Montgomery County Community College GEO 235 Sustainable Climate Communities 3-3-0

COURSE DESCRIPTION:

This course enables students to participate in building more sustainable communities in the face of changing climates. Students will analyze the science of climate change and research the forces creating the diversity of opinions, competing ethical systems and economic interests around this topic. This course includes service learning, climate modeling and secondary social science research.

REQUISITES:

Previous Course Requirements

- ENG 011 Basic Writing II or ESL 011 ESL Basic Writing II
- REA 011 Fundamentals of College Reading

Concurrent Course Requirements None

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
 Analyze the impacts of human society to better ensure sustainability. 	Assigned Readings AV/Multimedia Materials Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Service Learning Reflection Research Project on Forces Creating Diversity of Perspectives Library Research Class Ethics Application Essay Ethics Analysis Essay	Written Examination Student Presentations on Evidence of Historic or Prehistoric Climate Change Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Ethics Application Essay

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS		
2. Identify a climate	Assigned Readings	Written Examination		
change problem and its	AV/Multimedia Materials	Student Presentations on		
components.	Lecture/Discussion	Evidence of Historic or		
	Computer Modeling	Prehistoric Climate Change		
	Analyzing Anthropogenic	Computer Modeling		
	Climate Components	Analyzing Anthropogenic		
	Case Studies for Regional	Climate Components		
	& Scale Differences	Ethics Application Essay		
	Service Learning Reflection			
	Research Project on			
	Forces Creating Diversity			
	of Perspectives			
	Library Research Class			
	Ethics Application Essay			
3. Critically evaluate	Assigned Readings	Student Presentations on		
climate change	AV/Multimedia Materials	Evidence of Historic or		
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information from written,	Lecture/Discussion	Prehistoric Climate Change		
information from written, oral, graphic and mass	Lecture/Discussion Computer Modeling	Prehistoric Climate Change Computer Modeling		
information from written, oral, graphic and mass media communications.	Lecture/Discussion Computer Modeling Analyzing Anthropogenic	Prehistoric Climate Change Computer Modeling Analyzing Anthropogenic		
information from written, oral, graphic and mass media communications.	Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components	Prehistoric Climate Change Computer Modeling Analyzing Anthropogenic Climate Components		
information from written, oral, graphic and mass media communications.	Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional	Prehistoric Climate Change Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional		
information from written, oral, graphic and mass media communications.	Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences	Prehistoric Climate Change Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences		
information from written, oral, graphic and mass media communications.	Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Service Learning	Prehistoric Climate Change Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Ethics Analysis Essay		
information from written, oral, graphic and mass media communications.	Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Service Learning Reflection*	Prehistoric Climate Change Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Ethics Analysis Essay		
information from written, oral, graphic and mass media communications.	Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Service Learning Reflection* Research Project on	Prehistoric Climate Change Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Ethics Analysis Essay		
information from written, oral, graphic and mass media communications.	Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Service Learning Reflection* Research Project on Forces Creating Diversity	Prehistoric Climate Change Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Ethics Analysis Essay		
information from written, oral, graphic and mass media communications.	Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Service Learning Reflection* Research Project on Forces Creating Diversity of Perspectives	Prehistoric Climate Change Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Ethics Analysis Essay		
information from written, oral, graphic and mass media communications.	Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Service Learning Reflection* Research Project on Forces Creating Diversity of Perspectives Library Research Class	Prehistoric Climate Change Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Ethics Analysis Essay		

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS	
 Draw reasonable conclusions from identified climatological relationships. 	Assigned Readings AV/Multimedia Materials Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Service Learning Reflection Research Project on Forces Creating Diversity of Perspectives Library Research Class Ethics Analysis Essay Ethics Application Essay	Student Presentations on Evidence of Historic or Prehistoric Climate Change Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Ethics Application Essay	
5. Examine the ethical principles of differing attitudes towards climates.	Assigned Readings AV/Multimedia Materials Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Service Learning Reflection Research Project on Forces Creating Diversity of Perspectives Library Research Class Ethics Analysis Essay	Written Examination Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Service Learning Reflection Research Project on Forces Creating Diversity of Perspectives Ethics Analysis Essay	
 Apply an ethical framework to make informed decisions about climate change. 	Assigned Readings AV/Multimedia Materials Lecture/Discussion Case Studies for Regional & Scale Differences Service Learning Reflection Research Project on Forces Creating Diversity of Perspectives Library Research Class Ethics Application Essay	Case Studies for Regional & Scale Differences Service Learning Reflection Research Project on Forces Creating Diversity of Perspectives Ethics Application Essay	

LE	ARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS		
7.	Determine the optimal	Assigned Readings	Case Studies for Regional		
	resolution to a climate	AV/Multimedia Materials	& Scale Differences		
	change mitigation or	Lecture/Discussion	Service Learning Reflection		
	adaptation problem.	Case Studies for Regional	Research Project on		
		& Scale Differences	Forces Creating Diversity		
		Service Learning Reflection	of Perspectives		
		Research Project on	Ethics Application Essay		
		Forces Creating Diversity			
		of Perspectives			
		Library Research Class			
		Ethics Application Essay			
8.	Demonstrate personal	Assigned Readings	Student Presentations on		
	engagement in civic life	Lecture/Discussion	Evidence of Historic or		
	through working with	Computer Modeling	Prehistoric Climate Change		
	others to achieve a	Analyzing Anthropogenic	Service Learning Reflection		
	common sustainability	Climate Components	Case Studies for Regional		
	goal.	Case Studies for Regional	& Scale Differences		
		& Scale Differences			
		Service Learning Reflection			
		Ethics Application Essay			
9.	Research diverse	Assigned Readings	Research Project on		
	cultural and social	AV/Multimedia Materials	Forces Creating Diversity		
	perspectives of climate	Lecture/Discussion	of Perspectives		
	and climate change.	Case Studies for Regional	Case Studies for Regional		
		& Scale Differences	& Scale Differences		
		Library Research Class			
		Research Project on			
		Forces Creating Diversity			
		of Perspectives			
10	. Synthesize information	Assigned Readings	Research Project on		
	into a coherent	AV/Multimedia Materials	Forces Creating Diversity		
	argument explaining the	Lecture/Discussion	of Perspectives		
	individual, social,	Computer Modeling			
	economic, and global	Analyzing Anthropogenic			
	forces that shape the	Climate Components			
	complexity of diverse	Case Studies for Regional			
	human attitudes	& Scale Differences			
	towards climate change.	Service Learning Reflection			
		Research Project on			
		Forces Creating Diversity			
		of Perspectives			
		Library Research Class			
		Ethics Application Essay			

