The Ohio State University
Colleges of the Arts and Sciences New Course Request

Chemistry
Academic Unit
Chemistry

Book 3 Listing (e.g., Portuguese)
641 **Atmospheric Chemistry**
Number Title
Atmospheric Chemistry **UG, G** **3**
18-Character Title Abbreviation Level Credit Hours

Summer Autumn **Winter** Spring Year **2008**
Proposed effective date, choose one quarter and put an "X" after it; and fill in the year. See the OAA curriculum manual for deadlines.

A. Course Offerings Bulletin Information

Follow the instructions in the OAA curriculum manual. If this is a course with decimal subdivisions, then use one New Course Request form for the generic information that will apply to all subdivisions; and use separate forms for each new decimal subdivision, including on each form the information that is unique to that subdivision. If the course offered is less than a quarter or a term, please complete the Flexibly Scheduled/Off Campus/Workshop Request form.

Description (*not to exceed 25 words*): **Chemistry and composition of the lower atmosphere (troposphere and stratosphere), including regional and global perspectives**

Quarter offered: **Winter** Distribution of class time/contact hours: **2 – 1.5 hour/week**
Quarter and contact/class time hours information should be omitted from Book 3 publication (yes or no):

Prerequisite(s): **Chemistry 123**

Exclusion or limiting clause: **Chemistry 231 or 251 recommended, or approval by instructor**

Repeatable to a maximum of **0** credit hours.

Cross-listed with:

Grade Option (Please check): Letter ☒ S/U ☒ Progress ☐ What course is last in the series? **N/A**

Honors Statement: Yes ☐ No ☐ GEC: Yes ☐ No ☐ Admission Condition
Off-Campus: Yes ☐ No ☐ EM: Yes ☐ No ☐ Course: Yes ☐ No ☐
Embedded Honors Statement: Yes ☐ No ☐
Service Learning Course*: Yes ☐ No ☐ *To learn more about this option, please visit http://artsandsciences.osu.edu/currofc/

Other General Course Information:
(e.g. "Taught in English." "Credit does not count toward BSBA degree.")

B. General Information

Subject Code **400402** Subsidy Level (V, G, T, B, M, D, or P) **D**
If you have questions, please email Jed Dickhaut at dickhaut.1@osu.edu.

1. Provide the rationale for proposing this course:
This course is essential to the understanding of biogeochemical cycles. **There is currently no such course taught at OSU – concurrence letters provided by the School of Earth Sciences and the Environmental Sciences Graduate Program.**

2. Please list Majors/Minors affected by the creation of this new course. Attach revisions of all affected programs. This course is (check one):
☐ Required on major(s)/minor(s) ☐ A choice on major(s)/minors(s)
☒ An elective within major(s)/minor(s) ☒ A general elective:

3. Indicate the nature of the program adjustments, new funding, and/or withdrawals that make possible the implementation of this new course.

This course has been previously taught by Dr. Heather Allen in 2003 and 2005 as a Chemistry 694 course.

Enrollment (of Chemistry only students) has been ~17 students in each of those years.

4. Is the approval of this request contingent upon the approval of other course requests or curricular requests?

Yes ☐ No ☒ List:

5. If this course is part of a sequence, list the number of the other course(s) in the sequence: **N/A**

6. Expected section size: **30** Proposed number of sections per year: **1**

7. Do you want prerequisites enforced electronically (see OAA manual for what can be enforced)? Yes ☐ No ☒

8. This course has been discussed with and has the concurrence of the following academic units needing this course or with academic units having directly related interests (*List units and attach letters and/or forms*):
Not Applicable ☐

1) School of Earch Sciences: letter from Director/Chair Frank Schwartz is attached.

2) Environmental Science Graduate Program: letter from Director Mancl is attached.

9. **Attach a course syllabus that includes a topical outline of the course, student learning outcomes and/or course objectives, off-campus field experience, methods of evaluation, and other items as stated in the OAA curriculum manual and e-mail to asccurrofc@osu.edu.**

Approval Process The signatures on the lines in ALL CAPS (e.g. ACADEMIC UNIT) are required.

