

REQUEST FOR NEW COURSE

1. General Information.

- a. Submitted by the College of: Education Today's Date: 1-21-2010
- b. Department/Division: Curriculum and Instruction
- c. Contact person name: Rebecca McNail Krall Email: rebecca.krall@coe.uky.edu Phone: 257-2176
- d. Requested Effective Date: Semester following approval OR Specific Term/Year¹: _____

2. Designation and Description of Proposed Course.

- a. Prefix and Number: EDC 674
- b. Full Title: Advanced Studies in Teaching Elementary School Science
- c. Transcript Title (if full title is more than 40 characters): Advanced Studies in Elementary Science
- d. To be Cross-Listed² with (Prefix and Number): NA
- e. Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours³ for each meeting pattern type.

_____ Lecture _____ Laboratory¹ _____ Recitation _____ Discussion _____ Indep. Study

_____ Clinical _____ Colloquium _____ Practicum _____ Research _____ Residency

Seminar _____ Studio _____ Other – Please explain: _____

- f. Identify a grading system: Letter (A, B, C, etc.) Pass/Fail

g. Number of credits: 3

- h. Is this course repeatable for additional credit? YES NO

If YES: Maximum number of credit hours: _____

- If YES: Will this course allow multiple registrations during the same semester? YES NO

i. Course Description for Bulletin: An advanced course for classroom teachers that focuses on implementation of instructional strategies and assessments for teaching elementary science. A review of contemporary research in teaching and learning science will be closely related to classroom instruction. Specific focus will be given to technology integration, assessment, and addressing the needs of diverse student

¹ Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.

² The chair of the cross-listing department must sign off on the Signature Routing Log.

³ In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, represents at least two hours per week for a semester for one credit hour. (from SR 5.2.1)

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populations.

j. Prerequisites, if any: Graduate standing

k. Will this course also be offered through Distance Learning? YES⁴ NO

l. Supplementary teaching component, if any: Community-Based Experience Service Learning Both

3. Will this course be taught off campus? YES NO

4. Frequency of Course Offering.

a. Course will be offered (check all that apply): Fall Spring Summer

b. Will the course be offered every year? YES NO

If NO, explain: _____

5. Are facilities and personnel necessary for the proposed new course available? YES NO

If NO, explain: _____

6. What enrollment (per section per semester) may reasonably be expected? 10

7. Anticipated Student Demand.

a. Will this course serve students primarily within the degree program? YES NO

b. Will it be of interest to a significant number of students outside the degree pgm? YES NO

If YES, explain: _____

8. Check the category most applicable to this course:

Traditional – Offered in Corresponding Departments at Universities Elsewhere

Relatively New – Now Being Widely Established

Not Yet Found in Many (or Any) Other Universities

9. Course Relationship to Program(s).

a. Is this course part of a proposed new program? YES NO

If YES, name the proposed new program: Master of Education In Elementary Education

b. Will this course be a new requirement⁵ for ANY program? YES NO

If YES⁵, list affected programs: _____

10. Information to be Placed on Syllabus.

a. Is the course 400G or 500? YES NO

If YES, the *differentiation for undergraduate and graduate students must be included* in the information required in **10.b.** You must include: (i) identification of additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See SR 3.1.4.)

⁴ You must *also* submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.

⁵ In order to change a program, a program change form must also be submitted.

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- b. The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from **10.a** above) are attached.

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Signature Routing Log

General Information:

Course Prefix and Number: EDC 674

Proposal Contact Person Name: Rebecca McNall
 Krall Phone: 257-2176 Email: rebecca.krall@coe.uky.edu

INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
Curric Inst.	1/20/10	Mary Shake / 257-0767 / mcsnak1@email.uky.edu	<i>Mary C. Shake</i>
Coursest Curricula	1/26/10	Jeff. Reese 257-4909 jeff.reese@uky.edu	<i>Jeff Reese</i>
College of Education	2/9/10	Robert Shapiro 257-9795 rshap@1.uky.edu	<i>Robert Shapiro</i>
		/ /	
		/ /	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision ⁶
Undergraduate Council			
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

⁶ Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

EDC 674: Advanced Studies in Teaching Elementary Science

SYLLABUS

“Research and Reflection for Learning and Leading”

