

## SIGNATURE ROUTING LOG

### General Information:

Proposal Type: Course  Program  Other  *new*

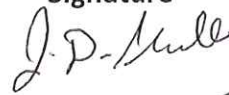



Proposal Name<sup>1</sup> (course prefix & number, pgm major & degree, etc.): GEO 135 Global Climate Change

Proposal Contact Person Name: Alice Turkington Phone: 7 9682 Email: alictet@uky.edu

### INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

### Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
Geography Director of Undergraduate Studies	6/8/2010	Jonathan Phillips / 7 6950 / jdp@uky.edu	
Geography, Chair (any cross-listing or affected) dpt, chair (any cross-listing or affected) dpt, chair	6/8/2010	Sue Roberts / 7 2399 / sueroberts@uky.edu	
A&S Ed. Policy Cmte.	9/21/10	Joanna Badagliacco, Soc. Sci. / 7-4335 / jmb@uky.edu	
A&S Dean	9/21/10	Anna Bosch, Associate Dean / 7-6689 / bosch@uky.edu	

### External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision <sup>2</sup>
Undergraduate Council	10/26/2010		
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

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<sup>1</sup> Proposal name used here must match name entered on corresponding course or program form.

<sup>2</sup> Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

# NEW COURSE FORM

## 1. General Information.

- a. Submitted by the College of: Arts and Sciences Today's Date: 5/18/2010
- b. Department/Division: Geography
- c. Contact person name: Alice Turkington (on leave Fall 2010)/ contact Chair, Sue Roberts Email: alicet@uky.edu sueroberts@uky.edu Phone: 7-2931
- d. Requested Effective Date:  Semester following approval OR  Specific Term/Year<sup>1</sup>: \_\_\_\_\_

## 2. Designation and Description of Proposed Course.

- a. Prefix and Number: GEO 135
- b. Full Title: Global Climate Change
- c. Transcript Title (if full title is more than 40 characters): \_\_\_\_\_
- d. To be Cross-Listed<sup>2</sup> with (Prefix and Number): \_\_\_\_\_
- e. Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours<sup>3</sup> for each meeting pattern type.
- |           |           |                         |              |       |                         |       |              |
|-----------|-----------|-------------------------|--------------|-------|-------------------------|-------|--------------|
| 2 Lecture | _____     | Laboratory <sup>1</sup> | 1 Recitation | _____ | Discussion              | _____ | Indep. Study |
| _____     | Clinical  | _____                   | Colloquium   | _____ | Practicum               | _____ | Research     |
| _____     | Seminar   | _____                   | Studio       | _____ | Other – Please explain: | _____ | _____        |
| _____     | Residency |                         |              |       |                         |       |              |
- f. Identify a grading system:  Letter (A, B, C, etc.)  Pass/Fail
- g. Number of credits: 3
- h. Is this course repeatable for additional credit? YES  NO
- If YES: Maximum number of credit hours: \_\_\_\_\_
- If YES: Will this course allow multiple registrations during the same semester? YES  NO

- i. Course Description for Bulletin: This course provides a broad overview of the processes that have shaped the climate in which we live, and of consequences of changes to this climate. The principal functions of climate in relation to the hydrosphere and biosphere are introduced, and climate change over geological time is described. The basic data used by climate science to identify and explain historical climate change, paleoclimate change, and more recent climate trends are examined. The course also considers the difference between climate science and 'pseudoscience' and how to evaluate predictions of future climate change. Fulfills the Gen Ed Intellectual Inquiry - Natural/Physical/Mathematical Sciences requirement.
- j. Prerequisites, if any: none
- k. Will this course also be offered through Distance Learning? YES<sup>4</sup>  NO

<sup>1</sup> Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.

<sup>2</sup> The chair of the cross-listing department must sign off on the Signature Routing Log.

