FAU
COLLEGE OF EDUCATION
Florida Atlantic University

Department of Teaching and Learning

Course Title: Science: Middle & Secondary School
Course Numbers: SCE 4360
Credit Hours: 3 Semester Hours (Undergraduate level)
Campus Location: , Room:
Day and Time:
Instructor:
Contact Information:
Cell:
Email:

Holidays:
Drop / add date:

Catalog Description
Science: Middle and Secondary School (SCE 4360) 3 credits
Prerequisite: Senior-level standing in a science discipline
Techniques of instruction for students enrolled in teacher education programs.

Course Connection to Conceptual Framework
As a reflective decision-maker, the teacher candidate will learn to make informed decisions, exhibit ethical behavior and provide evidence of capability to teach science in the classroom. Competency assessments link performance in a lab-based inquiry presentation to capability and demonstration of ethical behavior and reflective decision-making in a lesson plan design.

Competency Assessments Embedded in this Course –
A competency assessment is a required student performance to demonstrate proficiency of one of the Florida Educator
Accomplished Practices (FEAP). These competency assessments are embedded in selected courses in Florida Atlantic
University's Teacher Education professional preparation program. The Florida Department of Education (DOE) and The National Council for Accreditation of Teacher Education (NCATE) require that teacher candidates in colleges of education demonstrate the knowledge, skills and dispositions necessary to meet professional state and institutional standards. Consequently, the performance of students in regard to these competency assessments is used as documentation of student competence for the Florida Educator Accomplished Practices.

This course has two competency assessments, as well as other assignments, considered essential to mastery of knowledge, skills and dispositions. All students, regardless of the instructor or course section, will be required to complete these competency assessments. Student proficiency on the competency assessment will be evaluated utilizing a common rubric.

All students will be assessed on the basis of a three-point evaluation rubric: "Exceeds Expectations," "Meets Expectations," and "Does Not Meet Expectations." In order to successfully complete a program of study, all students must meet or exceed expectations on *all* competency assessments in *all* required courses. Consequently, students must "Meet" or "Exceed" expectations on both competency assessments **in order to pass this course.**

If a student fails to "Meet" or "Exceed" expectations on all competency assessments assigned to this course, or remediate within the course schedule, it is the policy of the Department of Teacher Education that the student will earn a grade of no more than a "C-" for the course and must repeat the course.

Content Outline:

(month/day)	Introduction, Blackboard, Syllabus, FCAT
(month/day)	No Class – Labor Day
(month/day)	Graphing
(month/day)	Velocity/Acceleration/Newton's 3 Laws
(month/day)	Energy/Other Labs/Biology – Competency 1 – Journals are due
(month/day)	Online Assignment - Websites
(month/day)	Lesson Plan (Competency 2)Presentations/Review for Midterm
(month/day)	Midterm - Online
(month/day)	Waves
(month/day)	Planetarium
(month/day)	Electricity
(month/day)	No School – Veteran's Day
(month/day)	Chemistry
(month/day)	Online Assignment - Article Assignment
(month/day)	Competency 3 is Due – review for Final
(month/day)	Final – Online

Assignments:

Assignment	Date Due	Point Value
Activity Assignments	Weekly	10 each day
Journal Assign. (Comp 1)		100
Websites		100
Lesson Plan (Comp 2)		100
Test 1		100
Planetarium Visit		50
Articles		100
Diversity Assign (Comp.3)		100
Exam		100

-Late assignments will be penalized 10% for each week late.

-THERE WILL BE NO MAKE-UP TESTS GIVEN

-Syllabus is subject to change at the instructor's discretion.

Competency assessment I: Professional Development Journal & Article Review
Continuous Improvement, Responsibility and Ethics~ Continuous Professional Improvement
FEAP Indicator B.1.e
> Uses a variety of data, independently, and in collaboration with colleagues, to evaluate learning outcomes, adjust planning and continuously engages in targeted professional growth opportunities and reflective practices.

