FORMAT 1

Submit original with signatures + 1 copy + electronic copy to UAF Governance.

See http://www.uaf.edu/uafgov/faculty/cd for a complete description of the rules governing curriculum & course changes.

TRIAL COURSE OR NEW COURSE PROPOSAL

SUBMITTED BY:

Department	**Atmospheric Sciences**	**College/School**	**CNSM**
Prepared by	**Barbara Day**	**Phone**	**7368**
Email Contact	**bdday@alaska.edu**	**Faculty Contact**	**Kenneth Sassen, x7845, ksassen@gi.alaska.edu**

1. ACTION DESIRED (CHECK ONE): Trial Course [ ] New Course [X]

2. COURSE IDENTIFICATION: Dept **ATM** Course # **F666** No. of Credits **3**

Justify upper/lower division status & number of credits: **Course requires graduate level mathematics and computer skills. Course load, readings, and homework are in keeping with three-credit hour student activities.**

3. PROPOSED COURSE TITLE: **Atmospheric Remote Sensing**

4. CROSS LISTED? *YES/NO* **No** If yes, Dept: [ ] Course # [ ]

(Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)

5. STACKED? *YES/NO* **No** If yes, Dept. [ ] Course # [ ]

6. FREQUENCY OF OFFERING: **Offered spring odd-numbered years**

(Every or Alternate) Fall, Spring, Summer — or As Demand Warrants

Received
JUN 11 2010
Dean's Office
College of Natural Science & Mathematics

7. SEMESTER & YEAR OF FIRST OFFERING (if approved) **Spring ~~2011~~ 2013**

I called Barbara re start date 7-17-2010 gh

8. COURSE FORMAT:

NOTE: Course hours may not be compressed into fewer than three days per credit. ~~Any course compressed into~~ fewer than six weeks must be approved by the college or school's curriculum council. Furthermore, any core course compressed to less than six weeks must be approved by the core review committee.

COURSE FORMAT: (check one) [ ] *1* [ ] *2* [ ] *3* [ ] *4* [ ] *5* [x] *6 weeks to full semester*

OTHER FORMAT (specify)

Mode of delivery (specify lecture, field trips, labs, etc) **lecture**

9. CONTACT HOURS PER WEEK: **3** LECTURE hours/weeks **0** LAB hours /week **0** PRACTICUM hours /week

Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit. This must match with the syllabus. See http://www.uaf.edu/uafgov/faculty/cd/credits.html for more information on number of credits.

OTHER HOURS (specify

type)

10. COMPLETE CATALOG DESCRIPTION including dept., number, title and credits (50 words or less, if possible):

ATM F666, Atmospheric Remote Sensing, 3 credits
Modern atmospheric research is becomingly increasingly reliant on measurements made from afar using instruments sensing various portions of the electromagnetic spectrum. Using principally microwave radars and visible-wavelength laser lidars, often combined with passive measurements from radiometers, many properties of the atmosphere can be routinely profiled by remote sensors located at the ground, from aircraft, or satellite. In this course, the fundamentals of these families of active remote sensors will be concentrated on including their designs and operating principles, applicable backscattering and extinction theories, and derive the basic radar equation.

11. COURSE CLASSIFICATIONS: (undergraduate courses only. Use approved criteria found on Page 10 & 17 of the manual. If justification is needed, attach on separate sheet.)

H = Humanities [ ] N = Natural Science [ ] S = Social Sciences [ ]

Will this course be used to fulfill a requirement for the baccalaureate core? [ ] **YES** [ ] **NO**

IF YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Format 6 [ ] W = Writing Intensive, Format 7 [ ] Natural Science, Format 8 [ ]

12. COURSE REPEATABILITY:

Is this course repeatable for credit? [ ] **YES** [x] **NO**

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

How many times may the course be repeated for credit? [ ] **TIMES**

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course? [ ] **CREDITS**

13. GRADING SYSTEM:

LETTER: [x] **PASS/FAIL:** [ ]

RESTRICTIONS ON ENROLLMENT (if any)

14. PREREQUISITES **ATM401/ATM 601; graduate standing; or permission of instructor.**

These will be *required* before the student is allowed to enroll in the course.

RECOMMENDED

Classes, etc. that student is strongly encouraged to complete prior to this course.

15. SPECIAL RESTRICTIONS, CONDITIONS No

16. PROPOSED COURSE FEES $-0-

Has a memo been submitted through your dean to the Provost & VCAS for fee approval? **Yes/No** [ ]

17. PREVIOUS HISTORY

Has the course been offered as special topics or trial course previously? **Yes/No** | **Yes** |

If yes, give semester, year, course #, etc.: | Spring 2007; Spring 2003 |

18. ESTIMATED IMPACT

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

No impact

19. LIBRARY COLLECTIONS

Have you contacted the library collection development officer (ffklj@uaf.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No [ ] Yes [ ]

Professor has talked to the librarian and all the requested materials will be available at the Keith Mather Library.