<sup>3</sup> In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, represents at least two hours per week for a semester for one credit hour. (from SR 5.2.1)

## NEW COURSE FORM

- i. Supplementary teaching component, if any:  Community-Based Experience  Service Learning  Both
3. Will this course be taught off campus? YES  NO
4. Frequency of Course Offering.
- a. Course will be offered (check all that apply):  Fall  Spring  Summer
- b. Will the course be offered every year? YES  NO   
If NO, explain: \_\_\_\_\_
5. Are facilities and personnel necessary for the proposed new course available? YES  NO   
If NO, explain: \_\_\_\_\_
6. What enrollment (per section per semester) may reasonably be expected? 126
7. Anticipated Student Demand.
- a. Will this course serve students primarily within the degree program? YES  NO
- b. Will it be of interest to a significant number of students outside the degree pgm? YES  NO   
If YES, explain: Fulfills the Gen Ed Intellectual Inquiry - Natural/Physical/Mathematical Sciences requirement.
8. Check the category most applicable to this course:
- Traditional – Offered in Corresponding Departments at Universities Elsewhere
- Relatively New – Now Being Widely Established
- Not Yet Found in Many (or Any) Other Universities
9. Course Relationship to Program(s).
- a. Is this course part of a proposed new program? YES  NO   
If YES, name the proposed new program: \_\_\_\_\_
- b. Will this course be a new requirement<sup>5</sup> for ANY program? YES  NO   
If YES<sup>5</sup>, list affected programs: \_\_\_\_\_
10. Information to be Placed on Syllabus.
- a. Is the course 400G or 500? YES  NO   
If YES, the *differentiation for undergraduate and graduate students must be included* in the information required in **10.b**. You must include: (i) identification of additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See SR 3.1.4.)
- b.  The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from **10.a** above) are attached.

<sup>4</sup> You must *also* submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.

<sup>5</sup> In order to change a program, a program change form must also be submitted.

# NEW COURSE FORM

## Signature Routing Log

**General Information:**

Course Prefix and Number:    Geo 135

Proposal Contact Person Name:

Alice Turkington or  
Sue Roberts, Chair

Phone: 7-2931

Email: alicet@uky.edu or  
sueroberts@uky.edu

**INSTRUCTIONS:**

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

**Internal College Approvals and Course Cross-listing Approvals:**

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
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**External-to-College Approvals:**

Council	Date Approved	Signature	Approval of Revision <sup>6</sup>
Undergraduate Council			
Graduate Council			
Health Care Colleges Council			
Senate Council Approval			
		University Senate Approval	

Comments:

\_\_\_\_\_

<sup>6</sup> Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

**GEO 135.xxx GLOBAL CLIMATE CHANGE  
OR  
MELTDOWN:  
How and Why the Earth's Climate is Changing**

Fall 2010  
Credit Hours 3.0

**Meeting time and place:**  
Tuesday and Thursday at 11:00-12:15pm  
Whitehall Classroom Building Rm. Xx

**Instructor:**  
Alice Turkington  
1473 Patterson Office Tower  
859-257-9682  
[alicet@uky.edu](mailto:alicet@uky.edu)

Office hrs: TBA

TA: xxx

**BULLETIN DESCRIPTION**

This course provides a broad overview of the processes that have shaped the climate in which we live, and of consequences of changes to this climate. The principal functions of climate in relation to the hydrosphere and biosphere are introduced, and climate change over geological time is described. The basic data used by climate science to identify and explain historical climate change, paleoclimate change, and more recent climate trends are examined. The course also considers the difference between climate science and 'pseudoscience' and how to evaluate predictions of future climate change. Fulfills the Gen Ed Intellectual Inquiry - Natural/Physical/Mathematical Sciences requirement.

**COURSE DESCRIPTION**

The Arctic Ocean may be ice-free within 50 years. Sea levels may rise 5 feet, devastating many coastal areas. Extreme tropical storms may increase in frequency. Within 50 years, an estimated 1 million species may have been driven to extinction. Are these disastrous circumstances all the result of climate change? Is this change natural, or driven by human impact? Can this global meltdown be averted?

