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Request for Curriculum Council Action

TO: Lynda Duke, Associate Dean of Curricular and Faculty Development

DATE SUBMITTED: 5 January 2016

(Please submit 1 double-sided copy of your proposal)

FROM: (Name) R. Given Harper

(Department) Biology, Environmental Studies

Email address: gharper@iwu.edu

1. WRITTEN RATIONALES: Attach a written rationale, following the guidelines found in the Curriculum Council Handbook, page 3, at www.iwu.edu/melloncenter/cc2015-16handbook.pdf. Please note that CC will not evaluate incomplete proposals. To expedite consideration of your submission, you must read and follow the guidelines carefully.

2. Proposed Action (Please check all that apply):

	Title	Number	Units
<input checked="" type="checkbox"/> New Course	Global Climate Change: Causes, Impacts, Solutions / OCS	120	1
<input type="checkbox"/> Gen Ed for Existing Course			
<input type="checkbox"/> Deletion			
<input type="checkbox"/> Change title from			
to			
<input type="checkbox"/> Change number from			
to			
<input type="checkbox"/> Change prerequisites from			
to			
<input type="checkbox"/> Special Topic/Experimental			
<input type="checkbox"/> May Term Course			
<input type="checkbox"/> New Major/Minor			
<input type="checkbox"/> Revised Major/Minor			
<input type="checkbox"/> Other (please specify)			

3a. If you are requesting General Education unit credit, please check the category:

- Analysis of Values
- The Arts
- Contemporary Social Institutions
- Cultural and Historical Change
- Formal Reasoning
- Gateway Colloquium (see 9b. below)
- Intellectual Traditions
- Literature
- Second Language
- Life Science Issues
- Life Science Lab
- Physical Science Issues
- Physical Science Lab
- Physical Education
- Fitness

3b. Please check the flag(s), if any, you are seeking:

- Writing Intensive
- Global Diversity
- U.S. Diversity

3c. Does this course already carry General Education credit? Yes No

If yes, which category/flag? _____
Will the existing category/flag remain? Yes No

3d. In what way will you assess how this course has met the goals of the Gen Ed category and/or flag(s) for which you are applying?

- Use the Gen Ed Student Survey (Administered by the Registrar's Office)
- Use a different tool/method (please explain)

4. Please insert here the proposed catalog course description. Course descriptions should be limited to no more than 50 words. The description must include (a) title; (b) prerequisites; (c) General Education category; and (d) when offered, although those four items do not count against the 50-word limit.

(a) Global Climate Change: Causes, Consequences, Solutions. (b) Prerequisites: none (c) General Education categories: Life Science Issue, Encountering Global Diversity flag. (d) When offered: Fall semester, 2016 (e) Course description: Global climate change is one of the most profound and complex issues facing humanity. This course will introduce students to the scientific principles that underlie the causes and consequences of climate change, and consider ways to both live and reduce its impacts in the UK and the U.S.

5. Please list any prerequisites: None

6. When will this course first be offered? (cannot be current or past term) Fall semester, 2016 (London Program)

7. Please indicate how often course is offered. Check only the single item that best describes this course. Because these are the only intervals used in the University Catalog, please do not edit or alter the list to fit a particular course. For example, if your course is offered every third year—an interval that does not appear in the Catalog—you might choose "Offered as needed" or "Offered occasionally" instead. Courses that cannot be offered at least every four years should not be proposed.

- | | |
|---|--|
| <input type="checkbox"/> Offered each semester | <input type="checkbox"/> Offered in alternate years, Fall Term |
| <input type="checkbox"/> Offered each Fall Term | <input type="checkbox"/> Offered in alternate years, Spring Term |
| <input type="checkbox"/> Offered each spring | <input type="checkbox"/> Offered in alternate years, May Term |
| <input type="checkbox"/> Offered each May Term | <input type="checkbox"/> Offered annually |
| <input type="checkbox"/> Offered each semester and May Term | <input type="checkbox"/> Offered every third semester |
| <input checked="" type="checkbox"/> Offered occasionally | <input type="checkbox"/> Offered by arrangement |
| <input type="checkbox"/> Offered in alternate years | <input type="checkbox"/> Offered as needed |

8. If your proposal is approved, would you be willing for the Mellon Center to use it as an exemplary submission in the online Curriculum Council Handbook? Yes No

9a. Is/are any other department(s) affected in any way by this request (e.g., course is cross-listed, team-taught, required or elective in another major or minor, etc.)?

No. Yes. In what way?

ELECTIVE COURSE FOR MAJORS (BIOLOGY)
Jon Wolf

Signature of the Head(s) of the Affected Department(s), School(s) or Program(s)

9b. If this proposal is for a Gateway course, does it overlap with any existing courses at IWU?

No. Yes. In what way?

