

**Section 1. Proposed Course Outline** (A general statement of course content that informs class syllabus construction. Once approved, all sections of a given course must include this content, no matter which instructor teaches the course, or the mode of delivery. Divisions must include this new course outline in the Divisional Course Outline binder as required by COPPs.)

Course Number: **ENSC 182** Full Course Title for print catalog: **Atmospheric Environment and Climate Change**

Abbreviated Course Title for Banner: **Atmos Envir & Climate Change** (30 character limit)

Prerequisites: none

Co-requisites: none

Grade Option: [x]  Graded (with P/NP option)  [ ]  Pass/No Pass only

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| --- | --- | --- | --- |
| **Number/Type Credits** | **Term Minimum Contact** | **Term Maximum Contact** | **11-Week Term Contact** |
| 2 Lecture | 20 hours (lecture credits x 10) | 24 hours (lecture credits x 12) | 22 hours (lecture credits x 11) |
| 2 Lec/Lab | 40 hours (lec-lab credits x 20) | 48 hours (lec-lab credits x 24) | 44 hours (lec-lab credits x 22) |
|  Lab |    hours (lab credits x 30) |    hours (lab credits x 36) |    hours (lab credits x 33) |
| 4 **Total credits (sum)** | 60 **Total hours (sum)** | 72 **Total hours (sum)** | 66 **Total hours (sum)** |

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| **Course Description (300 character limit):** changes highlighted |
| Causes, consequences, geologic history and science of climate change and atmosphere. Topics and labs include weather, sun-Earth cycles, air pollution, ozone layer, greenhouse effect, ocean/atmosphere/ice systems, climate models and data, predictions, feedbacks, tipping points, carbon sequestration, energy options. Advise G102, or GEOG141 first. |
| **Course Outcomes and Proficiencies** | **Assessments Planned** |
| What will the student ***know*** or ***be able to do*** at the end of the course?What ***attitudes*** related to the subject will the student hold? | What evidence will demonstrate that students have achieved course outcomes? (assessment tools may include departmental tests, written products, portfolios, juried performances, quizzes and exams, or alternative assessments such as qualitative studies, capstone projects, external reviewers, etc.) |
| **Upon successful completion of this course, the student will:** | **How each outcome will be assessed:** |
| Evaluate and perform scientific procedures and methods. Make detailed observations, gathering and assessing information, formulating hypotheses, and thinking creatively about weather, atmospheric chemistry and climate variables and climate changes over time. | Laboratory activities and experiments, write-ups of experiments, homework, journal or portfolio entries, Website problem sets, quizzes, exams, poster presentations, written and/or oral reports. |
| Interpret and compare some basic characteristics of the atmosphere and processes that influence weather and climate.  | Lab activities, homework, exams, write-ups of experiments, quizzes, written and/or oral reports |
| Conduct experiments and make measurements of atmospheric variables such as temperature, pressure, relative humidity and calculate or estimate other atmospheric variables from these. | Collaborative laboratory activities and experiments, homework, simulation software, spreadsheet calculations, Website problem sets, write ups of experiments, quizzes, exams, poster presentations, written and/or oral reports. |
| Summarize weather hazards and compare their effects on advantaged and disadvantaged human populations. | Case studies, student research, discussion, debate, simulation software, spreadsheet calculations, quizzes, and/or exams |
| Describe the natural and “enhanced” greenhouse effect and its causes. | Class discussions, laboratory activities and experiments, homework, quizzes, exams. |
| Predict potential consequences of global warming to ecologic, hydrologic, marine, meteorological, and human systems. | Class discussions, journal or portfolio entries, Website problem sets, quizzes, exams, poster presentations, written and/or oral reports. |
| Analyze the complexity of the Earth’s climate system including the carbon cycle and explain many of its feedbacks and the possibility of tipping points. | Class discussions, laboratory activities and experiments, homework, Website problem sets, simulation software, spreadsheet calculations, quizzes, exams, poster presentations, written and/or oral reports. |
| Describe and analyze the varied evidence for past climate change and assess the reliability and range of error of these data. | Class discussions, laboratory activities and experiments, homework, portfolio entries, Website problem sets, simulation software, spreadsheet calculations, quizzes, exams, presentations and/or reports. |
| Evaluate her or his contribution to climate change and personal role in mitigating that contribution. | Class discussions, journal entries, Website problem sets, analysis of day-to-day activities, quizzes, exams, presentations and/or reports. |
| Apply analysis of methods of climate stabilization wedges, carbon sequestration and carbon accounting to assess the potential for easing the collective effect of humans on the climate. | Class discussions, laboratory activities and experiments, homework, journal or portfolio entries, Website problem sets, write ups of experiments, quizzes, exams, poster presentations, written and/or oral reports. |
| Explain the chemistry of the ozone layer and its depletion and analyze the possible consequences of increasing ozone-destroying gases in the atmosphere. | Class discussions, laboratory activities and experiments, homework, journal or portfolio entries, Website problem sets, write ups of experiments, quizzes, exams, poster presentations, written and/or oral reports. |
| Distinguish the greenhouse effect and ozone depletion from each other, and elucidate their commonalities. | In-class research and collaborative activities, quizzes, exams, lab activities |

