

**AUBURN UNIVERSITY** **SYLLABUS**

**Course Number:** CTSE 7510

**Course Title:** Research Studies in Area of Specialization: Secondary Science

**Credit Hours:** 3 semester hours

**Prerequisites:** Admission to departmental graduate program

**Class meeting times:** TWF 2462/4 Haley Center 6:00 pm-9:00pm (Summer Session First 5 weeks May 17-June 24, 2012)

**Date Syllabus Prepared:** September 2006, Revised May 2012

**Texts:**

Holly, M. L., Arhar, J., & Kasten, W. Action Research for Teachers: Traveling the Yellow Brick Road. 3rd ed. Upper Saddle River.

**Additional Required Readings**:

\*Readings and articles will be disseminated or placed on reserve in the library or LRC. You are responsible for reading all materials prior to the class meetings and should be prepared to facilitate the group discussions on articles assigned. Lack of preparation and failure to have read assignments may result in point reductions from your final course grade.

**Course Description:**

Review, analysis, and interpretation of available research, with emphasis on interpreting new research to meet the changing needs of science teaching. Learn to recognize, use and apply results of both action and quasi-experimental research for the school environment. Research techniques will be discussed, with emphasis on their potential and limitations. Students will help write and defend a research proposal in their subject area. We will build and revise a model of how science learning occurs based on reading and interpretation of current research. We will examine how research has contributed to establishing national standards for classrooms.

**Course Objectives:** Upon completion of this course, students will be able to:

1. develop a model that explains how effective learning environments work with research that supports your model;

2. identify and use indices and other resources designed to help locate science research studies [ERIC, Dissertation Abstracts, other remote databases and library searching aids, and the Internet (AUBIE Cat and electronic mail)];

3. learn to locate, read, and generalize from current research in science education - be a wise "consumer" of research;

4. learn to abstract research findings into a format easily shared with other science teachers; The instructor for the course reserves the right to make minor amendments to the syllabus or course as necessary.

5. describe those current national standards for science education that are derived from research and how research supports their implementation in your classroom;

6. identify current and probable future areas of promising science education research;

7. develop and defend a proposal to do research in an environment available to you.

8. address the issue of epistemology or knowing in research through: (a) study of different research paradigms in social science.

9. compare and contrast the two main methodologies in educational research.

10. be informed of some of the all-encompassing research findings on science learning.

11. become adept at using various library resources, as well as technology to learn about current research in the literature on science education.

12. develop a research proposal project on a specific classroom or school based issue in a particular area of interest in science education.

13. address issues of equity in science teaching.

**Cultural Diversity**

“I don’t care that you know. I want to know that you care”

Author Unknown

This course reflects the College of Education’s commitment to cultural diversity. The goal of professional education programs at Auburn University is to prepare outstanding educators who are competent, capable, and caring in complex, diverse educational arenas. Such individuals are

Effective in their roles as culturally responsive teachers, designing and implementing sound meaningful and balanced instruction with the full range of learners.

Effective as they assist learners in their comprehension of issues surrounding diversity; and

Effective in their contributions of thoughtful and informed discourse to their own educational communities as they work to build equitable and supportive environments learners.

**Expectations**

In this course I expect you to:

Reflect critically on all experiences and readings.

Be prompt and in attendance at all course sessions.

Demonstrate critical reflection through discussion, writing and course assignments.

Complete assignments to the best of your ability.

Communicate expectations and ideas.

Recognize and validate the values of other class members.

**Course Requirements**

**Participation**

This class is intended to be both interactive and collaborative. You are expected to come to class prepared to discuss assignments. We may also designate small groups during the initial class session, and you will spend some time doing group work. Learning is most effective when we fully participate in the process of constructing knowledge. In this course it is my expectation that everyone actively participate. Participation starts with preparation. It is my expectation that each class participant will be fully prepared for each day by having read the assigned materials and completed other work requested and required.

