General Education Course Information Sheet

Please submit this sheet for each proposed course

Department & Course Number CEE58SL

Course Title Climate change, water quality, and ecosystem functioning

Indicate if Seminar and/or Writing II course _____

1 Check the recommended GE foundation area(s) and subgroups(s) for this course

Foundations of the Arts and Humanities

- Literary and Cultural Analysis _____
- Philosophic and Linguistic Analysis _____
- Visual and Performance Arts Analysis and Practice _____

Foundations of Society and Culture

- Historical Analysis _____
- Social Analysis _____

Foundations of Scientific Inquiry

- Physical Science _____
  With Laboratory or Demonstration Component must be 5 units (or more) _____
- Life Science Yes
  With Laboratory or Demonstration Component must be 5 units (or more) _____

2. Briefly describe the rationale for assignment to foundation area(s) and subgroup(s) chosen.

This course covers fundamental concepts in ecology, earth science, and microbial water quality. The latest research on the relationships between ecosystem and organism disruptions will be investigated.

3. "List faculty member(s) who will serve as instructor (give academic rank):
Jennifer Jay, Associate Professor

Do you intend to use graduate student instructors (TAs) in this course? Yes √ No ____

If yes, please indicate the number of TAs 1

4. Indicate when do you anticipate teaching this course over the next three years:

2010-2011	Fall		Winter		Spring	
	Enrollment		Enrollment		Enrollment	
2011-2012	Fall		Winter	√	Spring	
	Enrollment		Enrollment	40	Enrollment	
2012-2013	Fall		Winter	√	Spring	
	Enrollment		Enrollment	40	Enrollment	

5. GE Course Units

Is this an ***existing*** course that has been modified for inclusion in the new GE? Yes √ No ____

If yes, provide a brief explanation of what has changed. The area of environmental science covered has changed from wetlands to climate change and ecosystems. Both the discipline-specific academic rigor and the extent of community engagement have increased.

Present Number of Units: 5 Proposed Number of Units: 5

6. Please present concise arguments for the GE principles applicable to this course.

❑ General Knowledge	This course covers fundamental life science topics in depth. Specifically, we will learn basic ecology, microbiology, and earth science. Students will learn how earth's biological systems function and their responses to disruption.
❑ Integrative Learning	This class will be particularly strong in helping students integrate concepts across curricula. The course brings together three scientific areas: ecosystems, water quality, and climate change and asks students to investigation relationships. In working with K-12 students, math and graphing will be used to illustrate climate changes that have already occurred. For younger students, math problems can be quite simple, such as plotting temperature over time. For high school students, more complicated problems, such as how varying amounts of snowmelt affect our water supply, can be addressed.
❑ Ethical Implications	Students will discuss our role as educated citizens in addressing one of the largest problems facing humanity: climate change. For so long, the media presented this as a hypothetical issue, and we now have scientific consensus that it is occurring. Students will be directly involving themselves in educating others about science.
❑ Cultural Diversity	Students will be visiting public and private schools in the Los Angeles area, and will be in contact with students of diverse cultural backgrounds. Our long-time service learning partner, St. Anne's, has a student body that is 97% underrepresented in science.
❑ Critical Thinking	Students will be trained to read primary literature articles critically. They will write two research papers on topics of their interest.
❑ Rhetorical Effectiveness	This is an important part of the class. One two-hour session will be spent educating students on communication, and then two two-hour sessions will be spent watching each other practice and giving feedback on presentations.
❑ Problem-solving	Students will learn the scientific method through numerous case studies.
❑ Library & Information Literacy	The extensive internet resources that are available on climate change will be used in class and in working with younger students. For just one example, the Climate Hot Map is an interactive tool with which students can surf the globe and see impacts due to climate change and solutions occurring in specific locations.