Competency assessment II: Science Lesson Plan
Quality of Instruction~ Instructional Design and Lesson Planning
FEAP Indicator A.1.d: Selects appropriate formative assessments to monitor learning.
Quality of Instruction~ The Learning Environment
FEAP Indicator A.2.a: Organizes, allocates, and manages the resources of time, space, and attention. FEAP Indicator A.2.e: Models clear, acceptable oral and written communication skills. FEAP Indicator A.2.g: Integrates current information and communication technologies **Quality of Instruction~ Instructional Delivery and Facilitation**
FEAP Indicator A.3.c: Identify gaps in students' subject matter knowledge.
FEAP Indicator A.3.d: Modify instruction to respond to preconceptions or misconceptions.
FEAP Indicator A.3.j: Utilize student feedback to monitor instructional needs and to adjust instruction.
Quality of Instruction~ Assessment
FEAP Indicator A.4.d: Modifies assessments and testing conditions to accommodate learning styles and varying levels of knowledge.
Continuous Improvement, Responsibility and Ethics~ Continuous Professional Improvement
FEAP Indicator B.1.c: Uses a variety of data, independently, and in collaboration with colleagues, to evaluate learning outcomes, adjust planning and continuously improve the effectiveness of the lessons.

Exceeds Expectations (3 pts)	Meets Expectations (2 pts)	Does Not Meet Expectations (1 pt)

Competency assessment III: Science Teaching through a Diversity Lens:
Quality of Instruction~ The Learning Environment
FEAP Indicator A.2.d: Respects students' cultural linguistic and family background.
NCATE 4.A: Curriculum and accompanying field experiences are designed to help candidates understand the importance of diversity in teaching and learning. Candidates learn to develop and teach lessons that incorporate diversity and develop a classroom and school climate that values diversity. Candidates become aware of different teaching and learning styles shaped by cultural influences and are able to adapt instruction and services appropriately for all students, including students with exceptionalities.

Required Access
 Students in this course are required by the College of Education to have an active LiveText account to track mastery of programs skills, competencies and critical assignments and to meet program and college accreditation requirements. Students must have an account within: the first four (4) weeks of

the fall or spring semester, within the first three (3) weeks of summer session, or after the first class of a fast track course. Students who do not have an active LiveText account may have an academic hold placed on their record. Information regarding account activation is provided on the College of Education website, http://coe.fau.edu/livetext.

Required Text

Chiapetta, E.L., & Koballa, Jr, T.R. (2005). Science Instruction in the Middle and Secondary Schools. **(7th ed.)** Pearson Education, Inc. Upper Saddle River, NJ: Merrill Publishing an imprint of Prentice-Hall.
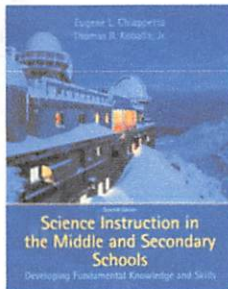
Recommended Text

Sciencesaurus: A Student Handbook. (2002). Great Sources Education Group, Inc. Wilmington, MA: Hougton Mifflin Company. (Elementary or Middle Edition)

Recommended Reading

American Association for the Advancement of Science. (2009). *Benchmarks for science literacy*. New York: Oxford University Press. http://www.project2061.org/publications/bsl/default.htm or www.project2061.org/tools/benchol/bolintro.htm

American Psychological Association. (2001). *Publication manual of the American Psychological Association* (5th ed.). Washington, DC: Author.