**Course Content by Major Topics**What topics will be presented? What are the main activities of the course? What are the central themes?

(See sample at <http://www.lanecc.edu/copps>

**Topics:**

***Introduction*** Scientific methods, human footprint

***Sun-Earth Energy Systems*** Composition of the atmosphere, introduction to energy, spectra, natural and “enhanced” greenhouse effect, greenhouse gases, Earth’s energy budget, radiative forcing

***Carbon Cycle and Resources*** Intro. to energy, energy demand and supply, fossil fuels, alternative energy, energy strategy, conservation, wind and sun energy resources, carbon management, and sequestration

***Weather Systems*** Weather, humidity, temperature, pressure, clouds and precipitation, cloud identification, dynamics of wind, fronts, storms, tornadoes, hurricanes

***Air Pollution*** Air pollution chemistry; criteria air pollutants; indoor air quality, air toxics science and policy, air pollution hazards, chemistry and biological effects of ozone depletion

***Climate History*** Life-climate-energy, 4+ billion years of climate history, fossil fuel origins; Tertiary climate history,Quaternary climate and glaciations, Milankovitch cycles, past sudden climate change; climate data: ice cores, marine sediments, isotopes, climate proxy data, satellite data, thermometer data, urban heat islands

***Climate System, and Modeling Climate*** Atmosphere circulation, wind energy, clouds, albedo, ocean circulation, thermohaline circulation, El Niño, La Niña, feedbacks, tipping points, Intergovernmental Panel on Climate Change (IPCC), climate models, emission scenarios, and chaotic climate

***Current and Future Climate Change Effects*** 20th, 21st Century and future warming, regional patterns, climate extremes, long-term change; effects on organisms, ice, sea level rise, effects on food, water, health, populations

***Action Strategy and Politics*** Community and attitude redesign, carbon stabilization and offsets, biological solutions, other greenhouse gas reductions, new technologies and environmental engineering, climate and air pollution laws and treaties/agreements, carbon economics, economic and other benefits of mitigation, no regrets strategy, environmental stewardship, recent ideas, adapting to climate change

**Section 2. Proposal Information**

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| --- | --- | --- |
| **Course Developer:** | **Type of Proposal** | **Type of Course:**  |
| Claudia Owen | [ ]  New course | [x]  Lower Division Collegiate (transfer)  |
| Date: 1/19/2016 |  [ ]  Currently 199 or 299  | [ ]  Professional/Technical (required or elective)  |
| Catalog year to take effect:  | [ ]  Experimental Course | [ ]  Developmental, numbered below 100 |
| 2015-2016\_\_\_  |  [ ]  199 Experimental Course |  |
| 2016-2017\_x\_\_  |  [ ]  299 Experimental Course |  |
|  | [x]  Revised course (If increasing credits, use credit change form) |
|  | [ ]  Reactivated course with no change |
|  | [ ]  Reactivated course with changes  |