(A) STUDENT CONTACT PER WEEK (if not applicable write N/A)

1.	Lecture:	**4**	(hours)
2.	Discussion Section:		(hours)
3.	Labs:		(hours)
4.	Experiential (service learning, internships, other):	**2**	(hours)
5.	Field Trips:		(hours)

(A) TOTAL Student Contact Per Week **6** **(HOURS)**

(B) OUT-OF-CLASS HOURS PER WEEK (if not applicable write N/A)

1.	General Review & Preparation:	**1**	(hours)
2.	Reading	**4**	(hours)
3.	Group Projects:	**1**	(hours)

4.	Preparation for Quizzes & Exams:	**1**	(hours)
5.	Information Literacy Exercises:		(hours)
6.	Written Assignments:	**2**	(hours)
7.	Research Activity:	**1**	(hours)

(B) TOTAL Out-of-class time per week	**10**	**(HOURS)**
GRAND TOTAL (A) + (B) must equal at least 15 hours/week	16	**(HOURS)**

CEE58SL Climate change, water quality and ecosystem functioning

Welcome!

This class covers the science relating climate change, water quality, and ecosystem health. Topics covered fall into 3 general categories: 1) fundamental concepts in ecology including needs of living things, populations and communities, carbon and nutrient cycling through the environment, ecosystem structure and services, and biodiversity; 2) the hydrologic cycle, basic aquatic chemistry, and microbial water quality; and 3) climate change and its impacts on ecosystem functioning and water quality.

We will examine the application of the scientific method in helping to understand and solve problems in environmental science. Case studies will be used to illustrate how natural scientists work on environmental issues. You will research a related topic of your interest and briefly discuss it with the class.

For the service learning component of this course, you will participate in a series of science education projects involving an elementary, middle, or high school audience. Total contact time with students will be 20 hours.

Course Goals and Learning Objectives:

Students should:

- develop a fundamental understanding of ecosystem functioning
- develop a basic knowledge of microbial and chemical water quality
- understand how natural scientists work and how scientific principles and methods are used to examine and solve environmental sustainability problems
- have a working understanding of Earth's physical, chemical and biological processes as related to climate change
- become involved in environmental education to a grades 2-12 audience

Service Learning*:*

1. Is a method whereby students learn and develop through active participation in thoughtfully organized service that is conducted in and meets the needs of communities
2. Is coordinated with an elementary school, secondary school, institution of higher education, or community service program and the community
3. Helps foster civic responsibility

4. Is integrated into and enhances the academic curriculum of the students, or the education components of the community service program in which the participants are enrolled
5. Provides structured time for students or participants to reflect on the service experience

(Definition taken from the Corporation for National Service, Learn and Serve)

Grading: Quizzes 20%; Exam 20%; Two individual research papers, 30%; Service learning preparation, work, and service learning journal, 30%. Attendance mandatory.

Individual research papers: In each of two five-page documents, each student will review the current state of knowledge on a case of ecosystem and/or water quality disruption that is currently occurring or expected to occur as climate changes. At least five primary literature articles should be cited for each paper, and relevant course readings should also be cited.

Service learning component of course:
Description of meaningful work: Students will work in groups of 4 to 5 to conduct a series of environmental/climate science education activities for an elementary, middle, or high school audience. UCLA students will assist K-12 students in various projects including creatively illustrating relevant climate and environmental science concepts and graphing data. Some attention will be placed on solutions to the climate problem, and several activities will highlight renewable energy. For example, younger students will build solar ovens to make s'mores; this project illustrates both the heat trapping that is central to greenhouse warming and the effectiveness of solar energy. Middle school students will also build solar buggies using solar panels, and make solar cells out of raspberry juice in a protocol developed at UCLA CNSI.

All student projects will involve the graphing of data related to parameters such as temperature and storm intensity at various locations around the world. For example, each small group in a class could plot temperature or precipitation data from a location around the globe of the group's choice. Each group could learn about the different challenges in various locations (rising sea level, storms, agricultural impacts, etc.) The Climate Hot Map is a great interactive resource to get students started on this. By looking at all data together, the class could learn about the difference between overall trends and site to site variability.

