

# GEOS 197SB: ENERGY OPTIONS FOR THE 21ST CENTURY

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TR 10:00-11:30, Julian 203

**Instructor: Dr. Tim Cope**

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Office Hours: by appointment; see attached schedule

## THE GOALS OF THIS COURSE

This first-year seminar is my chance to give you the tools you need to succeed in college. I build my seminars around a topic (each year is different), but the topic itself is secondary to this primary goal. In this class, you will learn several skills that will help you to do good, honest, college level work. These skills are:

1. Taking good notes, and studying effectively;
2. Asking good questions and contributing to a discussion;
3. Communicating your ideas in written form; and
4. Communicating your ideas in oral form.

Having these skills is vital to your success in *any* field of study in college. To help you along, I will give you lots of feedback in this class, and I'll direct you towards other places that you can get help. My goal is to make sure that you leave my class a lot stronger in all of these areas.

## YOUR GRADE

In order to determine whether I've been successful in imparting these skills to you, there are several means of assessment that I will employ in this class. Each contributes a percentage of your grade. Here they are:

Weekly quizzes: 10%	to ensure that you're taking good notes and studying effectively;
Participation and assignments: 20%	to ensure that you're asking good questions and contributing to discussions;
Research Proposal: 10%	to ensure that you can ask a good research question
Final presentation: 20%	to ensure that you can effectively communicate orally
Final paper: 40%	to ensure that you can effectively communicate with your writing

Please refer to the following pages for information about each of these five components of the course.

## THE TOPIC

I understand that it's difficult to fully participate in a class that holds no interest to you. That's why I chose this topic: no matter what your focus is in college, *you have to be interested in this*. Make no mistake, major changes in human civilization will occur during your lifetime because of the way humans have been conducting business since the industrial revolution. These major changes had better occur, or else we face a very bleak future.

You will learn a lot in this class about the way in which various interests intend to power civilization in the future. Some of these ideas involve new technology, but most involve technology that has been around for a very long time, waiting for the fossil fuel era to end. Switching to new energy sources is not an easy task. Fossil fuel is entrenched in human society, and economics, politics, and psychology are at least as important as our technological ability to make the switch. This topic is truly interdisciplinary: everyone has a stake in it.

## WHY I AM TEACHING THIS COURSE

I have never taught this particular subject before. Some of the content of this course is fairly new to me. I am certainly not an expert in economics, politics, or psychology—some of you know more about these things than I do. Therefore, ***my goal is to learn from you***. Even though you may not know very much about the topic now, you will be doing your own independent research in this class and, by the end, you'll have a lot to talk about. The great thing about a first-year seminar is that fifteen of us can do a lot more research in a semester than I can do on my own. I expect to learn fifteen times more from this class than I would otherwise!

## COMPONENTS OF THE COURSE

This class meets for an hour and a half on Tuesdays and Thursdays. That's not a lot of time, and I will want to use it efficiently. We will mix lectures and discussion about the reading with short group projects. The attached schedule gives a general flavor of the topics that I plan to cover in the course, but is subject to change. As a general rule, lecture and/or discussion will take place on Tuesdays, and group projects on Thursdays. This schedule is not fixed: I may change things depending on the dynamics of the group. If I do this, I'll let you know.

### Participation and discussion

The books that I have chosen for this class are good general references on the topic of energy, but they are not very detailed. It is my hope that what you read will inspire you to learn more. As you are reading, keep track of questions that you have so that you can ask them in class. Consider: what in the reading was not covered in enough detail, and makes you want to learn more? Was there anything you disagreed with, and that you might like to challenge? Does the assigned reading give you any other ideas? Are there alternative interpretations to the information presented in the reading? We will use your questions as a springboard for discussion in class. Your thoughtful participation in group discussions is worth 20% of your grade, so *speak up!*

### Quizzes

To begin each Thursday, you will be given a short quiz on the reading that you did over the weekend, along with any lecture material presented to you on Tuesday. It is important that you pay attention, take good notes, and continually study them: *anything* that goes on inside our classroom is fair game for a quiz. Quiz scores count for 10% of your grade.

### Term Projects

Each of you will complete a research project on some aspect of energy that interests you. This can be from a scientific, economic, historical, political, or environmental perspective (or even a combination). My hope is that no matter what your goals or interests are in college, you will find something interesting to research and write about. In order to pick a topic, do some research on your own. The more information you find, the more likely that topic will be a good one. In the past, I have provided students with a list of possible topics, but in many ways this defeats one of the most important lessons in scientific research, which is: *pick a good problem*. I will help to guide you in the selection of your topic, but ultimately the choice rests upon you. Topics may focus on any component of the energy problem, from the economics, politics or history of oil, to the feasibility of a specific form of alternative energy.