Signature of Existing Course Instructor

10. The Curriculum Council assumes that the faculty members of your department have seen and approved of this request. Please sign below if this assumption is correct:

Robin Hays
Signature of Faculty Member Primarily Responsible for This Proposal

Jon Wolf
Signature of the Head of the Department, School or Program

OCS 120: Global Climate Change: Causes, Impacts and Solutions

1. How does this course fit in with your overall program and faculty/student interest?

Over the past five years students majoring in Environmental Studies and Biology have expressed strong interest in the topic of global climate change. Climate change is one of the most profound and complex issues affecting humanity today. Recent scientific studies have heightened the scale of concern and suggest that the potential effects of the climate change problem may be even worse than previously feared. Extreme weather events are increasingly being attributed to climate change and there is now a greater emphasis on the need to prepare for and adapt to climatic changes. Understanding the causal factors and biogeochemical cycles that give rise to climate change, as well as steps that can be taken to mitigate and adapt to climate change, are essential knowledge *needed by all students*. The focus of this course will be to introduce students to the scientific principles that underlie the causes and consequences of global climate change, and to consider ways to both live with and reduce its impacts.

London and the United Kingdom are ideal settings for this course because the UK is an island nation that is extremely vulnerable to sea level rise due to climate change. The winter of 2013-2014 was the wettest winter in England and Wales since 1766, and resulted in widespread, persistent flooding (data from the UK Met Office). Both London and the UK are global leaders in addressing climate change and this course will take advantage of the unique resources in this region. London is also one of the most resilient “world cities” in the face of climate impacts, as it has employed numerous state-of-the-art technologies and climate adaptation strategies. The city has implemented programs such as increasing energy efficiency in buildings, increasing the use of renewable energy sources, and it has adopted more energy efficient modes of transportation. Students will observe and learn about these strategies, and make a web-based comparison of similar strategies in New York City, another “world city” that is highly vulnerable to climate change. During the course, students will become aware that the British are ahead of the U.S. in acknowledging and addressing many aspects of climate change, and we will consider the cultural and political differences that may contribute to this disparity. It is easy for students to be overwhelmed by the impacts of climate change, but they will learn about and observe innovative solutions to this problem.

The course will be divided into the following segments. **1. Climate Change Basics:** *The Earth's Climate and Atmospheric Processes; The Greenhouse Effect; The Carbon Cycle; Human Impacts on the Carbon Cycle.* **2. Climate Change Projections:** *Historical Climates and Temperature Trends in the UK and the U.S.; Climate Modeling; Projections of Change.* **3. The Impacts of Climate Change in the UK and the U.S.:** *Sea Level Rise; Extreme Weather Events; Effects on Humans; Effects on Ecosystems and Wildlife.* **4. Mitigation and Adaptation Strategies in the UK and the U.S.:** *Renewable Energy; Technology and Conservation; Using Ecosystem Services to Address Climate Change; Comparison of Mitigation/Adaptation Strategies of London vs. New York City.*

Major Learning Outcomes: Upon completion of the course students will be able to: identify the main physical processes that impact the global climate; demonstrate an understanding of the natural and human sources of greenhouse gases; collect, organize, display, and interpret data that relate to changes in atmospheric CO₂; identify and compare the most significant potential impacts of climate change in the UK and the U.S.; identify alternative technologies and behavioral changes that can mitigate climate change; identify strategies to adapt to climate change in London and New York City; utilize the scientific method to actively investigate hypotheses about the effectiveness of mechanisms by which London will adapt to climate change.

2. Who will teach the course? How will this course affect departmental course offerings and staffings?

I (Given Harper) will teach the course as part of the London Program, during the Fall semester, 2016. I normally teach Bio. 217 Introductory Ecology each fall semester, which is typically taken by both Biology majors and Environmental Studies Ecology concentration majors. The Biology Department has requested either

an adjunct or a visiting faculty member to teach the Bio. 217 Introductory Ecology course during the Fall semester, 2016. Abigail Jahiel will serve as Environmental Studies program chair while I am in London.

3. Are you deleting a course to make space for this one?

No

4. Why are you offering the course at this level?

The course content is very broad in nature and it does not require any prerequisites. It is designed to introduce students to broad science concepts that relate to climate change.

5. If the proposed course unit is less than 1, please explain.

The proposed course will be worth 1 course unit.

6. Explain how the library, computer, media or other resources are adequate.

Students will have access to the library facilities at the University College of London, which has extensive resources for this class. Students will also be able to access on the web numerous reports by the Intergovernmental Panel on Climate Change and summaries of recent negotiations on dealing with climate change (e.g., the Paris Climate Change talks).

7. For General Education courses, explain how the course meets the criteria for the appropriate category and/or flag.

This course will meet the criteria for the **Life Science Issues** category.