**Late/remedial work policy**

No late assignments unless in accordance with AU missed work policy (i.e. excused absence)

**Grading policy**

General grading rubric for assignments

100%: beyond the call of duty; strikingly impressive; excellent in every way

90%: both complete and showing evidence of original, active, critical thought

80%: all specified aspects of assignments minimally completed

<80% one or more aspects of assignments missing or unacceptable

**Grading Scale**:

A 92%-100%

B 80%-91%

C 70%-79%

D 60%-69%

F <60%

**Course Evaluation**

Your final course grade will be based on the following:

**Assignments Points**

Assignment #1 (Article critique) 15

Assignment #2 (Article critique) 15

Weekly Article seminar presentation 5 (5 points each) 25

4 pop quizzes (5 points) 20

Final exam 25

Field Experience (R) 25 fields hours

**Please pay special attention to specific course assignment due dates**. There will be no late assignments accepted unless in accordance with AU policy for missed work (i.e. due to an excused absence). Some class meetings will entail a discussion of a featured chapter from the assigned textbook or additional assigned readings. You are expected to have read the chapter or assigned articles and bring prepared notes to use in contributing to class discussion. You may be invited to lead this discussion.

**Article must be a maximum 3 pages in length double-spaced and no less than 2 pages**

**1. Assignment #1 Article Critique (15 pts) DUE June 20**

Article Critique

You will critique one article worth 15pts. You will be select a research article to critique from a science education journal which addresses hot topics and challenging issues in the area of science and science education. All assignments must be typed, double-spaced and in APA style 6th edition. Please select an article from one of the following suggested journals:

*Science Teacher*

*Science Scope*

*Journal of Research in Science Teaching*

*Science Education*

*School Science and Mathematics*

Additional journals that may address issues related to science and science education may include:

*Review of Educational Research*

*Journal of Negro Education*

*Journal of Counseling Psychology*

*Educational Researcher*

You may also access many journals online via Askeric.com or onlinejournals.com, or Auburn University library systems journals database. If there is a question about the journal you would like to use please see me. Please bring me the title of the journal and article that you plan to critique prior to the assignment due date for article critiques.

Preferably the article should relate to current issues related to science education. Please let me know if you have difficulty locating articles. Critique should address the criteria listed below and discussed in class. Write a maximum 3 page critique.

Format:

1. Attach a copy of the article.

2. All articles must be from research journals and no articles prior to 2002.

3. Include a complete citation for the article at the bottom of the last page in APA 6th edition style.

4. Allow sufficient margins for the instructor to make marginal notes and comments.

5. Please do not staple. Place a paperclip in the upper left corner

Criteria for grading assignments: 15 points total

Attach a copy of the article to the critique.

1. Writing must be clear, and paper well organized. Please type all papers.

2. All articles must be from research journals and no articles prior to 2002. The article critique must include citations that support the stance of your critique (or even the authors assumptions if you are in agreement) from 2 other sources (2 points).

3. The soundness of your critique and validity of your perceptions of the article determine the value of your work. Please organize thoughts with the reader in mind. (2 points)

4. Discuss and critique at least 2 of the author’s major assertions. (2 points)

5. Identify major themes of the article and discuss your perspective on these themes (2 points).

6. Please do not re-write article. Summarize the article in a brief introductory paragraph. All critiques should be in your own voice. (2 points)

7. You must both discuss the data collection and data analysis strategies used in this article to come up with the authors conclusions or assertions. (2 point)

8. Discuss whether you agree or disagree with the data collection and data analysis techniques used (why or why not). (1 point)

9. Discuss what you would have done differently if you were to conduct this study and why. (2 points)

**2. Assignment #2 (15 pts) Due June 20**

Article Critique

You will critique one article worth 15 pts. You will be select a research article to critique from a science education journal which addresses hot topics and challenging issues in the area of science and science education. All assignments must be typed, double-spaced and in APA style 6th edition. Please select an article from one of the following suggested journals:

*Science Teacher*

*Science Scope*

*Journal of Research in Science Teaching*

*Science Education*

*School Science and Mathematics*

Additional journals that may address issues related to science and science education may include:

*Review of Educational Research*

*Journal of Negro Education*

*Journal of Counseling Psychology*

*Educational Researcher*

You may also access many journals online via Askeric.com or onlinejournals.com, or Auburn University library systems journals database. If there is a question about the journal you would like to use please see me. Please bring me the title of the journal and article that you plan to critique prior to the assignment due date for article critiques.

Preferably the article should relate to current issues related to science education. Please let me know if you have difficulty locating articles. Critique should address the criteria listed below and discussed in class. Write a maximum 3 page critique.