20. IMPACTS ON PROGRAMS/DEPTS

What programs/departments will be affected by this proposed action?
Include information on the Programs/Departments contacted (e.g., email, memo)

None

21. POSITIVE AND NEGATIVE IMPACTS

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

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.

Remote sensing is a crucial aspect of modern atmospheric research, whose principles have applications to other widespread uses of remote sensors. Remote sensing with lidar and other probes has had a long history at UAF, and the instructor brings new research programs and equipment, and additional students in this area.

APPROVALS:

Nicole Mölders	Date	6-10-10
Signature, Chair, Program/Department of:	**Atmospheric Sciences**	
	Date	6/17/10
Signature, Chair, College/School Curriculum Council for:CNSM	**CNSM**	
Paul W. Layer	Date	6/18/10
Signature, Dean, College/School of:	**CNSM**	

Atmospheric Remote Sensing ATM F666

Instructor:	Prof. Kenneth Sassen
Office:	IARC 301
Email:	ksassen@gi.alaska.edu
Phone:	474-7845
Fax:	474-7290

Office Hours:	T Th 3:00-5:00 PM, IARC 301 W 1:30-4:30 PM, IARC 301 and by appointment
Text:	*Centimeter & Millimeter Wavelength Radars in Meteorology*, by Roger Lhermitte

Course Overview:
In this class you will receive the fundamentals of what and how can be learned about the atmosphere through modern remote sensing techniques. We will concentrate on active remote sensing using radar and lidar and on combinations of active and passive remote sensors to study the properties of clouds and aerosols, but other research methods like aircraft in situ sampling will be included. This course complements Cloud Physics. When interesting weather conditions occur, we will have 'field trips' to the roof of the Elvey Building to collect data at the Arctic Facility for Atmospheric Remote Sensing (AFARS). Although no single text covers this broad range of topics, Lhermitte's recent book is a good starting point and is useful for those who want a deeper understanding of radar meteorology than time permits us.

Grading:
Your grade will be determined by your combined scores on two one-hour exams, a two-hour final exam, and a homework assignment. The point breakdown is given below:

2 hour-long exams (100 points each)	200 points
Final exam (Tentatively 5/9)	200 points
Homework /Term paper	100 points
Total	500 points

The tentative grade scale is as follows:

435-500 points	A
380-434.9 points	B
325-379.9 points	C
270-324.9 points	D
<269.9 points	F

The grades may be curved, but if you get the lowest number in the range listed above, you will receive at least that grade.

Exams and Homework:
The two exams during the semester are an hour in length and are on the new information presented during the weeks before. The final exam is two hours long and is cumulative. I do give partial credit, so it is to your advantage to write down the steps in answering each question: let me know your reasoning.

For homework I will ask for a combination of occasional assignments and a 10-12 (double-spaced) page research paper giving a detailed account of a remote sensing research topic of your choice. You will provide the background of your topic through a comprehensive literature search, describe the instrument design and theory, and review how the data has added to our knowledge of the atmosphere. So, keep you eyes open for a topic that interests you during the semester. The paper will be due one week before the end of classes, but can be submitted at any time.

Ethics:
Do not cheat on your exams or plagiarize your paper, unless you want an automatic F. You are only cheating yourself.

Disabilities:
Students with documented disabilities who may need reasonable academic accommodations should discuss these with me during the first two weeks of class. You will need to provide documentation of your disability to Disability Services in the Center for Health and Counseling, 474-7043, TTY 474-7045.

Schedule:

Lesson Number	Topic
1	Course Outline and Fundamentals
2	Properties of Electromagnetic Waves
3	Principles and Designs of Remote Sensors
4	Propagation of Electromagnetic Waves: Refraction and molecular attenuation
5	The Basic 'Radar' Equation
6, 7	Backscattering and Attenuation from Spherical Particles
8, 9	Backscattering and Attenuation from Nonspherical Particles
10	Backscattering and Attenuation from Inhomogeneous Particles
11	First Exam
12, 13	Meteorological Applications: Cloud Physics Research
14	The Bright and Dark Bands (Sassen and Chen 1995)
15	NEXRAD Radar Applications (NWS)
16, 17	Overview of Remote Sensing Techniques
18, 19	The Multiple Remote Sensor Approach (Sassen 1984)
20	Second Exam
21, 22	Cirrus (Sassen and Mace 2001)
23	Field Trip to AFARS for Data Collection
24	Stratus Clouds (Sassen et al. 1999)
25	Mixed-Phase Clouds
26	Aerosols and Cloud Interactions (Sassen 2001)
27	Convective Systems, Hail and Rainfall
28	Field Trip to AFARS for Data Collection
29, 30	Review for Final