1. ACTION DESIRED (CHECK ONE):	Trial Course	x	New Course	

literacy in the rapidly developing field of climate-change science. Students will gain a thorough understanding of Earth climate dynamics and change through the study of both climate history and modern climate processes. Students will be trained to critically evaluate both the validity of paleoclimatic reconstructions and climate model predictions. This is the first semester of a two-semester series of classes entitled ”Climate Change Literacy”. Prerequisites: Graduate standing, or permission of instructor. (4+0)

11. COURSE CLASSIFICATIONS:

This course expands offerings for students in the natural / social sciences at both the graduate and undergraduate level. Since it has already been offered under a different title, and taken as an elective by other majors, no new impact is expected. By cross listing this class in multiple departments, students can take it under their own departmental designator. *NOTE: This is the first phase of a planned 2 semester, integrated Climate Change course series and we are currently investigating use of a different type of course designator such a " INTG Integrated Studies".*

21. POSITIVE AND NEGATIVE IMPACTS

*Please specify **positive and negative** impacts on other courses, programs and departments resulting from the proposed action.*

It is expected that any impacts on programs and departments will be positive. The goal of creating an integrated course is to improve inter-departmental collaboration and integration on campus. By co-teaching and cross-listing this course, students from multiple departments can take advantage of this class. This course represents an intentional effort to combine and integrate expertise on campus, rather than duplicating courses offered within departments. The interdisciplinary nature of Climate Change makes this a perfect topic for cross-departmental integration.

JUSTIFICATION FOR ACTION REQUESTED

The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

This trial course proposal follows an original proposed course change to GEOG 412. Since it will be partially co-taught with an innovative schedule, it was recommended to first offer it as a trial course.

This course proposal is the first step in the ongoing development of a 2 semester (8 credit) course sequence in on Climate Change Literacy. Faculty from multiple departments and schools are working together to develop an integrated multi-disciplinary course drawing on expertise from across campus. The two courses will comprise a capstone experience for senior BS Geography majors and other Natural Science majors with an interest in climate change science. Additionally, we hope to eventually be able to offer it as *four 2 credit modules for graduate students embarking on climate change projects,* but who need background coursework in all or some of the course modules. We believe this course sequence will provide a world class opportunity to study climate change at America's Arctic University. Our students will become literate in the many aspects of climate change, how they relate to each other, and how they affect society. We also hope and expect that this course may bring students from other universities to take advantage of this course and programs at UAF.

As a trial offering in Fall 11, we wish to offer this course, stacked and cross-listed, for 4 credits (3 lecture hrs/wk, plus 1 field trip and recitation/discussion groups). We feel that while condensed in time on the calendar (7 weeks each module), it is important to give students time to reflect and discuss course content (discussion groups =1 extra hour/ wk). The differences between graduate and undergraduate workloads and expectations are outlined in separate syllabi.

A comprehensive course proposal for the full course sequence will be submitted in Spring 11. A prospectus for the full course sequence and course philosophy is attached here for reference.

APPROVALS: Signatures on file at the Governance Office.

		Date	
Signature, Chair, Program/Department of:			
		Date	

ATTACH COMPLETE SYLLABUS (as part of this application).

Note: The guidelines are online: http://www.uaf.edu/uafgov/faculty/cd/syllabus.html

The department and campus wide curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course change will be denied.

SYLLABUS CHECKLIST FOR ALL UAF COURSES

During the first week of class, instructors will distribute a course syllabus. Although modifications may be made throughout the semester, this document will contain the following information (as applicable to the discipline):