Format:

1. Attach a copy of the article.

2. All articles must be from research journals and no articles prior to 2002.

3. Include a complete citation for the article at the bottom of the last page in APA 6th edition style.

4. Allow sufficient margins for the instructor to make marginal notes and comments.

5. Please do not staple. Place a paperclip in the upper left corner

**Criteria for grading assignments: 15 points total**

Attach a copy of the article to the critique.

1. Writing must be clear, and paper well organized. Please type all papers.

2. All articles must be from research journals and no articles prior to 2002. The article critique must include citations that support the stance of your critique (or even the authors assumptions if you are in agreement) from 2 other sources (2 points).

3. The soundness of your critique and validity of your perceptions of the article determine the value of your work. Please organize thoughts with the reader in mind. (2 points)

4. Discuss and critique at least 2 of the author’s major assertions. (2 points)

5. Identify major themes of the article and discuss your perspective on these themes (2 points).

6. Please do not re-write article. Summarize the article in a brief introductory paragraph. All critiques should be in your own voice. (2 points)

7. You must discuss both the data collection and data analysis strategies used in this article to come up with the authors conclusions or assertions. (2 points)

8. Discuss whether you agree or disagree with the data collection and data analysis techniques used (why or why not). (1 point)

9. Discuss what you would have done differently if you were to conduct this study and why. (2 points)

Article must be a maximum 3 pages in length double-spaced and no less than 2 pages

Grades on assignments, as well as questions, or concerns can be discussed during appointment times.

**3. 4 Pop quizzes: 20 points total 5 points each quiz)**

There will be 4 unannounced pop quizzes at 5 points each. (20 pts). These pop quizzes will be on assigned readings and discussions in class

**4. Weekly seminar presentations on articles on action research in the science classroom (unless you find an interesting topic outside of the science classroom). (5 at 1 point each)**

--In addition, we will share what we are learning from reading current published research. You will be asked to select an article that describes a quality

Research study in science education for grades 6-12.

--Each student will present a 10 minute seminar on the scheduled seminar days which presents their article selection for the week and responds to suggestions and criticism. You should use technology and other media to help us understand your main ideas. In addition, we will share what we are learning from reading current published research on a weekly basis as a seminar on scheduled Fridays (and 1 Weds). See more guidelines in weekly overview.

--**You will provide the instructor with a 1 page summary and overview of the study and any major findings or assertions made from the article.**

Use these journals to locate research articles that you will read and abstract. The journals are listed in order of potential usefulness for science education research studies. Avoid others except with prior approval.

Journal of Research in Science Teaching (1963-present), bimonthly, published by the National Association for Research in Science Teaching through John Wiley & Sons, Inc.: New York, NY, call number Q 181 .A1 J6

Science Education (1929-present), six per year, published by John Wiley & Sons, Inc.: New York, NY, call number Q1 .S385

American Educational Research Journal, quarterly, published by the American Educational Research Association: Washington, DC, call number L 11 .A66

Journal of Educational Research (1920-present), frequency varies, published by the American Educational Research Association, call number Folio L 11 .J75

Review of Educational Research (1931-present), five per year, each issue devoted to a specific topic with bibliography, call number L 11 .R35

Journal of Biological Education (1967-present), quarterly, pub. by Institute of Biology, call number QH 301 .J59

Journal of Chemical Education (1924-present), monthly, published by the Division of Chemical Education of the American Chemical Society, call number QD 1 .J93

Dissertations in science education (RBD Library and others available through Interlibrary Loan)

**5. Final exam period June 22-23**

**Final exam 25 points Scheduled for Friday June 22 from 7:00pm-9:30pm CST**

**6. Field experience hours (R)**

Students must document 25 field experience hours either tutoring or working with some type of summer camp or summer program/outreach experience (see field experience guide provided in Secondary Science Education Graduate Student Orientation). Please note that due to the fact that this course is offered in a 5 week mini session there may be some flexibility of when field hours can be completed and students are allowed to complete some of the hours outside of the specified 5 week summer session. Please keep in mind that all outreach activities must first be approved by the instructor of the course. Moreover, outreach activities are based on availability of programs and with prior approval from the instructor for the course and at the sole discretion of the instructor for the course. In addition, some students may have already completed the program hours required (total 150 field hours) prior to taking this course. The Science Education Discovery Camp will be held July 16-20 and July 23-27 and students are encouraged to participate in the camp to receive the 25 hours unless there is a class conflict with the times for the camp. Times will be posted to Canvas. June 22 students can also participate in Project Wild/Learning Tree training workshop from 8:00-3:30pm CST. More information to be provided.

