FORM X (WHITE)

Authorization To Offer Non-Degree Extension Credit Course Through Extended Studies*

1. Desired Term: Spring 2008

2a. Course abbreviation and Number: EDST E1019

2b. Abbreviated Title:
(No more than 25 characters, including spaces)
Teaching Project-based Science

Year of implementation: 2008

3. Number of Units: 3

4. Number of Units: 3

5. Billing Units: 0 ($0)

6. Allowed Student Levels: UC X CR X EF X (Default is to check all three levels)

7. Grading Method:
   ___N Normal (N) (Default is Letter Grade +/-. Students may request Credit/No Credit)
   ___Normal Plus Report-in-Progress (NP) (As for Normal; also allows Report-in-Progress)
   ___Credit/No Credit Only (C)
   ___Credit/No Credit or Report-in-Progress Only (CP)

8. Mode of Instruction:
   (See pages 17-23 at http://www.calstate.edu/cim/data-elem-
dic/APDB-Transaction-DED-SectionY.pdf for definitions of
the Course Classification Numbers)

<table>
<thead>
<tr>
<th>Type of Instruction</th>
<th>Number of Credit Units</th>
<th>Instructional Mode (Course Classification Number)</th>
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<tbody>
<tr>
<td>Lecture</td>
<td>3</td>
<td>C-02</td>
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<td>Activity</td>
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<td>Lab</td>
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9. Attributes: Course Requires Consent for Enrollment? ___Yes X No
   ___Faculty ___Credential Analyst ___Dean ___Program/Department - Director/Chair

   Prerequisites: _______________________

   Co-requisites: _______________________

10. Does this course impact other discipline(s)? (If there is any uncertainty as to whether a particular discipline is affected, check "yes" and obtain signature.) ___Yes X No
    If yes, obtain signature(s). Any objections should be stated in writing and attached to this form.

    Discipline ________________ Signature ________________ Date ________________
    Support ______ Oppose ______

    Discipline ________________ Signature ________________ Date ________________
    Support ______ Oppose ______

Important: Please Complete

1. Instructor: Kathy Norman

2. Extension Course Proposal Form (attached)

SIGNATURES: (COLLEGE LEVEL)

Kathy Norman  2/4/08

UNIVERSITY LEVEL

[Signature]  2/4/08

[Signature]  2/12/08

[Signature]  2/11/08

[Signature]  2/11/08

[Signature]  2/11/08

3. Dean of Extended Studies (or Designee)  Date

4. Vice President for Academic Affairs (or Designee)  Date
Teaching Project-based Science Edited Syllabus 2007

Faculty Information:

Faculty Name: Karen Reynolds
Phone: 707.937.0087
Email Address: KEReynolds@aol.com

Course Title: Teaching Project-based Science

Course Description: In Teaching Project-based Science, students review effective teaching and learning strategies in the context of a project-based approach, address concepts in science pedagogy, and design a plan for carrying out project-based science in grades 4-9 classrooms. Over the course of five weeks, students read a variety of content materials and perform assignments, including discussion board activities each week. These actions comprise approximately 45 hours of “student seat time.” Students taking the course for 3 graduate credits also complete a 10-15 page Action Research Paper.

Course Delivery: Critical to the professional-development experience of teachers today is learning to function effectively in an online learning environment, one that is destined to expand in the future. Teaching Project-based Science is an online course completed in five weeks, with an additional one-week grace period for submitting assignments. Although students may work on assignments offline, all course content, links to supplementary information, interaction among students in the class, class discussions, assessments, submission of assignments, and interaction with the instructor are carried out online, through email and the course site. This online format is designed for educators who need access to professional development on a flexible schedule and who are in different locations worldwide. Not all participants in this course will earn college credit; some are earning CEUs or auditing. Students earning college credit are required to participate in advanced discussions and complete all assignments.

Course Objectives/Outcomes

Performance Objectives
In this course, students will:
1. Distinguish project-based science from a traditional approach toward teaching and learning and describe benefits and limitations of each.
2. Describe at least three contrasting models for designing project-based instruction.
3. Describe and compare at least five strategies for assessing student progress and achievement in project-based instructional settings, as well as reflecting on teacher effectiveness.
4. Describe strategies for reflecting on and improving teacher effectiveness in project-based learning environments.
5. Produce and analyze a project-based unit of instruction in science appropriate for a specific grade level, student population, and/or instructional setting.

