

TO: Committee on Teacher Education

FROM: Troy Sadler

DATE: 3 March 2003

RE- Revised Proposal for Modifications to the Secondary Science Education Program

1) Change/Program Description

All secondary program areas are in the midst of enacting a new program for the B.S. in Secondary Education. Although the science program was modified slightly, it is not consistent with the other program areas (following the new "Anchor Model"). Whereas the other program areas prescribe three blocks as a part of the Teacher Education Program, science prescribes only two blocks. I would like to modify the science education program to become consistent with the new Anchor Model.

In order to enact this change, M346 (Exploring School Science Teaching) needs to be changed from a 2 credit course to a 3 credit course. M446 (Methods of Teaching SH/JH/MS Science) is a variable credit (1-5) course that is currently offered for 5 credits. If these changes are approved, it would be offered for 3 credits. The proposed changes would also mean that M480 (student teaching) for science education students would increase from 10 credits to 12 credits, because it would no longer be associated with the second field experience (M41 1). This would require student teachers to spend an additional two weeks in their student teaching classrooms to become acquainted with their cooperating teachers, students, school policies, etc. Because the science education student teachers would be following the same schedule as their peers from other content areas, the proposed changes would enable them to participate in M420 (Professional Development Seminar). These Changes, which are outlined in Table I would add 3 credits to the science education program, and align it with all other content areas.

The addition of 3 credit hours would increase the total hours required for the B.S. degree in secondary education to 143-147. The other faculty in science education and I believe that this requirement is inappropriately high for an undergraduate degree and will likely deter future students from majoring in science education. Therefore, in addition to the change in M346, this proposal also suggests modifications to the science content courses required for the degree. The changes would reduce the science course requirements from 64-68 to 49-53 credit hours. This would reduce the number of credits required for graduation to 128-132. However, it should be noted that students could double count at least 12 credits for the general education and content requirements (9 credits for Natural & Mathematical sciences and 3 credits for either the Arts & Humanities or Social & Historical Sciences requirements). The proposed changes are shown in an attached document; the existing program overview is attached for comparisons.

2) Rationale

Adopting the modifications proposed would be beneficial for several reasons:

- a) The modified program would align with the other content areas adding coherence to the secondary education program.
- b) The modified program would facilitate the scheduling of corequisite courses that will be shared by math and science education majors (i.e., W301, W401, and M469).

- c) The modified program would facilitate the articulation of the science education program with the Community of Teachers and Transition to Teach programs.
- d) The modified program would no longer require students to take 18 credits during the semester of student teaching.
- e) In the current structure, student teaching must be completed in or around Bloomington, which is becoming problematic. The modified program would enable students to student teach in other regions of the state.
- f) The modified program allows our students to experience 3 authentic teaching contexts-as opposed to only 2.
- g) Because of reductions in credit hours necessary for degree completion, it will be easier to recruit and maintain science education majors.

3) Faculty Staffing

The current course structure requires that science education faculty or associate instructors cover 10 credit hours of methods courses and field placements. The proposed program would require the same coverage of 10 credit hours for methods courses and field placements. Student teaching would increase by 2 credit hours and science students would enroll in the 1 credit professional development seminar.

4) Principle/Standard Documentation

Because the new Anchor Program was designed to address SOE Guiding Principles and IPSB standards and the proposed changes would align the science education program with the Anchor Program, the modified program is consistent with the Principles and Standards. Despite the proposed reductions in content courses, students will still meet the state science standards as well as be prepared for the PRAXIS H exams.

5) Integration with Existing Programs

The changes proposed are specifically designed to make the science education program more consistent with other programs in the School of Education.

6) Implementation Time Line

I would like to implement the modified, 3 credit M346 (and the rest of Block I) beginning in spring 2006. The 3 credit version of M446 (and the rest of Block 11) would first be offered in fall 2006. Block 111 which would include the 12 credit M480 and M420 would begin in spring 2007. Table 2 presents the implementation timeline. This schedule would enable all students who have currently declared science education as a major to complete their programs with the old requirements.

Table 1. A Comparison of the existing science education program, the proposed changes, and the secondary Anchor Model.