1.	Academic Unit Undergraduate Studies Committee Chair	Christopher M. Hadad Printed Name	10/15/2007 Date
2.	Academic Unit Graduate Studies Committee Chair	Robert S. Coleman Printed Name	10/15/2007 Date
3.	**ACADEMIC UNIT CHAIR/DIRECTOR**	Christopher M. Hadad **Printed Name**	10/15/2007 **Date**

4. **After the Academic Unit Chair/Director signs the request, forward the form to the ASC Curriculum Office, 4132 Smith Lab, 174 West 18th Ave. or fax it to 688-5678. Attach the syllabus and any supporting documentation in an e-mail to asccurrofc@osu.edu. The ASC Curriculum Office will forward the request to the appropriate committee.**

5.	**COLLEGE CURRICULUM COMMITTEE**	**Printed Name**	**Date**
6.	**ARTS AND SCIENCES EXECUTIVE DEAN**	**Printed Name**	**Date**
7.	Graduate School (if appropriate)	Printed Name	Date
8.	University Honors Center (if appropriate)	Printed Name	Date
9.	Office of International Education (if appropriate)	Printed Name	Date
10.	**ACADEMIC AFFAIRS**	**Printed Name**	**Date**

Atmospheric Chemistry Syllabus

Winter 2008

Chemistry 641: open to graduate and undergraduate students
(Prerequisite: Chemistry 123 (1 year sequence of general chemistry))

Instructor: Prof. Heather C. Allen, Newman and Wolfrom Bldg., Rm. 3105,
ph: 292-4707; e-mail: allen@chemistry.ohio-state.edu

- Text: Chemistry of the Upper and Lower Atmosphere, B. J. Finlayson-Pitts, J. N. Pitts, Jr., Academic Press, 2001
- Current scientific literature will be incorporated into the lectures (references to be given prior to class discussions)

Week 1: Atmospheric Chemistry Overview – physical properties and structure of the troposphere and the stratosphere, temperature profile, concentration profiles

Week 2: Atmospheric Chemistry of the Stratosphere – stratospheric ozone cycle, depletion, NOx, halogen cycles, polar stratospheric cloud chemistry

Week 3: Chemistry of Global Climate Change – Historical account of greenhouse gas and aerosol concentrations, carbon dioxide, ozone and altitude, aerosol uncertainties, sulfur cycle

Week 4: Atmospheric Chemistry of the Troposphere – tropospheric chemical cycles, hydroxyl and chlorine radical, chemical cleansing, oxidation, hydrocarbons in the troposphere, sources and sinks

Week 5: Urban Smog - VOC/NOx – Historical account of air pollution, progress and problems in experiments and modeling, assessing human impact on the atmosphere

Week 6: Heterogeneous Chemistry of the Stratosphere and the Troposphere – aerosols: nucleation and growth, global and local effects

Week 7: Case Studies: West vs. East, California vs. Ohio?

Week 8: Case Studies: World Events and Global Pollution, U.S., Mexico, Africa, and China

Week 9: Case Studies: Northern Hemisphere Pollution and the resulting Chemistry and Production of Haze in the Arctic

Week 10: Frontier Areas in Atmospheric Chemistry – research areas that have recently made an impact on the understanding of atmospheric chemistry

Course Grading

Homework (8 assignments)	10%
Midterm Exam	10%
Class Participation	15%
Oral Presentation	20%
- topic approved by 1/31/08	
Final Term Paper	20%
Final Exam	25%

- Students will give a 7-minute presentation on an approved publication relevant to current topics in atmospheric chemistry. These presentations will be scheduled in the last several weeks of the scheduled classes. Students will also be required to turn in a term paper; 10 pages – topic must also be approved &/or can be related to their presentation.
- Guest Speaker date TBA from NOAA/ARL (National Oceanographic and Atmospheric Administration – Aeronomy Research Laboratory, Boulder, Colorado)

THE OHIO STATE UNIVERSITY

School of Earth Sciences

275 Mendenhall Laboratory
125 South Oval Mall
Columbus, OH 43210-1398

Phone (614) 292-2721
Fax (614) 292-7688
E-mail earthsciences@osu.edu
www.earthsciences.osu.edu

August 30, 2007

To: Heather Allen
Department of Chemistry

From: Frank Schwartz
Ohio Eminent Scholar and Director

Re: Letter of support for proposed new course in Atmospheric Chemistry

I am writing to offer our strong and enthusiastic support for your proposed new course in Atmospheric Chemistry. From our discussion and reviewing your most recent syllabus, the course will cover the specific topics of atmospheric chemistry that are an integral part of the earth's biosphere, tackling subjects such as global change from an atmospheric chemistry viewpoint. This viewpoint is critically needed for students to understand the interplay between other earth system components of our biosphere. In general, the course covers topics that are applicable for students, undergraduate and graduate, in the School of Earth Sciences. It fits in well with our need to provide an in-depth coverage of atmospheric chemistry to our students since our atmosphere is a significant part of the earth system. Currently there is no such course offered here at Ohio State. I also understand that you have taught the course twice in the past 5 years (as a 694 group studies course) with high-scoring SEIs.

