**Auburn University Syllabus**

**CTSE 7510**

**Spring 2018**

**Professor: Dr. M. L. Russell**

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

**Credit Hours:** 3 semester hours

**Prerequisites:** Admission to departmental graduate program

**Class meeting times:** Thursdays 10:00-12:50pm **Class meeting location: 15B**

**Date Syllabus Prepared:** Revised January 2018

Professor: Dr. M. L. Russell

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334-844-6880

Office Hours: By appointment only

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I will respond to emails typically within 48 hours unless I am away from the office. If you do not hear back within 48 hours of emailing please send another email

# Students are required to check Canvas regularly for notes and important information. Please be sure to check your AU email account regularly, as well. Please note the class may also meet virtually via Zoom (online platform).

**Texts:**

Recommended: Holly, M. L., Arhar, J., & Kasten, W. Action Research for Teachers: Traveling the Yellow Brick Road (latest edition/3rd edition)

# 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 (at the discretion of the instructor for the course).

# Course Description:

Review, analysis, and interpretation of available research, with emphasis on interpreting new research to meet the changing needs of science teaching. Research methodology, landmark studies, critique and application of research in the area of specialization. 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 learn how to 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.
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.
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. address the issue of epistemology or knowing in research through: (a) study of different research paradigms in social science.
8. compare and contrast the two main methodologies in educational research.
9. be informed of some of the all-encompassing research findings on science learning.
10. become adept at using various library resources, as well as technology to learn about current research in the literature on science education.
11. 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.

# Please note that this is a course that moves quickly and students are expected to come prepared. The format of the course is discussion and student centered and the instructor promotes more student-student interaction.

**Late/remedial work policy**

No late assignments unless in accordance with AU missed work policy (i.e. excused absence) and at the discretion of the instructor of the course.

# 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

Article /seminar paper and presentation -5 at 5 points each 25

4 unannounced pop quizzes 4 at 5 points each 20

Midterm exam 25

Final Exam 25

Outreach Field Experience 5 hours Required (5 points will be deducted from you final grade for failure to complete the field hours)

Reflection paper on outreach field experience 5 (must complete outreach field experience to receive credit)

**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 readings. You are expected to have read assigned readings or assigned articles and bring prepared notes to use in contributing to class discussion. You may be invited to lead this discussion.

**Article/Seminar paper and presentation guidelines**

1. **Assignment must be a minimum 2 pages in length double-spaced and maximum 3 page. You are to present the article and upload the paper to Canvas on the assignment due date. Students are to use Prezi and at least 5 slides to present the “essence” of each article presented. Each student has 10 minutes to conduct the presentation and discussion for 5 minutes.**

**Article selected must be on “hot topics” in science education (preferably). Articles can address technology, equity, technology in the science classroom, NGSS, ELL in the science classroom, or any other recent topics in science and STEM education. Students will present the article (give a brief overview) 5 at 5 points each (25 points total).**

**Guidelines for in class presentations on seminar articles:**

--Essentially 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 presentation on the scheduled presentation days on their article selection for the week and respond to suggestions and criticism. You should use technology (Prezi) and other media to help us understand your main ideas. After the presentations there will be a 5 minute question/answer/discussion session.

You will select a research article to critique from a science education journal which addresses the area listed for the article seminar assignment due on the assigned due date. All assignments must be typed, double-spaced and in APA style 6th edition. Please select an article from research based or practitioner based journals (e.g. Science Teacher, Science Scope, Journal of Science Teacher Education, Journal of Science Teaching, Negro Educational Review)

**Please share with the class your article selection during the prior class meeting to ensure that students do not present on the same article. Also be sure not to present subsequent articles on an article that has already been presented. Discuss with your classmates articles so as not to duplicate assignment presentations.**

Format:

1. Attach a citation of the article and scan the article and post it to Canvas assignment posting no later than 10 minutes prior to the class meeting time/due date for the assignment and attach the assignment to Canvas as well. All assignments are to be turned in electronically. If there is no posting for the assignment on Canvas then students are to email the assignment no later than 10 minutes prior to the class meeting time for the due date of the assignment.
2. All articles must be from research journals and no articles prior to 2005.
3. Include a complete citation for the article at the bottom of the last page in APA 6th edition style.
4. Writing must be clear, and paper well organized. Please type all papers.
5. If possible attach the assignment in a PDF file on Canvas or MS word document so that I can make comments in the document through edit options.