Our climate is changing rapidly. Glaciers are melting at an unprecedented rate, plants and animals are migrating to new habitats, sea level is rising, and storms and droughts are increasing. In this course we will examine the causes and consequences of recent climate change, and use our understanding of climatic and environmental processes to inform discussion on future climate change.

This course can be divided into 5 main parts, each of which builds on the previous sections. First, we will examine the Earth-Atmosphere system, with a view to understanding the way the atmosphere and its gases regulate the Earth's climate. We will pay particular attention to the phenomenon called "the greenhouse effect", and how human activities and natural processes impact it. Second, we will examine the evidence for climate change through geologic time, and determine what may have caused climatic shifts, and how the changes were communicated through the Earth's atmosphere, hydrosphere and biosphere. Third, we will look at historic climate change in more detail, with a view to understanding how feedback in the climate system have worked, and to determining the likely extent of human impact on natural systems. Fourth, some of the consequences of climate change have been dramatic, and we will discuss the major global consequences of recent climate change, including glacier melting, loss of plant and animal species, and regional shifts in weather patterns. Finally, we will evaluate predictions of future climate change, and discuss the possible repercussions of these within our lifetimes.

**COURSE GOALS**

This course aims to encourage students to understand the various discussions surrounding global climate change, and to be able to think critically about these processes and potential future repercussions of these changes.

## COURSE STUDENT LEARNING OUTCOMES

This course is designed to provide a broad overview of the processes that have shaped the climate in which we live, and of the consequences of changes to this climate. By the end of the class, students should be able to:

1. Explain the principle functions of the climate system, its controls and interactions with the hydrosphere and biosphere.
2. Understand the principles of climate change through geologic time (100,000 years, 1 million years, 10 million years, 250 million years).
3. Describe the methods of inquiry that are used to inform scientists on historic climate change, and palaeoclimate changes.
4. Apply fundamental principles to interpret recent climate data, and proxy data, and evaluate predictions based on these.
5. Recognize the difference between scientific data, analyses and interpretation, journalism and 'pseudoscience'.
6. Demonstrate an ability to find, evaluate and use sources of scientific information on climate change and related research.
7. Design a research project to test an open research question in climate science, design the methods of data collection, analysis and interpretation, outline the limitations of the study and suggest productive avenues or future research.

### Proposed Course Schedule

This schedule is subject to change. The timing may vary from this schedule.

		Assignments due
Week 1	Introduction to course	Perceptions of climate change
Week 2	Gaia: the Earth system	What's in the media about climate change.
Week 3	The atmosphere	What's in the media about climate change.
Week 4	The greenhouse effect	Submit title of project.
Week 5	Palaeoclimates	What's in the media about climate change.
Week 6	Climate change and life on Earth	Submit title of project and 1 page proposal
Week 7	Historical climate change	What's in the media about climate change.

Week 8	Industrialization, fossil fuels and CO2	Submit annotated bibliography (10 sources)
Week 9	MIDTERM EXAM Recent climate change	What's in the media about climate change.
Week 10	Meltdown: feedbacks in the cryosphere	Submit introduction (1-2 pages)
Week 11	Recent changes in the Arctic	What's in the media about climate change.
Week 12	Impacts on biodiversity	Submit literature review (2-4 pages)
Week 13	Storms, droughts and changes in weather	What's in the media about climate change.
Week 14	Predicting climate change	What's in the media about climate change.
Week 15	Addressing with climate change	Submit first draft of paper
Week 16	STUDENT PRESENTATIONS	What's in the media about climate change.
Finals week	FINAL EXAM Time: Duration: Location: FINAL PAPERS DUE	Submit final paper

## GRADING

- A >90%
- B 80-89%
- C 70-79%
- D 60-69%
- E < 60%

Weekly Research	50 points
In-Class Participation	30 points
Research Paper	70 points
Exams	50 points

Note that students will be provided with a **midterm evaluation** based on course performance up until the midterm point following syllabus criteria.



