

TO: Academic Policies Committee

FROM: College of Education and Human Sciences

DATE: December 6, 2019

RE: Rename Major and Establish Four Emphases (Substantive Change)

We request that you consider placing this curricular item on your earliest possible agenda.

Name of Program: Physical Science, Comprehensive Major - Teaching

Program Code 240-004

Date of Department/Program Approval — November 14, 2019 – Physics Department

Date of CoEHS Curriculum Committee Approval – December 6, 2019

Date of CoEHS College Approval – December 6, 2019

From Current Catalog Web Page:

<https://catalog.uwec.edu/undergraduate/arts-sciences/interdisciplinary/physical-science-comprehensive-major-t-bs/>

To: Science Teaching, Comprehensive Major
Establish Four Emphases

1. Science Teaching, Physics Emphasis
2. Science Teaching, Chemistry Emphasis
3. Science Teaching, Earth/Space Science Emphasis
4. Science Teaching, Biology Emphasis

Science Teaching, Physics Emphasis

The comprehensive major in Science Teaching, Physics Emphasis prepares education students to teach all science courses in a regular education setting grades 4 through 12. (Total: 67 – 70 credits)

1. Physics Emphasis – 32 credits
 - PHYS 231 University Physics I (5)
 - PHYS 232 University Physics II (5)
 - PHYS 315 Mysterious Universe (3)
 - PHYS 332 University Physics III (3)
 - PHYS 340 Optics (4)
 - PHYS 350 Electronic Circuits (4)
 - MATH 114 Calculus I (4)
 - MATH 215 Calculus II (4)

2. Additional Requirements – 9 credits
 - ES 360 Teaching Science Grades 5 – 12 (3)
 - ES 385 Social Foundations: Human Relations (3)
 - GEOG 178 Conservation of the Environment (3) or BIOL 180 Environmental Biology and Conservation (3)

3. Chemistry Core – 6-9 credits
 - CHEM 105 General Chemistry I Lecture (3)
 - CHEM 106 General Chemistry I Laboratory (2)
 - CHEM 109 General Chemistry II with Lab (4)or
 - CHEM 115 Chemical Principles (6)

4. Earth & Space Science Core – 11 credits
 - Choose 1: GEOL 106 Earth Science (4) or GEOL 110 Physical Geology (4) or GEOL 115 Environmental Geology (4) or GEOL 118 Societal Issues in Earth Science (4)
 - Choose 1: GEOL 301 Earth Resources (3) or GEOL 304 Global Environmental Change or GEOL 308 Water Resources (3)
 - PHYS 226 Astronomy-Solar System (4)

5. Biology Core – 9 credits
 - BIOL 105 General Biology (3)
 - BIOL 106 Exploring the Living World (2)
 - BIOL 151 Biology of Humans (4)or
 - BIOL 221 Foundations of Biology I (4)
 - BIOL 222 Foundations of Biology II (3)
 - BIOL 223 Foundations of Biological Inquiry (2)

Science Teaching, Chemistry Emphasis

The comprehensive major in Science Teaching, Chemistry Emphasis prepares education students to teach all science courses in a regular education setting grades 4 through 12. (Total: 65 – 78 credits)

1. Chemistry Emphasis – 27-31 credits
 - CHEM 105 (3) and CHEM 106 (2) and CHEM 109 (4) or CHEM 115 Chemical Principles (6)
 - CHEM 213 Quantitative Analysis (4)
 - CHEM 218 Introduction to Inorganic Chemistry (3)
 - CHEM 304 Environmental Chemistry (3)
 - CHEM 325 Organic Chemistry I with Laboratory (4)
 - CHEM 326 Organic Chemistry II with Laboratory (4)
 - CHEM 318 Bioinorganic Chemistry (3) or CHEM 352 Fundamentals of Biochemistry (4) or CHEM 361 Molecules and Medicine (3)

2. Additional Courses – 9 credits
 - ES 360 Teaching Science Grades 5 – 12 (3)
 - ES 385 Social Foundations: Human Relations (3)
 - GEOG 178 Conservation of the Environment (3) or BIOL 180 Environmental Biology and Conservation (3)

3. Physics Core – 9-18 credits
 - PHYS 211 General Physics (5)
 - PHYS 212 General Physics (4)
 - or
 - PHYS 231 University Physics I (5)
 - PHYS 232 University Physics II (5)
 - MATH 114 Calculus I (4)
 - MATH 215 Calculus II (4)

4. Earth & Space Science Core – 11 credits
 - Choose 1: GEOL 106 Earth Science (4) or GEOL 110 Physical Geology (4) or GEOL 115 Environmental Geology (4) or GEOL 118 Societal Issues in Earth Science (4)
 - Choose 1: GEOL 301 Earth Resources (3) or GEOL 304 Global Environmental Change or GEOL 308 Water Resources (3)
 - PHYS 226 Astronomy-Solar System (4)

5. Biology Core – 9 credits
 - BIOL 105 General Biology (3)
 - BIOL 106 Exploring the Living World (2)
 - BIOL 151 Biology of Humans (4)
 - or
 - BIOL 221 Foundations of Biology I (4)
 - BIOL 222 Foundations of Biology II (3)
 - BIOL 223 Foundations of Biological Inquiry (2)

Science Teaching, Earth/Space Science Emphasis

The comprehensive major in Science Teaching, Earth/Space Science Emphasis prepares education students to teach all science courses in a regular education setting grades 4 through 12. (Total: 60-72 credits)

