

## INTEGRATED SCIENCE 351 SYLLABUS

**Fall 2012; Section 002, Call #80407; MW 11:00am - 12:15pm**

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**TEXTBOOK:** IS351 Lab Manual, available at campus bookstore

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### **ADA STATEMENT**

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### **STUDENT LEARNING OUTCOMES:**

- Students will understand the basic methodology of science: the practice of hypothesis forming, testing through well designed observation or experiment, interpretation of data, acceptance or modification of hypothesis and construction of scientific theory. They will demonstrate basic competence in taking various types of measurements and communicating them in the metric system.
  - Students will be able to communicate clearly their own scientific hypotheses complete with a precise account of their reasoning. Subsequent to experiment, they will be able to communicate clearly the reasons behind accepting or rejecting/modifying their hypothesis based on the available data.
  - Students will demonstrate detailed knowledge of the science TEKS for one specific grade level, together with an understanding of how to put together a full set of lesson plans that satisfy those TEKS.
  - Students will be able to apply the law of conservation of energy and Newton's laws of motion to understand simple, everyday phenomena involving objects under the influences of various types of forces, and no forces at all.
  - Students will understand the basic properties of solids, liquids and gases and how they relate to the microscopic structure of matter.
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## CLASS OVERVIEW

This class is complementary to IS352. Whereas 352 deals mainly with chemistry, 351 deals with physical science.

This class is not primarily concerned with pedagogy - that is, it is not a class designed to teach you *how to teach* science - although the activities that you participate in are designed to demonstrate the kinds of activities that are suitable for an elementary and middle school classroom. The main purpose of this class is to teach *you* the scientific knowledge required when you come to teach in your own classroom.

The specific concepts you will study in this class are pitched at a high school level; remember, it is essential that you know a subject at a higher level than the students you teach. Also, even if you are not intending to become a science teacher specifically, I still believe it is essential to have a knowledge of basic science in the classroom. Science impacts all areas of life, including those of an elementary or middle school student, and you will inevitably encounter science related questions regardless of what subject you teach. Additionally, the methods of critical thinking encouraged by science can be applied generally to most aspects of life, whether they relate to science or not. Finally, from a practical point of view, you will need to know the material in this course in order to pass the science part of the certification exams.

In this class, **critical thinking and analysis will be stressed over rote memorization**. I want to make class as an enjoyable an experience for you as possible. If you don't understand something, ask. If you still don't understand it, ask again! I don't mind being interrupted with questions and repeating things. Asking questions when they arise will help to minimize confusion and maximize understanding. It will also let me know when I'm not getting the information across.

To summarize the goals:

1. To give future elementary and middle school teachers the knowledge and understanding to effectively and comfortably teach science to their students using interesting hands on activities that reinforce key concepts and the science TEKS.
2. To give you the essential knowledge to pass the science portion of teacher certification exams (TExES).
3. To understand the scientific method, how science is actually carried out in practice, the relation of science to everyday lives, and to develop critical thinking skills useful in all aspects of life.

The teaching and learning of science should both be interesting and fun if approached in the right way. Children are natural scientists, in that they are constantly asking questions about how and why things work as they do, and are always attempting their own scientific experiments. Many people report that they lose interest in science during the later years of school (middle and high), citing dull teaching methods and the emphasis on standardized testing that take the life out of the subject. The overall aim in this class to make science entertaining and interesting to you, and for you to take that interest and enthusiasm into the classroom to encourage the next generation of children to engage with and participate in science.

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## **GRADING AND CONTENT:**

Grades will be determined by a combination of three exams (two midterms, one comprehensive final exam), class participation, homework and the notebook on TEKS activities. The grades break down as follows:

*3 Tests (2 Mid-terms, 1 Final)* - 100 points each

*Notebook* - 100 points

*Homework* - 100 points

*Participation* - 100 points

*TOTAL* - 600 points

GRADING SCALE: 600 - 540: A 539 - 480: B

479 - 420: C

419 - 360: D

359 & below : F

Note that by this grading scheme it is possible to end up with a grade of C or above without passing any of the 3 exams. Therefore, to demonstrate sufficient understanding of the material, if a student fails the first two exams, that student must pass the final exam in order to pass the class. Students who fail all three exams will fail the class regardless of their eventual average.

**Homework:** there will be around 8 to 10 homework assignments throughout the semester, worth between 10 and 20 points each; at the end of the semester the lowest scoring 2 homeworks will be dropped and only the 6-8 top grades counted. The homework will emphasize effective, clear communication of your ideas and thought processes over actually obtaining exactly the correct result.