1. Course information:
   ❑Title, ❑ number, ❑credits, ❑prerequisites, ❑ location, ❑ meeting time
   (make sure that contact hours are in line with credits).
2. Instructor (and if applicable, Teaching Assistant) information:
   ❑ Name, ❑ office location, ❑ office hours, ❑ telephone, ❑ email address.
3. Course readings/materials:
   ❑ Course textbook title, ❑ author, ❑ edition/publisher.
   ❑ Supplementary readings (indicate whether ❑ required or ❑ recommended) and
   ❑ any supplies required.
4. Course description:
   ❑ Content of the course and how it fits into the broader curriculum;
   ❑ Expected proficiencies required to undertake the course, if applicable.
   ❑ Inclusion of catalog description is *strongly* recommended, and
   ❑ Description in syllabus must be consistent with catalog course description.
5. ❑ Course Goals (general), and (see #6)
6. ❑ Student Learning Outcomes (more specific)
7. Instructional methods:
   ❑ Describe the teaching techniques (eg: lecture, case study, small group discussion, private instruction, studio instruction, values clarification, games, journal writing, use of Blackboard, audio/video conferencing, etc.).
8. Course calendar:
   ❑ A schedule of class topics and assignments must be included. Be specific so that it is clear that the instructor has thought this through and will not be making it up on the fly (e.g. it is not adequate to say "lab". Instead, give each lab a title that describes its content). You may call the outline Tentative or Work in Progress to allow for modifications during the semester.
9. Course policies:
   ❑ Specify course rules, including your policies on attendance, tardiness, class participation, make-up exams, and plagiarism/academic integrity.
10. Evaluation:
    ❑ Specify how students will be evaluated, ❑ what factors will be included, ❑ their relative value, and
    ❑ how they will be tabulated into grades (on a curve, absolute scores, etc.)
11. Support Services:
    ❑ Describe the student support services such as tutoring (local and/or regional) appropriate for the course.
12. Disabilities Services:
    The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials.
    ❑

GEOGRAPHY (ATM/BIO) *694*

Climate Change Processes: Past, Present, and Future

4 CREDITS

Instructors:

Dr. Daniel Mann (primary), Geography Program, School of Natural Resources, UAF
dhmann@alaska.edu , phone: 474-6929, Office: Scenario Network Arctic Planning, Denali Building, Office Hours: MWF 9:30-10:30 and by appointment

Dr. Uma Bhatt Department of Atmospheric Sciences**,** 474-2662, bhatt@gi.alaska.edu, IARC 307 Office Hours: T-Th – 12:00-1:00PM and by appointment (send email)

Meeting: Course meets 3 lectures hours per week + 1 hour discussion group/recitation
Time and location TBA

Course Description
This course is a survey of climate change science extending from the paleo-record to modern climate dynamics and modeling. The class consists of two distinct but integrated topical 'modules'. The first seven weeks will explore the paleoclimatic changes that have occurred on planet Earth, using the climatic history of the past to better understand current and future climatic changes. The second half of the semester introduces first principles of climate dynamics and predictive climate models and then applies these principals to studies of changing environments, geographic implications, and policy issues.

Course Prerequisites: ***Graduate standing with bachelors in natural or social sciences, or permission of instructor.***

Course Objectives: ***This course is designed for incoming graduate students, from various scientific disciplines who find themselves working on climate change related research. It will provide students a sound background understanding of the mechanisms, and models of climate dynamics as well as the history of climate change.*** Students will gain a thorough understanding of Earth climate dynamics and change through the study of both climate history and modern climate processes. Students will be trained to critically evaluate both the validity of paleoclimatic reconstructions and climate model predictions. This is the first semester of a two-semester series of classes entitled "Climate Change Literacy".

Instructional / Teaching Methods: This class will be a lecture course with weekly discussion groups and one weekend field trip. Discussion groups will require summary and discussion of assigned readings from the curr

Student Learing Outcomes:

Students who are successful in this class will learn these things:

The basic climate history of Earth including the details of events that occurred during the last 100,000 years, with emphasis on Last Glacial Maximum to Holocene transition.

A basic understanding of how the atmosphere, ocean, cryosphere, and biosphere interacted in the course of climate changes in the past.

The basic concepts of climate dynamics including: global energy balance, surface energy balance, hydrological cycle, atmospheric and oceanic general circulation as related to climate, past climate, climate feedbacks, climate models, and natural and anthropogenic climate variability/change.

By the end of this class, students will:

Be able to ***critically review and evaluate*** journal articles in the mainstream paleoclimate and climate change scientific literature

Be able to discuss intelligently paleo- and current climate-change issues.

Apply concepts from this class to their research, and share perspectives from their research field with the class.

Course Plan:

The Tuesday lectures will be conducted jointly with ATM 456/656, and in the second half of the semester will consist of introduction to concepts of physical climatology (Dr. Bhatt). On Thursdays the ATM and GEOG students will meet separately to cover more specific disciplinary subject matter. For GEOG 412 this subject material will include case studies and/or recent literature that involve the current week's topic and/or implications of the material for the geographic and environmental impacts of climate change.

