Mathematics and Science Concentration

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Proposed Course Work for a Mathematics/Science Concentration

MATH   131   Math for Elementary Teachers II (3 cr.)
EDUC   N102 Teaching and Learning Elementary School Mathematics (3 cr.)
EDUC   N343 Math in the Elementary School (3 cr.)

PHYS   20000 Physical Environment
EDUC   Q200 Scientific Inquiry
EDUC   Q405 Integrated Science for Science Education (3 cr.)

The concentration is 18 credits: 12 of these credits are pre-requisites for entry into the elementary education program and 6 of these credits students will take once they have been admitted to the elementary education program. This means that students can get the concentration within the 120 credit hour limit. The 6 credits students will take after they are admitted to the elementary education program are N343 and Q405.

Pre-Requisites: MATH 130, MATH 132, BIOL N100, and GEOG G110 OR G107

Rationale

The science education and mathematics education faculty are proposing a concentration in science and mathematics for elementary education majors that satisfies the requirements for a REPA II concentration. The concentration contains coursework that will allow our elementary education majors to be well prepared to teach science and mathematics courses to *all* elementary school students. It will do so by having elementary education students take three "tiers" of two courses each.

The first tier of courses is a mathematics and a science content course each of which are offered in the School of Science (MATH 131 and PHYS 20000). This tier of courses was selected because they focus on physics and statistics, two content areas that are often difficult for our elementary education students, and areas that they often have not studied during high school. Therefore, the aim of requiring these courses is to help them gain content knowledge in areas of mathematics and science in which they may be unfamiliar.

The second tier of courses is two education courses (Q200 and N102). The focus of these courses is to help elementary education students to develop depth in their own mathematical and scientific thinking and begin to relate this thinking to how children think about similar topics. A central goal of these courses is to help them differentiate their own thinking from the thinking of children, and to appreciate the scientific and mathematical thinking of children in all of its varied forms. As part of these courses, elementary

education students will begin to consider what it means to use children's thinking as a basis for instruction.

The third tier of courses is two education courses (Q405 and N343). These courses will build on the previous two education courses, and add an additional area of focus: how to use children's cultural, racial, and linguistic diversity as a basis for designing mathematics and science instruction. This tier of courses will explicitly address the reasons for attending to culture, race, and language in mathematics and science instruction, and how such diversity can be seen as a resources for engaging underrepresented populations in science and mathematics inquiry. These courses will be taken while students are having field experiences and so they will help support students in the design of innovative mathematics and science lessons and units in urban schools.

We see the above concentration as very marketable once our students' graduate because: (1) generally, elementary schools need teachers who embrace and are well prepared to teach mathematics and science; (2) more specifically, elementary schools need teachers who are prepared to support students who are underrepresented in science and mathematics to have early success in these content areas; and (3) the concentration is an integration of science and mathematics, which is aligned with schools general interest in the integration of science and mathematics.