Select your topic carefully. Some useful selection criteria for a topic are: 1) *the subject interests you*; 2) the scope of the project is not too broad or too narrow (a research paper on a specific model of air conditioner is too narrow, a paper on how to satisfy the energy needs of the world is too broad); 3) resources on the subject are available (a research paper on the energy use of interstellar spaceships would be entirely speculative, as there is no information on the subject); and 4) the subject has potential for further study (I would like all of your papers to conclude with suggestions for further research). Some of you may already have a familiarity with some form of alternative or conventional energy. If so, then by all means capitalize on it!

The term projects will consist of three parts:

#### 1. Research Proposal

Once you have picked a topic (topics are due by September 11, so get started!), it is your job to write and present to the class a proposal on your research. What problem do you intend to focus on? Why did you choose to study this particular topic? Why is it important? Present a case to the class outlining *why we should care* about what you plan to work on. Your proposals, presented orally to the class and in writing to me, are worth 10% of your grade.

#### 2. Term Paper

Your term paper for this class should be a substantial piece of work. There is a big difference between a book report in high school and an actual research paper. I want to see original ideas and creative thinking, backed up by hard data. A lot of the information and public opinions about energy are highly questionable. *Question them!* More specific information on the "nuts and bolts" of your term paper will be presented later on in the course. Please note the due dates on the last page of this syllabus. The term paper is worth 40% of your grade.

#### 3. Term Presentation

The last two weeks of the course will be spent finalizing and presenting the research project you have written. Each of you will prepare and deliver a 20-minute PowerPoint presentation on your research topic. The 20-minute format (15 for the presentations, 5 for questions) is the most common format used in the sciences and is a useful format to master regardless of

your future career path. Scheduling for presentations, and specifics for preparing presentations, will be given to you later on in the semester. The term presentation is worth 20% of your grade.

More information about each of these components of the class will be given to as the semester progresses.

## GEOS 197SB SCHEDULE

NOTE: This is a *tentative* schedule. I reserve the right to make changes as necessary. Assigned readings may be supplemented with web resources, news articles, technical papers, and other material as announced.

<i>Week of:</i>	<i>Tuesday activity</i>	<i>Thursday activity</i>	<i>Reading</i>	<i>Other</i>
<b>Aug 28</b>	-----	Introduction	Hubbert, 1956; Maugeri, 2006	
<b>PART 1: THE PROBLEM</b>				
<b>Sept 2, 4</b>	Peak Oil	Peak Oil	Goodstein	<i>Research possible topics</i>
<b>Sept 9, 11</b>	Basics of oil and gas	Finding oil	Goodstein	<b>Topics due</b>
<b>Sept 16, 18</b>	Basics of coal	Geology Field Trip	Goodstein	<i>Begin research on chosen topic</i>
<b>PART 2: POTENTIAL SOLUTIONS</b>				
<b>Sept 23, 25</b>	<i>Proposals</i>	<i>Proposals</i>	Deffeyes	
<b>Sep 30, Oct 2</b>	Nonrenewable solutions	Energy balance	Deffeyes	
<b>Oct 7, 9</b>	Nonrenewable solutions	Energy balance	Deffeyes	<b>Outline due</b>
<b>Oct 14, 16</b>	Biofuels	Field trip? (TBA)	Deffeyes	
<b>FALL BREAK: OCTOBER 18-26</b>				
<b>Oct 28, 30</b>	Basics of electricity	Basics of electricity	Web: all about circuits	<b>1st draft due</b>
<b>Nov 4, 6</b>	Wind Power	Wind turbine	Komor	<i>1st drafts returned*</i>
<b>Nov 11, 13</b>	Hydrogen	Electrolysis	Komor	
<b>Nov 18, 20</b>	Solar	Solar cell	Komor	<b>2nd draft due</b>
<b>Nov 25</b>	Biofuels	----THANKSGIVING----		<i>2nd drafts returned*</i>
<b>PART 3: YOUR RESEARCH</b>				
<b>Dec 2, 4</b>	<i>Presentations</i>	<i>Presentations</i>	No reading	
<b>Dec 9, 11</b>	<i>Presentations</i>	<i>Presentations</i>	No reading	

*Final Papers due by Dec 18, 1:00-4:00 PM*

### *Tim's fall 2008 schedule*

Here is my schedule as it stands now. Dark gray areas are my current course times; light gray areas are times during which I have other commitments during certain weeks. Unshaded areas are generally open, although I cannot guarantee that I will be available unless you have made an appointment to see me. If I am in my office, however, *my door is always open!*

<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
9:00	9:00	9:00	9:00	9:00
<b>10:20</b>	<b>10:00</b>	<b>10:20</b>	<b>10:00</b>	<b>10:20</b>
<b>11:00</b>	<b>11:30</b>	<b>11:00</b>	<b>11:30</b>	<b>11:00</b>
<i>LUNCH</i>				
1:00	1:00	1:00	<b>1:00</b>	1:00
2:00	<b>2:00</b>	2:00	<b>2:00</b>	2:00
3:00	<b>3:50</b>	3:00	<b>3:00</b>	3:00
4:00	<b>4:15</b>	4:00	<b>4:00</b>	4:00
5:00	<b>5:00</b>	5:00	5:00	5:00 <i>TGIF!</i>