If you need any further assistance in advertising the course once it is established for the winter 2008 quarter, please do not hesitate to contact me.

THE OHIO STATE UNIVERSITY

Environmental Science Graduate Program
246 Agricultural Engineering Bldg
590 Woody Hayes Dr
Columbus, OH 43210-1085

Phone (614) 292-9762
Fax (614) 292-9448

September 10, 2007

Dr. Heather Allen
Department of Chemistry
3105 Newman & Wolfram
100 W 18th Ave

Dear Dr. Allen,

Thank you for informing me of the new class, Atmospheric Chemistry that you are establishing. As Director for the Environmental Science Graduate Program, I am in strong support of such a course. Although OSU has an excellent Atmospheric Sciences program in the Geography Department, atmospheric chemistry is not touched upon. An understanding of our atmosphere, and specifically the chemistry of our atmosphere, is an area that needs to be offered as a course at OSU. I was fortunate to take a similar course as an Environmental Science graduate student at another university.

The atmosphere is a component of our biosphere. The interactions between the atmosphere, the oceans, fresh water bodies and our continental earth are extremely critical to the understanding of our environment and thus our ecosystem. This course presents atmospheric structure, and how the atmosphere functions as part of the earth's ecosystem, inclusive of feedback with other physical structures of the earth (soil, rock, water, thermal energy, sulfur and nitrogen cycles, etc). The Environmental Science Graduate Program (ESGP) curriculum committee will review acceptance of this course for our core course requirements for the ESGP masters and Ph.D. program after submission. I look forward to offering this course for our graduate students.

Sincerely,

Karen Mancl
Professor and Director

Spring 2003 Syllabus

Atmospheric Chemistry

Chemistry 694: open to graduate and undergraduate students
Prerequisite: taken or concurrently taking physical chemistry 521, 531 or approval by instructor
Spring 2003

Instructor: Prof. Heather C. Allen, Newman and Wolfrom Bldg., Rm. 3105,
ph: 292-4707; e-mail: allen@chemistry.ohio-state.edu

- Text: Chemistry of the Upper and Lower Atmosphere, B. J. Finlayson-Pitts, J. N. Pitts, Jr., Academic Press, 2001
- Reading of scientific papers (references to be given prior to class discussions) will be incorporated into the lectures/discussions
- Students will be encouraged to participate in discussions
- Students will give a 15-minute presentation on an approved subject relevant to current topics in atmospheric chemistry. These presentations will be scheduled in the last 45 minutes of class from week 5 til week 10, depending on the total number of registered students. Students will also be required to turn in a term paper; 10 pages – topic must also be approved &/or can be related to their presentation.

Course Syllabus

Week 1: Atmospheric Chemistry Overview – physical properties and structure of the troposphere and the stratosphere

Week 2: Atmospheric Chemistry of the Stratosphere

Week 3: Chemistry of Ozone Depletion and Global Climate Change

Week 4: Atmospheric Chemistry of the Troposphere

Week 5: Urban Smog - VOC/NOx, progress and problems in experiments and modeling

Week 6: Heterogeneous Chemistry of the Stratosphere and the Troposphere

Week 7: Case Study: Southern California Basin

Week 8: Case Study: Houston, Texas

Week 9: Case Study: Chemistry and Production of Haze in the Arctic

Week 10: Frontier Areas in Atmospheric Chemistry

NOTE: For 2008, grading content has changed

Course Grading	
Class Participation	10%
15 min. Presentation	30%
Term Paper	60%

Winter 2005 Syllabus

Atmospheric Chemistry

Winter 2005

Course # 20166-2

Wednesdays & Fridays: 11:30-12:48 in Newman & Wolfrom Bldg., Rm. 2136

Chemistry 694: open to graduate and undergraduate students (and postdocs!)
(Prerequisite: taken or concurrently taking physical chemistry 520, 531 or approval by instructor)

Instructor: Prof. Heather C. Allen, Newman and Wolfrom Bldg., Rm. 3105,
ph: 292-4707; e-mail: allen@chemistry.ohio-state.edu

- Text: Chemistry of the Upper and Lower Atmosphere, B. J. Finlayson-Pitts, J. N. Pitts, Jr., Academic Press, 2001
- Current scientific literature will be incorporated into the lectures (references to be given prior to class discussions; students are expected to read and prepare at least one question/comment on references)
- Students will give a 15-minute presentation on an approved subject relevant to current topics in atmospheric chemistry. These presentations will be scheduled in the last 45 minutes of class from week 5 til week 10, depending on the total number of registered students. Students will also be required to turn in a term paper; 10 pages – topic must also be approved &/or can be related to their presentation.
- Guest Speaker for lecture in February: Dr. Greg Frost from NOAA/ARL (National Oceanographic and Atmospheric Administration – Aeronomy Research Laboratory, Boulder, Colorado)