Lesson Plans

Topic One: What It Is and What It’s Not
This Topic delineates characteristics of project-based science teaching and addresses issues related to the paradigm.

Major Ideas:
A. What's Different? About the paradigm shift from traditional to project-based science; comparisons and examples.
B. Pros and Cons. Discussion and debate about the benefits and limitations of project-based science; includes self-reflective activity.
C. Student Success. New opportunities and requirements for students to succeed as empowered learners; a closer look at effects of teacher responses with a related activity.
D. Management Issues. Practical ideas for managing the environment that supports project-based science.

Topic One Assignments:
   a) Review Topic One content.
   b) Contribute to discussions on related issues.
   c) Take a quiz comparing different teaching approaches.
   d) Declare the nature of the credit sought – Graduate, CEU, or Audit
   e) Choose, with a rationale and connections to standards, a theme or focus around which to design a plan for teaching project-based science.
   f) Address issues of student motivation and collaborative management strategies.

Topic Two: Projects that Reach Out
Students consider several models that incorporate project-based science and begin identifying major components for specific teaching plans.

Major Ideas:
   A. PR Model. Potential for public relations opportunities that benefit students, science programs, and schools; vehicles for spreading the news.
   B. R and D Model. Research and development approaches that motivate students to solve practical problems; supporting resources.
   C. Science, Society and Decision-making. Addressing societal issues through solutions contributed by science; how students can become more aware of global connections.
   D. Connections to Service Learning. Opportunities for, and examples of, project-based science with community connections and benefits.

Topic Two Assignments:
   a) Review Topic Two content.
   b) Contribute to discussions on related issues.
   c) Take a quiz comparing different teaching approaches.
   d) Consider ways to combine benefits of four contrasting but complementary models for project-based science.
   e) Contribute to a set of ideas for R and D projects for students.
   f) Identify several "big events" that can be associated with the individually chosen themes.
   g) Address selected research studies in science education.

Topic Three: What Are They Learning?
Assessment approaches are the focus of this Topic, with an emphasis on giving every child an optimal opportunity to demonstrate knowledge and achievement.

Major Ideas:
   A. Assessment Toolbox. Practical suggestions for assessing student progress and crediting their achievements; assessing a drawing.
   B. Affective or Cognitive? Distinguishing between the affective and cognitive domain; teacher prompts that shift students into cognitive mode; when to look more closely at how students represent their knowledge.
   C. Nonverbal Evidence. How, in our predominantly verbal world, students can demonstrate understandings nonverbally; visualizing student behaviors; expanding "recordable credits."
   D. Ways They Say "I know!" Ways students demonstrate knowledge through reiteration, transfer, and invention; a look at assessment styles.
   E. Credits in the Round. Assessing the whole student, from different perspectives; using PDA's

Proposed Instructor Syllabus Template
F. Mirror, Mirror? Systematic strategies for reflecting on the student's own practice; using videotaping as a tool for serious self-improvement.

Topic Three Assignments:
   a) Review Topic Three content.
   b) Contribute to discussions on related issues.
   c) Take a quiz comparing different teaching approaches.
   d) Reflect on past assessment practices.
   e) Identify assessment strategies appropriate for the student's developing plan which may form the foundation for the Action Research Paper.
   f) Share and evaluate innovative ideas for assessment.
   g) Address issues related to alternative assessment strategies and action research.

Topic Four: You Do It!
This Topic focuses on major strategies for designing instruction for project-based science and on producing complete plans.

Major Ideas:
A. Brainstorm. Compares brainstorming, clustering, and mapping techniques as tools for generating and organizing content and ideas.
B. Target Standards and Purposes. Compares planning from the perspectives of "opportunist" and "architects;" reviews multiple purposes, with examples, embedded in instructional planning; addresses teacher fears of losing control of accountability.
C. Facts and Concepts. Discusses cognitive demand in learning facts, concepts, procedures, and how to process information; includes activities to analyze own practice.
D. Skills, Thinking, and Engagement. Focuses on engaging students in thinking and learning new skills; includes embedding assessment and problem solving.
E. Student Products. Addresses variety, criteria, and other aspects of student productivity; literature connections.
F. Logistics. Reviews ways to manage space, time, materials, and other challenges.

