

**MISSISSIPPI STATE UNIVERSITY
COLLEGE OF EDUCATION**

**DEPARTMENT of CURRICULUM, INSTRUCTION, and SPECIAL EDUCATION
COURSE SYLLABUS**

Course Prefix and Number: EDS 6653

Course Title: Science Education Pedagogy

Credit Hours: Three (3) semester hours

Type of Course: Lecture

Prerequisites: Admission to Teacher Education

Catalog Description: (Co-requisite: EDS 8883 or EDS 8893 or consent of instructor). Three hour lecture. Field-based. A comprehensive examination of the effective practices for teaching and evaluating science for middle and secondary students.

College of Education Conceptual Framework:



The faculty in the College of Education at Mississippi State University are committed to assuring the success of students and graduates by providing superior learning opportunities that are continually improved as society, schools, and technology change. The organizing theme for the conceptual framework for the College of Education at Mississippi State University is educational professionals - dedicated to continual improvement of all students' educational experiences. The beliefs that guide program development are as follows:

1. **KNOWLEDGE** - Educational professionals must have a deep understanding of the organizing concepts, processes, and attitudes that comprise their chosen disciplinary knowledge base, the pedagogical knowledge base, and the pedagogical content knowledge base. They must also know how to complement these knowledge bases with the appropriate use of technology.
2. **COLLABORATION** - Educational professionals must continually seek opportunities to work together, learn from one another, forge partnerships, and assume positions of responsibility.
3. **REFLECTION** - Educational professionals must be willing to assess their own strengths and weaknesses through reflection. They must also possess the skills, behaviors, and attitudes necessary to learn, change, and grow as life-long learners.
4. **PRACTICE** - Educational professionals must have a rich repertoire of research-based strategies for instruction, assessment, and the use of technologies. They must be able to focus that array of skills on promoting authentic learning by all students or clients, while exhibiting an appreciation and commitment to the value and role of diversity.

Course Objectives:

- 1) The student will become thoroughly familiar with the Mississippi Science Frameworks, the National Science Education Standards, and INTASC. INTASC # 1,

- 2, 5, 7, & 9; CFPO # 1, 2, & 10
- 2) The student will gain proper speaking skills. INTASC # 6, CFPO # 7
 - 3) The student will demonstrate proper use of technology in the classroom. INTASC # 6, CFPO # 10
 - 4) To introduce current philosophy and methods of teaching science. INTASC # 1, 2, 5, 7, & 9; CFPO # 1, 2, & 10
 - 5) To provide practice in teaching techniques (Mini-teaching lesson). INTASC # 1, 2, & 3; CFPO # 5, 6, & 7
 - 6) To introduce the science curricula and demonstrate the objectives of each. INTASC # 1; CFPO # 3
 - 7) To discuss Task Stream and Science NCATE requirements. INTASC # 1; CFPO # 9
 - 8) To discuss assessment and various evaluation methods. INTASC # 5 & 10; CFPO # 4
 - 9) To review the Interstate New Teacher Assessment and Support Consortium (INTASC) Standards. INTASC # 2, 3, 5, 6, 7, 8, 9, & 10; CFPO # 1
 - 10) To emphasize laboratory safety for all science content areas. INTASC # 1; CFPO # 3
 - 11) To communicate professional responsibilities. INTASC # 6, 9, & 10; CFPO # 1 & 8
 - 12) To promote self-development in the teaching of science inquiry. INTASC # 1, 2, & 3; CFPO # 5, 6, & 7

Topics:

Learning module	Topic
The Nature of Science Education	What Is Science Instruction? (3 hours)
	Science teacher content knowledge (1 hours)
	Enhancing science instruction (3 hours)
	Nature of Science and science misconceptions (5 hours)
Philosophical Rational	Informal science environments I (2 hours)
	Informal science environments II (2 hours)
	Educational psychology in the service of science instruction (2 hours)
	Assessment in science education (2 hours)
	Constructivism and conceptual change (2 hours)
Research support for Best practices in science Teaching	Inquiry rational (4 hours)
	Inquiry assessment and lab design (4 hours)
	Inquiry practical issues (4 hours)
Safety and Reflection of Practice	Safety and Ethical treatment of Animals (4 hours)
	Teaching as a Reflective Practice (5 hours)
	Professional Originations and Support (2 hours)

Text:

1. Readings will be made available through myCourses.
2. Required Membership To NSTA: New teacher/ student membership costs \$35 and gets you access to the online journal and other member services. This is an excellent price for an amazing resource.
3. Finn Scientific catalog (Free provided on request at www.flinnsci.org or by calling 800-452-1261)
4. American Association for the Advancement of Science (AAAS). (1993). Benchmarks for science

literacy: Project 2061. New York, NY: Oxford University Press. Available at:
<http://www.project2061.org/publications/bsl/online/index.php>

5. National Research Council (NRC). (1996). National science education standards. Washington, DC: National Academies Press.