**Course Content and Schedule:**

**Fridays are Seminar days (there will be one Weds designated as a seminar day as well). Please post your article and topic for seminar days to Canvas (there will be a place for assignment posting) so that I can make sure you do not present on the same article as your classmates. This should be posted at least 3 days prior to the class meeting date.**

**Weekly assigned readings will be posted to Canvas at least one week prior to the date for class discussion on the chapter or announced in class one week prior to class discussion on the chapter.**

***Class meeting dates (May 17-June20) Study/reading day June 21 Final Exam period June 22-23***

***W*eek 1**

**May 18, 22, 23**

***Overview of course***

Get acquainted. Discuss syllabus and course objectives. Discuss resources available for this course.

Action research and its value for improving classroom teaching. Attempt to define effective teaching, and build a working model for how it works: inputs and outputs. Discussion on action research.

**Due for May 23-Bring 1 article on current research in the science classroom for class discussion. Weds. May 23.**

**Week 2**

**May 25, 29, 30**

What can educational research tell us about effective science teaching? Discuss action research and its value for improving classroom teaching. Investigate current research on effective teaching in the science classroom, and build a working model for how it works: inputs and outputs. Discussion on action research.

**Due for May 25-Bring 1 article on current research in the science classroom for class discussion. Friday May 25, 2012**.

**Due for June 5**-Students are assigned to research a current topic or issue in the science classroom and prepare to discuss on Tuesday June 5. Questions to answer: How would you investigate this topic? Why does it interest you? What has already been done relative to research in this area? List three citations of similar research studies and briefly discuss their findings.

**Week 3**

June 1, 5, 6

Discussion on action research in the science classroom?

Seminar assignment: **Due on June 1-Bring 1 article on current research in the science classroom for class discussion. Friday June 1, 2012**

**Due for June 5-**Class discussion topics: What science education/science teacher related topic interests you and how would you investigate this topic? Students are assigned to research a current topic or issue in the science classroom and prepare to discuss on Tuesday June 5. Questions to answer: How would you investigate this topic? Why does it interest you? What has already been done relative to research in this area? List three citations of similar research studies and briefly discuss their findings. This will be presented to the class on June 5.

**Week 4**

June 8, 12, 13

Action Research in education: Conducting a study, data collection and data analysis research in LRC or AU library. Students will post to Canvas a 2 page minimum summary discussing how they would collect data, the types of data they would use and data analysis strategies for the research topic they would be interested in studying. Also discuss why you would use these data collection techniques. This is due no later than 9:00 pm CST posted to Canvas. **June 8 students will conduct independent work in LRC or AU library.**

**Weekly Seminar assignment will be posted to Canvas no later than 9:00pm CST on Friday June 8. Topics should be on current research in the science classroom.**

**Week 5 Last week of class**

June 15, 19, 20

Overview of research in Science Education. Qualitative vs. Quantitative research in the science classroom.

June 20-Last day of class.

**Due for June 15-Bring 1 article on current research in the science classroom for class discussion. Seminar presentations Friday June 15**

**Examples of research journals:**

Use only these journals to locate research articles that you will read and abstract. The journals are listed in order of potential usefulness for science education research studies. Avoid others except with prior approval. Please verify that the location in the library is current.

Journal of Research in Science Teaching (1963-present), bimonthly, published by the National Association for Research in Science Teaching through John Wiley & Sons, Inc.: New York, NY, call number Q 181 .A1 J6

Science Education (1929-present), six per year, published by John Wiley & Sons, Inc.: New York, NY, call number Q1 .S385

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Journal of Chemical Education (1924-present), monthly, published by the Division of Chemical Education of the American Chemical Society, call number QD 1 .J93

Dissertations in science education (RBD Library and others available through Interlibrary Loan)

**Class Policy Statements:**

Participation: Students are expected to participate in all class discussions and participate in all exercises. It is the student’s responsibility to contact the instructor if assignment deadlines are not met. Students are responsible for initiating arrangements for missed work. The instructor for the course reserves the right to make minor amendments to the syllabus or course as necessary.

