Appendix A – Advising Sheet

The Ohio State University
College of Arts and Sciences

Climate Change Fundamentals Certificate, Type 1a, 1b; Type 2

Advising Contact:
Karen Royce, Undergraduate Advisor for Earth Sciences, royce.6@osu.edu, (614)292-6961; Ryan Godfrey, Undergraduate Advisor for Geography, godfrey.117@osu.edu, (614)292-7788

Faculty Contact:
Bryan Mark, Dept of Geography; mark.9@osu.edu; and Matthew Saltzman, Sch of Earth Sciences; saltzman.11@osu.edu

The Climate Change Fundamentals (CCF) certificate is an interdisciplinary certificate to provide a comprehensive understanding of the physical and social science of climate change for 21st century citizens. Upon completion of the academic certificate in Climate Change Fundamentals, learners will be better prepared to explain the causes and consequences of climate change to diverse audiences.

The CCF certificate requires a minimum of 12 credits drawn from diverse departments and distributed as follows (*****indicates that a course is listed as offered on regional campuses):

Take one of the following introductory courses:

EARTHSC/EEOB/HIST 2911: Climate Change: Mechanisms, Impacts, and Mitigation (4)

GEOG 3900: Global Climate Change: Causes and Consequences (3)

GEOG 3901H: Global Climate and Environmental Change (3)

Students will take one course in Human Dimensions from the following list:

ENR 4450: Climate Change Policy (3)
ENR 3400: Psychology of Environmental Problems (3) Prereq: ENR 2300 or PSYCH 1100.
GEOG or ENGLISH 3597.03: Environmental Citizenship (3)

AEDE 4320: Energy, the Environment, and the Economy (3) Prereq: AEDECON 4310
CRPLAN 3550: Environmental Planning and Policy for a Sustainable Future (3) Prereq: CRPLAN 2110

Students will take one course in Climate System Science from the following list:

ENVENG 4218: Measurement and Modeling of Climate Change (3) Prereq: CIVILENG 2060, or permission of instructor
ATMOSSOC 5901: Climate System Modeling: Basics and Applications (3) Prereq: A grade of C- or above in ATMOSSC 2940 or GEOG 5900, or permission of instructor
GEOG 5900: Weather, Climate and Global Warming (3)
EARTHSC/GEOG 4911: Earth's Climate: Past and Future (3)
ENR/EARTHSC 5268: Soils and Climate Change (3)
PUBHEHS 4325: Climate Change and Human Health (online) (3)

Students will successfully complete a Capstone experience and present it to the Steering Committee for approval and assessment. This can be completed within an existing Capstone course from the following list:
ENR 4900.01: Environment and Natural Resources Management (3)
ENR/AEDECON 4567: Assessing Sustainability: Project Experience (3)
PUBAFRS 5620: Rapid Innovation for Public Impact (4)
ENVENG 4090: Environmental Engineering Capstone Design (3)
EARTHSC/GEOG 5194: Group Studies** (3)

**Renumbered cross-listed Climate Change Capstone in development

CCF Certificate Program Guidelines

Credit hours required: A minimum of 12.

Overlap with degree program: A student is permitted to overlap up to 50% of credit hours between other degree program (major, minor, other certificate, or general education) and the certificate program.

Grades required
• Minimum C- for a course to be counted on the certificate
• Minimum 2.00 cumulative GPA for all certificate course work.

Certificate approval: The certificate may be approved by the student's assigned academic advisor via the Degree Audit Report (DAR). If the certificate is not complete on the DAR, the student must consult with a College of Arts and Sciences advisor.

Consult with advisor for filing deadlines.

Appendix B: Certificate Completion Sheet

College of Arts and Sciences
Climate Change Fundamentals (CCF)
Certificate Program

Student Name: _____

Student OSU Email: _____

Certificate Advisor Name: _____

Required Core Courses (3 or 4 credits):

Course (Hours)	Course Grade	Term Completed
Pick one of the following: EARTHSC/EEOB/HIST 2911: Climate Change: Mechanisms, Impacts, and Mitigation (4) GEOG 3900: Global Climate Change: Causes and Consequences (3) GEOG 3901H: Global Climate and Environmental Change (3)		

One course from 3 of the following categories, selected from the Climate Change Fundamentals (CCF) Certificate Advising Sheet (9-10 credits). Fill in the name of the course selected in the table provided below:

Course (Hours)	Course Grade	Term Completed
Climate System Science course (3 credits): _____		
Human Natural Systems course (3 credits):_____		
Capstone Experience (3-4 credits): _____		