**Rubric for grading the seminar presentation articles submitted**

Criteria for grading assignments: 5 points total (5 total due). Total credit for all 5 seminar articles will be 25 points.

**Overview of research article guidelines for online paper submission**

**-purpose for study (1 point)**

**-research methodology, sample selection technique, and sample size (1 point),**

**- data collection techniques and data analysis (1 point),**

**- major themes and findings, conclusion, (1 point)**

**-how this adds to existing literature (1 point)**

**\*Please do not rewrite the article. Attach a copy in PDF format of the article to Canvas with this assignment.**

# There will be 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

# 1st exam: May include short answer, description format. More details to be provided prior to exam. 25 points

# 2nd exam: May include short answer, description format. More details to be provided prior to exam. 25 points

1. **Outreach Field experience hours at COSAM Science Olympiad, Forest Ecology Preserve, or an additional approved outreach experience (5 hours)**

Students are required to document and complete at least 5 field experience hours at the Forest Ecology Preserve, the COSAM Science Olympiad event, or any other approved outreach experience.

***Mandatory Outreach experience (5 hours) must be completed by April 27***

There are opportunities provided for students to complete this outreach experience component. Students will participate in COSAM Science Olympiad on Saturday March 31st from 8:00am-3:00pm for a minimum of 3 hours and conduct any remaining outreach work with the Forest Ecology Preserve (FEP) or another field experience opportunity designated by the course instructor. Please make sure that you have completed a fingerprinting/background check with Professional Ed. Services. Mrs. Jennifer Lolley will be your contact person for the Forest Ecology Preserve and she will meet with our classes to discuss the outreach experience.

Dr. Charles Eick will come speak with the class regarding the sign up for Science Olympiad. You must make arrangements and complete your outreach hours before February 14 and information on what you will do for this experience is due to my on February 14. of the semester and you must provide documentation of outreach detailing what you did and the coordinator of the program must signature your participation. DO NOT wait until the last minute to try to complete the outreach hours because Mrs. Lolley reserves the right to decline any student participating if they try to arrange to complete hours after April 1. Keep in mind that if you wait until too late you may not be allowed to complete the hours and will not receive credit for the paper since it must be on the FEP field experience.

## Documentation of outreach experience is due on the last class meeting date of April 26. You will need to type a

***statement that including the following: Name, dates and times attended a Science Olympiad, FEP, or another approved outreach experience. Dr. Eick, Mrs. Jennifer Lolley or the site representative for the outreach experienced must be signature your outreach documentation and this must be turned in by April 26.***

It is mandatory to tell me where you will be doing the outreach experience before you begin. You must make arrangements and

inform me of what you will do for the outreach hours no later than Feb.15. After you complete the hours you must provide

documentation of outreach detailing what you did and the coordinator of the program must signature your participation.

***Documentation of outreach experience is due on the last class meeting date of April 26***

1. ***Outreach reflection paper. (5 points)***

Students will write a minimum 2 page double-spaced reflection paper on their outreach experience and the paper must include the following:

1. What insights do you have now on teaching in the informal setting based on this experience?(1 pt)
2. What will you do in your own classroom to integrate more informal science opportunities for your students? (1 pt)
3. What did you do as part of your outreach hours and how has this helped you improve professionally? (1 pt)
4. What teaching strategies did you think work best in the informal setting and why? (1 pt)
5. Provide a brief overview of what you did for your outreach hours at the Forest Ecology Preserve. (1 pt)

***Please note if you attend different outreach experiences you can write or address the questions in the context of the overall experience In addition, if you are enrolled in another class with outreach experiences you will have to complete hours for both classes.***

**Course Content and Schedule**

# Week 1 (January 11)

***Overview of course***

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

# Week 2 (January 18)

Library research day/students will work on CITI training.