Course Syllabus

Week 1: Atmospheric Chemistry Overview – physical properties and structure of the troposphere and the stratosphere

Week 2: Atmospheric Chemistry of the Stratosphere

Week 3: Chemistry of Ozone Depletion and Global Climate Change

Week 4: Atmospheric Chemistry of the Troposphere

Week 5: Urban Smog - VOC/NOx, progress and problems in experiments and modeling

Week 6: Heterogeneous Chemistry of the Stratosphere and the Troposphere

Week 7: Case Studies: Southern California Basin

Week 8: Case Studies: Houston, Texas

Week 9: Case Studies: Chemistry and Production of Haze in the Arctic

Week 10: Frontier Areas in Atmospheric Chemistry

Note for 2008: grading content has changed

Course Grading

Class Participation	25%
15 min. Presentation	25%
Term Paper	50%

THE OHIO STATE UNIVERSITY

HEATHER ALLEN
Course: CHEM 694
Campus: COL College: MPS

Student Evaluation of Instruction Report

Winter 2005
Call Number 20166 2

Response rate :* 93.8% *of* 16 *students who paid fees by the 14th day of the quarter.*

Date of Report: 4/1/2005

Response scale is Likert-type with "5" being high and "1" being low.

	N	1	2	3	4	5	N/A
1. Well organized	15	0 %	0 %	7 %	20 %	73 %	0 %
2. Intellectually stimulating	15	0	0	0	27	73	0
3. Instructor interested in teaching	15	0	0	0	0	100	0
4. Encouraged independent thinking	15	0	0	0	7	93	0
5. Instructor well prepared	15	0	0	0	13	87	0
6. Instructor interested in helping students	15	0	0	0	13	87	0
7. Learned greatly from instructor	15	0	0	7	27	67	0
8. Created learning atmosphere	15	0	0	0	0	100	0
9. Communicated subject matter clearly	15	0	0	0	13	87	0
10. Overall rating	14	0	0	0	7	93	

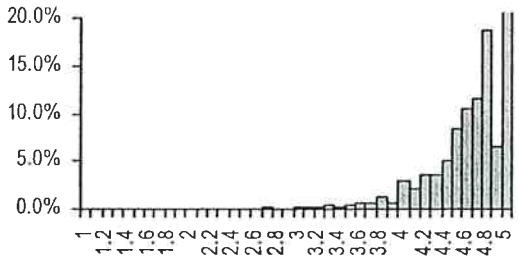
Your ratings are summarized below. When sufficient data exist, summaries are also provided for up to three reference groups. Your "comparison group" is based on the size of your class and the predominant reason students indicate they enrolled. Comparison group data are reported at both the college and university levels. Over the preceding 4 quarters,

40 instructors and **50** course sections were in your Comparison Group by College, and **711** instructors and **1280** course sections were in your Comparison Group by University. Across all courses using the SEI instrument since 1994, **7.47%** of them share the characteristics listed below. The Course-Offering Unit listing is not based on size or electivity; it is a summary of the SEI data across the previous four quarters in your department or school.

Your comparison groups have the following qualities: Class size 5 to 20; Predominant reason given for enrolling in this course is that it was a free elective choice.

	This Instructor		Comparison Group by College		Comparison Group by University		Course-Offering Unit	
	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev
1. Instructor well organized	4.7	0.6	4.5	0.4	4.6	0.4	4.2	0.4
2. Intellectually stimulating	4.7	0.5	4.6	0.4	4.5	0.4	4.0	0.4
3. Instructor interested in teaching	5.0	0.0	4.8	0.3	4.8	0.3	4.3	0.5
4. Encouraged independent thinking	4.9	0.3	4.6	0.4	4.6	0.4	4.2	0.4
5. Instructor well prepared	4.9	0.4	4.6	0.4	4.6	0.4	4.3	0.5
6. Instructor interested in helping students	4.9	0.4	4.7	0.3	4.7	0.3	4.3	0.5
7. Learned greatly from instructor	4.6	0.6	4.4	0.4	4.5	0.4	3.9	0.6
8. Created learning atmosphere	5.0	0.0	4.5	0.4	4.6	0.4	4.1	0.5
9. Communicated subject matter clearly	4.9	0.4	4.5	0.5	4.6	0.4	4.0	0.7
10. Overall rating	4.9	0.3	4.6	0.4	4.7	0.4	4.2	0.6

Comparison Group by University Distribution of Mean Scores on Overall Rating (Item 10)



Group mean on Overall Rating = 4.7

Instructor mean on Overall Rating = 4.9

Policies and procedures regarding SEI reports are addressed in the SEI handbook, published on the web at www.ureg.ohio-state.edu/ourweb/tests/SEI_handbook.pdf. Report generated by the Office of the University Registrar. Questions may be e-mailed to <seiadmin@osu.edu>.

