

SEC 406: Theory and Practice in Teaching Secondary Science

4 Credit Hours

Syllabus: Fall, 2014
Thursday: 5:00 – 7:45
223 Education Building

Vital Information

Instructor: Dr. Dennis S. Kubasko, Jr.

Office: 1026 Natural Sciences
Trailer

Email: kubaskod@uncw.edu

Office Phone: 962-3168

See Directions Here: http://www.uncw.edu/ba/campus_map/index.htm

Office Hours:

- Tuesday: 10:00 – 12:00; 1026 Natural Sciences Trailer
- Wednesday: 1:00 – 3:00; 1026 Natural Sciences Trailer
- Thursday: 3:00 – 5:00, 223 Watson College of Education Bldg
- Always available by appointment!

Course Web Site: <http://people.uncw.edu/kubaskod/courses.html>

Class Location: 223 Education Building

The location of classes will change from week to week. Refer to the quarterly calendar.

- Classes on campus at UNCW will meet in **223 Education Building**
- Many classes will take place at our area high school-based locations.
 - Ashley High School, Hoggard High School, Laney High School, and/or New Hanover High School
- Some classes will take place at informal science settings in the community.
 - Carolina Beach State Park, NC Aquarium at Fort Fisher, and/or Arlie Gardens

Course Description

Theory and Practice in Teaching Secondary Science (9-12). Corequisites: SEC 410, SEC 421, SEC 422. Prerequisite: SEC 300. Emphasis on theory, curriculum development (including interdisciplinary and global), inquiry, critical thinking, classroom management, instructional strategies and selection of appropriate instructional materials. Successful planning and teaching practices with adaptations to diverse needs of students will be discussed.

4.000 Credit hours

4.000 Lecture hours

Required Texts, Online Subscriptions, Materials and Readings

Readings for the course will come from a variety of resources. The majority of student readings can be located from 2 science reform texts, a recommended textbook, journal articles and on-line resources. All sources can be located in at least one of three places: Randall library e-reserve, Randall library traditional holdings, and the World Wide Web.

A. *Required Texts* (First three texts can be found online)

1. **National Science Education Standards** (The National Research Council)

http://www.nap.edu/catalog.php?record_id=4962#toc

- This text is required for this class.

2. **Benchmarks for Scientific Literacy** (American Association for the Advancement of Science)

<http://www.project2061.org/tools/benchol/bolframe.htm>

- This text is required for this class.

3. **Next Generation Science Standards** (National Research Council).

<http://www.nap.edu/NGSS/>

- This text is required for class
- “Next Generation Science Standards identifies the science all K-12 students should know. These new standards are based on the National Research Council's A Framework for K-12 Science Education. The National Research Council, the National Science Teachers Association, the American Association for the Advancement of Science, and Achieve have partnered to create standards through a collaborative state-led process. The standards are rich in content and practice and arranged in a coherent manner across disciplines and grades to provide all students an internationally benchmarked science education.”

4. **Science Instruction in the Middle and Secondary Schools: Developing Fundamental Knowledge and Skills, 7/E**; Eugene L. Chiappetta, *University of Houston* and Thomas R. Koballa, *University of Georgia*; Publisher: Allyn & Bacon; Copyright: 2010; Format: Paper; 312 pp, (Published: 03/26/2009); ISBN-10: 013715304X, ISBN-13: 9780137153046
- Required for class; please purchase it.
 - “The seventh edition of *Science Instruction in the Middle and Secondary Schools: Developing Fundamental Knowledge and Skills for Teaching* continues to provide the initial scaffolding needed by novice teachers to understand and enact the basics of science teaching and learning. The six introductory chapters focus on the basic functions of science teaching—purpose, planning, assessing, teaching, and managing. The remaining chapters center on the foundational areas of science education with many vignettes and examples of effective classroom practices. *Stop and Reflect* exercises throughout give students a moment to think and reflect on the chapter content.”

B. Online Subscriptions

- Subscription to **TaskStream** (<https://www1.taskstream.com/>): A web-based toolset enabling educators to design lessons and units, map and track standards, create rubrics, develop electronic portfolios and web pages, and compile and distribute shared curriculum resource collections.
 - Purchase an account with TaskStream (<https://www.taskstream.com/pub/Enroll/Default.asp>).
 - \$42 for one year.