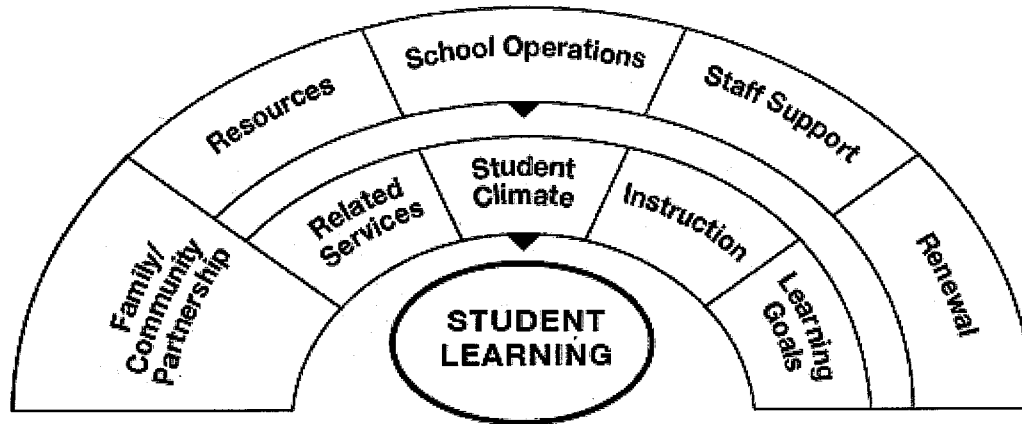
Office Location	UK 1113
Email	Rebecca.Kelli@coe.uky.edu
Prerequisites	None
Methods of Instruction	Handwritten
Contacting	Handwritten
Instructor	Handwritten

UK College of Education Professional Themes

This course will address the four themes outlined in the conceptual framework for the UK professional education unit: **research**, **reflection**, **learning**, and **leading**. Students will be given the opportunity to review, analyze, discuss, and apply **research** from diverse perspectives in education, including professional scholarship and practitioner inquiry, in order to reflect on their own practices as they study, observe, and practice in P-12 school and university classrooms. **Reflection** will also be integrated into students' learning opportunities through the production of written essays and analyses of observation and teaching experiences to help students take advantage of the analytical and problem-solving skills that comprise critical professional reflection on one's own teaching. This course emphasizes the commitment of the professional education unit to ensure that its graduates move into their professional lives equipped for life-long **learning** as educators who will be active in **leading** colleagues in their schools, districts, and professional organizations. The ultimate goal in addressing these four themes is to produce teacher leaders who work together to improve student learning among diverse populations and improve education in Kentucky and beyond.

Leadership, and specifically Teacher Leadership, within our framework of *Research and Reflection for Learning and Leading*, is informed by the “Framework for School Leadership Accomplishments” (Bellamy, Fulmer, Murphy, & Muth, 2007, p. 34). In this framework, **student learning** is the central objective and it is accomplished through nine interactive, collaborative efforts by diverse stakeholders (see Figure 1 below). Permission to use this model was granted by Bellamy and his colleagues.

Figure 1. Framework for School Leadership Accomplishments



Bellamy, Fulmer, Murphy, & Muth, 2007, p. 34

This framework is designed to help actualize the theme, *Research and Reflection for Learning and Leading*, and thus prepare a skilled and influential group of leaders who will work as members of learning communities focused on the essential goal of schools: student learning.

Course Overview/Objectives:

This course is designed to develop reflective teachers that implement reforms-based instructional practices in teaching science in the elementary school. The main themes in the course include constructivist principles for teaching science, teaching science through inquiry, use of formative assessment to guide instruction, and analysis of instruction and student learning. Through the course, students will develop deeper understanding of how children learn science, and contemporary research-based strategies for teaching science. In addition, students will develop and implement an inquiry-based unit that scaffolds students learning of concepts in alignment with state and national science education standards, and reflecting research-based practices.

Course Objectives/Student outcomes:

- Students will describe constructivist principles for teaching science and support these principles using appropriate arguments supported by the research literature.
- Students will apply constructivist principles in a critique of science curricular materials appropriate for teaching elementary science.
- Students will discuss the benefits for using inquiry in teaching science.
- Students will develop and implement standards-based science lessons that reflect constructivist principles and address common student misconceptions.
- Students will implement educational technologies in ways that make science concepts more accessible to students, and/or support students learning.
- Students will develop and implement formative assessments that identify student learning needs and are used to guide instruction.
- Students will use literature from best practices to critique lessons for teaching elementary science.
- Students will demonstrate and articulate ways to differentiate science instruction to address the needs of all students in the classroom.

Course Delivery

This course will continue to be offered as a traditional on campus course in which student meet weekly with the instructor.

