

**University Studies 210: Scientific Reasoning  
Thinking & Communicating Scientifically  
Tennessee Governor's School @ The University of Tennessee, Knoxville  
Summer 2005  
MWF 8:30 – 9:30 a.m., BU 555**

**Contact Information:**

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**Teaching Assistants:**

Leigh Shoemaker:  
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Joe Kuntz:  
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**Texts:** *Understanding Scientific Reasoning*, (4<sup>th</sup> edition) by Ronald N. Giere  
*The Elements of Style*, by Strunk and White.

**Course Description and Course Objectives:** The general goal of this course is to get students to understand scientific reasoning by understanding how scientists go about the business of science and communicate with one another. Some specific objectives that will aid in the attainment of the general goal are:

- Learn some general methods of logical reasoning;
- Learn the importance of theoretical hypotheses;
- Learn some history of science and marginal scientific endeavors;
- Learn statistical, probability, and causal models of scientific reasoning;
- Acquiring the ability to *reconstruct* and *evaluate* scientific reasoning;
- Learn how to make political and personal decisions give certain scientific claims; and
- Learn how, in writing, to communicate more effectively the results of such critical analysis.

**Assignments:** Reading and homework assignments will be issued during each class meeting according to the syllabus. Students are *strongly* encouraged to do the readings and homework before the following lecture. This practice will reinforce basic material while providing students the opportunity to formulate pertinent questions about difficult material for the next lecture. All assignments must be typed if they are to be turned in for a grade.

**Grading:** Assignments will count toward the final grade in the following manner:

Writing Assignments (there will be at least 4):	30%
Group Web Project:	30%
Final Exam:	30%
Participation:	10%

**Final grades will be assessed on the following percentage scale:**

A = 91-100%	B+ = 86-90%	C+ = 76-80%	D = 60-69%	F = 0-59%
	B = 81-85%	C = 70-75%		

**Writing and Computer Skills:** You will be involved in writing and computer skills classes. The writing and computer labs are for your benefit, so use them. Your final group project will encompass both writing and web components. So, make sure you attend these labs. Plus, the final exam will have writing and computer questions included. So make sure to read *The Elements of Style*.

**Discussion Sections and Papers:** On Wednesdays you will have papers due, and you will have discussion sections with either Leigh Shoemaker or Joe Kuntz. You should go to the same discussion section every time. Part of your participation grade will reflect how you did in the discussion groups.

**Attendance:** Attendance is mandatory, and you should be on time. I know that this is (i) an early class, and (ii) you have to walk from Hume's Hall to get here, but you can all do it. Sleep will be your best friend at GSS, so don't neglect it.

**Late Policy:** Stuff cannot be turned in late unless there is a relevant explanation for the allowance (sickness or religious holiday, etc.) It is best if you let me know before the assignment is due if you have a reason to turn it in late.

**E-mail & Blackboard:** There will be a blackboard component to this class. I will place announcements, homework assignments, and quizzes on blackboard on a weekly basis and you may have to use the digital drop box feature. I will place course related material on blackboard in PDF format. Thus, you will have to know how to open Adobe PDF files. You can get Adobe Reader for free at the Adobe website. All e-mail correspondences will be done through your UT e-mail account. So, if you have another e-mail account you would like to use, forward your UT e-mail to that account. If you need help doing this, go to: <http://online.utk.edu>.

**Honor Statement:** Students must uphold the Academic Honor Statement they signed when they arrived at The University of Tennessee. If you do not remember the Honor Statement, it can be found on page 36 of the *Undergraduate Catalog*. I reserve the right to use plagiarism detection software like 'Turnitin.com' to enforce academic honesty.

**Students with Disabilities:** Reasonable accommodations will be made for students with disability. Such students must (1) register with, and provide documentation to, the Office of Disability Services (ODS), and (2) submit a letter from ODS stating that such academic accommodations are needed. All relevant documentation should be submitted within the first few days of classes or as soon as a disability is identified. See me if you have questions.

**Odds & Ends:** Please turn off your cellular phone, pager, PDA, or any other item that may beep or cause a disturbance in class. If you are having trouble with your electronic devices, then leave them at home or ask for help. If your device beeps or rings during class, you will have to ask the class for help. You do not want to have to ask the class for help!

## Class Schedule

Wednesday, 1 June 2005: **Syllabus & Scientific Reasoning** [CH 1: Sec 1.1-1.3]

Friday, 3 June 2005: **Understanding Theoretical Hypotheses** [CH 2: Sec 2.1-2.5]

Monday, 6 June 2005: [CH 2: Sec 2.6-2.11]

\*Wednesday, 8 June 2005: **Historical Episodes** [CH 3: Sec 3.1; 3.3; 3.4]

Friday, 10 June 2005: **Marginal Science** [CH 4: Sec 4.2; 4.3; 4.4; 4.6]

Monday, 13 June 2005: **Statistical Models** [CH 5: Sec 5.1-5.6]

\*Wednesday, 15 June 2005: **Probability Models** [CH 5: Sec 5.7]

Friday, 17 June 2005: **Evaluating Statistical Hypotheses** [CH 6: sec 6.1-6.5]

Monday, 20 June 2005: [CH 6: Sec 6.5-6.7]

\*Wednesday, 22 June 2005: **Causal Models** [CH 7: Sec 7.4-7.5]

Friday, 24 June 2005: **Evaluating Causal Hypotheses** [CH 8: Sec 8.1-8.9]