National Research Council (1996). *National science education standards*. Washington, DC: National Academy Press. http://www.nap.edu/readingroom/books/nses/overview.html

State of Florida DOE (2008). *Florida Department of Education Science Content Standards,* http://www.floridastandards.org/index.aspx or http://www.fldoestem.org/FLDOE_STEM/Review_FL_Science_Standards.aspx

Guidelines Used in Developing Course Objectives

Florida Educator Accomplished Practices (FEAP)
National Science Teachers Association (NSTA)
Florida Department of Education Competencies and Skills: Biology (FSMCS - BIO)
Florida Department of Education Competencies and Skills: Chemistry
(FSMCS -CHM) Florida Department of Education Competencies and Skills:
Physics (FSMCS - PHY) National Science Education Standards (NSES)

Goal of the Course

This course is designed to involve you in both cooperative and independent activities that will guide you to become a confident, competent, and motivating teacher of secondary school science. As a teacher of science, you will have the unique opportunity to teach on the cutting edge of discovery and research, using technology formats now common in classrooms. Bringing

this excitement level to your students, while guiding student learning across academic and cultural diversity, is an engaging challenge. I will provide opportunities to explore, experiment, analyze and explain concepts in science education, using a variety of tools and techniques. The course is designed with you, the pre-service/beginning science teacher in mind, and includes a reflective approach to science teaching history, methods and curricula. As a reflective decision-maker, you will learn to make informed decisions, exhibit ethical behavior and provide evidence of your capability to teach science in the classroom.

Course Objectives
Upon successful completion of this course, the teacher candidate will be able to:

1. Describe methods of instruction that provide well-balanced instructional lessons, including the importance of informal experiences in introducing concepts, identifying steps in a teacher-led lesson, whole class discussion techniques, and describing ways to facilitate science investigations for all. NSTA 1.a, 3.b, 5.a, 5.b,

2. Maintain a student-centered learning environment that is safe, organized, equitable, flexible, inclusive, and collaborative, the effective educator consistently respects students' cultural, linguistic, and family background; FL-FAU-FEAP2013 A.2.d,

3. Demonstrate and model the use of higher-order thinking skills by posing problems, dilemmas and questions in lessons.

4. Plan activities with identified performance and learning outcomes.

5. Apply concepts from human development and learning theories, and select appropriate formative assessments to monitor learning; FL-FAU-FEAP-2013.A.1.d

6. Maintain a student-centered learning environment that is safe, organized, equitable, flexible, inclusive, and collaborative, the effective educator consistently organizes, allocates, and manages the resources of time, space, and attention; FL-FAUFEAP-2013.A.2.a

7. Maintain a student-centered learning environment that is safe, organized, equitable, flexible, inclusive, and collaborative, the effective educator consistently models clear, acceptable, oral and written communication skills; FL-FAU-FEAP2013.A.2.e

8. Maintain a student-centered learning environment that is safe, organized, equitable, flexible, inclusive, and collaborative, the effective educator consistently integrates current information and communication technologies FL-FAU-FEAP2013.A.2.g

9. Consistently utilize a deep and comprehensive knowledge of the subject taught to identify gaps in students' subject matter knowledge; FL-FAU-FEAP-2013.A.3.c

10. Consistently utilize a deep and comprehensive knowledge of the subject taught to modify instruction to respond to preconceptions or misconceptions; FL-FAU-FEAP-2013.A.3.d

11. Consistently utilize a deep and comprehensive knowledge of the subject taught to utilize student feedback to monitor instructional needs and to adjust instruction. FL-FAU-FEAP-2013.A.3.j

12. Modify assessments and testing conditions to accommodate learning styles and varying levels of knowledge; FL-FAUFEAP-2013.A.4.d

13. Collaborate with the home, school, and larger communities to foster communication and to support student learning and continuous improvement; FL-FAU-FEAP-2013.B.1.c

14. Understand current National and State standards in science education, including Common Core Standards. (NSTA 6.a, 6.b)

Teaching Methodologies

FAU Grading Scale
Grading will be based on a varied spectrum of activities, skills, and understandings. The FAU grading scale is as follows:

