To: Dean Van Galen, Chancellor  
116 North Hall  
University of Wisconsin-River Falls

From: Wes Chapin, Chair  
Faculty Senate  
University of Wisconsin-River Falls

June 14, 2012

RE: UWRF Faculty Senate Motion 2012-13/3

At the June 12, 2012 meeting of University of Wisconsin-River Falls Faculty Senate, motion 2012-13/3 was passed and it is effective immediately. This motion is forwarded to you for your action.

Motion from the Academic Programs and Policies Committee (Steve Kelm, Chair) to approve the proposed program changes within the Broad Field Science Education major.

Approved

Disapproved

Dean Van Galen, Chancellor

Date
TRANSMITTAL for UNDERGRADUATE PROGRAMS: Changes or Proposals

INFORMATION

1. Program title: Broad Field Science Education
2. Department(s): Teacher Education
3. College(s): Education And Professional Studies
4. Proposal prepared by: Mike Harris/Diane Bennett Date: 2/15/2012

5. Check all that apply:
   - New program
   - Change in course name
   - Change in Major
   - Change in course content
   - Existing program
   - Change in number of credits
   - Change in Minor
   - Change in Emphasis/Option

6. Other Programs/Departments Consulted (Requires letters of support from all Departments or Programs substantially affected):
   1. Chemistry
   2. Biology
   3. Physics
   4. Geology

7. Date of Implementation: Fall Semester 2012 Year

8. Have all courses in this program been approved? Yes ☐ No ☑
   If “No,” which ones? CHEM 261, CHEM 322, ESM 302

9. Attach Request Narrative. (Include description of program before and after proposed changes).

UNIT APPROVALS: Requires signatures of all Departments Chairs and Deans whose programs will be affected by the changes or proposal. Signature lines for the affected Departments and Colleges (Noted in 6 above), are on the back of this form. These signatures should be obtained prior to review by all other shared governance levels.

<table>
<thead>
<tr>
<th>Department Chair</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>James</td>
<td>2/22/12</td>
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<tr>
<td>College Curriculum Cmtt. Chair</td>
<td></td>
<td>3/19/12</td>
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<tr>
<td>Faculty Senate Chair</td>
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<tr>
<td>Provost / Vice Chancellor</td>
<td></td>
<td>7/2/12</td>
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<tr>
<td>Chancellor</td>
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<td>6/30/12</td>
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NOTE: The master copy of this transmittal and accompanying documents must be filed in the Provost’s office upon final approval. The Provost’s office will notify all appropriate administrative offices [Registrar, Dean(s), and Department Chair(s)] of approvals and necessary actions to implement changes.

Rev. 11/08
<table>
<thead>
<tr>
<th>Role</th>
<th>Signature</th>
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<tbody>
<tr>
<td>Department Chair</td>
<td>Karl P. P.</td>
<td>2-23-12</td>
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<tr>
<td>Department Chair</td>
<td>Donavan F.</td>
<td>23 Feb 2012</td>
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<tr>
<td>Biology Department Chair</td>
<td>B. H.</td>
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</table>

Rev. 11/08
OLD CURRICULUM: Broad Field Science Education (149 credits to degree)

University Requirements (6)
  Cultural Diversity: (3)
  Global Perspectives: (3)

General Education (38)
  Communication: ENG 100 (3)
  Communication: ENG 200 (3)
  Communication: COMS 101 (3)
  Social and Behavior Science: (6)
  Humanities and Fine Arts (HF): (3) ART 100 or DANC 100 or MUS 100 or THEA 105 or PHIL/ART 310
    (Satisfies DPI Part A2)
  Humanities and Fine Arts: ENGL 105 or 106 or 107 (3)
    (Satisfies DPI Part B, Literature course)
  Mathematics: (3)
  Scientific Investigation: (SL) (3) Double Counts in Major
  Sciences: (5) (3) Double Counts in Major
  Multidisciplinary inquiry (3)
  Personal Health and Wellness: PED 108 (1)
  Personal Health and Wellness: PE (1/2)
  Personal Health and Wellness: PE (1/2)
  Ethical Citizenship (3)