Topic Four Assignments:
   a) Review Topic Four content.
   b) Contribute to discussions on related issues.
   c) Take a quiz comparing different teaching approaches.
   d) Submit and post draft of the in-progress plan and request specific feedback.
   e) Provide specific feedback for at least two students in the course.
   f) Address analysis of instructional resources and professional opportunities.

Topic Five: Review and Refine
The focus of this Topic is on making final improvements based on individual review and collegial feedback, as well as reflecting on the feedback process, itself.

Major Ideas:
A. Checking for Leaks. Common things to fix in the plan; tracking the big picture; backup plans.
B. Sharing with Colleagues. Reasons and rewards related to sharing plans with colleagues; strategies for obtaining meaningful feedback; thoughts on co-teaching.
C. The Refining Process. Attention to revising and polishing plans; analysis of teacher time.
D. Launch! Last preparations; keeping a travel log.

Topic Five Assignments:
   a) Review Topic Five content.
   b) Contribute to discussions on related issues.
   c) Take a quiz comparing different teaching approaches.
   d) Submit the final Action Research Paper to the Instructor. Revise your plan and post the final version.
   e) React critically to the final versions of Action Research Papers/plans submitted by at least two students in the course.
f) Consider strategies for sharing insights related to project-based science at school sites and district levels.
g) Complete the JASON Course Survey.

Action Research Paper Overview:
Consider a question or concern related to (a) your unit plan and (b) instruction, students, or the classroom environment that you would like to address and for which you would like to find a practical answer. Devise a plan and carry it out. Report your results as follows:
1. Action: Identify an interesting question to ask related to your own teaching or student learning, or identify an area for focused reflection.
2. Rationale: Describe the purpose or desired outcome of this effort (action research and focused reflections have purposeful agendas).
3. Background: Consider course readings or outside literature you have reviewed and make connections to your action research.
4. Methods: Describe the methods, procedures, or strategies you used, and what kinds of observations you made (data collected).
5. Analysis: How did you analyze the results or make sense of your observations.
6. Implications: Explain how this effort informs, or makes a difference in, future teaching or learning in your setting. What might you do next?
7. Submit completed paper as an attachment in APA format.

Texts (required readings): Course Content found in Blackboard
Students read for depth, breadth, clarification, and special interest through the online course documents as well as links to external web sites. The content information, tutorials, and scholarly reports provided represent government agencies, professional organizations, academic institutions, and other expert groups.

Bibliography (required and optional readings): Suggested Course Content found outside Blackboard


Student Evaluation Process:
Successful completion of the course is determined by points earned proportionally as follows: weekly discussion assignments (35%), quizzes and final exam (20%), unit plan (20%), action research report (25%)
Accumulating points out of 100 will earn grades as defined below:

* Students not taking the course for graduate credit do not have to complete the Action Research Paper and must obtain at least 70 points to pass the course.

* Students taking the course for graduate credit will be graded according to the Plus/Minus Grading Scale:
   A+  97-100
   A   94 - 96.99
   A-  90 - 93.99
   B+  87 - 89.99
   B   84 - 86.99
   B-  80 - 83.99
   C+  77 - 79.99
   C   74 - 76.99
   C-  70 - 73.99
   D   50 - 69.99
   F   50 >
Karen E. Reynolds, PhD
Professor Emerita, College of Education, San Jose State University
CONSULTANT and INSTRUCTOR: K-12 Science Education, Integration of Art and Science, Integration of Technology in Education.

CONTACT
Address: 10425 Nichols Ln, Mendocino CA 95460
Phone: (707) 937-0067
e-mail: kereynolds@aol.com

EDUCATION
Ph. D. in Education University of California, Berkeley 1984: concentrations in teacher education, curriculum development in science, and computer education. Dissertation title: A Study of In-Service Teachers' Behavior While Using Inductive and Deductive Instructional Materials in an Introductory Course in BASIC
Recent degrees:
BFA Illustration, SJSU, May 2003.
Additional coursework 1967-present emphasizing ecology, earth sciences, fine arts, art education
Teaching Credentials: State of California:
Standard Secondary (Life): Biology, Anthropology, General Science
Elementary Multiple Subject

PROFESSIONAL EXPERIENCE
Dr. Reynolds career as an educator spans more than 40 years, beginning as a Peace Corps Volunteer (Nigeria 1966-68). Her experience includes 17 years of classroom teaching junior high level general science, 24 years as a teacher supervisor and pre-service K-12 methods instructor, 30 years instructing K-12 teacher in-service and faculty professional development. In addition, she has advised candidates for the M.A. Degree in Education and in Art History. She has worked with students and teachers from diverse cultural backgrounds and has taught in the areas of science, teacher education, computer and technology education, outdoor education and other subjects including some mathematics, physical education, and art. Currently Dr. Reynolds consults in education, teaches online courses for JASON Academy, and is developing proficiency in fine arts (painting).