Category goals

1. *Acquaint students with important life and/or physical science concepts, as well as connections among different areas of science.*

Students will acquire knowledge about major life and physical science concepts. They will learn about natural and anthropogenic processes involved in the carbon cycle, which incorporates both life and physical science concepts. Students will learn how humans have greatly impacted the carbon cycle through the combustion of fossil fuels (i.e., physical science concepts), and then learn how climate change has impacted both ecosystems and organisms (i.e., life science concepts). Throughout the course they will utilize the scientific method to test hypotheses related to climate change. For example, students will investigate the impact of trees in sequestering carbon via photosynthesis in a section of the Victoria Business District. They will identify tree species and count and measure tree diameters, and then use tree species conversion factors (for storing carbon) and calculate the amount of carbon that trees can sequester. In another exercise students will record and compare the average temperatures of a part of the city where there are no trees (i.e., a heat island), and in a different part of the city shaded by trees. Students will document the impact of trees in reducing the heat island effect, which can help ameliorate the impact of rising temperatures in cities.

2. *Develop students' understanding of the roles that critical analysis, abstract thinking, creativity, and imagination play in the scientific enterprise.* Students will study the creative thinking and critical data analysis that lead to the development of the global climate change hypothesis. They will look at original data from Mauna Loa, Hawaii, where scientists were among the first to document that carbon dioxide levels were increasing in the atmosphere. Students will also investigate other hypotheses proposed to explain the increase

in the Earth's average temperature over time, and look at data for/against these hypotheses. In addition, students will observe first-hand the scientific technologies that have been developed to mitigate climate change.

3. *Introduce students to the usefulness of applying scientific concepts to the understanding of everyday experiences.* A major emphasis of this course is for students to utilize the scientific method to test hypotheses that relate to climate change. The information gained will allow them to formulate and then test hypotheses about natural phenomena they observe. For example, students will be able to measure and record carbon dioxide levels resulting from their own actions (e.g., driving a car), and determine ways in which those carbon footprints can be reduced (e.g., walking or taking public transportation).

4. b. *Improve understanding of scientific and technological issues which affect society and consider strengths and limitations of science in dealing with these issues.* This course will provide the scientific basis in order to understand climate change and the technological and other means to attempt to mitigate the worst future effects of climate change. Ultimately students will learn that science has identified the problem and can forecast the extent to which climate change may occur (although there are some uncertainties about such predictions), but they will learn that the actual implementation of the solutions to this problem is a political one (i.e., a limitation of science). Students will also read reports by the Intergovernmental Panel on Climate Change and evaluate uncertainties about climate change projections.

Encountering Global Diversity Flag

1. This course will *develop students' ability to analyze and understand the contemporary British society while living in Britain.* The course will also enable students to understand the social and cultural frames of reference for addressing climate change from the British perspective and compare it to the perspective of the U.S.

A major component of this course will allow students to compare the impacts of climate change in the UK and the U.S. and also compare the similarities and differences in climate change mitigation and adaptation strategies in the UK and the U.S. For example, I will arrange for opportunities for students to meet members of the London communities who are taking action to address climate change. The Crystal Palace Transition Town movement is a community-led response to climate change in the Crystal Palace residential area in South London. It includes numerous projects where residents work to reduce their carbon footprint while building local resilience to climate change. The students and I will meet with members of this movement at a pub during one of their monthly meetings, and I will arrange for students to see and actually participate in the initiatives of residents to rely on local food, use renewable energy, reduce waste, and utilize low-carbon transportation. The Transition Town has regularly scheduled workdays to help with these endeavors. This will be a marvelous way for students to interact with local residents and to query them on their knowledge and motives for their actions.

2. Courses use such materials as primary texts, films, or other appropriate materials arising directly from the non-U.S. society(ies). *If the course is a travel course, it provides opportunities for direct and significant cultural interactions between the students and members of the society(ies) they are visiting.*

Students will have opportunities to interact with citizens of the UK on a daily basis (e.g., as indicated in part 1 above). The students will live in flats that also house British students, which will provide many opportunities to converse with British students about this phenomenon. Students will also live for a week in the Scottish highlands and interact with Scottish residents, and they will also travel to Wales for several days and have the opportunity to interact with Welsh residents. Throughout this course IWU students will be immersed in British culture and they will consider how cultural differences influence perceptions about climate change in the UK and U.S.

3. What methods will be used to ascertain if and how the course has met the category/flag goals?

In addition to the Gen. Ed. Student Survey administered by the registrar's office, I will utilize pre-enrollment and post-enrollment tests. For the Life Sciences Issues designation, I will administer a pre-course enrollment test and an identical post-enrollment test that will query them on scientific principles underlying climate change, the extent to which climate change has and will occur, and solutions to this problem. For the Encountering Global Diversity flag, I will administer a pre-enrollment test and an identical post-enrollment test on the extent to which British vs. Americans citizens are knowledgeable about climate change, the mitigation actions that have been/will be taken by each country, and the possible cultural reasons for any perceived differences.