**ACADEMIC ETHICS**

Plagiarism and cheating are unacceptable (see UK Student Code Part II section 6.3.0). Academic dishonesty can result in serious consequences.

**ACADEMIC ACCOMODATIONS**

If you have a documented *disability* that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257 2754, email address [jkarnes@email.uky.edu](mailto:jkarnes@email.uky.edu)) for coordination of campus disability services available to students with disabilities.

**ATTENDANCE AND EXCUSED ABSENCES**

*Attendance* simply **MUST** be a priority if you wish to do well in this class. Students are expected to attend ALL classes and to take notes.

The Academic Ombud states that students are entitled to an excused absence for the purpose of observing their major *religious holidays* if the instructor is notified by the university deadline for this semester.

The only other excused absences are a documented serious illness, the documented illness or death of family member, and official documented University-related trips.

**CLASSROOM DECORUM**

Please turn all your technology off when you enter the classroom space, including your computer. Disruptions will not be tolerated in the classroom.

All work must be submitted on or before the deadline (day and time) specified for each. *Late work* will not be graded. In the case of an excused absence, make-up opportunities will be granted, provided adequate notice is provided and proper documentation is submitted.

**READINGS**

This course is based on several sources, including books, films and media articles. Students must obtain a copy of the class text: Tim Flannery, 2006. *The Weather Makers: How man is changing the climate and what it means for life on Earth*. Atlantic Monthly Press, pp384.

Other materials will be provided in class, and lectures will supplement discussions on the readings and films (see appended material).

**STUDY HINTS**

Attending class and taking notes will be vital in class performance. It is important to

fully participate in class discussions in addition to taking notes and listening to each lecture and, as understanding of each topic is paramount to simply copying lecture notes and memorizing the material. The readings are mandatory, and all relevant material should be read before each class.

### **IN-CLASS PARTICIPATION AND ASSIGNMENTS**

One of the main aims of this class is to encourage you to think critically about contemporary issues of environmental change. To that end, you must bring an 'entry ticket' to every class – i.e. a 1-page critique of the assigned reading, which will also serve as preparation for class discussion.

You are required to submit either a piece of your term paper, or one paragraph (max 1 page) on a recent news item or report on an event/situation/policy change etc. that pertains to that week's topic. These are to be submitted each **Thursday**, and we will discuss some of these each week. If a student is forced to miss class for an appropriate reason, please submit the course work prior to the absence. No individual lecture notes or instruction will be given to students missing class, even for legitimate reasons.

### **RESEARCH PAPER**

A major component of course assessment in this class will be a research paper, which deals with any topic of a student's choice under the general heading of global climate change. In order to help make progress on this project, the following timetable will be followed:

- **Title of project – date**
- **Short proposal – date**
- **Annotated bibliography – date**
- **Literature Review – date**
- **First draft of paper – date**
- **Student Oral Presentations – date**
- **Final Paper – date**

The topic, and the statement of a problem, will be chosen after consultation with the instructor. The aspect of climate change under consideration may be contemporary or historic, natural or human induced, large or small scale, local, regional or global in effect and may have a low or high impact on human existence. It must have relevance in a global context, however. Assistance and guidance with gathering of information and on presentation (written or oral) will be given.

**Student evaluation:** You will be required to submit a final paper that is 8-10 pages long (including figures), formatted and with references properly cited. You will also present your proposal to the class in a 5-7 minute oral presentation.

- **Proposal** 50%
- **Oral Presentation** 50%

## **EXAMS**

Both the Midterm Exam and the Final Exam are take-home exams. This does not mean they are easier than standard closed-book exams, quite the contrary. In order to do well in these exams, you need to keep up-to-date with your readings, to attend all classes and participate effectively in class. I expect a high standard of analysis, discussion and written communication from you in these exams. This will allow you to consider the questions in-depth, and base your answers on the understanding you have acquired during the semester, both from lectures and from readings.