1. Earth/Space Science Emphasis – 27 credits
 - Choose 1: GEOL 106 Earth Science (4) or GEOL 110 Physical Geology (4) or GEOL 115 Environmental Geology (4) or GEOL 118 Societal Issues in Earth Science (4)
 - Choose 2: GEOL 102 Oceanography (3) or GEOL 301 Earth Resources (3) or GEOL 304 Global Environmental Change (3) or GEOL 308 Water Resources (3)
 - GEOL 312 Minerology and Petrology I (5)
 - GEOL 320 Sedimentology and Stratigraphy (4)
 - GEOL 315 Hydrogeology I (4) or GEOL 418 Earth History (4) or {GEOL 468 Computers in Geology (1) and GEOL 470 Field Geology I (3)}
 - PHYS 226 Astronomy-Solar System (4)

2. Additional Courses – 9 credits
 - ES 360 Teaching Science Grades 5 – 12 (3)
 - ES 385 Social Foundations: Human Relations (3)
 - GEOG 178 Conservation of the Environment (3) or BIOL 180 Environmental Biology and Conservation (3)

3. Physics Core – 9-18 credits
 - PHYS 211 General Physics (5)
 - PHYS 212 General Physics (4)
 - or
 - PHYS 231 University Physics I (5)
 - PHYS 232 University Physics II (5)
 - MATH 114 Calculus I (4)
 - MATH 215 Calculus II (4)

4. Chemistry Core – 6-9 credits
 - CHEM 105 General Chemistry I Lecture (3)
 - CHEM 106 General Chemistry I Laboratory (2)
 - CHEM 109 General Chemistry II with Lab (4)
 - or
 - CHEM 115 Chemical Principles (6)

5. Biology Core – 9 credits
 - BIOL 105 General Biology (3)
 - BIOL 106 Exploring the Living World (2)
 - BIOL 151 Biology of Humans (4)
 - or
 - BIOL 221 Foundations of Biology I (4)
 - BIOL 222 Foundations of Biology II (3)
 - BIOL 223 Foundations of Biological Inquiry (2)

Science Teaching, Biology Emphasis

The comprehensive major in Science Teaching, Biology Emphasis prepares education students to teach all science courses in a regular education setting grades 4 through 12. (Total: 60-74 credits)

1. Biology Emphasis – 25-27 credits
 - BIOL 221 Foundations of Biology I (4)
 - BIOL 222 Foundations of Biology II (3)
 - BIOL 223 Foundations of Biological Inquiry (2)
 - BIOL 323 Genetics (3)
 - BIOL 308 Evolution (3)
 - Choose 2 from: BIOL 318 Plant Form and Function (4) or BIOL 319 Animal Form and Function (5) or BIOL 361 Biology of Microorganisms (5)
 - BIOL 496 Student Academic Apprenticeship (1-2)

2. Additional Courses – 9 credits
 - ES 360 Teaching Science Grades 5 – 12 (3)
 - ES 385 Social Foundations: Human Relations (3)
 - GEOG 178 Conservation of the Environment (3) or BIOL 180 Environmental Biology and Conservation (3)

3. Physics Core – 9-18 credits
 - PHYS 211 General Physics (5)
 - PHYS 212 General Physics (4)
 - or
 - PHYS 231 University Physics I (5)
 - PHYS 232 University Physics II (5)
 - MATH 114 Calculus I (4)
 - MATH 215 Calculus II (4)

4. Chemistry Core – 6-9 credits
 - CHEM 105 General Chemistry I Lecture (3)
 - CHEM 106 General Chemistry I Laboratory (2)
 - CHEM 109 General Chemistry II with Lab (4)
 - or
 - CHEM 115 Chemical Principles (6)

5. Earth/Space Science Core – 11 credits
 - Choose 1: GEOL 106 Earth Science (4) or GEOL 110 Physical Geology (4) or GEOL 115 Environmental Geology (4) or GEOL 118 Societal Issues in Earth Science (4)
 - Choose 1: GEOL 301 Earth Resources (3) or GEOL 304 Global Environmental Change or GEOL 308 Water Resources (3)
 - PHYS 226 Astronomy-Solar System (4)

Rationale: Effective August 1, 2018, the Wisconsin Department of Public Instruction (DPI) changed the rules for teacher licensure. The revised rules changed the specific subject licenses (biology, chemistry, earth/space science, physics) in science to a broad license in science that must include all specific subject areas. In other words, we will be preparing education students to teach ALL subject areas of science in one license.

The proposed four emphases will allow students to choose an area they wish to pursue for greater depth of content knowledge. Creating four emphases from which students can choose will also indicate to future employers that students have more preparation in a specific science subject area. Our graduates will be certified to teach all subject areas of science but have more expertise and content knowledge in one specific area.

Secondly, the revised rules for teacher licensure changed the grade levels that education students will be certified to teach from grades 5-12 to grades 4-12. This revision of the Physical Science teaching major is in response to these revised DPI rules. Moreover, this revised major aligns with the national standards for the preparation of science teachers according to the National Science Teaching Association (NSTA). With the proposed revisions, we will be preparing students who will be able to teach a broad range of science subjects in grades 4-12.

Finally, the proposed revisions constitute a substantive change. The changes fit the definition of a substantive change according to system policy. The changes do not exceed 30% of the requirements for the program, there will be no changes to the UW System major code, and the first two digits of the Classification of Instructional Program (CIP) code remain the same.