**Class participation** is assessed through involvement in group activities and their associated in-class worksheets, and through occasional class quizzes for which notice will be given at least one class in advance. A large part of this class will be spent doing hands on activities in groups. If you do not involve yourself in these activities and let other people do all the work, three things will happen: 1 - you will lose participation points, 2 - you will not understand the activity or the principles it is demonstrating, and 3 - the class will be long and boring. As with homeworks, the lowest scoring 2 participation grades (that is, activity worksheets and quizzes) will be dropped.

**Exams** will be scheduled at least two weeks before you are due to take them to give you adequate time to review the material covered. They will be scheduled when we have covered sufficient material. I don't set the exam times at the beginning of the semester because different classes move at different rates. The exams will consist of a multiple choice section together with the occasional written question and group activity.

Classes will be a mixture of discussion of concepts and hands-on activities. I will occasionally give hand-outs on various concepts, but be prepared to take your own notes throughout this class.

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## **CLASS CONDUCT AND POLICIES:**

**1. All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See Student's Guide Handbook, Policies and Procedures, Conduct). Rude or disruptive behavior will NOT be tolerated.**

**2. Absences/ lateness to class.**

- Roll is taken at the beginning of each class using the seating chart; if you change your seating position, make sure you let me know and update the chart.
- I will excuse absences or lateness for what I consider valid reasons (illness, school-sponsored events, court appearances, and what I determine to be emergencies) provided that excessive absences are not a problem; proof of excuse will be required. You should give your reason for absence or lateness **in writing (preferably email)**, before the class if possible, or they will not be accepted. Absences due to vacations will not be considered excused for any reason.
- Each unexcused absence will result in a 10-point deduction from the final grade.
- Late to class twice without valid reason: 5-point deduction from final grade.
- Three consecutive unexcused absences or unexcused absences 50% of the time will result in the student automatically being dropped from the class with a failing grade.
- Any work missed due to unexcused absences, including exams, may not be made up.

Remember, you will be doing the majority of your work during class as part of a group. Your group members rely on your presence, so please be there for them.

**3. Late homework** without valid excuse will be accepted with a deduction of 3 points for each class it is late after the due date.

**4. As airplane stewards say just before take-off and landing, cell phones and other electronic devices should be turned off and put away at all times.**

- If a cell phone rings (vibrating counts as ringing): 5-points deduction from their class participation grade. I will make exceptions to this rule at my discretion if some type of situation exists in which someone (family member, doctor, lawyer, etc.) might need to get in touch with you in a hurry. **You must let me know of such situations in advance.**
- Students listening to iPods or other such devices will be dismissed and one letter grade deducted from their final average.
- Texting during class: 5-points deduction from final grade.

**5. No talking** while I'm explaining concepts/going over activities, etc - it is very disruptive to those sitting around you. Whispering counts - it can be very audible! If I need to ask students repeatedly to stop talking, 5 points will be deducted from the grade for each time. Continued offenders will lose a letter grade from their class average and be asked to leave for the remainder of the class.

**6. Students doing work for another class** will be asked to leave and will be docked a full letter grade from their class average.

7. **Drinks are usually acceptable, but food is prohibited.** You may eat before class, but all food must be put away by the time I start class. Students who continue to eat after I start class will be given deducted 10 points from their class grade.

8. **Cheating and plagiarizing will not be tolerated.** Cheating will include turning in identical papers on individual assignments. Students caught cheating/plagiarizing will be referred to the Dean of Students for disciplinary actions and given a failing grade in the course.

9. If I or my TA notices anyone acting against any of the class policies, or other students complain about disruptive behavior, then I may deduct the appropriate points without letting you know immediately, to avoid disruption to the class. It is **your** responsibility to behave in an adult way in these classes, and be respectful to your fellow classmates.

It is useful to begin thinking of yourselves as **professionals** rather than students and conduct yourselves accordingly. You are training to be teachers; it is a good idea to behave in a way you would expect students in your own classes to behave.

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#### **CLASS SCHEDULE:**

Here is a tentative schedule for the class:

Subject	Class
Introduction to class/What is science?/The metric system	1-4
The fire in the bottle: example of a demonstration which highlights many scientific concepts	11-15
Exploring the scientific method: the pendulum	5-10
Motion, forces and gravity: Newton's laws	16-22
Properties of matter: heat/pressure/gases/buoyancy	23-28