in School Contexts, or HDFS 2420 Adolescence & Emerging Adult Dev. | | 3 |
| Content Requirements (51-60 Hours) | | HOURS |
| Must maintain a minimum 2.75 GPA in Content Requirements | | |
| Content Core All students, regardless of teaching licensure area, must complete Content Core | | 38 |
| MATH 1151 Calculus I (can overlap with GE Math & Quantitative Reasoning or Data Analysis) | | 5 |
| BIOLOGY 1113.xx Biological Sciences: Energy Transfer & Development (can overlap with GE Natural Science) | | 4 |
| CHEM 1210 General Chemistry I | | 5 |
| CHEM 1220 General Chemistry II | | 5 |
| PHYSICS 1200 Mechanics, Kinematics, Fluids, Waves, or PHYSICS 1250 Mechanics, Work & Energy, Thermal Physics | | 5 |
| PHYSICS 1201 E&M, Optics, Modern Physics, or PHYSICS 1251 E&M, Waves, Optics, Modern Physics | | 5 |
| ASTRON 1102 From Planets to the Cosmos, ASTRON 2140 Planets & The Solar System (can overlap with GE Origins & Evolution), or ASTRON 1144 Stars, Galaxies, & the Universe | | 3 |
| EARTHSC 1121 The Dynamic Earth | | 3 |
| STAT 1350.xx Elementary Statistics, or STAT 1450.xx Introduction to the Practice of Statistics | | 3 |
| Content Licensure Options Choose additional content for teaching licensure area from Page 3. Students are highly encouraged to complete Integrated Science. Must complete at least one area. | | |
| Integrated Science (16 hours) Earth Science (13-14 hours) Life Science (15 hours) | Physics (22 hours) Chemistry (20 hours) | |
| Major Requirements (35 Hours) | | HOURS |
| B- minimum grade required in all Major Requirements | | |
| EDUTL 5501 Inclusion | | 3 |
| EDUTL 5005 Equity & Diversity (can overlap with GE Citizenship for a Diverse & Just World) | | 3 |
| EDUTL 5442 Teaching Reading Across the Curriculum | | 3 |
| EDUTL 5721 Methods in Teaching STEM I | | 3 |
| EDUTL 5722 Methods in Teaching STEM II | | 3 |
| EDUTL 5744 Technologies Used in STEM | | 1.5 |
| EDUTL 5745 Assessment in STEM I: Introduction | | 1.5 |
| EDUTL 3189.07 Field Experience | | 1 |
| EDUTL 4189.07 Advanced Field Experience: STEM Education | | 2 |
| EDUTL 5195.07 Reflective Seminar: STEM Education | | 1+1+2 |
| EDUTL 5191.07 Supervised Student Teaching Internship: STEM Education | | 10 |
| Successful completion of the Ohio Assessment for Educators examinations is required prior to student teaching. To be recommended for state of Ohio teacher licensure, must maintain a 2.75 cumulative GPA, 2.75 content GPA, and earn a B- or higher grade in student teaching. | | |