Total credits (12-14): _____

Certificate Advisor Signature: _____

Date: _____

Appendix C: Semester-by-semester sample program

Plan to complete in two years

Year 1:
Autumn: Either EARTHSC/EEOB/HIST 2911: Climate Change: Mechanisms, Impacts, and Mitigation (Autumn, offered annually) or GEOG 3900: Global Climate Change: Causes and Consequences (Autumn or Spring, offered every semester) or GEOG 3901H: Global Climate and Environmental Change
Spring: Elective – Human Dimensions or Climate System Science

Year 2:
Autumn Elective – Human Dimensions or Climate System Science
Spring: Capstone Experience

Appendix D: Course List

This alphabetized list indicates the many options students have for completing the CCF certificate. Listings for each course include (1) department, (2) course title, (3) credit hours, (4) brief description, (5) prerequisites, (6) whether the course is new, (7) which part of the certificate requirements the course satisfies, and (8) whether the course is offered on regional campuses.

~

AEDECON 4320: Energy, the Environment, and the Economy (3 credits). Introduces students to core economic concepts related to energy and the environment. Prereq: AEDECON 4310. New: no. Satisfies: human dimensions class. RC: no.

ATMOSSC 5901: Climate System Modeling: Basics and Applications (3 credits). An examination of climate system modeling, including their component atmospheric, oceanic, sea ice and land surface models, and their coupling, and their applications. Prereq: A grade of C- or above in ATMOSSC 2940 or GEOG 5900, or permission of instructor. New: no. Satisfies: climate system science class. RC: no.

CRPLAN 3550: Environmental Planning and Policy for a Sustainable Future (3 credits). This course has been designed to incorporate environmental considerations into land use planning and policy making. Upon completion of this course students should be able to analyze environmentally related planning problems not requiring in-depth environmental expertise and recognize when such expertise is necessary. Prereq: CRPLAN 2110. New: no. Satisfies: human dimensions class. RC: no.

EARTHSC/EEOB/HIST 2911: Climate Change: Mechanisms, Impacts, and Mitigation (4 credits). Examination of the basic science of climate change, of the ability to make accurate predictions of future climate, and of the implications for global sustainability by combining perspectives from the physical sciences, the biological sciences, and historical study. Team-taught with faculty members in EEOB and History. Prereq: none. New: no. Satisfies: introductory class. RC: no.

EARTHSC/GEOG 4911: Earth's Climate: Past and Future (3 credits). Examination of Earth's climate and its natural development as understood from the geologic record spanning the full history of the planet, as well as how the future climate is likely to evolve under ongoing human modifications. Prereq: Either EARTHSCI/EEOB/HIST 1911 or GEOG 3900. New: yes. Satisfies: climate system science class. RC: no.

EARTHSC/GEOG 5194: Group Studies (3 credits). Capstone projects involving group problem solving and communication of results to diverse audiences related to climate change topics.

Prereq: permission of instructors. New: no. Satisfies: capstone experience with approved project. RC: yes.

ENVENG 4090 Environmental Engineering Capstone Design (3 credits). Culminating design course for the Environmental Engineering program. Must be taken as close to graduation as possible. Prereq: Sr standing. Not open to students with credit for 619. New: no. Satisfies capstone experience with approved project. RC: no.

ENVENG 4218: Measurement and Modeling of Climate Change (3 credits). A study of the atmospheric boundary layer, its interaction with the land surface and vegetation in particular, and hand-on experience with micrometeorological and eddy-covariance instrumentation and data analysis. Prereq: CIVILENG 2060, or permission of instructor. New: no. Satisfies: climate system science class. RC: no.

ENR/EARTHSC 5268 Soils and Climate Change (3 credits). Soil processes, abrupt climate change, trace gases and their properties, global C cycle, gaseous emissions, C-neutral fuels, carbon sequestration, Kyoto Treaty, trading of C credits. Prereq: none. New: no. Satisfies: climate system science class. RC: no.

ENR 3400: Psychology of Environmental Problems (3 credits). The theory and psychology behind individual and group behavior as it relates to environmental problems. Prereq: ENR 2300 or PSYCH 1100. New: no. Satisfies: human dimensions class. RC: no.

ENR 4450: Climate Change Policy (3 credits). Climate change adaptation and mitigation policy instruments and governance processes; theoretical frameworks for analysis of climate change governance. Prereq: none. New: no. Satisfies: human dimensions class. RC: no.

ENR/AEDECON 4567: Assessing Sustainability: Project Experience (3 credits). Students gain experience in sustainability assessment by applying concepts and quantitative methods to evaluate environmental, economic, social, & technical sustainability of specific projects. Prereq: ENR 2500 or AEDECON 2500, and Sr standing; or permission of instructor. Not open to students with credit for AEDEcon 4567. New: no. Satisfies: capstone experience with approved project. RC: no.