2000 to present
Jason Academy faculty and course author. Instructor and author of three courses: Aquatic Ecology, Teaching Project-Based Science, and Science and Young Children
2003 to present Instructor, Cambridge College summer session, MA in Education and science programs teaching the course Attaining Science Literacy.
1995-1997 Director, Elementary Education Program, Teacher Education Division, San Jose State University


1975 to present. Instructor, K-12 in-service teacher workshops and courses in science teaching, and technology:


1980-present. Independent consultant: K-12 science methods; use of computers and new technologies for instruction and assessment; middle level curriculum.

1972-1976. SCUBA instructor, Aqua Tutus Diving Club, San Lorenzo, CA.


RECENT ADDITIONAL EXPERIENCE RELATED TO TECHNOLOGY IN EDUCATION

2001 Development of online content modules for teachers sponsored by the Jason Project. The five-week modules include Aquatic Ecosystems and Project-Based Learning, instructor in the Introductory Course for the series.

2001 Director for Intel Grant to train 20 faculty in the use of Intel curriculum and facilitate the integration of technology curriculum for at least 800 students in the College of Education over two years.

2000-2001 Co-director and PI, CSU Technology for Learning Grant serving 150 in-service teachers organized in a year long cohorts for professional development (120 hours) integrating technology in instruction K-12.

1999-2001 Participant and site coordinator for BayTech, the SJSU PT3 Grant supporting faculty professional development to integrate technology in teacher preparation.

2000 Developed online course: Learning in a High tech Environment for graduate students and in-service teachers.

1999-2000 Aquist, Faculty in Residence providing assistance to faculty in developing effective learner-centered design for multimedia and online instruction.


Chair, College of Education Technology Committee 1998-99.


Participation and research in interactive multimedia transmissions with Warner Bros. in providing distance education in animation to multiple sites.

Developer, multimedia instructional units for teacher preparation in science. SJSU 1984-95.


Director, California Technology Project, 1991 Technology Leadership Academy: Science (Statewide training of regional trainers)

Acting Director, SJSU Teacher Education Division Discovery Lab
SJSU School of Education facilitator for Computer Education Requirements for Multiple Subjects and Single Subject Clear Credentials
ASTUTE alternate SJSU Representative, planner and instructor for CSU methods faculty workshops, 1987-present.
Consultant and coordinator, National Geographic Association workshop for trainers in the implementation of KIDNET and other computer-based projects for elementary and middle schools.

PUBLICATIONS and PRESENTED PAPERS
2003: Science and Young Children, a five-week online JASON Academy course focusing on pre-K-3 science and pedagogy.
2001 Teaching Project-based Science, a five-week online course for JASON Academy for Professional Development of Teachers in Science.
2001 Aquatic Ecology, a five-week online course for JASON Academy for Professional Development of Teachers in Science
1992 Integrating Technology in Science Instruction: Model Units, with Judy Wright Update for Technology in the Curriculum, California Dept. of Education.

ORGANIZATIONS
National Science Teachers Association (NSTA) Life Member; California Science Teachers Association (CSTA); Elementary School Science Association (ESSA); National Association for Research in Science Teaching (NARST); Computer Using Educators (CUE); Association for Research in Education (AERA); Association for Teacher Education (ATE); International Interactive Communications Society (IICS); National Marine Science Education Association (NMSEA)
Others for purposes of receiving journals.

MAJOR AREAS OF PROFESSIONAL INTEREST

Instruction (preservice and inservice): Science Methods K-8; General methods for middle/junior high teaching; Uses of technology in instruction and assessment, particularly interactive videodisc, multimedia. Distance Education. Undergraduate Blended Programs.

Curriculum Development

Multi-media and Distance Education in a constructivist environment in technology education and science education; Middle Level teacher preparation. Integration of science and art.

Research

Drawing to learn in science; Art experiences as a basis for science understandings; Alternative pictorial-based assessment strategies in science using new technologies; Instruction and assessment in a constructivist environment; Alternative conceptions in science among teachers.

AWARDS