	B+ 87-89 (3.33)	C+ 77-79 (2.33)	D+ 68-69 (1.33
A 93-100 (4.00	B 83-86 (3.00)	C 73-76 (2.00)	D 63-66 (1.00)
A- 90-92 (3.67)	B- 80-82 (2.67)	C- 70-72 (1.67)	D- 60-62 (0.67)	F 0-59 (0.00)

OPTIONAL VOLNTEER SCIENCE MUSEUM PROJECT FOR EXTRA CREDIT – Museum of Discovery and Science (MODS), Fort Lauderdale, FL Informal Science Lesson Plan Presentation: Up to **5%** added to final grade. Require full compliance for credit. Also, you are eligible for 10 hours of academic service credit after completing this volunteer project. **Appendix.**

Participation, Attendance & Make-up Policy

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of nonattendance.

Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absence and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

Code of Academic Integrity policy statement

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001.

Disability policy statement

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter

Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling/

LIVETEXT RUBRIC:

FEAP	ASSIGNMENT	EXCEEDS EXPECTATION	MEETS EXPECTATION	DOES NOT MEET EXPECTATION
FL-FAU-FEAP-2013.A.1.d Selects appropriate formative assessments to monitor learning	Lesson Plan	The written science lesson plan clearly and articulately demonstrates the planning of a lesson with identified: 1. learning outcomes 2. performance outcomes 3. planned activities. The written lesson plan expertly demonstrates formative assessments embedded in instructional delivery, linked to summative assessments in the plan.	The written science lesson plan appropriately demonstrates the planning of a lesson with identified: 1. learning outcomes 2. performance outcomes 3. planned activities. The written lesson plan demonstrates formative assessments embedded in instructional delivery, linked to summative assessments in the plan.	The written lesson plan contains little or no evidence of: 1. learning outcomes 2. performance outcomes 3. planned activities. The written lesson plan fails to demonstrate formative assessments embedded in instructional delivery, linked to summative assessments in the plan.
FL-FAU-FEAP-2013.A.2.a Organizes, allocates, and manages the resources of time, space, and attention	Lesson Plan	The presentation of the lesson plan includes focused planning in regard to the organization, allocation and management of time, space and attention, noted in the peer review.	The presentation of the lesson plan includes some evidence of planning in regard to the organization, allocation and management of time, space and attention, noted in the peer review.	The presentation of the lesson plan includes limited or missing evidence of planning in regard to the organization, allocation and management of time, space and attention, noted in the peer review.

FL-FAU-FEAP-2013.A.2.e Models clear, acceptable, oral and written communication skills	Lesson Plan	In the presentation of both the written and oral presentation of the lesson plan, the teacher candidate models exceptionally clear communication skills, with a deep and comprehensive knowledge of content taught. The teacher candidate consistently relates subject matter to appropriate secondary-level real world experiences.	In the presentation of both the written and oral presentation of the lesson plan, the teacher candidate models adequately clear communication skills, with a knowledge of content taught. The teacher candidate relates subject matter to appropriate secondary-level real world experiences.	In the presentation of both the written and oral presentation of the lesson plan, the teacher candidate fails to model clear communication skills, with a knowledge of content taught. The teacher candidate does not relate subject matter to appropriate secondary-level real world experiences.
FL-FAU-FEAP-2013.A.2.g integrates current information and communication technologies	Lesson Plan	The teacher candidate demonstrates proficiency in emergent technology, and an outstanding integration of current FL State and national standards suitable for the secondary classroom.	The teacher candidate demonstrates a developing proficiency in emergent technology, and an integration of current FL State and national standards suitable for the secondary classroom.	The teacher candidate demonstrates a limited integration of current FL State Standards and technologies suitable for the secondary classroom.
FL-FAU-FEAP-2013.A.3.c Identify gaps in students' subject matter knowledge	Lesson Plan	Using a deep and comprehensive knowledge of science content and the peer review provided from classmates, the teacher candidate drafts a lesson plan reflection and expertly identifies gaps in students' subject matter knowledge from the oral presentation of the lesson,	Using the peer review provided from classmates, the teacher candidate drafts a lesson plan reflection and identifies gaps in students' subject matter knowledge from the oral presentation of the lesson.	Using the peer review provided from classmates, the teacher candidate fails to draft an appropriate lesson plan reflection to identify gaps in students' subject matter knowledge from the oral presentation of the lesson.