The service learning component will culminate with a poster session at UCLA for all K-12 students. Working in small groups with UCLA students, K-12 students will make posters showing results of their work. For example, elementary school student posters could include graphs of temperature data that the students created, while older K-12 students might present on variations in snow pack in CA. Poster session will be hosted by the Center for Embedded Networked Sensing at UCLA.

All K-12 students will also tour UCLA in small groups led by the UCLA students in the class.

Connection to course material: Presentations to K-12 students will include the sharing of data from reputable sources such as the Intergovernmental Panel on Climate Change (IPCC) and journals such as Science and Nature.

Required hours of service learning: Students will spend eight two-hour sessions working with students in groups (weeks 3 through 10). An additional four hours contact time with students will occur during the culminating field trip to UCLA.

Community Partners:

1. St. Anne's Middle School. Contact person: Anna Brown, Science Teacher. (annamtbrown@yahoo.com)
2. Roosevelt Elementary School. Contact person: Jennifer Lynch (jlynch@smmusd.org) and Anna Nitti (anitti@smmusd.org)
3. Flintridge Prepatory School. Contact person: Nick Ponticello (nponti@gmail.com)

Lecture Topics:

I. The Basics of Climate Change (weeks 1 and 2)
- Film: An Inconvenient Truth
- Causes and evidence of global climate change
- Natural and anthropogenic forcings
- Introduction to Global Climate Models

II. Climate Change Impacts on Hydrology and Water Quality (weeks 3, 4, and 5)
- Background:
  - Water as solvent of life
  - Basic hydrologic cycle
  - Basic water chemistry and biology of natural waters
- Climate impacts:
  - On surface water hydrology and quality
  - On ocean pH

III. Climate Change Impacts on Ecosystem Functioning (weeks 6, 7, 8, and 9)
- Background:
  - Needs of living things
  - Ecosystem services and biodiversity
  - Overview of ecosystem functioning.
  - Terrestrial, surface water, and ocean ecosystem structure
- Climate impacts:
  - Phenology, abundance, and ranges.

Arctic and Antarctic ecosystems
Equatorial, boreal, and temperate ecosystems

IV. Closing: Climate Change solutions (week 10)
Stabilization wedge game

Reading List (broken down by section of course):

For the first three sections of the course, readings will come from three sources:

A. Withgott, J., and S. Brennan, Environmental: The Science Behind the Stories, Pearson, 4th edition.
B. The Intergovernmental Panel on Climate Change (IPCC) 2004 Report
C. The Climate Change Science Compendium 2009

I. The Basics of Climate Change (weeks 1 and 2)

A. Withgott, J., and S. Brennan:
Chapter 18. Global Climate Change

B. IPCC Report 2004:
Chapter 1. Assessment of observed changes and responses in natural and managed systems.

C. Climate Change Science Compendium 2009:
Chapter 1. Earth Systems (11 pp.)

II. Climate Change Impacts on Hydrology and Water Quality (weeks 3, 4, and 5)

A. Withgott, J., and S. Brennan:
Chapter 15. Freshwater Systems and Resources
Chapter 16. Marine and Coastal Systems and Resources

B. IPCC Report 2004:
Chapter 3. Freshwater resources and their management

C. Climate Change Science Compendium 2009:
Chapter 3. Earth's Oceans (7 pp.)

III. Climate Change Impacts on Ecosystem Functioning (weeks 6, 7, 8, and 9)

A. Withgott, J., and S. Brennan:
Chapter 4. Species Interactions and Community Ecology (W&B)
Chapter 5. Environmental Systems and Ecosystem Ecology (W&B)