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
11. Determine the nature and extent of the required information and formulate an effective and efficient search strategy to retrieve it.	Assigned Readings AV/Multimedia Materials Lecture/Discussion Computer Modeling Analyzing Anthropogenic Climate Components Case Studies for Regional & Scale Differences Service Learning Reflection Research Project on Forces Creating Diversity of Perspectives Library Research Class Ethics Application Essay	Student Presentations on Evidence of Historic or Prehistoric Climate Change Research Project on Forces Creating Diversity of Perspectives
12. Use information ethically and legally, employing the appropriate format and documentation to acknowledge sources.	Assigned Readings AV/Multimedia Materials Lecture/Discussion Case Studies for Regional & Scale Differences Research Project on Forces Creating Diversity of Perspectives Library Research Class Ethics Analysis Essay Ethics Application Essay	Student Presentations on Evidence of Historic or Prehistoric Climate Change Research Project on Forces Creating Diversity of Perspectives Ethics Analysis Essay Ethics Application Essay

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that 70% of students will meet or exceed outcome criteria.

SEQUENCE OF TOPICS:

- 1. Preliminary Work
 - a. Course Introduction
 - 1) personal introductions
 - 2) course topics
 - 3) defining sustainability
 - 4) course format
 - 5) course materials
 - b. Service Learning Orientation
 - 1) purpose of service learning
 - 2) service learning reflection
 - 3) service learning partners
 - c. Cultural Diversity
 - 1) diversity of opinions, attitudes & emotions

- 2) regional/scale differences
- 3) age/generation/period differences
- 4) benefits of diversity
- 5) benefits of consensus
- d. Library Research Techniques
 - 1) introduction to the library
 - 2) ethical use restrictions
- 2. Science of Climate Change
 - a. Introduction to Science
 - 1) Scientific Method
 - 2) purpose of Science
 - 3) limits of Science
 - b. Recent Climate Change History
 - 1) temperature records
 - 2) sea level (tidal) records
 - 3) glacial & sea ice cover
 - 4) Hubbard Brook & Mohonk Mountain House observations
 - c. Prehistoric Climate Change Evidence
 - 1) tree rings
 - 2) pollen & lake bed sediments
 - 3) ice cores
 - 4) Milankovich cycles
 - d. Anthropogenic Effects
 - 1) climate modeling
 - 2) analyzing components of anthropogenic change
 - 3) synthesizing effects of anthropogenic change
- 3. Culture and Climate Change
 - a. Environmental Ethics & Core Values
 - 1) environmental ethical systems
 - 2) identifying core values
 - 3) applying ethical systems in new situations
 - b. Economic Interests
 - 1) sustaining communities
 - 2) vested interests
 - 3) transition costs
 - 4) cost/benefit analysis
 - c. Political Processes
 - 1) regional planning
 - 2) US environmental policies
 - 3) Inter-Governmental Panel on Climate Change
 - d. Climate Change Risks
 - 1) exposure to hazards
 - 2) access to emergency resources
 - 3) cultural adaptability
 - e. Climate Change Adaptations
 - 1) case studies of regional & scale differences

- 2) benefits
- 3) debates
- f. Climate Change Mitigation
 - 1) carbon reduction
 - 2) carbon sequestration
 - 3) geo-engineering

LEARNING MATERIALS:

Students may participate in a Field Trip to a sustainable community.

Climate Analysis Indicators Tool (CAIT) @ http://cait.wri.org/cait.php.

Columbia University Earth Institute & NASA Goddard Institute for Space Studies (2003-2010) Educational Global Climate Model (EdGCM).

Columbia University Center for International Earth Science Information Network & NASA Socioeconomic Data and Applications Center (n.d.) TerraViva! SEDAC Viewer GIS @ http://sedac.ciesin.columbia.edu/terraVivaUserWeb.

NASA Goddard Institute for Space Studies annual surface temperature GIS @ <u>http://data.giss.nasa.gov/gistemp</u>.

Pennsylvania DEP/Penn State Environment & Natural Resources Institute "Pennsylvania Climate Change Impact Assessment" (2009) @ <u>http://www.depweb.state.pa.us/portal/server.pt/community/climate_change_advisory_committee/10412</u>.

Schneider et al. (2010). Climate Change Science & Policy. Island Press.

UN Inter-governmental Panel on Climate Change (2007). *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Cambridge University Press.

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

COURSE APPROVAL:			
Date:	10/13/2010		
Date:	3/22/2011		
Date: Date:	6/25/2012 4/18/2013		
Date:	7/22/2013		
Date: Date:	11/26/2017 12/4/2017		
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This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.