Professional Education (42 credits)
  TED 120 Intro to Education and Instructional Technology (3)
  TED 212 Educational Psychology: Middle and Secondary Education (5)
  TED 252 Foundations of Multicultural Education (3)
  TED 414 Development of the Transescent (4)
  TED 434 Techniques in Science (3)
  TED 462 Content Area Literacy in Middle and Secondary School Science Education (3)
  TED 465 Management Strategies for the Secondary Science Classroom (3)
  TED 473 Student Teaching: Middle School (6)
  TED 474 Student Teaching: Secondary Education (6)
  SPED 330 Exceptional Child (3)
  TED 420 School and Society (3)

Broad Field Science: (63)
  BIOL 150, 210, 230 (9)
  CHEM 121, 122, (10)
  GEOL 101, 102, 150, 202 (11)
  PHYS 151, 152, 156, 157 (10)
  OR 161, 166, 162, 167
  ESM 300 OR GEOG 300 (3)
  Two supporting areas (20)
OLD CURRICULUM: Broad Field Science Education—PHYSICAL SCIENCE CERTIFICATION (147 credits to degree)

University Requirements (6)
   Cultural Diversity: (3)
   Global Perspectives: (3)

General Education (38)
   Communication: ENG 100 (3)
   Communication: ENG 200 (3)
   Communication: COMS 101 (3)
   Social and Behavior Science: (6)
   Humanities and Fine Arts (HF): (3) ART 100 or DANC 100 or MUS 100 or THEA 105 or PHIL/ART 310
      (Satisfies DPI Part A2)
   Humanities and Fine Arts: ENGL 105 or 106 or 107 (3)
      (Satisfies DPI Part B, Literature course)
   Mathematics: (3)
   Scientific Investigation: (SL) (3) Double Counts in Major
   Sciences: (5) (3) Double Counts in Major
   Multidisciplinary Inquiry (3)
   Personal Health and Wellness: PED 108 (1)
   Personal Health and Wellness: PE (1/2)
   Personal Health and Wellness: PE (1/2)
   Ethical Citizenship (3)

Professional Education (42 credits)
   TED 120 Intro to Education and Instructional Technology (3)
   TED 212 Educational Psychology: Middle and Secondary Education (5)
   TED 252 Foundations of Multicultural Education (3)
   TED 414 Development of the Transcendent (4)
   TED 434 Techniques in Science (3)
   TED 462 Content Area Literacy in Middle and Secondary School Science Education (3)
   TED 465 Management Strategies for the Secondary Science Classroom (3)
   TED 473 Student Teaching: Middle School (6)
   TED 474 Student Teaching: Secondary Education (6)
   SPED 330 Exceptional Child (3)
   TED 420 School and Society (3)

   Broad Field Science: (61)
   CHEM 6 courses: (17)
      Select from CHEM 121, 122, 230 (or 231), 236, 251
   PHYS 7 courses (21)
      Select from PHYS 161, 166, 162, 167, 264, 311, 331
   CHEM 7 courses (21)
      Select from CHEM 232, 237, 311, 340, 341, 342, 355, 356, 361, 411, 416, 422, 461
   PHYS 300 level or above (3)
   MATH (or PHYS) (10)
   ESM 300 OR GEOG 300 (3)
NEW Broad Field Science Education with Major Emphases (132-135 credits to degree)

University Requirements (0) (3 credits counted in General Education; 3 credits counted in Professional Education)

Cultural Diversity: TED 252 (counted below)**

Global Perspectives: HIST 201: Intro to Asian Civilization (counted below)**
(Satisfies three requirements: DPI Part C, Global Perspectives, and Social & Behavior Science)

General Education (32-33)
Communication: ENG 100 (3)
Communication: ENG 200 (3)
Communication: COMS 101 (3)

Social and Behavior Science: HIST 201 (3)**
(Satisfies DPI Part C, Non-Western History or Contemporary Culture)

Social and Behavior Science: any SB course (3)**
(Satisfies DPI Part D, Western History or Contemporary Culture)

Humanities and Fine Arts: ART 100, DANC 100, MUS 100, THEA 105, or PHIL/ART 310 (3)
(Satisfies DPI Part A2)

Humanities and Fine Arts: ENGL 105, 106 or 107 (3)
(Satisfies DPI Part B, Literature course)

Math: MATH 166 (4) (Chemistry, Physical Science, & Physics, emphases); MATH 216, 226 or 336 (3) for Biology emphasis)**

Scientific Investigation: Inherent in major (0)

Sciences: Inherent in major (0)