\*Traditional Masters students- Please note that traditional Class A certification students will be required to complete a field project and 30 clock hours of field experience hours beginning Fall 2009 as a requirement for this course.

**Attendance/Absences**: Attendance is required at each class meeting. If an exam is missed, a make-up exam will be given only for University-approved excuses as outlined in the Tiger Cub. Arrangement to take the make-up exam must be made in advance. Students who miss an exam because of illness need a doctor’s statement for verification of sickness and should clear the absence with the instructor the day they return to class. Other unavoidable absences from campus must be documented and cleared with the instructor **in advance**. Attendance is mandatory and participation is paramount for success in this class. You are responsible for attending all class sessions. In the event of an emergency (or something pretty close to it) please make every effort to notify me in advance (prior to the class meeting). You are required to contact the instructor personally in advance for the absence via e-mail, telephone, or leave a message with the administrative asst. Mary Lin, or Elaine Prust in the Dept. of Curriculum and Teaching (844-4434) if you are unable to contact me personally in the event of an emergency. Students are allotted one absence (either excused or unexcused) but you are still required to contact the professor in advance. Failure to contact the professor prior to this absence may result in a 5 point deduction per absence from the actual grade earned for the class. In addition, each absence may result in a five point deduction per absence. After three absences students will be recommended for withdrawal from the class. Should an extended illness or family emergency arise please notify your instructors as soon as possible. In the event that there is an absence it must be in accordance with Tiger Cub policies on absences in order to be excused. Please remember that assignments are still due, in the event that you are absent. Attendance is mandatory. \*Please arrive at each class on time (6:00 pm) and be prepared to discuss and respond to issues and topics covered in the class. Excessive tardiness will not be accepted and two tardies (more than 10 minutes late) will be considered as one absence and will result in a 5 point deduction from your final grade. Moreover, late students may not be permitted to enter class and may be counted as an unexcused absence at the discretion of the professor of the course.

\*If you miss a class, you are still required to turn in the assignments on time for full credit. Please contact me prior to turning in your assignment via e-mail as an attachment only. In the event that you are have an excused absence in accordance with AU’s excused absence policy all assignments must be turned in no later than 3 days after the date you miss class. Preferably, unless you have a medical emergency make every effort to turn assignments in on the date that they are due even if you have an excused absence.

**Unannounced quizzes: There will be 4 unannounced quizzes.**

**Accommodations**: Students who need accommodations are asked to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternative time can be arranged. To set up this meeting, please contact me by e-mail. Bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have an Accommodation Memo but need accommodations, make an appointment with the Program for Students with Disabilities at 1244 Haley Center, 844-2096 (V/TT).

**Honesty Code:** The University Academic Honesty Code and the Tiger Cub Rules and Regulations pertaining to Cheating will apply to this class.

“As members of the academic community, students are expected to recognize and uphold standards of intellectual and academic integrity. The university assumes as a basic and minimum standard of conduct in academic matters that students be honest and that they submit for credit only the products of their own efforts. Both the ideals of scholarship and the needs for fairness require that all dishonest work be rejected as a basis for academic work.” (AU Bulletin) Any questions related to academic honesty will be subject to the Policy on Academic Honesty as stated in the Auburn University Bulletin.

**Professionalism**: As faculty, staff, and students interact in professional settings, they are expected to demonstrate professional behaviors as defined in the College’s conceptual framework. These professional commitments or dispositions are listed below:

Engage in responsible and ethical professional practices

Contribute to collaborative learning communities

Demonstrate a commitment to diversity

Model and nurture intellectual vitality

**Auburn University’s official Contingency Plans will apply to this course in the event of an emergency, etc.**

**Justification for Graduate Credit**

Graduate courses “should be progressively more advanced in academic content than undergraduate programs” and should “foster independent learning” (SACS guidelines 3.6.1 and 3.6.2).

Factors to consider in evaluating a course for graduate credit include but are not limited to the following:

use of specific requisites;

content of sufficient depth to justify graduate credit (materials beyond the introductory level);

content should develop the critical and analytical skills of students including their application of the relevant literature;

rigorous standards for student evaluation (all students in a 6000-level course must be evaluated using the same standards); course instructor must hold graduate faculty status or be approved by the Dean of the Graduate School.