

Course Syllabus

Secondary School Science Teaching Methods BTNY/CHEM/GEO/MICR/PHYS/ZOOL 4570 Fall 2011

Course overview:

Teaching science is something that only a few endeavor to do, and fewer still actually do it well. This course is meant to give the preservice science teacher many opportunities to reflect upon and design science curricula for the classroom. However, this class is not simply a list of lesson plans and assessment strategies. Students in this course will experiment with their own curricula, teaching strategies, and assessments in order to develop a coherent philosophy and approach for teaching science.

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Office Hours: Tue/Thurs 10:30 – 11:30; Wednesday 9:00 – 10:30

Note that “office hours” are not the only times that I’ll be in my office. If you would like to stop by and I’m around, I’m almost always happy to talk to you. (On Tuesday and Thursday afternoons, as well as all day Monday and Friday, I am often in the university’s *Teaching & Learning Forum* office in the library, room 057B.) You are also welcome to schedule appointments as necessary.

Meeting time: Wednesday, 4:30 – 7:20 PM

Final exam period: Wednesday, Dec. 7, 4:30 – 6:20 PM

Meeting place: LL 230

Course Web Page: <http://physics.weber.edu/johnston/methods>

Major course objectives:

This course is designed with the expectation that every student who possesses the desire and drive can be successful at meeting the following objectives:

1. refine an understanding of the nature of science and scientific inquiry
2. apply theory of science learning and develop resources for further research in specific areas of science education
3. apply current science education standards to science curricula
4. translate educational theories into appropriate classroom strategies
5. develop instructional activities over short-term (one class period) and long-term (multi-week) timeframes.
6. evaluate science educational materials (including old and new technologies) that could serve as curricular and instructional resources
7. identify approaches that accommodate learning for a diverse group of learners
8. create materials that would provide valid assessments of students’ science learning
9. develop a coherent and informed professional stance toward science teaching

Major themes:

There are three major themes for this course, yet all three of these should “spiral” around one another so that no single theme is ever left behind. These are:

- assessment and evaluation
- curriculum design
- classroom practice

Ironically, perhaps, there is no single unit that addresses “teaching” definitively, even though this is a “teaching methods” course. The act of teaching is no more a single technique than being a doctor is to sit down with a patient. In fact, it involves multiple interactions between the teacher, the curriculum, and (most important) the learner.

Grading:

Grading will be based on a varied spectrum of activities, skills, and understandings. These are designed to prepare the teacher not only to design things to do in a classroom, but also to reflect upon why and how to design such.

Professionalism

Professional behavior is expected at all times in class and while collaborating outside of class with others to complete work related to the class. These behaviors include, but are not limited to: attendance, punctuality, excellence in class assignments, constructive class participation, being a positive contributor in group work, taking advantage of opportunities to broaden personal knowledge and skills, effectively communicating with your course instructor, members of the class, and of the wider science education community. *Professionalism is expected not as a percentage of your grade, but as a condition for passing the course. A student who does *not* participate in major assignments and presentations or does not complete the community based project, the curriculum design, and the final lesson will not receive a passing grade in the course.

Practice and prompts20%

Expect to have something to continually work on in this course. This could be a written response to a reading, a draft of your teaching philosophy, some brief research with members of a group, or the completion of some kind of laboratory assignment. All assignments will be formally given in class, and specific details (including due dates) will be presented at the time the assignment is given. Much of this work will be done online.

Projects: Lesson plans, curriculum projects, and assessment plans20%

You are to create plans for teaching a science topic and/or skill to a group of secondary school students. The plan must be scientifically accurate, and educationally sound. You will also create tools that can be used to evaluate student understanding and instructional effectiveness. For much of this work you will be collaborating with others in the course.

Community-based project20%

While most of our work in the class will be within our own, close-knit and small social sphere, you will also see and interact with science instruction in other places. In particular, our plan is to host a community science night for kids and parents at a local school. This will take place during one of our class periods. Details will follow, but the general idea is that you plan, conduct, and reflect on this project.

Curriculum design20%

The final “capstone” project in this course will be a carefully crafted “map” of a course. More details will follow, but the basic intent is that this will be something you will actually use, in whole or in part, during your teaching experiences.

The Final Lesson20%

This lesson will be presented at the end of the course, and it will showcase your best representation of classroom science. (Imagine that this is the lesson you have prepared for an interview for a teaching position.) Specific details will follow, but imagine that everything you learn in this course should be represented in the plan and practice of this.

One last word about “grading”: I view grading and feedback as something that is meant to help you to continue to reflect, learn, and improve. For this reason, the final grade in this course is determined *not* by a simple averaging of scores, but by looking at where you end up. This is especially applicable to the *final lesson* and *curriculum design*. Often, you will be giving feedback to one another, and since we are all helping each other to improve, it is important that you are both thoughtfully critical and supportive of one another.

Important notes:

- You are a vital part of this course and its success, and for this reason you need to show up regularly. Many other reasons exist to justify you sticking around for an evening class: First, the material covered in class is such that it is very difficult to get the same understandings and experiences on your own time outside of class. Second, there will occasionally be food and/or stuff to play with and/or assignments to hand out. Third, your grade is determined by your participation and contributions to class. Finally, your instructor is known for doing idiotic, life-threatening (to himself, not to you) labs and demonstrations, and it is always interesting to see what might happen next.
- Late work will be accepted for half credit if it is turned in within a week of its due date. Individual “dog-ate-it” and “had-to-get-married” stories will be considered on a case-by-case basis. In order to get more leniency, notify the instructor in advance of any problems you might have.
- Academic dishonesty on any work will not be tolerated. Extreme violations will result in automatic failure of the course. In this course, it is difficult to imagine what academic dishonesty would look like, since so much work is by its very nature done in groups. Be aware, however, that professionalism is a part of your course grade, and you should reflect the same integrity that you would expect from your own students.
- Any student requiring accommodations or services due to a disability must contact Services for Students with Disabilities (SSD) in room 181 of the Student Service Center. SSD can also arrange to provide course materials (including this syllabus) in alternative formats if necessary. You are also welcome to discuss any special needs with the instructor, though you are not required to do so.
- This is a very interactive and student centered classroom. Please help us to make it so both by participating in class and by offering suggestions as to how to better structure the class. An inherent philosophy of this class is that knowledge is constructed in social arenas, so the expectation is that there will be great inspirations and new realizations made as we interact with one another. In fact, one of the benefits of teaching this class is that an instructor tends to learn as much (or more) from students as students should learn from instructors.
- Please do not hesitate to visit the instructor if you have any questions, concerns or comments about the course, or to discuss favorite cross-country ski routes, photography, music, poetry, physics, pottery, yeast, backpacking trails, etc. Often an instructor sits in an office, lonely and sad, during hours that should be filled with student interactions; so please feel free to drop in, even if it isn’t during a posted office hour. (The worst that could happen is you would be told to come back at another time.) Also, email tends to be an incredibly useful mechanism for getting in contact with instructors and getting your questions or comments responded to.