Multidisciplinary Inquiry: ESM 300 (3) (Physical Science Emphasis); any approved course for Biology, Chemistry, & Physics emphases)

Personal Health and Wellness: PED 108 (1)

Personal Health and Wellness: PE (1/2)

Personal Health and Wellness: PE (1/2)

Ethical Citizenship: GEOL 269 (3) (Biology, Chemistry, & Physics emphases); any approved course for Physical Science emphasis)**

Professional Education (42 credits)
TED 120 Intro to Education and Instructional Technology (3)
TED 212 Educational Psychology: Middle and Secondary Education (5)
TED 252 Foundations of Multicultural Education (3)
TED 414 Development of the Transcendent (4)
TED 434 Techniques in Science (3)
TED 462 Content Area Literacy in Middle and Secondary School Science Education (3)
TED 465 Management Strategies for the Secondary Science Classroom (3)
TED 473 Student Teaching: Middle School (6)
TED 474 Student Teaching: Secondary Education (6)
SPED 330 Exceptional Child (3)
TED 420 School and Society (3)
**OPTION A: Broad Field Science Education: Biology Major Emphasis (59-60 credits)**

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<tr>
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<th>Credits</th>
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<tr>
<td>BIOL 150</td>
<td>General Biology</td>
<td>(3)</td>
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<tr>
<td>BIOL</td>
<td>General Botany (210) OR General Zoology (230) OR Cell and Molecular Biology (240)</td>
<td>(3)</td>
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<tr>
<td>CHEM 121</td>
<td>General Chemistry I (5) OR CHEM 120 Introduction to General Chemistry (6)</td>
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<td>CHEM 122</td>
<td>General Chemistry II (5)</td>
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<tr>
<td>GEOL 102</td>
<td>Introductory Geology Lab</td>
<td>(1)</td>
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<tr>
<td>ESM 302</td>
<td>Environmental Education Lab*</td>
<td></td>
</tr>
<tr>
<td>PHYS 117</td>
<td>Astronomy</td>
<td>(3)</td>
</tr>
<tr>
<td>PHYS 151</td>
<td>Algebra-based Physics I</td>
<td>(4)</td>
</tr>
<tr>
<td>PHYS 156</td>
<td>Algebra-based Physics Laboratory I</td>
<td>(1)</td>
</tr>
<tr>
<td>PHYS 152</td>
<td>Algebra-based Physics II</td>
<td>(4)</td>
</tr>
<tr>
<td>PHYS 157</td>
<td>Algebra-based Physics Laboratory II</td>
<td>(1)</td>
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<tr>
<td>BIOL 110</td>
<td>Freshmen Colloquium</td>
<td>(1)</td>
</tr>
<tr>
<td>BIOL 230</td>
<td>General Zoology</td>
<td>(3)</td>
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<tr>
<td>BIOL 240</td>
<td>Cell and Molecular Biology</td>
<td>(3)</td>
</tr>
<tr>
<td>BIOL 350</td>
<td>Genetics and Evolution</td>
<td>(3)</td>
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<tr>
<td>BIOL 360</td>
<td>Ecology</td>
<td>(3)</td>
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<tr>
<td>BIOL 471</td>
<td>Lab Teaching Experience</td>
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Advanced Biology Electives: choose 14 credits from the following list of recommended electives (14)

**Recommended Electives:**

<table>
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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
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<td>BIOL 296</td>
<td>Field Research Experience</td>
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<td>BIOL 305</td>
<td>Applications in Molecular Biology</td>
<td>(3)</td>
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<tr>
<td>BIOL 307</td>
<td>Human Heredity</td>
<td>(2)</td>
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<tr>
<td>BIOL 310</td>
<td>Identification of Plants</td>
<td>(3)</td>
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<td>BIOL 324</td>
<td>Microbiology</td>
<td>(4)</td>
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<tr>
<td>BIOL 333</td>
<td>Entomology</td>
<td>(3)</td>
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<td>BIOL 341</td>
<td>Anatomy and Physiology I</td>
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<td>BIOL 342</td>
<td>Anatomy and Physiology II</td>
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<td>BIOL 344</td>
<td>Wildlife Biology</td>
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<td>BIOL 345</td>
<td>Immunology</td>
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<td>BIOL 353</td>
<td>Histology</td>
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<td>BIOL 354</td>
<td>Freshwater Biology</td>
<td>(3)</td>
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<td>BIOL 364</td>
<td>Developmental Biology</td>
<td>(3)</td>
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<td>BIOL 434</td>
<td>Ichthyology</td>
<td>(3)</td>
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<tr>
<td>BIOL 444</td>
<td>Ornithology</td>
<td>(3)</td>
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<tr>
<td>BIOL 451</td>
<td>Molecular Biology</td>
<td>(4)</td>
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<td>BIOL 453</td>
<td>Virology</td>
<td>(3)</td>
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<tr>
<td>BIOL 481</td>
<td>Seminar</td>
<td>(1)</td>
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<tr>
<td>BIOL 499</td>
<td>Independent Study</td>
<td>(1-3)</td>
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</tbody>
</table>
Required Supporting Coursework:
GEOL 269  Environmental Geology (counted in general education) (0)