### How not to get an A in your assignments or exams

- Don't bother to answer the question asked, just write down everything you know about some topic (you can always choose your own topic)
- Write ideas and examples as they come into your head, rather than structure them logically
- Repeat yourself at length to fill up the required number of pages with text, in the largest font available
- Don't bother to label sketches or diagrams
- Do not include a key, title, frame, scale or direction arrow on a map
- Forget to reference material, or list references not used in the paper
- Base your argument on undocumented web pages and nonacademic sources
- Mix up measurement units and use symbols without explanation in the text'
- Forget to use a spell checker, or use it without checking words the spell checker missed (e.g. glacier =glazier)
- Hand in an assignment late
- Turn up for the exam on the wrong day / at the wrong time
- Miss class more than once and don't bother copying the notes from classmates
- Give lots of detailed description of information with no interpretations or evidence of critical thinking
- List headlines as facts without any supporting data
- Make graphs and diagrams messy, very small with too much detail, or too pixelated to read
- Don't bother to present information as graphs or diagrams if it can be presented in a large congested spreadsheet
- Don't bother to check for grammatical errors
- Bring in your aims and objectives in an *ad hoc* manner; even better, wait until the end
- Don't refer to the question in a conclusion, or leave off the conclusion and finish in mid-flow
- Don't ask for any guidance or assistance from the instructor
- Panic

**General Education Course Submission Form**

**Date of Submission: 1 June 2010**

**1. Check which area(s) this course applies to.**

Inquiry – Arts & Creativity	<input type="checkbox"/>	Composition & Communications - II	<input type="checkbox"/>
Inquiry – Humanities	<input type="checkbox"/>	Quant Reasoning – Math	<input type="checkbox"/>
Inquiry – Nat/Math/Phys Sci	<input checked="" type="checkbox"/>	Quant Reasoning – Stat	<input type="checkbox"/>
Inquiry – Social Sciences	<input type="checkbox"/>	Citizenship – USA	<input type="checkbox"/>
Composition & Communications - I	<input type="checkbox"/>	Citizenship - Global	<input type="checkbox"/>

**2. Provide Course and Department Information.**

Department: Geography

Course Prefix and Number: GEO 135 Credit hours: 3

Course Title: Global Climate Change

Expected Number of Students per Section: 126 Course Required for Majors in your Program? No

Prerequisite(s) for Course? None

This request is for (check one): A New Course  An Existing Course

**Departmental Contact Information**

Name: Alice Turkington\* Email: alict@uky.edu

Office Address: 1457 POT Phone: 7-2931

**3. In addition to this form, the following must be submitted for consideration:**

- A syllabus that conforms to the Senate Syllabi Guidelines, including listing of the Course Template Student Learning Outcomes.
- A narrative (2-3 pages max) that describes how the course will address the General Education and Course Template Learning outcomes and the type(s) of course assignment(s) that could be used for Gen Ed assessment.
- If applicable, a major course form for an existing course, or a new course form for a new course.

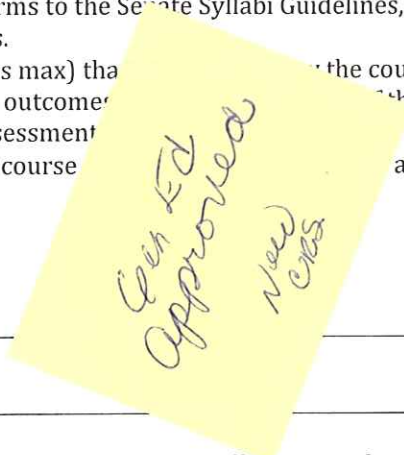
**4. Signatures**

Department Chair: \_\_\_\_\_ Date: \_\_\_\_\_

Dean: \_\_\_\_\_ Date: \_\_\_\_\_

College Deans: Submit all approved proposals electronically to:

**Sharon Gill** [Sharon.Gill@uky.edu](mailto:Sharon.Gill@uky.edu)  
Office of Undergraduate Education



As this freshman level class deals with such a vast topic, which is complex and often presented in confusing ways, the assessment through exams does not require memorization of facts and concepts by students. Rather, the exams are take-home, and the focus will be on making a coherent argument that is supported by relevant data. Each exam will be offered over a 48-hour period, and the expectations for exam answers will be explicitly defined for students, including the provision of a sample answer. Exams will offer choice; each may require, for example, answering of 2 questions from a list of 5, to enable students to learn topics of interest to them in more detail.