ENR 4900.01 Environment and Natural Resources Management (3 credits). Integration of technical knowledge with social and institutional constraints as they relate to professions in ENR management. Prereq: Sr standing in ENR. New: no. Satisfies: capstone experience with approved project. RC: no.

GEOG 3900: Global Climate Change: Causes and Consequences (3 credits). Examines the natural and human factors that force changes in our climate and environment and explores strategies for a sustainable environment in the future. Prereq: none. New: no. Satisfies: climate system science class. RC: no.

GEOG 3901H: Global Climate and Environmental Change (3 credits). Examines both natural and social factors that force changes in our climate and environment and explores strategies for a sustainable environment in the future. Prereq: Honors standing, or permission of instructor. Not open to students with credit for 3900. New: no. Satisfies: climate system science class. RC: no.

GEOG/ENGLISH 3597.03: Environmental Citizenship Change (3 credits). Provides tools for environmental citizenship by teaching interdisciplinary perspectives on biophysical and sociocultural forces that shape environments. Addresses general processes through local case studies. Prereq: none. New: no. Satisfies: human dimensions class. RC: no.

GEOG 5900: Weather, Climate and Global Warming (3 credits). An introduction to the fundamental physical and mathematical principles governing both day-to-day weather and the average of weather, or climate. Objectives are to understand the physical processes of the earth-atmosphere system, describe its weather features and climate characteristics today, and outline how they might change in the future as a result of global warming. Prereq: Not open to students with credit for ATMOSSC 2940. New: no. Satisfies: climate system science class. RC: no.

PUBAFRS 5620 Rapid Innovation for Public Impact (4 credits). The Rapid Innovation for Public Impact course is like a multi-disciplinary capstone or hands-on applications course in which student teams tackle real, contemporary, complex problems sponsored by government or non-profit agencies. Following Lean Innovation methodology, student teams develop minimum viable products (MVP) or prototype-solutions through intensive customer discovery and agile design. Prereq: none. New: no. Satisfies: capstone experience with approved project. RC: no.

PUBHEHS 4325: Climate Change and Human Health (3 credits). Recognize current controversies about climate change, summarize the evidence about climate change on human health, and identify major human diseases associated with climate change. Prereq: none. New: no. Satisfies: climate system science class. RC: no.

Take one of the following introductory courses (3 or 4 credits)

- EARTHSC/EEOB/HIST 2911*: **Climate Change**: Mechanisms, Impacts, and Mitigation
- GEOG 3900: **Global Climate Change**: Causes and Consequences
- GEOG 3901H: Global Climate and Environmental Change

*pending approval to change course number from 1911 to 2911

Students will take one course in Human Natural Systems from the following list:

- A 3000+ level course addresses dimensions of human behavior and decision making as it relates to natural systems and climate change. 3 credits. Select **one** of the following courses:

    - ENR 4450: **Climate Change** Policy
    - ENR 3400: Psychology of Environmental Problems
    - GEOG 3597.03: Environmental Citizenship (or English 3597.03)
    - AEDE 4320: Energy, the Environment, and the Economy
    - CRPLAN 3550: Environmental Planning and Policy for a Sustainable Future

Students will take one course in Climate System Science from the following list:

- A 3000+ level course that explores dimensions of Earth's climate system and human impacts, and/or methods of climate science (measurement, data analysis). 3 credits. Select **one** of the following courses:
    - ENVENG 4218: Measurement and **Modeling of Climate Change**
    - ATMOSSOC 5901: **Climate System Modeling**: Basics and Applications
    - GEOG 5900: Weather, **Climate and Global Warming**
    - EARTHSC/GEOG 4911*: Earth's **Climate: Past and Future**
    - ENR/EARTHSC 5268: Soils and **Climate Change**
    - PUBHEHS 4325: **Climate Change** and Human Health (online)

*Course proposal under review (submitted April 1, 2022)

Students will successfully complete a 3-4 credit Capstone experience involving group problem solving and communication of results to diverse audiences related to climate change topics as approved by the Steering Committee. This can be completed within an existing Capstone course from the following list (or Group Studies in Earth Sciences and Geography): (3 or 4 credits)

- ENR 4900.01 Environment and Natural Resources Management Capstone (3)
- ENR/AEDECON 4567: Assessing Sustainability: Project Experience (3)
- PUBAFR 5620: Rapid Innovation for Public Impact (4)
- ENVENG 4090: Environmental Engineering Capstone Design (3)
- EARTHSC/GEOG 5194: Group Studies* (3)

*We are in the process of creating a new EARTHSC/GEOG Climate Change Capstone course (TBD)