Earth and Space Science Licensing for Option A:

An Earth and Space Science license will be earned upon completion of the coursework listed below. This additional concentration is based on 16-19 total credits of earth and space science coursework. Overlap with required coursework in the major will allow for this add-on license to be completed with an additional 8 - 11 credits.

GEOL 269  Environmental Geology (3 cr, completed in major)
GEOL 102  Introductory Geology Lab (1 cr, completed in major)
ESM 302  Environmental Education Lab (1cr, completed in major)
PHYS 117  Astronomy (3 cr, completed in major)
GEOL 330  Meteorology (3 cr)

Choose 2 of the following courses:

GEOL 150  Historical Geology (4 cr)
PHYS 318  Astrophysics (3 cr)
GEOL 305  Geology of the Planets (2 cr)
GEOL 441  Introduction to Geophysics (4 cr)

Recommended Supplemental Coursework:
GEOL 202  Oceanography (3 cr)
ESM 360  Hydrology and Water Quality (4 cr)
OPTION B: Broad Field Science Education: Chemistry Major Emphasis (57-58 credits) **

BIOL 150 General Biology (3)
BIOL General Botany (210) OR General Zoology (230) OR Cell and Molecular Biology (240) (3)
CHEM 121 General Chemistry I (5) OR CHEM 120 Introduction to General Chemistry (6)
CHEM 122 General Chemistry II (5)
ESM 302 Environmental Education Lab (1)*
GEOL 102 Introductory Geology Lab (1)
PHYS 117 Astronomy (3)

PHYS 161 Calculus-based Physics I (4)
PHYS 166 Calculus-based Physics Laboratory I (1)
PHYS 162 Calculus-based Physics II (4)
PHYS 167 Calculus-based Physics Laboratory II (1)

CHEM 231 Organic Chemistry I (3)
CHEM 236 Organic Chemistry Lab I (1)
CHEM 232 Organic Chemistry II (3)
CHEM 237 Organic Chemistry Lab II (1)
CHEM 250 Foundations of Analytical Chemistry (4)
CHEM 361 Biochemistry I (3)
CHEM 340 Physical Chemistry of Biological Systems (3)
CHEM 322 Inorganic Chemistry (4)*
CHEM 480 Chemical Communications and Research (1)

CHEM 261 Laboratory Safety (2)*

Advanced Lab and Research Series: (choose one)
CHEM 355 Separation Science Laboratory (1)
CHEM 356 Chemical Instrumentation Lab (1)
CHEM 366 Biochemistry Laboratory (1)
CHEM 495 Undergraduate Research (1)

Required Supporting Coursework:

GEOL 269 Environmental Geology (counted in general education) (0)

Earth and Space Science Licensing for Option B:

An Earth and Space Science license will be earned upon completion of the coursework listed below. This additional concentration is based on 16-19 total credits of earth and space science coursework. Overlap with required coursework in the major will allow for this add-on license to be completed with an additional 8 - 11 credits.