Existing Science Ed Program		Proposed Changes to the Science Ed Program		Anchor Model	
Course	Cr	Course	Cr	Course	Cr
<i>Semester I</i>		<i>Block I</i>		<i>Block I</i>	
M346 Exploring School Science Teaching	2	M346 Exploring School Science Teaching	3	M3XX Special Methods 1	3
M303 Field Experience I	1	M303 Field Experience I	2	M303 Field Experience 1	2
M469 Literacy	2	M469 Literacy	2	M469 Literacy	2
W301 Technology B	1	W301 Technology B	1	W301 Technology B	1
Credits	6	Credits	8	Credits	8
<i>Semester II</i>		<i>Block II</i>		<i>Block II</i>	
M446 Methods of ... SH/JHYMS Teaching Science	5	M446 Methods of Teaching SIVJHJMS Science	3	M4XX Special Methods II	3
M411 Field Experience 11	2	M403 Field Experience R	2	M403 Field Experience II	2
W401 Technology C	1	W401 Technology C	1	W401 Technology C	1
M480 Student Teaching	10				
Credits	18	Credits	6	Credits	6
		<i>Block III</i>		<i>Block III</i>	
		M480 Student Teaching	12	M480 Student Teaching	12
		M420 Professional Development Seminar	1	M420 Professional Development Seminar	1
		Credits	13	Credits	13
Total Credits	24	Total Credits	27	Total Credits	27

Table 2. Proposed implementation timeline. Only those courses which would be altered are shown.

Semester	.Block I	Block 11	Block IH
Fall 05	M346(2cr) M303(1cr)	M446(5cr) M411 M480(10cr)	
Spring 06	M346(3cr) M303(2cr)	M446(5cr) M411 M480(10cr)	
Fall 06	M346(3cr) M303(2cr)	M446(3cr) M403(2cr)	
Spring 07	M346(3cr) M303(2cr)	M446(3cr) M403(2cr)	M480(12cr) M420

Proposed Changes to the Content Field requirements for the Secondary Science degree program

A. Secondary Science Education CORE (32 credits)

(All science majors must complete the following courses.)

BIOL L112 Introduction to Biology: Biological Mechanisms	3
BIOL 1-1 1 1 Introduction to Biology: Evolution & Diversity &	3
CHEM C1 17 Principles of Chemistry & Biochem I	5
CHEM C1 18 Principles of Chemistry & Biochem If	5
GEOG G107 Physical Systems of the Environment	3
GEOL G104 Earth Science: Evolution of the Earth	3
PHYS P201 General Physics I AND	5
PHYS P202 General Physics 11	5
OR	
PHYS P221 Physics I AND	5
PHYS P222 Physics If	5

B. Certification Concentration Areas (14-18 credits minimum)

(select one area)

AREA I EARTH-SPACE SCIENCE (18 credits minimum)

Required Courses

AST A201 General Astronomy I	3
AST A202 General Astronomy 11	3
GEOG G304 Physical Meteorology & Climatology	3
GEOL G225 Earth & Materials (P: CHEM C101 or C105)	4

Elective Group

G-01- G329 Introductory Field Experience in Environ. Sci. 5 (P: One course In environmental Science & G225)	5
G300 Environmental and Urban Geology (P: One course physical or gen. geology or physical gecog)	3
G302 Development of the Global Environment (P: One course in ASTR, CHEM, PHYS, and MATH M1 18)	3
G334 Prin. of Sedimentology.& Strat.(P: G222 or G225)	3
G415 Geomorphology (15: G222 or G225 & C101 or C105 & MI 19 or M21 1)	3

AREA 11 LIFE SCIENCE BIOLOGY (18 credits minimum)

Required Courses

BIOL L113 Biology Lab (P or C- LI 12 & I-11 1)	3
BIOL L211 Molecular Biology (P: LI 12)	3
BIOL L311 Genetics (P: L211)	3
BIOL L31 8 Evolution (P: L31 1)	3
BIOL L473 Ecology (P: L31 8 or consent of instructor)	3

Elective Group

BIOL 1-3i 2 Cell Biology (P: L21 1)	3
BIOL L313 Cell Biology Lab (P- LI 12 & 1-11 13 or C383 or C384 & C- L312)	3
BIOL L317 Developmental Biology (P: L31 1)	3
BIOL L319 Genetics Lab (P or C* L317)	3
BIOL M31 0 Microbiology (P, L211 & 2 semester chemistry)	3
BIOL M315 Microbiology Lab (C: M31 0)	2
BIOL B300 Vascular Plants (P.- Intro to Biology)	3
BIOL L341 Natural History of Coral Reefs Field Course (P: Intro Biology, one course In organismal bio or ecology, sedimentology or stratigraphy, & swimming proficiency)	4
BIOL L351 Fungi (P: 1-11 1 1, & LI 12)	3
BIOL L352 Fungi Lab (P or C: B351)	2
BIOL B364 Summer Flowering Plants (P: Intro BIOL)	5
BIOL B373 Plant Development (P: LI I 1 & L21 1)	3
BIOL Z374 Invertebrate Zoology (P- Intro BIOL)	3
BIOL M375 Human Parasitology (P- LI I I & L211) 3	3
BIOL L376 Biology of Birds (P: LI I I & L21 1)	3
BIOL Z406 Vertebrate Zoology (P. LI I & L21 1)	3
BIOL L433 Tropical Biology (Field Course)	3
BIOL L490 Independent Research (P: 2.5 GPA)	3
SPEA E410 Introduction to Environmental Toxicology (P: SPEA E272 or H16 & a BIOL course)	3
SPEA E442 Habitat Analysis Terrestrial (Field	3