C. Materials

1. At least one 2 GB USB Flash or Thumb Drive (Check Wal-Mart, Best Buy, Sam’s Club, COSTCO, Target, Amazon.com)
2. Class and field experiences: Field notebook and/or journal

D. Journals

1. The Science Teacher
 - The National Science Teachers Association publishes this journal for science educators. Their mission is to promote excellence and innovation in science teaching and learning. I’ve found the organization to be the “flagship” community for science practitioners and this journal is specifically designed to serve as a forum for secondary science educators to exchange ideas and teaching methods.
 - <http://www.nsta.org>

E. Online Sources:

1. North Carolina Department of Public Instruction (NCDPI)
 - Students will use this web page to “serve as a curriculum terminal from which you can travel to specific goals and objectives based on discipline and grade level. This service provides a convenient way for teachers, administrators, and parents to verify the instructional objectives of the Standard Course of Study at a given grade and subject area.”
 - <http://www.ncpublicschools.org/>
2. North Carolina Professional Teaching Standards
 - “Every public school student will graduate from high school, globally competitive for work and postsecondary education and prepared for life in the 21st Century.”
 - <http://www.ncpublicschools.org/docs/effectiveness-model/ncees/standards/prof-teach-standards.pdf>
3. UNCW Watson College of Education
 - Intern Performance Scale North Carolina Professional Teaching Standard
 - <http://www.uncw.edu/ed/professionalexperience/internship.html>
4. STEM Education and Leadership
 - STEM Education is an infusion of Science, Technology, Engineering, and Mathematics through project-based learning to understand complex problems and to prepare our next generation of innovators.
 - <http://www.ncpublicschools.org/stem/>

Participation, Attendance, Academic Honor, & Other Information

1. **Attendance** is required by all students. After the second absence and upon each additional absence, the final grade will be reduced by one letter grade. For instance, a student having missed three classes can only attain a grade of C upon successful completion of all course work.
 - 1 absence = no grade deduction (Grade of A, still possible)
 - 2 absences = one letter grade deduction (Grade of “B”, at best)
 - 3 absences = two letter grade deduction (Grade of “C”, at best)
 - 4 absences = three letter grade deduction (Grade of “D”, at best)
 - More than 4 absences = please drop the class (Grade of “F”)

In the case of an absence, it is the student's responsibility to find out what work was missed, and to make work up on his or her own time. I recommend finding a "study buddy" that would be willing to share with you all vital information.

2. Students are not to be **late for class**. Class time will begin promptly - 5:00 PM; ending by 7:45 (on most days).
3. **Participate** in class activities. Students are expected to be in class and participating in all discussions, activities, field visits, and assignments. Many students are bringing with them a variety of different perspectives from a variety of different contexts and ALL are valuable. It is vital for the learning of everyone to include each student's perspective in class.
4. **Complete** all assignments as detailed in the requirements section. Any assignment submitted after the due date may result in a major (30%) grade deduction unless there is a documented emergency. It is the students' responsibility to make sure all assignments are submitted on time! NO assignments will be accepted later than one week after the due date unless there is a documented emergency. Being absent from class the day an assignment is due is NO excuse for not turning in the assignment. If there is an illness or emergency, be sure to contact the instructor prior to missing class and arrange to have any assignment submitted prior to the missed class.
5. **Adhere** strictly to the UNCW Honor Code (See Student Handbook, Code of Student Life)
<http://uncw.edu/odos/honorcode/>

Course Purpose

The purpose of the course is to prepare undergraduate pre-service interns and lateral entry teachers for North Carolina Secondary Science Licensure and future employment in a high school context. Those contexts can include public, private, parochial, charter school and early college settings, but are not necessarily limited to solely those. The course is designed to emphasize the five North Carolina Professional Teaching Standards. [Learn NC](#) has posted the standards in more detail and included resources. Teacher Education Resources for the state of North Carolina can be found here: <http://www.ncpublicschools.org/work4ncschools/teachereducation/>. The [21st Century Standards](#) and the [Department of Public Instruction Essential Standards in Science](#) are designed to serve the intern as a guide for appropriate instructional practice. For example, student interns will be expected to transform static data sets into authentic learning experiences for secondary students. Student interns will be expected to incorporate a variety of technological competencies into their professional practice.