GEOL 269 Environmental Geology (3 cr, completed in major)
GEOL 102 Introductory Geology Lab (1 cr, completed in major)
ESM 302 Environmental Education Lab (1cr, completed in major)
PHYS 117 Astronomy (3 cr, completed in major)
GEOL 330 Meteorology (3 cr)

Choose 2 of the following courses:
GEOL 150  Historical Geology (4 cr)
PHYS 318  Astrophysics (3 cr)
GEOL 305  Geology of the Planets (2 cr)
GEOL 441  Introduction to Geophysics (4 cr)

Recommended Supplemental Coursework:
GEOL 202  Oceanography (3 cr)
ESM 360  Hydrology and Water Quality (4 cr)
Option C: Broad Field Science Education: Physical Science (Physics and Chemistry) Major Emphasis (58-60) **

MATH 167 Calculus II (4)
PHYS 161 Calculus-based Physics I (4)
PHYS 166 Calculus-based Physics Laboratory I (1)
PHYS 162 Calculus-based Physics II (4)
PHYS 167 Calculus-based Physics Laboratory II (1)

PHYS 264 Modern Physics (4)
PHYS 311 Electronics: Circuits and Devices (4)
PHYS 362 Mathematics of Physics and Engineering II (3)

Choose 6 credits from the following electives:
  PHYS 204 Intermediate Physics Lab (1)
  PHYS 220 Science of Light (3)
  PHYS 250 Statics (3)
  PHYS 312 Electronics: Linear Integrated Circuits (3)
  PHYS 313 Digital Electronics (3)
  PHYS 318 Astrophysics (3)
  PHYS 331 Curriculum Physics (3)

CHEM 121 General Chemistry I (5) OR CHEM 120 Introduction to General Chemistry (6)
CHEM 122 General Chemistry II (5)

CHEM 231 Organic Chemistry I (3)
CHEM 236 Organic Chemistry I Lab (1)
CHEM 232 Organic Chemistry II (3)
CHEM 237 Organic Chemistry II Lab (1)

CHEM 250 Foundations of Analytical Chemistry (4)
CHEM 261 Laboratory Safety (2)*

Choose one of the following electives:

  CHEM 311 Polymer Chemistry (3)
  CHEM 322 Inorganic Chemistry (4)*
  CHEM 340 Physical Chemistry of Biological Systems (3)
  CHEM 341 Chemical Thermodynamics and Kinetics (3)
  CHEM 342 Molecular Structure and Spectroscopy (3)
  CHEM 361** Biochemistry I (3) (requires BIOL 150 as prerequisite)
  CHEM 461 Pharmacology (3)

Earth and Space Science Licensing for Option C:

An Earth and Space Science license will be earned upon completion of the coursework listed below. This additional concentration is based on 16-19 total credits of earth and space science coursework. Overlap with required and elective coursework in the major will allow for this add-on license to be completed with an additional 5 - 11 credits.
GEOL 269  Environmental Geology (3 cr, completed in major)
GEOL 102  Introductory Geology Lab (1 cr, completed in major)
ESM 302  Environmental Education Lab (1 cr, completed in major)
PHYS 117  Astronomy (3 cr, completed in major)
GEOL 330  Meteorology (3 cr)

Choose 2 of the following courses:

GEOL 150  Historical Geology (4 cr)
PHYS 318  Astrophysics (3 cr, possible elective in major)
GEOL 305  Geology of the Planets (2 cr)
GEOL 441  Introduction to Geophysics (4 cr)

Recommended Supplemental Coursework:
GEOL 202  Oceanography (3 cr)
ESM 360  Hydrology and Water Quality (4 cr)
Option D. Broad Field Science Education: Physics Major Emphasis (57-58) **

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<td>CHEM 122</td>
<td>General Chemistry II (5)</td>
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<tr>
<td>ESM 302</td>
<td>Environmental Education Lab (1) *</td>
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<td>GEOL 102</td>
<td>Introductory Geology Lab (1)</td>
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<td>PHYS 117</td>
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<td>PHYS 161</td>
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<td>PHYS 167</td>
<td>Calculus-based Physics Laboratory II (1)</td>
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<td>MATH 167</td>
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<td>Phys 204</td>
<td>Intermediate Physics Lab (1)</td>
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<td>Phys 311</td>
<td>Electronics: Circuits and Devices (4)</td>
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<td>Phys 318</td>
<td>Astrophysics (3)</td>
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<td>Phys 485</td>
<td>Senior Seminar (1)</td>
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<td>Phys 362</td>
<td>Mathematics of Physics and Engineering II (3)</td>
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Choose 6 credits from the following electives:

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<td>PHYS 250</td>
<td>Statics (3)</td>
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<td>PHYS 312</td>
<td>Electronics: Linear Integrated Circuits (3)</td>
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<td>PHYS 313</td>
<td>Digital Electronics (3)</td>
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<td>PHYS 331</td>
<td>Curriculum Physics (3)</td>
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</table>

Required Supporting Coursework:

GEOL 269  Environmental Geology (counted in general education) (0)

*Adoption pending university approval of this new course

Earth and Space Science Licensing for Option D:

An Earth and Space Science license will be earned upon completion of the coursework listed below. This additional concentration is based on 16-19 total credits of earth and space science coursework. Overlap with required coursework in the major will allow for this add-on license to be completed with an additional 5 – 7 credits.