Grading

Participants' grades will be based on five assessment tasks and class participation as described below. These tasks will be assessed according to the level of thoroughness and the degree to which participants adhere to the assignment guidelines as well as standard language and reference conventions. Guidelines and assessment rubrics will be distributed in class for each assignment. In general, criteria used to grade assessment tasks include: comprehensiveness, coherence, cohesiveness, clarity, level of detail (e.g., inclusion of evidence and/or examples to support points), organization, and application to practice and adherence to language and reference conventions. Written work should be generated in a word processing program, double spaced (12 point font), and paginated.

Task	Distribution	Grading Scale	Course Assessment Tasks:
Reflective writing	10%	93 - 100% A	
Comparative critique of two elementary curricular materials	20%	87 – 93% B	
Team research paper on student misconceptions on a given standards-based science concept, and suggested instructional practice.	20%	79 – 87% C	
Assessment instruments	20%	79% and below E	
Mini Unit	20%		
Class Participation	10%		

nts must be submitted on or before the due dates given in the course schedule. **Ten percent will be deducted from the value of an assignment for each day it is late**, unless prior arrangements have been made with the instructor. Full descriptions of these assignments and evaluation rubrics for each are appended to this syllabus.

Task	Description	Standards Alignment
Reflective writing	Students will write critical and reflective responses to primary readings, class discussions, and assignments.	KETS 1, 2, 6, 7, 10
Comparative critique of two elementary curricular materials	Students will compare and contrast two elementary curricular materials, identifying strengths and weaknesses, and suggesting improvements.	KETS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Student misconceptions research paper	Students will work in teams of two to develop a research paper on student misconceptions on particular standards-based science concepts, and suggested research-based practices for remedying these concepts.	KETS 1, 4, 8, 10
Mini Unit	Students will work in teams of two or three to develop and teach three standards-based elementary science lessons that address a particular concept. Lessons will include use of inquiry and constructivist approaches, formative assessment to guide instruction, and implementation of educational technology. Team will teach the unit to at least one group of K-2 students and will assess outcomes of the unit.	KETS 1, 10

Outline of Course Topics

Week	Topics and/or Activities
1-4	Research on teaching and learning in elementary science; Review of state and national science education standards, and experiencing inquiry as a student
5-6	Using technology to promote design and inquiry in science; Development of modelling-based inquiry lessons
7-8	Development, critique, and implementation of inquiry units;
9-10	Reflections of inquiry units

Course Policies

Addressing Themes of Diversity, Assessment, and Technology

All UK professional education programs address and affirm the value of diversity in education, the use of technology to support all aspects of instructional programming, and the importance of attaining high levels of skill in assessing the outcomes of instruction. This course will provide students an opportunity to demonstrate attention to these themes and reflect on the mechanisms that this course has provided to demonstrate improved skills in these areas.

Attendance

Attendance of individuals in the class is required, and university rules regarding absences will be followed. Exchange of ideas is essential for the learning that occurs in this class. In most class meetings, students work in pairs and/or in groups. The absence of one individual affects the performance of all persons working in the group. If you are absent, it is each student's responsibility to make up the work and provide evidence that the absence was excused. Without this evidence, the absence will be considered unexcused. Two tardies, whether arriving late or leaving early, equals one unexcused absence. I reserve the right to lower your final grade one letter grade your grade for each unexcused absence.

Excused Absences: S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences:

- 1) serious illness;
- 2) illness or death of family member;
- 3) University-related trips;
- 4) major religious holidays;
- 5) other circumstances you find to be "reasonable cause for nonattendance."

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later

than the last day for adding a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (257-2754).

In the case of an excused absence, it is the student's responsibility to inform the instructor of the absence, preferably in advance, but no later than the day following the absence.

Opportunities for make-up will be discussed then. Evidence supporting an excused absence must be submitted to the instructor within one week of the absence.

Participation and Professionalism

Evidence of professional dedication will be expected throughout this course and in all course-related interactions. Credit for participation and professionalism will be part of the evaluation. This means, in part, that we expect your regular, punctual attendance and participation. If you miss a class for any reason, it is **your** responsibility to contact the instructor and to make up any work.