Students are also assigned to select a research interest that is a problem in science education or STEM education. What is your research interest? Why is this a problem? How would you investigate this topic? Why does it interest you? Students are assigned to look up the term action research and begin working on a literature search for topics they are interested in learning more about relative to STEM or Science Education.Students will present the responses to these questions in class on January 25. Students will also work on their article seminar topic due February 8.

**January 18-January 31 Drop Course penalty days (See AU Academic Calendar)**

**Week 3 (January 25)**

Students are assigned to look up the term action research and begin working on a literature search for topics they are interested in learning more about relative to STEM Education or Science Education. Conducting a study; Introduction, literature review-SLO-5

Discuss 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. Conducting a study; Introduction, literature review-SLO-5

**January 31 15th class day**

**-Last day to drop from course with no grade assignment**

**-Last day for potential tuition refund for dropped classes**

# Week 4 (February 1)

Library resource orientation

# Week 5 (February 8)

**Article/seminar paper #1 due-Must be on an action research based topic in STEM or Science Education**

Conducting a study; literature review, statement of the problem (SLO 1-5) IRB procedures and protocols; Ethic in research

Ethics in research

Data collection; Sampling strategies

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.

# Week 6 (February 15)

Conducting a study; literature review, statement of the problem (SLO 1-5) IRB procedures and protocols; Ethic in research

Ethics in research Data collection; Sampling strategies

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 work as well as inputs and outputs. Discussion on action research.

**February 23 Early alert midterm grade**

**Week 7 (February 22)**

**1st exam**

**March 2 Midsemester 36th class day**

**Week 8 (March 1)**

**Article/seminar paper #2 due-Must be on technology in STEM Education or Science Education.**

Ethics in research

Data collection; Sampling strategies

Data collection

# Week 9 (March 8)

Guest speaker (tentative)

**Week 10 (March 12-16 Spring break)**

# Week 11 (March 22)

**Article/seminar paper #3 due-Must be on an equity issue in STEM Education or Science Education.**

Data analysis and reported

# Week 12 (March 29)

Data analysis and reporting

**March 30 Last Day to Withdraw-Last day to withdraw from course with no grade penalty. “W” assigned.**

**Week 13 (April 5)**

**Article/seminar paper #4 due-Select any topic in the area of STEM Education or Science Education.**

**Week 14 (April 12)**

Data analysis and reporting

**Week 15 (April 19)**

**Article/Seminar paper #5 due-Must be a topic in the area of ELL students in STEM Education or Science Education.**

Overview of topics discussed for course

Writing and reporting

**Week 16 (April 26)**

**Last day of class/semester wrap-up**

***Outreach reflection paper due***

**April 27 (last day of the semester) Classes end**

April 28-29 Study/Reading Day

April 30-May 4 Final Exam Period

May 5-7 Commencements

F**inal exam CTSE 7510-See AU final exam schedule for day and time of exam will be based on CTSE 7510 meeting**

**day/time unless the exam time as outlined in the AU final exam scheduled conflicts with the instructors schedule**

**for another exam. In that case another day and time will be designated by the instructor.**

# 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 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 student eHandbook. 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. 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 AU 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 (10:00 am) 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).

**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 ethics**; **Contribute to collaborative learning communities; Demonstrate a commitment to diversity; Model and nurture intellectual vitality.**

There may be some class meetings that utilize Canvas or Zoom and entail on-line discussions or live chat discussions.

Students are required to log in and participate in all discussion. Failure to participate will be considered an unexcused class absence and result in a 5 point deduction from your final grade for each time that you fail to participate.

* \*Traditional Masters students- Please note that traditional Class A certification students will be required to complete a field project as a requirement for the program. More information will be provided to students who are completing the traditional masters.

All assignments are expected to be typewritten, grammatically accurate, and free of spelling and typographical errors. Assignments are to be of a quality that would be expected of a professional.

