Honors Ignition Seminar – Scientific Decision Making – Fall 2013

Class Meetings:

Lecture: HNPG015-002 Call #15671 Professor Joel Sachs

Tuesday, Thursday at 9:40– 11:00 am in Sproul Hall #2212

Instructors and Office Hours:

Professor Joel Sachs
Wednesday, 12:00- 2:00pm, or by appointment
#310 Science Labs I
Joel.Sachs@ucr.edu
827-6357

Class website: https://ilearn.ucr.edu/

- All information for this class, including this syllabus, can be found at your UCR-iLearn website.

What you will learn from this class:

- The scientific method empowers people and institutions to achieve specific goals (*not just scientists)*.
- The scientific method is a mainstay of improvement in business and industry.
- You will learn how to use the scientific method and apply it to everyday health and social issues both for personal matters and to be informed about decisions made by our government.
- You all will be called on to solve problems during your career, whether in business, law, or government ,etc., and this style of thinking should be helpful in those areas as well.
- This class emphasizes critical thinking rather than memorization of facts.
- You will learn to tackle novel situations and to analyze arguments and descriptions of new findings.

Homework:

- **Questions for review:** A list of questions that summarize key concepts from each lecture will be posted within two hours of each lecture's completion.
    - Answers to each lecture's 'questions for review' are due *via email* to joel.sachs@ucr.edu before the beginning of the following lecture.
    - With your e-mail, please attach a document that includes the questions for review and your answers. The document must be single spaced and must not be longer that two pages long.
    - For lectures that precede exams, the questions for review are due before the following lecture period.
- **Homework:** Four formal homework assignments are due throughout the quarter, on **10 Oct**., **24 Oct**., **19 Nov**., and **3 Dec**. In all cases homework assignments should be sent by email to joel.sachs@ucr.edu by the due date (before 5:00pm). Late homework will not be accepted unless you have a written excuse that is turned in within a week of the due date (see below).
    - Each homework assignment follows its own template, which is available on the class website. Please use the template and follow the instructions carefully.
    - The articles used for each homework assignment must be less than 9 months old. You must attach a copy of the article with your homework in which the publication date of the article is clearly evident. You will not receive credit for a homework that does not have the article attached in a readable form.
    - Some homework assignments require you to quote from the article. Please make sure that the quoted sections are clearly indicated "with double quotations" in your homework.
    - Be succinct when completing the different portions of homework. Excessive verbosity will reduce the credit you receive. Do not add unnecessary wording, especially when quoting from the article.
    - Failure to follow the homework templates will result in points being deducted.

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How to choose an articles for homework assignments:

- The most important part of finding a good article is to choose one with sufficient depth. Ideally, the article should contain enough information so that the information requested by the template is specifically mentioned. Do not use really short articles, as they will not contain enough information to satisfactorily complete the assignment.
- A common mistake is to use an article that talks about the consequence of a study but does not go into detail about the study itself. Such articles are difficult to fit into the class formats, because they are too removed from the actual studies.
- Good sources for articles include the following, although some of these sources will provide easier access to electronic articles. Even within these sources, many articles will be too short to be useful.
    - New York Times, Science section http://www.nytimes.com/pages/science/index.html
    - The Wall Street Journal http://online.wsj.com/home-page
    - The Science Daily http://www.sciencedaily.com/
    - Time Magazine, Science section http://science.time.com/
    - Discover Magazine http://discovermagazine.com/
    - MSN, Health section http://healthyliving.msn.com/news/
    - New Scientist http://www.newscientist.com/
    - The Web of Science http://apps.webofknowledge.com/ (Original Articles)*
    - Pubmed http://www.ncbi.nlm.nih.gov/pubmed (Original Articles)*

    **These sites require logging in to a computer through UCR*

Grading

Grades are based on class participation, and performance on homework and exams. Attendance at class is mandatory to get participation points. Note that exams will cover material from class discussions, and any materials on the class website.

Homeworks	4 homeworks (25 points each)	100 points
Exams	3 Exams (50 points each)	150 points
Class participation	17 classes (~3 points per class)	52 points
Questions for review	16 lectures (3 points per lecture)	48 points
Total		***350 points***

1. Requests for re-grading must be submitted to the professor in writing with an explanation for why the scoring is thought to be inaccurate. All grade evaluations are based on an evaluation of the entire exam or assignment. The deadline to request a re-grade is one-week after the answer key is posted or an assignment has been returned (whichever is later).
2. **Late assignments and missed exams** are graded as a zero unless you have written documentation from an appropriate source or have made arrangements with the professor within a week of the due date.
3. **Late arrival at exams** is not acceptable. Please plan ahead for traffic. If you arrive more than 10 minutes late your grade will be decreased by 10%. Once the first student leaves the exam the room is closed and students who arrive after that point will receive a zero on the exam.
4. **Discussion and contesting of grades** will only be done in person with the professor in person. I am happy to discuss your grades with you in person, but I will not do so over e-mail or telephone.

Lecture	*Date*	*Homework*	*Questions for review*	*Topics*
			MODULE I: THE SCIENTIFIC METHOD AND MODELS	
1	Th. 26, Sept.			○ Introduction + Why science matters ○ A template for scientific Inquiry
2	Tu. 1, Oct.		Lecture 1 due	○ How non-scientists use the scientific method ○ Models are the Building Blocks of Science
3	Th. 3, Oct.		Lecture 2 due	○ All models are false
4	Tu. 8, Oct.		Lecture 3 due	○ Models of sex in condom testing ○ Are you too intoxicated to drive safely?
5	Th. 10, Oct.	Hwk. 1 Due	Lecture 4 due	○ Eradicating infectious diseases
6	Tu. 15, Oct.		Lecture 5 due	○ Extrapolating health risks
	Th. 17, Oct.			**Exam 1**
			MODULE II: DATA	
7	Tu. 22, Oct.		Lecture 6 due	○ Why error is unavoidable ○ Reducing the error, a temple for ideal data
8	Th. 24, Oct.	Hwk. 2 Due	Lecture 7 due	○ Drug and DWI testing protocols
9	Tu. 29, Oct.		Lecture 8 due	○ DNA typing now and before
10	Th. 31, Oct.		Lecture 9 due	○ Science and the criminal justice system ○ Data presentation
			MODULE III: INTERPRETATION AND CONCLUSIONS	
11	Tu. 5, Nov.		Lecture 10 due	○ Is science logical?
12	Th. 7, Nov.		Lecture 11 due	○ Uncertainty and random
	Tu. 12, Nov.			**Exam 2**
13	Th. 14, Nov.		Lecture 12 due	○ Correlations are hard to interpret ○ Controls
14	Tu. 19, Nov.	Hwk. 3 Due	Lecture 13 due	○ Prisoners of silence ○ Experiments make the best controls ○ Some problems are intrinsically difficult
			MODULE IV: IMPEDIMENTS AND CONFLICT	
15	Th. 21, Nov.		Lecture 14 due	○ Biological correlates of being gay
16	Tu. 26, Nov.		Lecture 15 due	○ Conflict and the corruption of science
	Th. 28, Nov.			*No Class - Thanksgiving*
17	Tu. 3, Dec.	Hwk. 4 Due	Lecture 16 due	○ Deliberate bias: how conflict creates bad science ○ Our brains intrinsically mislead us
	Th. 5, Dec.			**Exam 3**