<table>
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<tr>
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<tr>
<td>GEOL 269</td>
<td>Environmental Geology (3 cr, completed in major)</td>
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<tr>
<td>GEOL 102</td>
<td>Introductory Geology Lab (1 cr, completed in major)</td>
<td></td>
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<tr>
<td>ESM 302</td>
<td>Environmental Education Lab (1cr, completed in major)</td>
<td></td>
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<tr>
<td>PHYS 117</td>
<td>Astronomy (3 cr, completed in major)</td>
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<tr>
<td>GEOL 330</td>
<td>Meteorology (3 cr)</td>
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</tbody>
</table>

Choose 2 of the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GEOL 150</td>
<td>Historical Geology (4 cr)</td>
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</table>
PHYS 318       Astrophysics (3 cr, completed in major)
GEOL 305       Geology of the Planets (2 cr)
GEOL 441       Introduction to Geophysics (4 cr)

Recommended Supplemental Coursework:
GEOL 202       Oceanography (3 cr)
ESM 360        Hydrology and Water Quality (4 cr)

*Pending university approval of this new course

**Indicates change from previous curriculum
Rationale: Changes in Broad Field Science Education

The College of Education and Professional Studies in partnership with the College of Arts and Sciences is seeking support for a revised set of Broad Field Science programs which are aimed at rigorous and efficient preparation of future science teachers.

In the spring of 2011, a self-study assessment of the Broad Field Science Program was prepared. This assessment was presented to the Program Audit and Review committee in June 2011. The assessment revealed the need for a restructuring of the BFS program. Key issues were a concern about the lack of appropriate science content preparation, the lack of a “home base” for students, the coordination of the BFS program, and the market strength of the BFS major.

The first priority was the determination of the marketability of the Broad Field Science Programs. This involved face-to-face interviews with a variety people: UWRF faculty, current BFS students and alumni, and middle school teachers, high school teachers and administrators from private K-12 schools, middle schools, and high schools.

The current Broad Field Program includes the following options

- Broad Field Science-Liberal Arts
- Broad Field Science Certification
- Broad Field Science-Physical Science Certification

The input strongly favored eliminating the Broad Field Science-Liberal Arts option. This option does not prepare the student to be especially marketable as it is designed to provide a general and basic science education. This is the one BFS option which does not result in teacher licensing.

The input clearly indicated a support for teacher training which includes a broad science education coupled with a rigorous content preparation in a core science. This combination of broad science preparation and in-depth preparation in one science was universally valued. The core science training (and H.S. level licensing) equips the teacher with a firm grasp of the subject matter, quite beyond the level about which they will be teaching. This teacher provides the H.S. the ability to offer advanced high school and college-level coursework. The Broad Field Science education (and BFS “601” license) prepares the teacher to understand the interplay between the different branches of science. This teacher is valuable as a middle school general science teacher. This teacher has increased market value at the high school level. The understanding of other science disciplines makes the teacher more able to make connections between their subject matter and branches of science.

This narrative is related to a modification of the existing Broad Field Science Certification program. This program is a comprehensive major in which the student earns a BFS (601) license and two specialty licenses. The specialty licensing was awarded based on coursework completed in two areas of concentration: biology, chemistry, physics, or earth science.

It is proposed that this single program with a myriad of permutations of concentrations be replaced by four distinct major emphases. These programs are distinct from the current program in that they:

- require the student to choose a single area of specialization in a core science
- limited the core science to biology, chemistry, and physics (including physical science)
- require substantially more rigorous core science coursework
- are based on a major (defined as 34 credits or greater) in the core science
- enable streamlining of the Minnesota licensing process
- will be housed in their respective science departments
- correct known program deficiencies
- provide an add-on certification option to enable licensing in Earth and Space Science

In addition, the proposed curricula significantly reduce the credits to degree for students pursuing Broad Field Science degrees.