Exams will be prepared by the key course instructor (Bhatt for ATM and Mann for GEOG). Homework and term paper assignments will also be different for ATM656 and GEOG 412 to emphasize the different expectations in the two courses.

On Fridays, the two groups will meet together in a discussion session. These sessions will include the discussion of journal articles, sharing of student project work, and exchange of information regarding their respective Thursday class meeting. A specific intent of these sessions is to foster peer-teaching skills in graduate students.

Paleoclimate Field Trip: Mandatory weekend field trip to Isabel Pass with stops at important paleo-climate sites in Interior Alaska. Stops will include loess sections, paleo-dune fields, Pleistocene and Holocene moraines, and an examination of lake sediments. Students will be prepared with readings ahead of time, will participate in group discussions, and will complete a field notebook.

SCHEDULE OF LECTURES AND DISCUSSION GROUPS

J - signifies joint class meeting with ATM 456/65

S – signifies separate class meetings in which:

-GEOG class explores the *applications* of concepts to geographic/environmental Earth systems.

(-ATM class will explore more in depth climate dynamics concepts and problem sets.

Fridays - ATM and GEOG students meet to exchange information and view points on Thursday's special topics. The Friday sessions will usually be joint, but may occasionally meet separately. In general these sessions will develop the skills needed to communicate with a wider audience (see above).

Week	Topic	Tuesday 1.5 hours	Thursday 1.5 hours	Friday 1 hour	Key Text
Week 1	Introduction to Paleoclimate Reconstruction	**J** - Mann	**J** - Mann	**J** - Bhatt & Mann	Ruddiman
Week 2	Precambrian/Mesozoic Climates	**J** - Mann	S- Mann	**J** - Bhatt & Mann	Ruddiman
Week 3	Orbital Scale Climate Change	**J** - Mann	**J** - Mann	Field trip GEO students	Ruddiman
Week 4	Pleistocene Ice Ages	**J** - Mann	**S -** Mann	**J** - Bhatt & Mann	Ruddiman
Week 5	Gases Feedbacks	**J** - Mann	**S -** Mann	**J** - Bhatt & Mann	Ruddiman
Week 6	LGM and Deglacial Climate Change	**J** - Mann	**S -** Mann	**J** - Bhatt & Mann	Ruddiman
Week 7	The Holocene	**J** - Mann	**EXAM 1**	**J** - Bhatt & Mann	Ruddiman
Week 8	Global Energy Balance	***J** - Bhatt*	**S -** Mann	**J** - Bhatt & Mann	Hartmann
Week 9	Radiative Equilibrium	***J** - Bhatt*	**S -** Mann	**J** - Bhatt & Mann	Hartmann
Week 10	Surface Energy Balance	***J** - Bhatt*	**S -** Mann	**J** - Bhatt & Mann	Hartmann
Week 11	Atmospheric General Circulation	***J** - Bhatt*	**S -** Mann	**J** - Bhatt & Mann	Hartmann
Week 12	Climate Feedbacks	***J** - Bhatt*	**S -** Mann	**J** - Bhatt & Mann	Hartmann
Week 13	Climate Modeling	***J** - Bhatt*	**S -** Mann	**J** - Bhatt & Mann	Hartmann
Week 14	Current issues of Anthropogenic Climate Change	***J** - Bhatt*	**EXAM 2**	**J** - Bhatt & Mann	Hartmann

Exams, Assignments and Grading:

Exam 1	Paleoclimates	15%
Exam 2	Climate Dynamics	15%
Field Trip Report		15%
Literature Search		10%
Article Review		10%
Semester Project		20%
Project Presentation		15%

Exams will cover lecture materials and will be in multiple-choice, short answer and essay format. Students will conduct a literature search in a topic of their choosing. Review and present one article for discussion. Students will work on a semester-length term paper on a topic chosen in consultation with instructor, a ***30 minute presentation*** will be required. Details and expectations regarding article review assignments, field trip report, and semester project will be posted on Blackboard.