FL-FAU-FEAP-2013.A.3.d Modify instruction to respond to preconceptions or misconceptions	Lesson Plan	Using a deep and comprehensive knowledge of science content and the peer review provided from classmates, the teacher candidate expertly drafts a lesson plan reflection and modifies instruction to respond to preconceptions or misconceptions.	Using the peer review provided from classmates, the teacher candidate drafts a lesson plan reflection and modifies instruction to respond to preconceptions or misconceptions.	Using the peer review provided from classmates, the teacher candidate fails to draft an appropriate lesson plan reflection to modify instruction to respond to preconceptions or misconceptions.
FL-FAU-FEAP-2013.A.3.j Utilize student feedback to monitor instructional needs and to adjust instruction.	Lesson Plan	Utilizing a deep and comprehensive knowledge of science content, the teacher candidate uses peer feedback after the lesson presentation to expertly monitor instructional needs and to adjust instruction on the final lesson plan	Utilizing a deep and comprehensive knowledge of science content, the teacher candidate uses peer feedback after the lesson presentation to monitor instructional needs and to adjust instruction on the final lesson plan	The teacher candidate fails to use peer feedback after the lesson presentation to monitor instructional needs and to adjust instruction on the final lesson plan
FL-FAU-FEAP-2013.A.4.d Modifies assessments and testing conditions to accommodate learning styles and varying levels of knowledge	Lesson Plan	Using the peer review in lesson analysis, the lesson reflection expertly modifies assessments and testing conditions to accommodate learning styles and varying levels of knowledge.	The lesson reflection and analysis modifies assessments and testing conditions to accommodate learning styles and varying levels of knowledge.	The lesson reflection and analysis does not adequately modify assessments and testing conditions to accommodate learning styles and varying levels of knowledge.
FL-FAU-FEAP-2013.B.1.c Uses a variety of data, independently, and in collaboration with colleagues, to evaluate learning outcomes, adjust planning and continuously improve the	Lesson Plan	The written lesson plan, and adjusted final written lesson plan clearly and consistently demonstrate the use of the peer review comments and other data sources to evaluate learning outcomes, adjust planning and continuously	The written lesson plan, and adjusted final written lesson plan demonstrate the use of the peer review comments and other data sources to evaluate learning outcomes, adjust planning and continuously improve the	The written lesson plan, and adjusted final written lesson plan fail to demonstrate the use of the peer review comments and other data sources to evaluate learning outcomes, adjust planning and continuously improve the

effectiveness of the lessons		improve the effectiveness of the lesson.	effectiveness of the lesson.	effectiveness of the lesson.
FL-FAU-FEAP-2013.A.2.d To maintain a student-centered learning environment that is safe, organized, equitable, flexible, inclusive, and collaborative, the effective educator consistently respects students' cultural, linguistic, and family background.	Science Teaching through a Diversity Lens	In response to posed elements "the scientist from another cultural perspective" and "equity in Science Education" the candidate demonstrates an acute awareness of different teaching and learning styles shaped by cultural influences.	In response to posed elements "the scientist from another cultural perspective" and "equity in Science Education" the candidate demonstrates a developing awareness of different teaching and learning styles shaped by cultural influences.	In response to posed elements "the scientist from another cultural perspective" and "equity in Science Education" the candidate fails to demonstrate an awareness of different teaching and learning styles shaped by cultural influences.
FL-FAU-FEAP-2013.B.1.e Engages in targeted professional growth opportunities and reflective practices	Professional Development & Article Review	The review of an article within a science journal, and the analysis of the journal itself demonstrates an exceptional understanding of professional growth opportunities using research in the discipline.	The review of an article within a science journal, and the analysis of the journal itself demonstrates an understanding of professional growth opportunities using research in the discipline.	Either the review of an article within a science journal, or the analysis of the journal itself fails to demonstrate an understanding of professional growth opportunities using research in the discipline.