Finally, this course must address the implications of scientific findings on policy, and the implications of policy on future climate change. One in-class activity designed to think about these complex issues will divide the class into 4 groups, each of which has to design a policy to reduce carbon emissions on campus, in the city, at the state level, and at the federal level, respectively. Inconsistencies and disagreements will be discussed, and the process is designed to engage with a timely and relevant political issue that is complex, uncertain and for which there are many possible resolutions. While climate change amelioration or adaptation are not the main focus of the class, they are often the issues of interest to students, and at least one week will be devoted to them in this course. As an alternative to the term paper, it may be viable to offer students/groups the opportunity to develop outreach or educational materials for distribution to students in university or high schools; these materials would not only demonstrate understanding of the science, but also an appreciation of the political institutions, cultural issues and social organizations that are interconnected with the pursuit of scientific understanding.

4. What is the carbon budget? At what timescales does it operate? Which processes, or fluxes, are the fastest? Which processes, or fluxes, are acting to promote or ameliorate climate change presently?

Similarly, when students watch documentaries on climate change, from a range of perspectives, they will be provided with a worksheet of questions to answer to help focus their attention, and to practice note-taking and extraction of pertinent points from a video resource.

Students will then build on these basic reading and inquiry skills through the semester, by finding resources to answer simple questions such as: what is your carbon footprint; how much CO<sub>2</sub> is emitted by cars in Kentucky each year? In each case, students will use a variety of electronic resources, and consider the reasons for discrepancies between them, thereby learning how to validate sources. In doing each of these activities, students practice their quantitative reasoning abilities and communication skills as they report group/individual findings to the class. These skills should develop through the semester, and equip students to prepare and deliver a presentation on their term paper.

Development of critical thinking skills and an overall understanding of the process of scientific enquiry will be achieved, in this class, through a weekly evaluation of media reports on climate change. The brief evaluations offered by students will be discussed among the class, in order to teach students how to read science through journalism. Students will assess the validity of claims by considering the data on which they are based, and will learn to distinguish scientific findings (whether part of a consensus in the discipline or not), political statements and myths. In this area of research, this skill is crucial for students, and will depend on their gaining a strong foundation in the principles of climatology and palaeoclimatology, in scientific methods, as well as skills in critical thinking. Most importantly, students will be able to evaluate the reports with increasing skill, as their information literacy and knowledge grows.

Understanding the process of scientific inquiry, with particular attention paid to the validity of sources, will be further developed as students are guided through the process of designing and writing a research paper on some topic within climate change science. Students are encouraged to choose a topic of interest to them, and perhaps linking their studies to date to the topic. Once the research question has been identified, students write an annotated bibliography; this will be guided through use of a detailed handout of instructions on the method and purpose of annotated bibliographies, which will help develop an important skill for later research papers in university classes. Drafts of sections of the paper will be submitted during the semester, commented on and revised as the paper is developed. If the class size is large (>30), this may be accomplished through group projects, in which students divide tasks, write a longer paper, and assess each other's contributions to the work. These projects may also be presented at the annual UK Showcase for Undergraduate Scholars for credit, if appropriate.

of information and on presentation (written or oral) will be given. Each student will be guided through the process of choosing a research question, outlining the paper, writing an annotated bibliography, analyzing and discussing your data/findings and drawing appropriate conclusions. Students will be required to submit a final paper that is 8-10 pages long (including figures), formatted and with references properly cited. Each student will also present your proposal to the class in a 5-7 minute oral presentation. [If the class size is large, this paper can be researched and presented by small groups of students, rather than individuals]

### **Course Identifier**

This is a new Geography course, at the 100-level, which has previously only been offered (in a different format) as a Discovery Seminar Class. It will, therefore, need to be approved with a new course number and title.