Methods of Instruction: Discussion, demonstration, inquiry, discovery, cooperative activities, and problem-based learning. This course has a field-based component.

Suggested Student Activities

NSTA Membership (*due xx/xx)

Join NSTA Student membership \$35. Upload proof of membership (receipt) to myCourses and participation in online discussion.

Science in the classroom

Students will select an article from NSTA that is relevant to their content area then write a short summary, rationale for selection, a description of where it fits into your science curriculum and a statement of how it influenced your perception of science teaching (no more than 1 page). During the weeks these will be due, an assignment will appear on myCourses. You will then be required to upload your reflection & the article to the discussion board to share, read, and comment on other's.

Completion of Safety Training (*due xx/xx)

Safety training is offered free of charge from Flinn scientific. Complete this training by registering at their website (<http://labsafety.flinnsci.com/Home.aspx>) watch the video series and complete the assessments. Upload a summary of your Certificate of completion including chapter scores to myCourses. **This assignment is time consuming.**

Misconception interviews, lesson plan and reflection (*due xx/xx)

In order to understand where to begin instruction, it is crucial to know where students are "coming from" in terms of their understandings about science. Often, students' understanding of science concepts differs from the accepted scientific explanation. For this assignment, you will interview 2 children about a science concept, compare their answers to commonly held misconceptions, and consider what this means related to teaching science in the classroom. Then, teach a lesson based on the misconceptions at in your class and write a short reflection on what you did and how it may have changed your perception of teaching. (The AAAS website is a great resource for this.)

Discrepant Event Presentation/handout, lesson and reflection (*due xx/xx)

Find, modify and/or otherwise develop a discrepant event and present it to your class in 5-8 minutes. This presentation should be accompanied by a one page (front/back is OK) handout with the following sections: a) overview/introduction, b) grade level targeted, c) time constraints and issues, d) necessary materials, e) discussion of where this would fit within the science curriculum, f) the nature of the discrepancy and a discussion of what is happening from a scientific perspective. You will also be required to present and RECORD your discrepant event in your classroom and write a brief reflection about the lesson on the importance of using discrepant events in the classroom. You will post this video and hand out for all students to view on myCourses.

Reading Sets

Reading sets will be assigned each week and you will be required to write three POMS related to the readings for each week.

POMS (Points of Most Significance) (*Due Friday of each week there is a reading set assigned)

These are POMS inspired by an individual reading set and represent what you think are the most important points made **by the authors** of a given paper set.

Your POMS statements must be carefully written and **thoroughly reviewed for clarity and for sense** (a matter of whether the statement says what you want it to say and how clearly you have said it).

3 POMS will be written each week regarding each reading set. All 3 POMS will be submitted as an assignment. You will choose one POMS to post to myCourses discussion board and then review and discuss the POMS of your Classmates.

Final Project: Critique of Professional Practice (*due xx/xx)

Design and teach a lesson that incorporates the knowledge you have gained from this class.

To earn full credit on this project you must complete the following:

- Record video of the entire lesson and upload to myCourses
- Discuss the rationale for choosing the lesson and why you included the activities used in the lesson
- Write a reflection on the lesson and how this course influenced the lesson
- USE READING SETS as references and INCLUDE POMS for support in the rationale and reflection

Mississippi State University Honor Code:

“As a Mississippi State University student I will conduct myself with honor and integrity at all times. I will not lie, cheat, or steal, nor will I accept the actions of those who do.”

In the event of occurrence of academic misconduct, the guidelines and procedures outlined in the academic misconduct policy will be followed. The MSU Honor Code can be found at:

<http://www.honorcode.msstate.edu/>

Technology:

Technology will be used in both the delivery of the course content and through course requirements completed by graduate students. Delivery of course content will use PowerPoint presentations, materials on the Internet and myCourses. All course assignments will be completed using appropriate software.

Diversity:

Student will examine materials for appropriateness to use with diverse learners.

Mississippi State University Accommodations for Disabilities:

Students with disabilities meeting guidelines for eligibility under Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 are provided appropriate reasonable accommodations and services as individually determined by the Department of Student Support Services staff. The Director of Student Support Services is available to consult with the diagnostician regarding requirements for specific disabilities and can be reached by phone at (662) 325-3335

Field Component:

A field component of observation hours in a local public school is required.

Evaluation of Student Progress

Grading Scale: A= 100% to 93%, B= 92.9% to 86%, C= 85.9% to 79%, D= 78.9% to 72%, F= 71.9% and below

Assignment	Percent	Objectives
NSTA membership	5%	9, 8
Science in the Classroom (3x50)	15%	1, 2, 3, 5, 6
Completion of Safety Training	10%	4, 7
Misconception lesson plan and reflection	10%	4, 5, 6
Discrepant Event presentation, write up, recorded lesson and	10%	9, 5, 7
POMS	20%	1, 9
Professionalism	10%	8
Final Project	20%	all
Total	100%	

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