| Content Choices from Page 2 (in addition to Content Core) | |
|---|--------------|
| Integrated Science | 16 |
| BIOLOGY 1114.xx Biological Sciences: Form, Function, Diversity, & Ecology | 4 |
| ANATOMY 2300 Human Anatomy | 4 |
| BIOCHEM 2210 Elements of Biochemistry | 4 |
| EARTHSC 2122 Climate & Life Over Billions of Years on Earth | 4 |
| Earth Science | 13-14 |
| EARTHSC 2122 Climate & Life Over Billions of Years on Earth | 4 |
| EARTHSC 4450 Water, Ice, & Energy in Earth's System, or EARTHSC 2206 Oceanography, or EARTHSC/ENR 2155 Energy & Environment | 3 |
| GEOG 5900 Weather, Climate, & Global Warming, or GEOG 3900 Global Climate Change: Causes & Consequences | 3 |
| ENR 2100 Intro to Environmental Science (3), or ENR 2501 Intro to Sustainability (4), or ENR 2300 Society & Natural Resources (3) | 3-4 |
| Life Science | 15 |
| BIOLOGY 1114.xx Biological Sciences: Form, Function, Diversity, & Ecology | 4 |
| MOLGEN 4500.xx General Genetics | 3 |
| EEOB 3310.xx Evolution | 4 |
| MICRBIO 4000.xx Basic & Practical Microbiology | 4 |
| Physics | 22 |
| MATH 1152 Calculus II | 5 |
| MATH 2153 Calculus III | 4 |
| PHYSICS 2300 Intermediate Mechanics I *Physics Content Choice requires PHYSICS 1250 and 1251 from Content Core area | 4 |
| CSE 1222 Introduction to Computer Programming in C++ for Engineers & Scientists | 3 |
| PHYSICS 3700 Experimental Physics Instrumentation & Data Analysis Lab | 3 |
| ASTRON 2291 Basic Astrophysics & Planetary Astronomy | 3 |
| Chemistry | 20 |
| MATH 1152 Calculus II | 5 |
| CHEM 2210 Analytical Chemistry I: Quantitative Analysis | 5 |
| CHEM 2510 Organic Chemistry I | 4 |
| CHEM 2540 Organic Chemistry Lab I | 2 |
| BIOCHEM 4511 Introduction to Biological Chemistry | 4 |
| Total Hours: 119-147 | |
| Free Electives to reach 120 Hours: 0 | |
| Minimum of 120 credit hours required for degree completion. Total Hours range is based on licensure area selection, requirement course choices and/or the number of credits that overlap between requirement areas. Students are encouraged to overlap as many credits as possible. | |



Effective for students admitted to the College of Education and Human Ecology beginning **Autumn 2025**

| General Education Requirements (32-39 Hours) | | HOURS |
|---|--|-----------------------------------|
| Launch Seminar | | 1 |
| Reflection Seminar | | 1 |
| Foundations (22-25 Hours) | | |
| Writing & Information Literacy | | 3 |
| | | |
| Mathematical & Quantitative Reasoning or Data Analysis | | 3-5 |
| | | |
| Literary, Visual & Performing Arts | | 3 |
| | | |
| Historical & Cultural Studies | | 3 |
| | | |
| Natural Science | | 4-5 |
| | | |
| Social & Behavioral Sciences | | 3 |
| | | |
| Race, Ethnic & Gender Diversity | | 3 |
| | | |
| Thematic Pathways (8-12 Hours) | | |
| Take 4-6 hours from Citizenship for a Diverse & Just World and 4-6 hours from another Thematic Pathway of choice. | | |
| Citizenship for a Diverse & Just World | | 4-6 |
| Choice of 4-6 hours from one additional Thematic Pathway: | | 4-6 |
| Lived Environments Sustainability Health & Wellbeing | Origins & Evolution Traditions, Cultures, & Transformations Number, Nature, Mind | Migration, Mobility, & Immobility |
| EHE 1100 College Survey | | 1 |