### **Core Competencies of Learning Outcome # 1.**

This course has been designed based on the principles outlined in the materials at the GenEd website, and the assignments (including activities, exams, papers, projects, etc.) build on each other in a way that promotes achievements of the "core competencies" for Learning Outcome #1.

The class will rely on lecture material to teach the principles of climatology, functioning of the climate system, its controls and interactions within the hydrosphere, cryosphere and biosphere. Lecture material and readings will help students understand the reasons for climate change on a range of geologic timescales, interpret proxy data for recent climate changes, evaluate climate predictions and describe the methods of enquiry used to inform scientists on climate change. The students will complete assigned readings before class, and their reading will be guided to facilitate their transition to the level of critical thinking expected in a university. For example, when students have read the first chapters of *The Weather Makers*, their comments and notes will be discussed in small groups; to demonstrate the main points of understanding they should glean from the reading (and to demonstrate the need to do further research when material proves difficult), the groups will be given questions to answer:

1. How is the atmosphere stratified? Why is this? What are the differences between the layers, especially with regard to temperature and composition?
2. What is the greenhouse effect? How does it work? How does it vary across the electromagnetic spectrum?
3. What are the most important greenhouse gases? Why do they differ in their impacts?



Turekian, KK (1996) *Global environmental change: past, present and future* Prentice Hall

Many other recent books on climate change, climate policy, climatology, etc – depending on the instructor's expertise.

### **Assessment Strategies**

#### *1. Class participation*

One of the main aims of this class is to encourage students to think critically about contemporary issues of environmental change. To that end, students must bring an 'entry ticket' to every class– i.e. a 1-page (max) critique of the assigned reading, which will also serve as preparation for class discussion.

There will be a number of in-class exercises for students to complete in small groups, which will highlight a number of issues pertaining to climate change, and will allow you to practice data analysis in a variety of ways. These may include: calculating an individual personal carbon footprint; calculating the carbon footprint of the state of Kentucky; making predictions of future temperature changes; long range weather forecasting; designing strategies to reduce carbon dioxide emissions at campus/city/state/national levels.

#### *2. Climate change news*

Students are required to submit one paragraph (max 1 page) on a recent news item or report on an event/situation/policy change etc. that pertains to that week's topic. These are to be submitted each **Thursday**, and the class will discuss some of these each week. Students should summarize the findings reported in the article, and offer an evaluation or personal response to it. Students might consider some of the following questions: who reported the findings; who funded the study; are the findings new; are the data sufficient to draw these conclusions; what are the limitations to the study; have you read other reports that contradict or support this one; are you interested in pursuing this line of inquiry?

#### *3. Research paper*

A major component of course assessment in this class will be a research paper, which deals with any topic of a student's choice under the general heading of global climate change. The topic, and the statement of a problem, will be chosen after consultation with the instructor. The aspect of climate change under consideration may be contemporary or historic, natural or human-induced, large or small scale, local, regional or global in effect and may have a low or high impact on human existence. It should also reflect the student's interests and academic strengths, where appropriate. Assistance and guidance with gathering

## SUPPORTING MATERIALS

**Examples of Resources***Student resources:*

Tim Flannery, 2006. *The Weather Makers: How man is changing the climate and what it means for life on Earth*. Atlantic Monthly Press, pp384.

Robert Henson, 2006. *The Rough Guide to Climate Change*. Penguin Group, London, pp338.

Michael Mann & Lee Kump, 2009. *Dire Predictions: understanding global warming*. Pearson Education, New York, pp208.

Al Gore, 2006. *An Inconvenient Truth*. Paramount Classics. (DVD)

Intergovernmental Panel on Climate Change Fourth Assessment Report ([www.ipcc.ch](http://www.ipcc.ch))

New Scientist ([www.newscientist.com](http://www.newscientist.com))

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*Instructor resources:*

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