

Graduate Group in Science & Mathematics Education (SESAME) Ph.D. Course Requirements for Students Admitted FALL 2007 and later.

Approved by SESAME Executive Committee July 10, 2007 | Revised 10/29/10

The SESAME program requires doctoral students to complete coursework in each of the following seven areas. These courses provide exposure to the major concerns and issues of this field of study. Students, in consultation with their advisor(s), choose from the list of approved courses under each category. Students who wish to substitute other courses to meet the requirements may petition the SESAME Executive Committee.

NB: Students must take required courses for a letter grade. A student's transcript is required to have a balance of courses with letter grades and pass/fail grades (or satisfactory/unsatisfactory) such that two-thirds of the course units have earned a letter grade.

First Year Seminar | two semesters during first year of enrollment:

SCMATHE 210 Practicum in Science and Mathematics Education, Research and Development

Colloquia | four semesters, taken in first two years of enrollment:

SCMATHE 292 Research Seminar and Colloquium

Individual & Social Cognition | one course: Courses involving a cognitive science approach to thinking, learning or instruction.

EDUC 226	Constructive Epistemology
EDUC 227	Metacognition
EDUC 229A	Problem Solving and Understanding (Also listed as Psychology C223)
EDUC 229B	Cognitive Science Approaches to Learning
EDUC 229D	Discourse and Learning in Mathematics and Science Classrooms
EDUC 229F	Conceptual Change
EDUC 232	Problem Solving and Understanding in Elem. School Classroom
EDUC 290C	Representations
EDUC 290C	Principals for Embodied Design
EDUC 290C	Neo-Vygotskian Perspectives on Cognitive Development
EDUC 290C	Cognitive Ergonomics in STEM Education Research

Discipline | one course: Project-based courses on learning and instruction in a particular subject area (mathematics, computer science, or one of the physical sciences). In addition to extensive readings, the student must conduct, report on, and write up an empirical study (an experiment, clinical interviews, models of out-loud protocols, field work, etc.) germane to the course.

EDUC 222A	Programming & Problem Solving
EDUC 224A	Mathematical Thinking and Problem
EDUC 290C	Scientific Thinking and Learning
EDUC 290C	Learning Chance: Computer-Supported Inquiry into Probability
EDUC 290C	Paradigmatic Didactic Mathematics Problem Situation

Curriculum and Technology Design | one course: Project-based courses on the principled development of instructional materials. A major part of such courses is the production and/or evaluation a substantial piece of instruction.

SCMATHE 220C	Instructional Design in Science/Mathematics Education
EDUC 221A	Towards Ambitious Instruction in Mathematics
EDUC 221B	Curriculum Development & Instruction in Science
EDUC 222B	Design of Computer-Based Instruction
EDUC 290C	Scientific Cognition: Development, Learning & Instruction
EDUC 295B	Technology, Curriculum and Instruction

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Methodology | three courses: one chosen from *Qualitative Methodology Group A*, a second course chosen from *Quantitative Methodology* and a third methodology course chosen in consultation with your faculty advisor. Students may petition for a waiver or substitution of a course to meet the degree program requirements.

Qualitative Methodology Group A

EDUC 228A Qualitative Methodology
EDUC 228B Modeling of Knowledge and Cognitive Processes
~~EDUC 288B Theory and Methods of Field Work (no longer taught as of Fall 2008)~~

Qualitative Methodology Group B

EDUC 293V Video-Analysis Seminar
EDUC 290C Modeling-Based Methodology for Design, Learning, and Research

Quantitative Methodology

EDUC 293A/L Data Analysis in Education Research/Lab
EDUC 275B/L Data Analysis in Educational Research II
Psych 205A Psychological Statistics and Data Analysis