***All assignments must be turned in within ten minutes of the start of class on the day that they are due or within ten minutes of the time identified on the syllabus.*** They must be submitted as a hard copy or via email or Canvas unless otherwise specified. Assignments must be turned in by the student completing the assignment.

**No late assignments** will be accepted unless accompanied by a university approved excuse. All absences must be in accordance with the AU absence policy in order for the absence to be excused and late work to be accepted based on the absence.

If a student misses turning in an assignment and has a university approved excuse, he or she will have **one week** from the time he or she returns to class to turn in the assignment.

**Any assignment completed and /or submitted not in accordance with the guideline in this syllabus may be returned and may not be accepted for credit.**

**Please note**: Any incomplete assignments or assignments not typed up in the proper format will not be accepted. All papers must be in 12 font, Times New Roman, and line spacing should be according to guidelines outlined for the assignment

All submitted work should be typed and neatly arranged. NO creative margins. Please start all assignments at the very top of the first page and put your name, assignment, and date on the very last page.

**Late/remedial work policy**

If you miss a weekly class and the absence is excused (in accordance with AU absence policy), you can turn in the assignments on time if you would like to receive credit. The assignment must be turned in the day you return to class following the excused absence. Otherwise NO late assignments will be accepted unless students have an excuse in accordance with the AU absence policy listed in the AU online guidelines. **All assignments are due via Canvas at the start of each class meeting on the date they are scheduled.**

If the absence is unexcused then the assignment will not be accepted.

**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.

**Classroom Behavior:** “Behavior in the classroom that impedes teaching and learning and creates obstacles to this goal (learning) is considered disruptive and therefore subject to sanctions. Students have the responsibility of complying with behavioral standard. Examples of improper behavior in the classroom (including the virtual classroom of e-mail, chat rooms, telephone, and web activities associated with the courses) may include, but are not limited to the following: arriving after a class has begun; use of tobacco products; monopolizing discussion; persistent speaking out of turn; distractive talking including cell phone usage; audio or video recording of classroom activities or the use of electronic devices (including cell phones) without the permission of the instructor; refusal to comply with reasonable instructor directions; employing insulting language or gestures; verbal, psychological, or physical threats, harassment, and physical violence. (See *AU guidelines available online)*

Classroom Behavior: The Auburn University Classroom Behavior Policy is strictly followed in the course; please refer to the Student Policy eHandbook at <http://www.auburn.edu/student_info/student_policies/> for details of this policy.

Students are responsible for checking class emails and Canvas daily, if you use email or Canvas. You are to use your AU official email address only for all correspondence with the instructor for the class.

Cell phones may **NOT** be used during this class unless otherwise designated by the instructor of the class. Laptop and other devices should only be used if the student is taking notes for the class or instructed to use the device for class assignments during the class. **Placing or receiving calls, text messages, instant messages, or emails may result in immediate dismissal from the instructional sessions. Failure to adhere to the policies for this class will result in the student being dismissed from the class meeting. In the event that the student is asked to leave and does not comply the AU Code of Conduct policy will be enforced. In addition,the student may be recommended to the Deans office for removal from the course and/or program.**

**Academic Honesty Policy:** All portions of the Auburn University student academic honesty code (Title XII) found in the *AU guidelines* will apply to university courses. All academic honest violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee. Honesty Code: The University Academic Honesty Code and the AU ehandbook Rules and Regulations pertaining to Cheating and all Academic Honesty policies will apply to this class. All portions of the Auburn University Student Academic Honesty code (Title XII) found in the Student Policy eHandbook at <http://www.auburn.edu/student_info/student_policies/> will apply to this class.

All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee.

# Auburn University’s official Contingency Plan

If normal class and/or lab activities are disrupted due to high number of students experiencing illness or an emergency or crisis situation (such as a widespread H1N1 flu outbreak), the syllabus and other course plans and assignments may be modified to allow completion of the course. If this occurs, an addendum to your syllabus and/or course assignments will replace the original materials.

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.