Attendance, Participation, and Professionalism together

1. Students will attend all class meetings and field placement sessions.
2. Students will complete all assignments prior to scheduled discussions and due dates (see course calendar).
3. Students will attend all class meetings and be active participants.
 - a. Active participation may include: verbal participation in discussions, asking questions or responding to peers or instructor in constructive ways, clearly demonstrating active listening (taking notes, paying attention, etc.), and communicating with the instructor via office meetings and/or email.
4. Absences will be communicated in advance and in writing to the instructor, or will do so as soon as possible.
 - a. It is the **student's** responsibility to pursue make-up work and collect materials and information from missed class meetings.Students will conduct themselves in a professional and ethical manner.
 - b. They will be punctual, presentable, respectful of peers and instructors, and they will be honest in their academic efforts.
 - c. They will attend to and engage course materials to learn and improve their knowledge, understanding, and practice as teachers.
5. Attendance, participation, and professionalism will be assessed holistically based on the above criteria, and will be used to determine the outcome of borderline grades.
6. Students are encouraged to communicate regularly with the instructor so that they are aware of their standing.
7. Students who fail to attend class, participate as expected, and/or conduct themselves professionally or ethically will be required to meet with the instructor to set improvement goals.
8. Poor conduct or lack of participation may negatively affect your course grades.
9. In cases of extreme or frequent misconduct, the instructor reserves the right to dismiss a student from class and notify the department and college for potential disciplinary action.

10. In non-emergency situations, late work will not be accepted without prior arrangements with the instructor.
 - a. The instructor reserves the right to refuse late work or to accept late work for reduced credit unless the student has made prior arrangements with the instructor.

Students with Special Needs

The American with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protections for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides a reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please notify your instructor and contact the Disability Resource Center (Mr. Jake Karnes, jkarnes@uky.edu) 257-2754, room 2 Alumni Gym.

The course will be conducted with openness and respect to all individuals' points of view and experience. The activities and discussions will not tolerate discrimination or prejudice toward any person or group's religion, ethnicity, disability, gender, or sexual orientation.

Classroom Behavior, Decorum, and Civility (aka, Ethics Statement)

This course and its participants will not tolerate discrimination, violence, or vandalism. EDC is an open and affirming department for all people, including those who are subjected to racial profiling, hate crimes, heterosexism, and violence. We insist that appropriate action be taken against those who perpetrate discrimination, violence, or vandalism. The University of Kentucky is an Affirmative Action and Equal Opportunity institution and affirms its dedication to non-discrimination on the basis of race, color, religion, gender, age, sexual orientation, domestic partner status, national origin, or disability in employment, programs, and services. Our commitment to non-discrimination and affirmation action embraces the entire university community including faculty, staff, and students.

All students are expected to conduct themselves in an appropriate and ethical manner during their UK classes and related field placements, as befitting graduate students, future teachers, and ambassadors for the University of Kentucky. Any unethical behavior in class may result in failure for the course and/or expulsion from the program, determined on a case-by-case basis. Faculty will follow all university due process procedures in cases of academic or ethical misconduct. Please consult the instructor if you have questions regarding this requirement.

Statement on Plagiarism

All materials generated for this class (which may include but are not limited to syllabi and in-class materials) are copyrighted. You do not have the right to copy such materials unless the professor or assistant expressly grants permission. As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writing, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have permission of that person. Plagiarism is one of the worst academic violations, for the plagiarist destroys trust among others.

In this course, credit must be given to all work that is used in projects, documents, and other course work using the American Psychological Association (APA) 5th edition style guide.

Commitment to Diversity

The UK Department of Curriculum and Instruction is committed to: making diversity central to policies, decisions, and practices; evaluating progress toward diversity in the program; disseminating results widely; and using these results to strengthen diversity for the Commonwealth.

Equitable access to high quality instruction in Kentucky's secondary schools is directly and indirectly affected by this department's beliefs in and support for social diversity in schools. Moreover, the Commonwealth is directly affected by the ability of its youth to acquire high levels of skill that can then be used by them as citizens to enhance their communities and participate in the state's ongoing progress and prosperity in local, regional, national, and global contexts. Therefore, it is essential for our students to understand issues related to social diversity and make a commitment to value diversity as they engaged in teaching, research, reflection, learning, and leadership. By valuing diversity, our program is committed to enabling and empowering all people in educational contexts regardless of their race, ethnicity, gender, social class, sexual orientation, domestic partner status, and so forth.

Commitment to Addressing the Achievement Gap

The UK Department of Curriculum and Instruction aligns itself with the positions of the NCTM, NCSS, NSTA, and NCTE regarding cultural and linguistic diversity. The program seeks to underscore that cultural and linguistic diversity should be treated as integral components of public education, and that the failure to accommodate such diversity in curriculum and instruction contributes to disparities in student achievement across racial populations—a phenomenon popularly referred to as “the achievement gap.”