SPEA E443 Habitat Analysis Aquatic (Field Course)	3
SPEA E455 Limnology	3
(P: SPEA E272 or H316 & C101 or C105)	
SPEA E547 Introduction to Conservation Biology (P: Ecol)	3
GEOL G41 1 Invertebrate Paleontology	3
(P: LI 1 1 or LI 12 & 300-400 level BIOL or GEOL course)	

AREA III PHYSICAL SCIENCE (17 credits minimum)

Required Courses

CHEM C341 Organic Chemistry I (P: C106)	3
CHEM C342 Organic Chemistry 11 (P:C341)	3
CHEM C360 Intro to Physical Chemistry	3
(P: C1 17 & MI 19 & P201)	
PHYS P301 Physics III (P: P202 or P222) OR	3
PHYS P300 General Physics III (P: P202 or P222)	3
Elective Group I (Select at least one)	
CHEM C343 Organic Chemistry Lab (P: C341 & C- C342)	2
PHYS P309 Modern Physics Lab (P: P301)	2
Elective Group 11 (Select at least one)	
PHYS P31 0 Environmental Physics (P: P201 & M21 1)	3
PHYS P331 Theory of Electricity & Magnetism	3
(P: P222 or P202 & M212)	

AREA IV CHEMISTRY (14 credits minimum)

Required Courses

CHEM C341 Organic Chemistry I (P: C106)	3
CHEM C342 Organic Chemistry 11 (P:C341)	3
CHEM C343 Organic Chemistry Lab (P: C341 & C- C342)	2
CHEM C360 Intro to Physical Chemistry	3
(P: C1 06 & MI 19 & P201)	
Elective Group (Select at least one)	
CHEM C315 Chemical Measurements (P: C317 & C318)	3
CHEM C317 Equilibria & Electrochemistry	3
(P: C341 & M211 or M215)	
CHEM C318 Spectrochemistry & Separations	2
(P: C341 & M211 or M215)	
CHEM C361 Physical Chemistry of Bulk Matter	3
(P: C1 06 & M212 or M216 & P202 or P222)	
CHEM C430 Inorganic Chemistry (P: C1 06 & C- C34 1)	3
CHEM C483 Biological Chemistry (P: C342 & 15 c. CHEM)	3
CHEM C484 Biomolecules & Catabolism	3
(P: C341 & C342 & 12 c. CHEM)	
CHEM C485 Biosynthesis & Physiology (P: C484)	3
GEOG G434 Air Pollution Meteorology (P: G304)	3
GEOL G406 Intro to Geochemistry	3
(P: G222 or G225 & M212 & C106)	
GEOL G444 Methods In Analytical Chemistry	2
SPEA E451 Air Pollution & Control	3
(P: E272 or H316 & C101 or C105 & M1 19 or M21 1)	

AREA V PHYSICS (14 credits minimum)

Required Courses

PHYS P301 Physics III (P: P202 or P222) OR	3
PHYS P300 General Physics III (P: P202 or P222)	3
PHYS P309 Modern Physics Lab (P: P301)	2
PHYS P31 0 Environmental Physics (P: P201 & M21 1)	3
PHYS P331 Theory of Electricity & Magnetism	3
(P: P222 or P202 & M212)	
Elective Group (Select at least one)	
PHYS P332 Theory of Electricity & Magnetism 11	3
(P: P331 & M212)	
PHYS P340 Thermodynamics & Stat. Mechanics (C: M31 1)	3
PHYS P360 Physical Optics (P: P331)	3
PHYS P400 Digital-Analog Electronics I AND	3
PHYS P401 Digital-Analog Electronics 11	3
PHYS P410 Computing Aps. in Physics (P: P332 & C301)	3
PHYS P441 Analytical Mechanics (P: M343 & M212)	3