Students will be required to make presentations that are both informative and motivational. Student interns will demonstrate an understanding of the local, state, and national reform movements and synthesize this understanding into accredited practice. The course will culminate with a completed unit plan that will be presented to their peers for review.

Conceptual Framework

This course is designed to focus on key components of the Watson College of Education [conceptual framework](#). The WSE develops highly competent professionals to serve in educational leadership roles. All educators must use data for decisions, reflect upon their practice, exemplify their commitment to professional standards, implement appropriate communication strategies, and strive to meet the needs of all learners. Assignments in this course will assist you in preparing you to be a competent professional and a leader.

Goals and Objectives

A. Students will extend their knowledge of science **content** and **process**:

- to demonstrate an understanding of both breadth and depth of standards.
- by aligning their knowledge and comprehension of their discipline of interest (Biology, Chemistry, etc.) with both the NCDPI standard course of study along with national themes and standards addressed in reform minded documents.
- by incorporating authentic inquiry-based experiences grounded in students' understanding of the nature of the scientific endeavor.

B. Students will develop increased **pedagogical skills** that support their science content instruction:

- through the employment of successful traditional methodologies such as direct instruction, discovery learning, and cooperative learning.
- using effective laboratory-based, hands-on instruction.
- with reform-minded, inquiry-based methods.
- by effectively utilizing multiple assessment strategies that are both formative and summative in nature.

C. Students will develop skills that support **reflective practice**:

- by engaging in peer discourse and personal revision of effective lesson planning strategies.
- through the accommodation and modification of curricular approaches for diverse and exceptional learners.
- By employing effective classroom management strategies.

- through seeking out professional literature, colleagues, and other resources to support his/her own development as a learner and a teacher.

D. Students will be able to generate and access successful **collaborative endeavors**:

- through the location and utilization of on-site school-based resources.
- by engaging in technology-based endeavors to extend student experiences.
- through the application of authentic, community-based informal science education settings.

E. Meet the following **secondary program objectives** specific to science methods as outlined in the program sheet:

- by demonstrating that a knowledge of the content you teach.
- by signifying an ability to contextualize teaching, learning, and schools within a global perspective.
- through effectively collaborating with colleagues across grade levels and disciplines.
- By establishing a pattern of reflective practices and scholarly inquiry culminating in confidence, professionalism, and effectiveness as a teacher.

Assessments (400 Total Points)

A. Participation, Engagement and Service Learning Grade (100 points): Twenty five percent (25%) of your grade will be based on this first criterion. Students are expected to be in class and participating in discussions. Many students bring a variety of different perspectives and all are valuable. It is vital to articulate, listen and value all perspectives in class. TaskStream questions of the day allow for everyone to have input as well as share views and opinions in a non-threatening online setting. Most teachers go above and beyond their commitment to students as outlined in any teacher contract. We expect the same of our secondary science methods students. Service hours need to be completed by the end of the semester. We will discuss what constitutes service and how to quantify those hours on the first day of class.

1. Service contributions: (Documented 10 Hours of Volunteer Work with Informal Science settings)	30 points
2. Online responses to: Ten “Questions of the Day” – Please refer to TaskStream	20 points
3. Science Safety Module: Complete Flynn’s Science Safety Module	30 Points

4. Behavioral Management Module Video Critique of Teaching	20 Points
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B. Assignment Activities (200 points): Fifty percent (50%) of your grade will be based on this second criterion. Collaboration, peer review, and product presentation will influence these grades. Individuals will be asked to collaborate with a peer to complete two assignments. Peers will be asked to constructively critique another’s product for review and editing. Time will be provided in class to organize, research, and, maybe, complete some of this work. Note that each of these activities can or may be included in your unit at the end of the semester. **Preliminary** assignments can be subject to change and include the following:

1. How did we get here? Science from a historical perspective (NOS)! ○ Student Motivation	Individual In Class	75 points
2. Using Informal Learning Settings for Problem Based Learning (PBL) ○ Interdisciplinary Project – Cemeteries	Group Take Home	75 points
3. Math-Science Partnership ○ Traditional vs. Inquiry Investigations	Group Take Home	50 points

C. Final Unit Plan, Presentation and Exam (100 points): Twenty five percent (25%) of your grade will be based on this third criterion. The objective of this component is to assess your planning and presentation of your final unit plan and your performance of the final exam at the end of the semester. To complete the unit plan, visit [TaskStream](#) for the details.

1. One Week Unit Plan	Individual Take Home	50 points
2. Final Exam and Presentation	In Class	50 Points

Tuesday, December 9th 2014: 5:00 PM – 7:45 PM

<http://uncw.edu/reg/exams-fall14.htm>

University Mission Statement

The University of North Carolina Wilmington, the state's coastal university, is dedicated to learning through the integration of teaching and mentoring with research and service. Our powerful academic experience stimulates creative inquiry, critical thinking, thoughtful expression and responsible citizenship in an array of high-quality programs at the baccalaureate and master's levels, and in our doctoral programs in marine biology and educational leadership. Substantial research activity, combined with our hallmark teaching excellence and moderate size, advances distinctive student involvement in faculty scholarship. We are committed to diversity and inclusion, affordable access, global perspectives, and enriching the quality of life through scholarly community engagement in such areas as health, education, the economy, the environment, marine and coastal issues, and the arts.

<http://uncw.edu/planning/uncwmissionstatement.html>

Watson School of Education Mission Statement

The mission of the Watson College of Education is to develop knowledgeable and proficient education professionals dedicated to improving schools and society. We address this mission by:

- Providing academically rigorous programs;
- Producing and using meaningful scholarship;
- Partnering with schools, organizations and diverse communities;
- Advancing the profession.

<http://uncw.edu/ed/mission.html>

The UNCW Statement on Diversity in the University Community

In the pursuit of excellence, the University of North Carolina Wilmington actively fosters, encourages, and promotes inclusiveness, mutual respect, acceptance and open-mindedness among students, faculty, staff, and the broader community. Diversity is an educational benefit that enhances the academic experience, and fosters a free exchange of ideas from multiple perspectives. Diversity includes, but is not limited to race, sex, age, color, national origin (including ethnicity), creed, religion, disability, sexual orientation, political affiliation, veteran's status, gender, educational disadvantage, socio-economic circumstances, language, and history of overcoming adversity.

<http://uncw.edu/diversity/about.html>

UNCW CARE

UNCW CARE intervenes on a broad spectrum of violent behaviors, including sexual assault, relationship abuse, stalking and harassment. We offer a comprehensive variety of violence prevention and relationship education programs, trainings, and educational campaigns to the UNCW campus. We respond to students who have been victimized, as well as those affected by someone else's experience with abuse or assault, by providing supportive services, including crisis response, individual advocacy and coordination with both on-campus and off-campus resources.

The CARE Office is located on the second floor of DePaolo Hall, across from the Student Health Center, in the CARE/CROSSROADS suite. CARE can be contacted at 910-962-CARE. Emergency or after-hours consultation is also available by calling the CARE responder at 910-512-4821.

<http://www.uncw.edu/care/>

The University Learning Center

DePaolo Hall 1056 & 1003, first floor

910.962.7857

www.uncw.edu/ulc

The University Learning Center's (ULC) mission is to help students become successful, independent learners. Tutoring at the ULC is NOT remediation: the ULC offers a different type of learning opportunity for those students who want to increase the quality of their education. ULC services are free to all UNCW students and include the following:

- Learning Services (University Studies) <http://www.uncw.edu/ulc/learning/index.html>
- Math Services <http://www.uncw.edu/ulc/math/index.html>
- Study Sessions <http://www.uncw.edu/ulc/includes/StudySessions.html>
- Supplemental Instruction <http://www.uncw.edu/ulc/si/index.html>
- Writing Services <http://www.uncw.edu/ulc/writing/index.html>