Monday, 27 June 2005: **Modes of Decision Making** [CH 9: Sec 9.1-9.9]

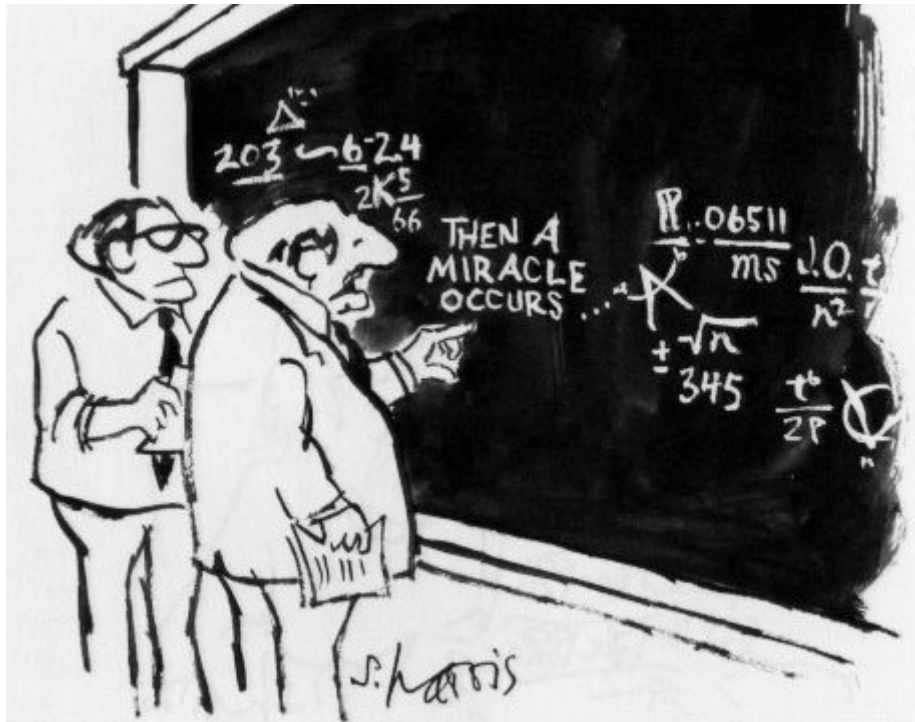
\*Wednesday, 29 June 2005: **Evaluating Decisions** [CH 10: 10.1-10.4]

Friday, 1 July 2005: FINAL EXAM @ 10:30 a.m.

\* Indicates a day you have discussion sections.

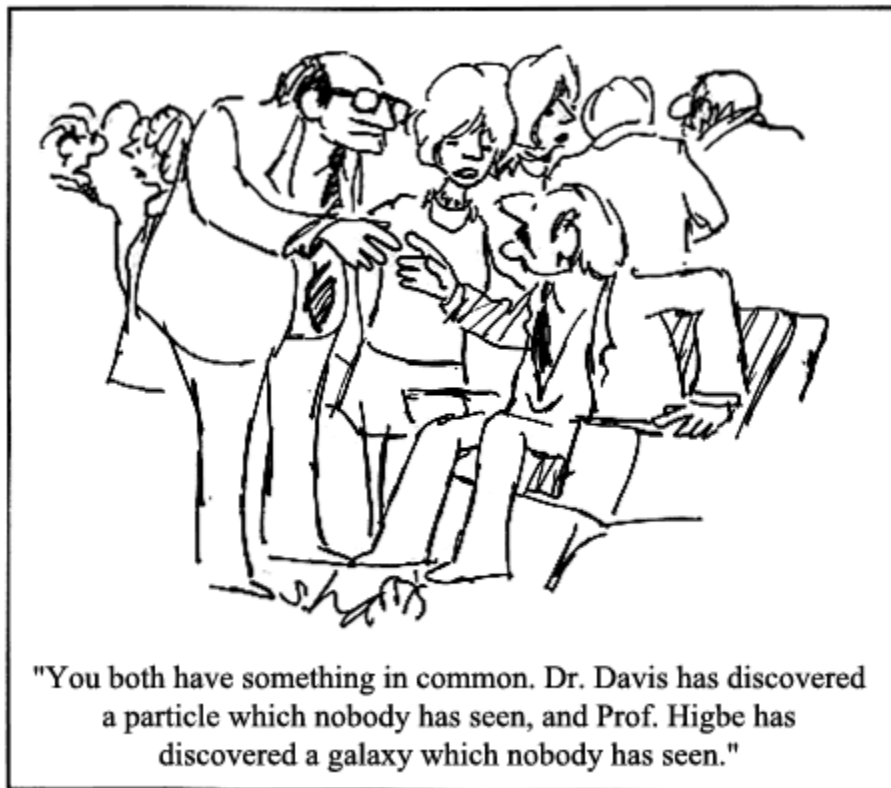
We will be going through the entire text. It might seem like a lot of work, but there are lots of pictures and many exercise sets that take up lots of pages. On average you will be reading 13 pages every two days, which is quite manageable.

*The above schedule and procedures in this course are  
subject to change in the event of extenuating circumstances.*



"I think you should be more explicit here in step two."

from *What's so Funny about Science?* by Sidney Harris (1977)



"You both have something in common. Dr. Davis has discovered a particle which nobody has seen, and Prof. Higbe has discovered a galaxy which nobody has seen."