Commitment to Technology

The UK Department of Curriculum and Instruction is committed to teaching students so they use technology as a personal and professional tool. Our program is guided by NCATE standards, UK College of Education Technology Standards, EPSB Teacher Standards, and SPA Standards as they relate to technology. Students are required to use technology for a majority of their classes. Students use technology for class assignments, lesson plan design and preparation, class presentations, record keeping, and data analysis. Students are required to successfully complete course work focusing on using technology. Our students are required to communicate via electronic mail, use list serves, access the Internet and online databases, and use digital texts and modes for research projects and presentations. Our students use Microsoft Word, Excel, Access, and PowerPoint. They are given multiple opportunities during student teaching to videotape their teaching for use in self-analysis toward professional development. Our program offers students access to “smart” classrooms and technology labs in order to further facilitate their use of technology.

List of References

A readings packet is required for the course. Selected readings are taken from the list of resources that follow. In addition, some readings are made available through the Education Library E-reserves.

- Abell, S. K., & Volkmann, M. J. (2006). *Seamless Assessment in Science: A guide for elementary and middle school teachers*. Portsmouth, NH: Heinemann.
- American Association for the Advancement of Science. (1993). *Benchmarks for scientific literacy*. New York: Oxford University Press.
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- Baron, A. E., Kemker, K., Harmes, C., & (2003). Large-scale research study on technology in K-12 schools: Technology integration as it relates to the national technology standards. *Journal of Research on Technology in Education*, 35(4), 489-507.
- Bitner, N., & Bitner, J. (2002). Integrating technology into the classroom: Eight keys to success. *Journal of Technology and Teacher Education*, 10(1), 95-100.
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- Cajas, F. (2001). The science/technology interaction: Implications for science literacy. *Journal of Research in Science Teaching*, 38(7), 715-729.
- Carpenter, T. P., & Romberg, T. A. (2004). *Powerful practices in mathematics and science*. Madison, WI: National Center for Improving Student Learning and Achievement in Mathematics and Science.
- Donovan, M. S., & Bransford, J. D. (2005) Introduction. In M. S. Donovan and J. D. Bransford (Eds.), *How students learn: History, mathematics, and science in the classroom*
- Driver, R., Guesne, E., & Tiberghien, A. (Eds.). (1985). *Children's ideas in science*. Milton Keynes, England: Open University Press.
- Driver, R., Asoko, H., Leach, J., Mortimer, E., Scott, P. (1994). Constructing scientific understanding in the classroom. *Educational Researcher*, 23(7), 5-12.
- Flick, L., & Bell, R. L. (2000). Preparing tomorrow's science teachers to use technology: Guidelines for science educators. *Contemporary Issues in Technology and Teacher Education* (Online serial), 1(1). Available from: <http://www.citejournal.org/vol/iss1/currentissues/science/article1.htm>
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- Johnassen, D. H. (2000). Toward a design theory of problem solving. *Educational Technology Research and Development*, 48(4), 63-85.

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- Moyer, R., Hackett, J., & Everett, S. (1996). *Teaching science as investigations: Modeling inquiry through learning cycle lessons*. Columbus, OH: Pearson.
- National Research Council. (1996). National science education standards. Washington, DC: Academy Press.
- Pugalee, D. K., Arbaugh, F., Bay-Williams, J. M., Farrell, A., Mathews, S., and Royster, D. (2008). *Navigating through mathematical connections in grades 6-8*.
- Reif, F. (1987). Instructional design, cognition, and technology: Applications to the teaching of scientific concepts. *Journal of Research in Science Teaching*, 24(4), 309-324.
- Rieber, L. (1990). Using computer animated graphics in science instruction with children. *Journal of Educational Psychology*, 82(1), 135-140.
- Rosser, S. V. (1995). *Teaching the Majority: Breaking the Gender Barrier in Science, Mathematics, and Engineering*. New York: Teachers' College Press.
- Stepanek, J., Appel, G., Leong, M., Mangan, M. T., & Mitchell, M. (2007). *Leading lesson study: A practical guide for teachers and facilitators*. Thousand Oaks, CA: Corwin Press.
- Wiggins, G. (1998). *Educative assessment: Designing assessments to inform and improve student performance*. Hobokon, NJ: Jossey & Bass.
- Wiggins, G. & McTighe, J. (2006). Understanding by design (pp. 13-34), 2nd ed. Upper Saddle River, NJ: Pearson.
- Wisnudel, M., Spitulnik, M. W., & Krajcik, J. (1998), Technological tools to support inquiry in a science methods course. *Journal of computers in mathematics and science teaching*, 17(1), 63 – 74.
- Wormeli, R. (2006). *Fair isn't always equal: Assessing and grading in the differentiated classroom*. Portland, ME: Stenhouse Publishers.
- Vosniadou, S. (2007). Conceptual change and education. *Human Development* 50(1): 47-54.