**Rationale:**

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| --- |
| How does this proposal further the goals of the program or department?  |
| Reason for changing course number to ENSC 182. The ENVS prefix is used for Environmental Studies programs in Oregon and is therefore confusing since this course is an Environmental Science course. The ENVS 182 course will be discontinued and it would be nice for the 3 environmental science courses to be in sequence. The suggested changes in content are less than 30%, probably around 25%. We are also changing instructional format to lecture-lab rather than separate lectures and labs. |
| What assessment evidence supports this proposal?  |
| Some students are transferring to the University of Oregon or Oregon State University and not receiving environmental science credit for this course because of a misunderstanding of what ENVS means. |
| How do you know there is a demand for this course?  |
| This course has been offered many times and is usually full. |

**Section 3. Curriculum Equity** [**http://www.lanecc.edu/copps**](http://www.lanecc.edu/copps)

**To promote an environment where all learners are encouraged to develop their full potential, this course will support Lane’s Curriculum Equity policy in the following way(s):**

* This course includes culturally and ethnically diverse energy use practices and comparison of their carbon footprint.
* It discusses environmental justice, especially in areas where air pollution, climate change and environmental degradation burden underprivileged peoples and individuals more out of proportion to privileged groups. It examines north versus south responsibility for and sensitivity to climate change.
* It portrays the contributions of women and men from diverse cultural and ethnic backgrounds to the field of environmental science and in working toward reducing air pollution and achieving climate sustainability.
* It illustrates the valuable role of women in improving environmental conditions when they have seized or were given the opportunity.
* It uses gendered examples equally when illustrating theories and concepts.
* It emphasizes the idea that everyone needs clean air and a survivable climate and the atmosphere must be preserved for everyone regardless of race, gender, age, religion, disability, national origin, marital status, or class background, including those people who do not exist yet--to and beyond the 7th generation and that environmental degradation affects us all now and into the future.

**Section 4. For revised courses only: PREVIOUS Catalog/Course Information:**

Course Number: **ENVS 184** Course Title in Banner: **Global Climate Change** (30 characters maximum)

Full Course Title in print catalog: Global Climate Change

Prerequisites: none

Co-requisites: none

Grade Option: [x]  Graded (with P/NP option) [ ]  Pass/No Pass only

|  |  |  |  |
| --- | --- | --- | --- |
| **Number/Type Credits** | **Term Minimum Contact** | **Term Maximum Contact** | **11-Week Term Contact** |
| 3 Lecture | 30 hours (lecture credits x 10) | 36 hours (lecture credits x 12) | 33 hours (lecture credits x 11) |
|    Lec/Lab |    hours (lec-lab credits x 20) |    hours (lec-lab credits x 24) |    hours (lec-lab credits x 22) |
| 1 Lab | 30 hours (lab credits x 30) | 36 hours (lab credits x 36) | 33 hours (lab credits x 33) |
| 4 **Total credits (sum)** | 60 **Total hours (sum)** | 72 **Total hours (sum)** | 66 **Total hours (sum)** |

**Course Description:** (new proposed with highlighted changes from the old version ENVS 181)

Causes, consequences, geologic history and science of climate change. Topics include sun-Earth cycles, greenhouse effect, ocean/atmosphere/ice systems, climate models and data, predictions, feedbacks, tipping points, carbon sequestration, energy options. Advise ENVS 182, G 102, or GEOG 141 first.

What will change? [x] Course Number [x] Title [ ] Course Description [ ] Credit hours [ ] Contact hours

**Section 5. Support Courses (New Professional/Technical course proposals must complete.)**

Professional/Technical courses are tracked within programs for purposes of Carl Perkins funding and budgetary planning. Indicate all degree or certificate programs for which this course will be required.

