SCIENCE EDUCATION (SCIED)

SCIED 550: Science Education Curriculum
3 Credits
History, analysis, and evaluation of precollege science curricula.
SCIED 550 Science Education Curriculum (3) The course examines
the precollege science curriculum: its history in the United States,
the sociocultural influences that shaped it, the impact of recent state
and national science standards documents, the evolution of changing
theoretical and practical aspects of curriculum design, and the influence
of science education research on curriculum. Participants investigate
and apply methods for analyzing and evaluating curricula, and review
research on the impacts of curriculum and instruction on student learning
and other outcomes. Broader questions concerning economics, ethnicity,
language, gender, and class will inform this work.

SCIED 551: History, Philosophy, & Sociology of Science and Science Teaching
3 Credits
Examination of the implications of history, philosophy, and sociology of
science for science teaching. SCIED 551 History, Philosophy, & Sociology
of Science and Science Teaching (3) This course explores science and
school science studies from a sociocultural perspective. Topics draw
from scholarship in the sociology, philosophy, and discourse of science.
Among the central topics for discussion will be the social context of
disciplinary knowledge, problems of experimentation, ideological bias in
research, feminist critiques of science, the discourse of school science,
multicultural issues in science, and knowledge access issues. The
focus will remain on curriculum, instruction, and learning throughout the
course. The course goals include learning about the history, philosophy,
and sociology (HPS) of science as related to science education, learning
about educational research and scholarship, applying ideas from HPS
to the field of science education research. Students are expected to
examine and interpret contemporary research in science education and
related fields.

Prerequisite: graduate standing

SCIED 552: Science Teaching and Learning
3 Credits
Exploration of the theoretical and empirical foundations of the teaching
and learning of science. SCIED 552 Science Teaching and Learning (3)
This course is an exploration of the foundational empirical and theoretical
research in the teaching and learning of science. The first part of the
course includes a core of learning theory based in the literature of
education and science education. In addition to this theoretical work
students will read empirical studies based on different theoretical
foundations allowing for the critical examination of the relationship
between theory and empirical based on theory. The readings and
discussions in this course will be centered on the questions of "Is there
a science of education that allows us to make instructional decisions
in science teaching based on research?" and "What is the theoretical
basis of standards-based science education reforms such as inquiry-
based science?" The goal of this course is to help students develop a core
foundational knowledge in the science education literature as well as an
articulated theoretical framework for teaching and learning they can use
to develop their own research projects.

SCIED 558: Research Problems in Science Teaching
3 Credits
Problems and research dealing with curriculum, materials, evaluation, and
supervision of science teaching and learning.

Prerequisite: SCIED412 or SCIED458 ; teaching experience

SCIED 583: Survey of Research in Learning Sciences and Technology
3 Credits
Analysis and evaluation of research in domains of learning sciences
and technology. This course reviews the empirical research literature
from the Learning Sciences and Technology fields. Students will gain
experiences reading and understanding research papers to understand
modern perspectives on the theories, models, methods, and tools used in
the learning sciences.

Cross-listed with: LDT 583

SCIED 590: Colloquium
1-3 Credits/Maximum of 3
continuing seminars that consist of a series of individual lectures by
faculty, students, or outside speakers.

SCIED 596: Individual Studies
1-9 Credits/Maximum of 9
Creative projects, including nonthesis research, which are supervised on
an individual basis and which fall outside the scope of formal courses.

SCIED 597: Special Topics
1-9 Credits/Maximum of 9
Formal courses given on a topical or special interest subject which may
be offered infrequently.

SCIED 855: Precollege Engineering Education
3 Credits
This course is intended to help experienced educators to critically
understand the "E" in "STEM education." Engineering has only recently
roared into state and national curriculum standards, venturing out of
its traditional lair in higher education. We explore the reasons for this
development, as well as the opportunities and challenges that the
change presents for students and teachers. As we proceed, we draw
upon the varied experiences of participants, including teachers from
elementary, middle, and secondary schools, as well as informal settings
such as science museums. Because few precollege STEM teachers
have studied engineering formally, we review the history and nature of
engineering, and work through a number of activities that model aspects
of engineering work. Throughout the course, an emphasis is placed on
the epistemic practices of engineering, which make the subject unique
among school subjects. Contemporary relevant school curricula and
informal educational programs are reviewed, and students carry out an
actual design project. This course is intended for teachers, and prior
formal training in design, modeling, and physics is not required.