| Pre-Major Requirements (12 Hours) | | HOURS |
|---|-----------------------------------|-----------|
| EDUCST 2189S First Education Experience Program (FEEP) | | 3 |
| ESPHE 3206 School & Society (can overlap with GE Race, Ethnic, & Gender Div.), or ESPHE 4280 History of Modern Edu. | | 3 |
| ESEPSY 2309 Psychological Perspectives on Education | | 3 |
| ESEPSY 5401 Adolescent Learning & Dev. in School Contexts, or HDFS 2420 Adolescence & Emerging Adult Dev. | | 3 |
| Content Requirements (51-58 51-60 Hours) | | HOURS |
| Must maintain a minimum 2.75 GPA in Content Requirements | | |
| Content Core All students, regardless of teaching licensure area, must complete Content Core | | 38 |
| MATH 1151 Calculus I (can overlap with GE Math & Quantitative Reasoning or Data Analysis) | | 5 |
| BIOLOGY 1113 Biological Sciences: Energy Transfer & Development (can overlap with GE Natural Science) | | 4 |
| CHEM 1210 General Chemistry I | | 5 |
| CHEM 1220 General Chemistry II | | 5 |
| PHYSICS 1200 Mechanics, Kinematics, Fluids, Waves, or PHYSICS 1250 Mechanics, Work & Energy, Thermal Physics | | 5 |
| PHYSICS 1201 E&M, Optics, Modern Physics, or PHYSICS 1251 E&M, Waves, Optics, Modern Physics | | 5 |
| ASTRON 1102 From Planets to the Cosmos, ASTRON 1144 Stars, Galaxies, & the Universe, or ASTRON 2140 Planets & the Solar System (can overlap with GE Theme: Origins and Evolution) | | 3 |
| EARTHSC 1121 The Dynamic Earth | | 3 |
| STAT 1350.xx Elementary Statistics, or STAT 1450.xx Introduction to the Practice of Statistics | | 3 |
| Content Licensure Options Choose additional content for teaching licensure area from Page 3. Students are highly encouraged to complete Integrated Science. Must complete at least one area. | | |
| Integrated Science (20 16 hours) | Physics (18 22 hours) | |
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| Life Science (19 15 hours) | | |
| Major Requirements (35 Hours) | | HOURS |
| B- minimum grade required in all Major Requirements | | |
| EDUTL 5501 Inclusion | | 3 |
| EDUTL 5005 Equity, Diversity, and Justice in Education (can overlap with GE Citizenship for a Diverse & Just World) | | 3 |
| EDUTL 5442 Teaching Reading Across the Curriculum | | 3 |
| EDUTL 5721 Methods in Teaching STEM I | | 3 |
| EDUTL 5722 Methods in Teaching STEM II | | 3 |
| EDUTL 5744 Technologies Used in STEM | | 1.5 |
| EDUTL 5745 Assessment in STEM I: Introduction | | 1.5 |
| EDUTL 3189.07 Field Experience | | 1 |
| EDUTL 4189.07 Advanced Field Experience: STEM Education | | 2 |
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| EDUTL 5191.07 Supervised Student Teaching Internship: STEM Education | | 10 |
| Successful completion of the Ohio Assessment for Educators examinations is required prior to student teaching. To be recommended for state of Ohio teacher licensure, must maintain a 2.75 cumulative GPA, 2.75 content GPA, and earn a B- or higher grade in student teaching. | | |

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| ANATOMY 2300.04 Human Anatomy | 4 |
| BIOCHEM 4511 Biological Chemistry – BIOCHEM 2210 Elements of Biochemistry | 4 |
| EARTHSC 2122 Climate & Life Over Billions of Years on Earth | 4 |
| PHYSICS 2300 Intermediate Mechanics I | |
| Earth Science | 13-14 |
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| EARTHSC 4450 Water, Ice, & Energy in Earth's System, or EARTHSC 2206 Oceanography, or EARTHSC/ENR 2155 Energy & Environment | 3 |
| GEOG 5900 Weather, Climate, & Global Warming, or GEOG 3901 Global Climate Change: Causes & Consequences | 3 |
| ENR 2100 Intro to Environmental Science (3), or ENR 2501 Intro to Sustainability (4), or ENR 2300 Society & Natural Resources (3) | 3-4 |
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STEM Education

Bachelor of Science in Education



Effective for students admitted to the College of Education and Human Ecology beginning **Autumn 2022**

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| GEOG 5900 Weather, Climate, & Global Warming, or GEOG 3901 Global Climate Change: Causes & Consequences | 3 |
| ENR 2100 Intro to Environmental Science, or ENR 2500 Intro to Sustainability, or ENR 2300 Society & Natural Resources | 3 |
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| MOLGEN 4500.xx General Genetics | 3 |
| EEOB 3310.xx Evolution | 4 |
| MICRBIO 4000.xx Basic & Practical Microbiology | 4 |
| Physics | 18 |
| MATH 1152 Calculus II | 5 |
| PHYSICS 2300 Intermediate Mechanics I | 4 |
| CSE 1222 Introduction to Computer Programming in C++ for Engineers & Scientists | 3 |
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| Total Hours: 120-145 | |
| Free Electives to reach 120 Hours: 0 | |
| Minimum 120 credit hours required for degree completion. Total Hours based on requirement course choices and/or number of credits that overlap between requirement areas. Students encouraged to overlap as many credits as possible. | |