Lecture—4 hours. Prerequisite: course 1, 2, or 3 and consent of instructor. Interdisciplinary survey of historical and contemporary experiences of Koreans in the United States from the late nineteenth century to the present. Offered in alternate years. GE credit: ArtHum or SocSci, Div | ACGH, AH or SS, DD, WC, —K. Kim

150E. Southeast Asian American Experience (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2, or 3, and consent of instructor. Upper division status and knowledge of historical and linguistic contexts and contemporary issues in Southeast Asian American communities required. Offered in alternate years. GE credit: ACGH, Div | ACGH, AH or SS, DD, OL, WC, —Ill. Valverde

150F. South Asian American History, Culture, & Politics (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2, 3, or 4, or consent of instructor. South Asian American experiences, focusing on the histories, cultures, and politics of Indian, Pakistani, Bangladesh, and Sri Lankan communities in the U.S. Interdisciplinary approaches to migration, labor, gender, racialization, and community mobilization. Offered in alternate years. GE credit: ArtHum, SocSci, Div | ACGH, AH or SS, DD, OL, WC, —II. Maira

153. Asian American Legal History (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2, or 3, or consent of instructor. Legal history of Asian Americans, from the mid-19th century to present. Laws and administrative policies affecting Asian American communities, including those governing immigration, social and economic participation, World War II internment, and affirmative action. GE credit: SocSci | ACGH, DD, SS, —II.

189A. Topics in Asian American Studies (4)
Lecture—4 hours. Prerequisite: course 1, 2, or 3, and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. History. May be repeated for credit when topic differs. Offered irregularly. GE credit: ArtHum or SocSci, Div | ACGH, AH or SS, DD, WC, —III.

189B. Topics in Asian American Studies (4)
Lecture—4 hours. Prerequisite: course 1, 2, or 3, and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. History. May be repeated for credit when topic differs. Offered irregularly. GE credit: SocSci | ACGH, DD, SS, WC.

189C. Topics in Asian American Studies (4)
Lecture—4 hours. Prerequisite: course 1, 2, or 3, and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. History. May be repeated for credit when topic differs. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS.

189D. Topics in Asian American Studies (4)
Lecture—4 hours. Prerequisite: course 1, 2, or 3, and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. History. May be repeated for credit when topic differs. Offered irregularly. GE credit: SocSci | ACGH, DD, SS.

189E. Topics in Asian American Studies (4)
Lecture—4 hours. Prerequisite: course 1, 2, or 3, and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Comparative Race Studies. May be repeated for credit when topic differs. Offered irregularly. GE credit: ACGH, Div | ACGH, AH or SS, DD, OL, WC, WE.

189F. Topics in Asian American Studies (4)
Lecture—4 hours. Prerequisite: course 1, 2, or 3, and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Asian and Asian American Studies. May be repeated for credit when topic differs. Offered irregularly. GE credit: SocSci | SS.

189G. Topics in Asian American Studies (4)
Lecture—4 hours. Prerequisite: course 1, 2, or 3, and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Race, Class, Gender, and Sexuality. May be repeated for credit when topic differs. Offered irregularly. GE credit: SocSci | SS.

189H. Topics in Asian American Studies (4)
Lecture—4 hours. Prerequisite: course 1, 2, or 3, and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Society and Institutions. May be repeated for credit when topic differs. Offered irregularly. GE credit: ArtHum | SS.

189I. Topics in Asian American Studies (4)
Lecture—4 hours. Prerequisite: course 1, 2, or 3, and upper division standing, or consent of instructor. Intensive treatment of a topic in Asian American Studies. Politics and Social Movements. May be repeated for credit when topic differs. Offered irregularly. GE credit: ArtHum or SocSci | ACGH, AH or SS, DD, OL, WE.

92. Internship (1-5)
Internship—3-15 hours. Prerequisite: enrollment in upper division or consent of instructor. Major Adviser. Internship is major-dependent on availability of intern position with priority to Asian American Studies minors. Supervised internship in community and institutional settings related to Asian American concerns. (P/NP grading only.)

97T. Tutoring in Asian American Studies (1-5)
Tutoring—1-5 hours. Prerequisite: upper division standing and completion of appropriate course with distinction; consent of instructor. Tutoring in lower division Asian American Studies courses in small group discussion. Weekly meetings with instructor. May be repeated for credit once for a given course and also for a different course. (P/NP grading only.)

98E. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily intended for upper division students. (P/NP grading only.)

99. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Asian Studies

See Asian Studies, on page 171; East Asian Languages and Cultures, on page 223; and East Asian Studies, on page 228.

Astronomy

See Physics, on page 466.

Atmospheric Science

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Land, Air and Water Resources, on page 364.

The Major Program

Atmospheric science is the study of the air that surrounds the planet. It includes all weather phenomena and climate including the chemistry of trace constituents and cloud and particle formation, as well as quantitative studies of severe weather events such as hurricanes and tornadoes. It includes the study of the impacts of human and other biotic activity on the quality of the air we breathe. Changes in regional and global climate are also central to this field of study.

The Program. Modern meteorology is a quantitative science that is becoming increasingly computer dependent. In addition to the study of daily weather events, the program deals with fundamental dynamical and physical processes that involve the general circulation of the atmosphere, turbulent mass and energy transfer at the planetary surface as well as within the free atmosphere, radiative and terrestrial radiation throughout the atmosphere; atmospheric interaction with the biosphere; climate variations; and developments in remote sensing using satellites with modern meteorological instrumentation. In addition, the program has significant expertise in the areas of air quality and its related atmospheric chemistry. As well as providing a broad background in meteorology, the major includes an informal minor area to be chosen from mathematics, computer science, environmental studies, resource management or a physical or biological science.