B. IPCC Report 2004:
Chapter 4. Ecosystems, Their Properties, Goods, and Services

C. Climate Change Science Compendium 2009:
Chapter 4. Earth's Ecosystems (9 pp.)

IV. Closing: Climate Change solutions (week 10)

A. Withgott, J., and S. Brennan:
Chapter 21. New Renewable Energy Solutions

Course Revision Proposal

	Civil & Environmental Engineering 58SL Climate Change, Water Quality, and Ecosystem Functioning	
	Requested revisions that apply:	
	☐ Renumbering ☑ Title ☑ Format ☐ Requisites ☑ Units ☐ Grading ☑ Description	
	Multiple Listing: ☐ Add New ☐ Change Number ☐ Delete	
	Concurrent Listing: ☐ Add New ☐ Change Number ☐ Delete	
	CURRENT	**PROPOSED**
Course Number	**Civil & Environmental Engineering 58SL**	**Civil & Environmental Engineering 58SL**
Title	**Wetlands and Water Quality Service Learning Course**	**Climate Change, Water Quality, and Ecosystem Functioning**
Short Title	**WETLANDS&WATER QLTY**	**CLIMATE CHNG&ECOSYS**
Units	Fixed: **4**	Fixed: **5**
Grading Basis	**Letter grade only**	**Letter grade only**
Instructional Format	Primary Format **Lecture**	Primary Format **Lecture - 4 hours per week**
	Secondary Format **None**	Secondary Format **Activity - 2 hours per week**
TIE Code	**LECN - Lecture (No Supplementary Activity) [T]**	**LECN - Lecture (No Supplementary Activity) [T]**
GE	**No**	**Yes**
Requisites	**None**	**None**

Description	Lecture, three hours; outside study, nine hours. Learning and teaching of basic water quality concepts and wetland functions in one of two middle school classrooms in Los Angeles. Topics include photosynthesis, respiration, basic water quality parameters (pH, dissolved oxygen, salinity, turbidity), basic contaminant chemistry and metal precipitation, and role of wetlands in microbial water quality. Field trip with middle school students to Ballona Wetlands. Letter grading.	**Lecture, four hours; service learning, two hours; outside study, nine hours. Science related to climate change, water quality, and ecosystem health. Topics include carbon and nutrient cycling, hydrologic cycle, ecosystem structure and services, biodiversity, basic aquatic chemistry, and impacts of climate change on ecosystem functioning and water quality. Participation in series of science education projects to elementary or middle school audience. Letter grading.**
Justification		**This course is still a water quality / environmental science course, but the focus has shifted to the effects of climate change on water quality and ecosystem functioning. The title change better describes this new focus. Additionally, the course will cover sufficient biology to be a GE course in Life Science. The significant amount of service learning engagement required (20 hours per quarter) in addition to four lecture hours per week made a change to 5 units appropriate.**
Syllabus		File *CEE58SL_Climate_change_syll5_14_11.doc* was previously uploaded. You may view the file by clicking on the file name.
Supplemental Information		**None**
Effective Date	**Winter 2005**	**Fall 2011**
Department	**Civil & Environmental Engineering**	**Civil & Environmental Engineering**
Contact		Name **MAIDA BASSILI**

Routing Help	E-mail **maida@ea.ucla.edu**

ROUTING STATUS

Role:	Registrar's Office
Status:	Processing Completed

Role:	Registrar's Publications Office - Hennig, Leann Jean (lhennig@registrar.ucla.edu) - 56704
Status:	Added to SRS on 6/30/2011 3:55:09 PM
Changes:	TIE Code, Description
Comments:	Edited course description into official version.

Role:	Registrar's Scheduling Office - Bartholomew, Janet Gosser (jbartholomew@registrar.ucla.edu) - 51441
Status:	Added to SRS on 6/28/2011 10:16:38 AM
Changes:	TIE Code
Comments:	No Comments

Role:	FEC School Coordinator - Soh, Michael Young (N/A)
Status:	Returned for Additional Info on 6/20/2011 11:59:14 AM
Changes:	TIE Code, Justification
Comments:	Routing to Registrar's Office

Role:	Department/School Coordinator - O'byrne, Kathy (kobyrne@college.ucla.edu) - 57867
Status:	Approved on 6/14/2011 10:53:52 AM
Changes:	TIE Code
Comments:	In justification section, should read "20 hours per quarter" (instead of "20 hours per week").

Role:	Registrar's Office - Hennig, Leann Jean (lhennig@registrar.ucla.edu) - 56704
Status:	Returned for Additional Info on 5/26/2011 1:13:27 PM
Changes:	TIE Code
Comments:	Reroute back to Kathy O'Byrne for final approval.