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| --- | --- |
| Program | Division |
|       |       |
|       |       |

**Section 6. Overlap Courses (New course proposals must complete.)**

While overlap of course materials is not necessarily a flaw, duplication of course materials may lead to inefficient use of college resources. If there is overlap, the faculty of overlapping courses must agree on the extent of overlap and attach a rationale explaining its necessity if it is more then 10%.

Indicate all departments/courses that this course may overlap. Division Dean of existing course enters one of two options at right. Note: N/A is not an option.

Options:

1. No overlap.

2. Approved: overlap is acceptable. Rationale attached.

3. Disapproved: reasons attached.

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| Division | Course Number / Title | % Overlap | Option | Division Dean of existing course(Signature required for all options) | Date |
|       |       |       |       |  |       |
|       |       |       |       |  |       |

**Section 7. Qualification to fulfill degree requirements** (complete all relevant forms, available at <http://www.lanecc.edu/currsched/curriculum-forms> and send to Curriculum/Scheduling for the Degree Requirements Review Committee):

[ ]  Form(s) applying for the following degree requirement status have been attached. (Only check this box when forms have been completed and attached.)

**This course already has the following designations:**

**AAOT, ASOT-Bus, OTM:**

[ ]  Arts & Letters

[ ]  Social Sciences

[x]  Science /Computer Science

[ ]  Mathematics

[ ]  Cultural Literacy Option

(please submit with course syllabus to Michael Samano in Social Science)

**All degrees:**

[ ]  Health/Wellness/Fitness

**AAS, 1-year and 2-year certificates:**

[ ]  Human Relations

**Optional designation:**

[x]  Sustainability status

**Section 8. Library Impact Statement**

Under accreditation standards, Library consultation is essential for new programs, new courses and for substantively revised courses when the revisions entail any change in library use.

**What assignments will require the use of library and information resources?**

No additional resources are needed for this class.

Each academic area has a Liaison Librarian <http://www.lanecc.edu/library/services/liaison.htm>. Contact the designated librarian to discuss the library needs of your course. Please allow the librarian at least one week to assess library resources.

**To be completed by Liaison Librarian:**

[ ]  Library resources are adequate to support this proposal.

[ ]  Additional resources are needed but can be obtained from current funds.

[ ]  Significant additional Library funds/resources are required to support this proposal.

 Liaison Librarian Date

**Section 9. Divisional Approval** (To be completed by Division Chair and Administrative Assistant)

**Human, Physical, and Financial Resources:**

[ ]  Additional instructional costs (staff, materials, services or facilities) will be incurred to offer this course. Source of funding:

[x]  No additional instructional resources (staff, materials, services or facilities) are needed to offer this course.
Explain:

**Required Certifications:**

[x]  We have developed minimum course certification standards according to the COPPs procedure “Instructor Qualifications: Credit,” to be filed with ASA upon course approval.

[x]  We have completed faculty certification form(s) for faculty qualified to teach this course, to be filed with ASA and Human Resources upon course approval.

Administrative Assistant/Coordinator Date

**Fees:**

[x]  We have completed fee rationale and fee request forms to be submitted to ASA upon course approval, in compliance with the COPPs procedure, “Fees: Special”

[ ]  No special fees will be required for this course.

**Divisional Recommendation:**

[x]  The Academic Dean and Administrative Assistant have reviewed this course proposal and kept a copy for divisional files.

[x]  Faculty review of this course was completed within the division on 1/14/2016(date).

[x]  Pass [ ]  Do Not Pass

 02/08/2016

Academic Dean Date

**Section 10. College Approval**

Curriculum Committee Chair Date Executive Dean for Academic Affairs Date

Curriculum Approval Committee hearing:       \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Date Vice President for Academic & Date

 Student Affairs