THE OHIO STATE UNIVERSITY

HEATHER ALLEN
Course: CHEM 694
Campus: COL College: MPS

Student Evaluation of Instruction Report

Spring 2003
Call Number 19196 6

Response rate*: 82.4% of 17 students who paid fees by the 14th day of the quarter.

Date of Report 7/16/2003

Response scale is Likert-type with "5" being high and "1" being low.

	N	1	2	3	4	5	N/A
1. Well organized	14	0 %	0 %	7 %	36 %	57 %	0 %
2. Intellectually stimulating	14	0	0	0	29	71	0
3. Instructor interested in teaching	14	0	0	0	14	86	0
4. Encouraged independent thinking	14	0	0	7	21	71	0
5. Instructor well prepared	14	0	0	7	36	57	0
6. Instructor interested in helping students	14	0	0	7	21	71	0
7. Learned greatly from instructor	14	0	0	14	21	64	0
8. Created learning atmosphere	14	0	0	7	21	71	0
9. Communicated subject matter clearly	14	0	0	7	29	64	0
10. Overall rating	14	0	0	7	29	64	

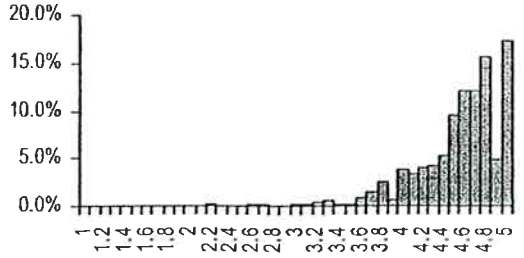
Your ratings are summarized below. When sufficient data exist, summaries are also provided for up to three reference groups. Your "comparison group" is based on the size of your class and the predominant reason students indicate they enrolled. Comparison group data are reported at both the college and university levels. Over the preceding 4 quarters,

31 instructors and **42** course sections were in your Comparison Group by College, and **767** instructors and **1274** course sections were in your Comparison Group by University. Across all courses using the SEI instrument since 1994, **7.46%** of them share the characteristics listed below. The Course-Offering Unit listing is not based on size or electivity; it is a summary of the SEI data across the previous four quarters in your department or school.

Your comparison groups have the following qualities: Class size 5 to 20; Predominant reason given for enrolling in this course is that it was a free elective choice.

	This Instructor		Comparison Group by College		Comparison Group by University		Course-Offering Unit	
	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev
1. Instructor well organized	4.5	0.7	4.5	0.4	4.5	0.4	4.1	0.5
2. Intellectually stimulating	4.7	0.5	4.6	0.4	4.4	0.5	4.0	0.4
3. Instructor interested in teaching	4.9	0.4	4.7	0.3	4.7	0.3	4.2	0.6
4. Encouraged independent thinking	4.6	0.6	4.5	0.4	4.5	0.4	4.2	0.5
5. Instructor well prepared	4.5	0.7	4.6	0.4	4.6	0.4	4.2	0.6
6. Instructor interested in helping students	4.6	0.6	4.7	0.4	4.7	0.4	4.3	0.6
7. Learned greatly from instructor	4.5	0.8	4.5	0.5	4.4	0.5	3.8	0.7
8. Created learning atmosphere	4.6	0.6	4.5	0.5	4.5	0.4	4.1	0.5
9. Communicated subject matter clearly	4.6	0.6	4.4	0.6	4.5	0.5	3.9	0.7
10. Overall rating	4.6	0.6	4.6	0.5	4.6	0.4	4.1	0.6

Comparison Group by University Distribution of Mean Scores on Overall Rating (Item 10)



Group mean on Overall Rating = 4.6

Instructor mean on Overall Rating = 4.6

Policies and procedures regarding SEI reports are addressed in the SEI handbook, published on the web at www.ureg.ohio-state.edu/ourweb/tests/SEI_handbook.pdf. Report generated by the Office of the University Registrar. Questions may be e-mailed to <seiadmin@osu.edu>.