Role:	Department/School Coordinator - Bassili, Maida L (maida@ea.ucla.edu) - 51851
Status:	Returned for Additional Info on 5/26/2011 12:54:53 PM
Changes:	TIE Code
Comments:	Hi Kathy, Forwarded is Professor Jay revised CEE 58SL CIMS proposal per your instructions. Please review and advise if all information requested is provided. Also, please advise us once it get approved.

Role:	HSSEAS Central Administrator - Reneau, Myrna L (mirna@ea.ucla.edu) - 52941
Status:	Returned for Additional Info on 5/26/2011 12:16:01 PM
Changes:	TIE Code
Comments:	Routing back to Maida

Role:	Department/School Coordinator - Bassili, Maida L (maida@ea.ucla.edu) - 51851
Status:	Returned for Additional Info on 5/20/2011 10:45:45 AM
Changes:	TIE Code
Comments:	Hi Myrna, Please find forwarded updated proposal for CEE 58SL from Professor Jenny Jay. Please proceed and once approved, please forward to Kathy O'byrne (kobyrne@college.ucla.edu)for final approval. Thank you

Role:	Department Chair or Designee - Chen, Jiun-Shyan (jschen@seas.ucla.edu) - 74620
Status:	Approved on 5/20/2011 10:38:01 AM
Changes:	TIE Code
Comments:	No Comments

Role:	UgC Curriculum Committee Co-chair or Designee - Stolzenbach, Keith D (stolzenb@seas.ucla.edu) - 67624
Status:	Approved on 5/20/2011 9:37:25 AM
Changes:	TIE Code
Comments:	Approved. Need to apply for GE status after it is approved.

Role:	Department/School Coordinator - Bassili, Maida L (maida@ea.ucla.edu) - 51851
Status:	Returned for Additional Info on 5/19/2011 3:11:48 PM
Changes:	TIE Code
Comments:	Hi Keith, Forwarded is updated proposal of CEE 58SL that Jenny forwarded along with the new uploaded syllabus. Please check and forward to Professor Chen. Thank you.

Role:	Department Faculty Member - Jay, Jennifer Ayla (jjay@seas.ucla.edu) - 75365
Status:	Approved on 5/19/2011 2:02:40 PM
Changes:	TIE Code
Comments:	I updated the syllabus in three ways: 1) I changes to a new environmental science text because I believe it to be superior. Assigned chapters have been updated; 2) the 20 hours contact time for the service learning component will all be with the elementary or middle school age students, rather than other organizations; and 3) the community partners are a middle school and a YMCA.

Role:	Department/School Coordinator - Bassili, Maida L (maida@ea.ucla.edu) - 51851
Status:	Returned for Additional Info on 3/2/2011 12:44:35 PM
Changes:	TIE Code
Comments:	Hi Jenny, It seems that there is a problem with the submission of CEE 58SL. Please see comments provided by the registrar's office.

Role:	FEC School Coordinator - Soh, Michael Young (N/A)
Status:	Returned for Additional Info on 3/2/2011 12:05:31 PM
Changes:	TIE Code
Comments:	Maida - please see comments from Kathy re: SL portion of course. Also, if course is requesting GE credit, proposal must be submitted to GE Governance Committee.

Role:	Department/School Coordinator - O'byrne, Kathy (kobyrne@college.ucla.edu) - 57867
Status:	Returned for Additional Info on 3/1/2011 10:56:51 AM
Changes:	TIE Code

Comments:	Have some basic questions about logistics of connecting students with sites, and the necessity of alternative work (e.g., Tree People). Would like to consult with the instructor. In course description, it states "outside instruction 9 hours", which doesn't mesh with the syllabus. Also says "one of two middle schools", but I believe the syllabus has a community partner that is an after school program.

Role:	Registrar's Office - Hennig, Leann Jean (lhennig@registrar.ucla.edu) - 56704
Status:	Returned for Additional Info on 2/17/2011 9:50:05 AM
Changes:	TIE Code
Comments:	Reroute to Kathy O'Bryne to review.