GRADUATE vs UNDERGRAD EXPECTATIONS AND GRADING

1) *Two tier exam structure, graduate students will be tested on basic lecture material, but will have an additional take-home component. Graduate exams will be graded with different rubric and with higher expectations.*
2) *Grad student article reviews will require review of 2-4 journal articles, undergrads will review 1 paper (with instructor guidance). Grad students will review longer and more sophisticated articles, will have different assignment criteria, and will be evaluated with a different rubric and higher expectations.*
3) *Graduate student semester papers will be 10 pages, undergraduate 6 pages.*
4) *Graduate students will give 30 minute presentations, each leading at least one discussion session.*
5) *Graduate students are expected to integrate course material into their research and/or contribute perspectives relative to their research in the course discussions.*
6) *Graduate students will be expected to mentor one undergraduate, helping them review a journal article.*

Course grades will be assigned as indicated at the table below. Course %'s are for THIS course only and may vary with different instructors. Grade point values are indicated on the table as well. Please see "Academics and Regulations" section of UAF 2007-2008 Catalogue.

grade	**%**	**GP**			
A+	100-97	4.0	C+	79-77	2.3
A	96-92	4.0	C	76-72	2.0
A-	91-90	3.7	C-	71-70	1.7
B+	89-87	3.3	D+	69-67	1.3
B	86-82	3.0	D	66-62	1.0
B-	81-80	2.7	D-	61-60	0.7

Grade Expectations: All grades are determined on an absolute score as above (with no curve) In general, grades will reflect the following about your class performance:
A = 90-100 percent: outstanding work, mastery of topic

GEOGRAPHY (ATM/BIO) 494

Climate Change Processes: Past, Present, and Future

4 CREDITS

Instructors:

Dr. Daniel Mann (primary), Geography Program, School of Natural Resources, UAF
dhmann@alaska.edu , phone: 474-6929, Office: Scenario Network Arctic Planning, Denali Building, Office Hours: MWF 9:30-10:30 and by appointment

Dr. Uma Bhatt Department of Atmospheric Sciences**,** 474-2662,

Student Learing Outcomes:

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A basic understanding of how the atmosphere, ocean, cryosphere, and biosphere interacted in the course of climate changes in the past.

The basic concepts of climate dynamics including: global energy balance, surface energy balance, hydrological cycle, atmospheric and oceanic general circulation as related to climate, past climate, climate feedbacks, climate models, and natural and anthropogenic climate variability/change.

Fridays - ATM and GEOG students meet to exchange information and view points on Thursday's special topics. The Friday sessions will usually be joint, but may occasionally meet separately. In general these sessions will develop the skills needed to communicate with a wider audience (see above).

Week	Topic	Tuesday 1.5 hours	Thursday 1.5 hours	Friday 1 hour	Key Text

	Change			Mann	

Exams, Assignments and Grading:

Exam 1	Paleoclimates	15%
Exam 2	Climate Dynamics	15%
Field Trip Report		15%
Literature Search		10%
Article Review		10%
Semester Project		20%
Project Presentation		15%

Exams will cover lecture materials and will be in multiple-choice, short answer and essay format. Students will conduct a literature search in a topic of their choosing. Review and present one article for discussion. Students will work on a semester-length term paper on a topic chosen in consultation with instructor, a 15 minute presentation will be required. Details and expectations regarding article review assignments, field trip report, and semester project will be posted on Blackboard.

GRADUATE vs UNDERGRAD EXPECTATIONS AND GRADING

1) Two tier exam structure, graduate students will be tested on basic lecture material, but will have an additional take-home component. Graduate exams will be graded with different rubric and with higher expectations.

C- 71-70 1.7	D 66-62 1.0
D+ 69-67 1.3	D- 61-60 0.7

Grade Expectations: All grades are determined on an absolute score as above (with no curve) In general, grades will reflect the following about your class performance:
A = 90-100 percent: outstanding work, mastery of topic
B = 80-89 percent: above average work, all assignments completed well
C = 70-79 percent: average, all or most assignments completed, most work satisfactory
D = 60-69 percent: pass, unsatisfactory or missing work
F = less than 60 percent: failure to meet requirements of course

Support and Disabilities Services: The UAF Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. The course instructors will work with the Office of Disabilities Services to provide reasonable accommodation to students with disabilities. Please notify the instructor of any special needs.

Plagiarism etc: Plagiarism and cheating are matters of serious concern for students and academic institutions. This is true in this class as well. The UAF Honor Code (or Student Code of Conduct) defines academic standards expected at the University of Alaska Fairbanks, which will be followed in this class. (Taken from the UAF plagiarism web site, which has many links with good information about this topic).

Extra Credit: Extra credit is not an option in this course except under unusual circumstances.