APPENDIX Name: _____

Optional Volunteer Science Museum Project for Extra Credit

MODS Informal Science Lesson Plan & Presentation

Procedure

1) Contact Ms. Summer Scarlatelli through email sscarlatelli@mods.net at the Museum of Discovery and Science (MODS), Ft. Lauderdale, FL to make an appointment.

2) One individual complimentary Pass will be provided by the MODS.

3) Visit the MODS in Fort Lauderdale, FL.

4) Report to Ms. Scarlatelli or her designee.

5) Tour the Exhibits.

6) Select one Exhibit.

7) Discuss the selected exhibit with Ms. Scarlatelli.

8) Receive Instruction on that exhibit to Gain understanding of the Science Subject Matter Content of that Exhibit.

9) Prepare an Informal Science Lesson. (Topic for this Informal Lesson developed based on Informal Science Education Resources such as the Science Museums must be different from the topic you chose for the "Formal" Science Lesson Plan in class.)

10) Present the Lesson to designated MODS student visitors or staff and receive feedback (Need to work with Ms. Scarlatelli.) (Note: Presentation must be completed ahead of the deadline for turning in this Informal Science Lesson Plan.)

11) Revise your Informal Science Lesson based on feedback.

12) Submit the following to the course Instructor on or before to Dr. Kumar.

    1) Informal Science Lesson Plan prepared and used in the MODS project

    2) Self Reflection

    3) Submit 10 volunteer hours to Academic Service Credit

(Up to 5% added to final grade. Requires full compliance for credit. Also, you are eligible for 10 hours of academic service credit, and remember to submit your service hours before deadline.)
NOTE: Topic for this Informal Lesson developed based on Informal Science Education Resources such as the Science Museums must be different from the topic you chose for the "Formal" Science Lesson Plan in class. Those students who have previously participated in this project as part of SCE 4350/SCE 4113 are eligible to participate only if they select a newer exhibit with different science content.

Assumption of Risk Statement for Student: I whose name appears above understand that there are certain physical risks inherent in every form of service-learning. I understand the risks associated with this Academic Service-Learning assignment. I nonetheless agree to assume those risks so as to gain the benefits from participation in this valuable learning experience. I hereby release the State of Florida, the Board of Trustees, Florida Atlantic University and its agents and employees from any and all liability associated with my participation in this assignment at Florida Atlantic University.

SELF-REFLECTION – Optional Volunteer Science Museum Project

Your Name:

Course:

Semester:

Title of your Lesson Plan/Presentation:

Description of the Science Concept or Principle:

Description of the MODS Exhibit Used for the Project:

Type of Audience (circle one): K-12 Students OR Adults:

Note: Please attach a Copy of your Lesson Plan to this Self Reflection

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Reflecting upon your experience in this project, explain the following.

1) Describe any effect on your level of understanding of the Science Concept/Principle you addressed

2) Describe any effect on your level of confidence in explaining the Science Concept/Principle you addressed

3) Describe any effect on your ability to relate science to real-world examples

4) Describe any Effect on your ability to teaching science

5) Describe any effect on your decision to utilize community resources such as MODS in your future

K-12 teaching

Note: Note: In order to receive full credit for the Volunteer Project for Extra Credit you are required to email this Self Reflection typed along with a copy of your lesson plan used to teach at the MODS to Dr. Kumar (david@fau.edu) no later than the deadline noted in your Syllabus.   Also, your contact at the MODS must be emailing Dr. Kumar an evaluation of your performance on this assignment. Thank you.