Role:	Registrar's Scheduling Office - Thomson, Douglas N (dthomson@registrar.ucla.edu) - 51441
Status:	Added to SRS on 2/2/2011 3:50:22 PM
Changes:	Short Title, TIE Code, Effective Date
Comments:	No Comments

Role:	HSSEAS Central Administrator - Reneau, Myrna L (mirna@ea.ucla.edu) - 52941
Status:	Approved on 1/20/2011 5:46:54 PM
Changes:	TIE Code
Comments:	Approved by the FEC Jan 20th 2011

Role:	Department/School Coordinator - Isom, Chauncey A (chauncey@ea.ucla.edu) - 62891
Status:	Approved on 1/19/2011 4:22:40 PM
Changes:	TIE Code, Justification, Syllabus
Comments:	Note: I copied Prof. Jay's explanation regarding the C&EE 58SL unit change from the comment field to the justification field for clarity.

Role:	HSSEAS Central Administrator - Reneau, Myrna L (mirna@ea.ucla.edu) - 52941
Status:	Approved on 1/14/2011 4:12:19 PM
Changes:	TIE Code
Comments:	Please review

Role:	Department/School Coordinator - Bassili, Maida L (maida@ea.ucla.edu) - 51851
Status:	Returned for Additional Info on 1/13/2011 12:02:15 PM
Changes:	TIE Code
Comments:	Hi Myrna, Totally forgot about forwarding this course to you before the holidays. Please include in the next FEC meeting for discussion. Thank you.

Role:	Department Chair or Designee - Chen, Jiun-Shyan (jschen@seas.ucla.edu) - 74620
Status:	Approved on 11/4/2010 6:32:27 PM
Changes:	TIE Code
Comments:	No Comments

Role:	Department Chair or Designee - Stolzenbach, Keith D (stolzenb@seas.ucla.edu) - 67624
Status:	Approved on 11/4/2010 9:28:14 AM
Changes:	TIE Code, Description
Comments:	Send a draft proposal to the GE office ASAP to get their feedback.

Role:	Department Faculty Member - Jay, Jennifer Ayla (jjay@seas.ucla.edu) - 75365
Status:	Approved on 10/29/2010 6:20:09 AM
Changes:	Units, Instructional Format, TIE Code, Description, Syllabus
Comments:	The significant amount of service learning engagement required (20 hours per week) in addition to four lecture hours per week made a change to 5 units appropriate.

Role:	Department/School Coordinator - Stolzenbach, Keith D (stolzenb@seas.ucla.edu) - 67624
Status:	Returned for Additional Info on 9/29/2010 3:45:36 PM
Changes:	TIE Code
Comments:	Jenny, I am sending this back to you as I know you are revising it.

Role:	Department Faculty Member - Jay, Jennifer Ayla (jjay@seas.ucla.edu) - 75365
Status:	Approved on 8/13/2010 2:43:43 PM
Changes:	TIE Code, Syllabus
Comments:	The syllabus has been updated, and the new one uploaded.

Role:	Department Faculty Member - Stolzenbach, Keith D (stolzenb@seas.ucla.edu) - 67624
Status:	Returned for Additional Info on 8/5/2010 11:00:09 AM
Changes:	TIE Code
Comments:	I am routing this back to Jenny so she can make the wording here compatible with the GE application wording.

Role:	Department Faculty Member - Jay, Jennifer Ayla (jjay@seas.ucla.edu) - 75365
Status:	Approved on 7/29/2010 9:07:36 PM
Changes:	Short Title, Instructional Format, TIE Code, GE, Description, Justification
Comments:	The new syllabus, description, and justification has been added.

Role:	Initiator/Submitter - Bassili, Maida L (maida@ea.ucla.edu) - 51851
Status:	Submitted on 7/22/2010 3:27:31 PM
Comments:	Initiated a Course Revision Proposal

Back to Course List

Comments or questions? Contact the Registrar's Office at
cims@registrar.ucla.edu or (310) 206-7045