Internships and Career Alternatives. Atmospheric science students have participated in internships with the California Air Resources Board, various county Air Pollution Control Districts, and the National Weather Service. Job opportunities include: national weather services, forecasting for broadcast media or private forecasting firms, environmental consulting firms (such as environmental impact reports, wind farm siting), government agencies at all levels from local to state (Air Resources Board) to national (NOAA), and companies whose operations are impacted by weather (such as airlines, futures markets). About half of our graduates continue their education by seeking the M.S. or Ph.D. degree in atmospheric science or related areas.

B.S. Major Requirements:

Written Expression, Also counts toward College Engagemen Requirement................................. 3-4

University Writing Program 101 or one course from 102 or 104 sequences or course selected with adviser’s approval

Preparatory Subject Matter........................... 59-60

Plant Sciences 2 ..................................... 4

Chemistry 2A, 2B ................................ 10

Computer Science Engineering 30 or course selected with adviser’s approval, 4

Mathematics 21A, 21B, 21C, 21D, 22A, 22B ........................................... 22

Atmospheric Science 60 .................................. 4

Physics 9A, 9B, 9C ....................... 12

Statistics 13 ................................. 3

Depth Subject Matter .............................. 41

Atmospheric Science 110, 111, 111L, 120, 121A, 121B, 124, 128 .................................. 28

Internship-Atmospheric Science 192 or 199 ........................................... 2

Two upper division Atmospheric Science courses selected with adviser’s approval, not including courses 192 and 199 .......................... 7

Engineering 6, Atmospheric Science 150, Civil and Environmental Engineering 150, or course selected with adviser’s approval. 4

Restricted Electives .......................... 15

Coordinated group of courses (minor area) to be chosen with adviser’s approval from mathematics, computer science, environmental studies, communication, resource management, or a physical or biological science (at least 10 upper division units)

Total Units for the Major ....................... 118-120

Major Adviser, Shu-Hua Chen

Advising Center the major, is located in 1150 Plant and Environmental Sciences Building in Land,
Air and Water Resources Teaching Center 530-752-1603; lawravisn@ucdavis.edu.

Note. Alternative options for students who are interested in atmospheric science are to minor in ATM or to major in ESM choosing climate change and air pollution track. However, both the ATM minor and the ESM climate change and air quality track do not meet the federal civil service requirements for meteorologists.

Minor Program Requirements:

Minor Program. The minor in Atmospheric Science provides a coherent treatment of atmospheric and climate science, with the option to focus on such topics as climate change, meteorological instrumentation, and satellite remote sensing. Students undertaking the minor could have the minor and a minimum preparatory coursework in calculus and physics (Mathematics 16A-16B, Physics 5A or 7A). Some upper division courses in atmospheric science have the Mathematics 21 and 22 series and the Physics 9 series as prerequisites.

Atmospheric Science........................ 20-24
Atmospheric Science 60, 110…………………8
Four courses selected with the approval of the minor program adviser from upper division Atmospheric Science courses (excluding 192 or 199) or Environmental Science and Management 131 ………………… 12-16

Minor Adviser. Shu-Hua Chen

Graduate Study. You can specialize in particular areas of atmospheric science through graduate study and research leading to the M.S. and Ph.D. degrees. For details, see the Atmospheric Science [A Graduate Program], on page 175, and see Graduate Studies, on page 29.

Related Courses. See Environmental Science and Policy 150A; Physics 104A, 104B; Environmental Science and Management 131.

Courses in Atmospheric Science (ATM)

Questions pertaining to the following courses should be directed to the instructor or to the Air, Water and Resources Teaching Center in 1150 Plant & Environmental Sciences Building 530-752-1603.

Lower Division

5. Global Climate Change (3)


10. Severe and Unusual Weather (3)

Lecture—2 hours; discussion—1 hour. Prerequisite: high school physics. Introduction to physical principles of severe and unusual weather: flood, blizzard, thunderstorms, lightning, tornadoes, and hurricanes. Emphasis on scientific perspective and human context. Not open to students who have received credit in the ATM 140 series. GE credit: ScEng | QL, SE, SL, VL—I. (I.) Grotjahn, Paw U

30. Issues in Atmospheric Science (2)

Lecture—1 hour; discussion—1 hour. Prerequisite: high school physics. Introduction to selected topics in atmospheric science, such as: meteorological aspects of air pollution, use of computer models in weather forecasting, theories of global climate change, impact of satellites on meteorology, and modern meteorological instrumentation. (P/NP grading only.) GE credit: SL, VL—I. (I.) Anastasio

60. Introduction to Atmospheric Science (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A or 21A and Physics 5A, 7A or 9A. Fundamental principles of the physics, chemis- try, and fluid dynamics underlying weather and cli- mate. Solar radiation, the greenhouse effect, and the thermal budget of the Earth. Clouds and their forma- tion, convection, precipitation, mid-latitude storm sys- tems. GE credit: ScEng | QL, SE, VL—I. (I.) Falaona

92. Atmospheric Science Internship (1-2)

Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Internship off and on campus in atmospheric science. Supervision super- vised by a member of the faculty. (P/NP grading only)—I, II, III, (I, II, III.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only)—I, II, III, (I, II, III.)

99. Special Study for Undergraduates (1-5)

(P/NP grading only)—I, II, III, (I, II, III.)

Upper Division

110. Weather Observation and Analysis (3)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 60. Acquisition, distribution and analysis of meteorological data. Vertical sounding analysis, sta- bility indices, probability of local severe weather, weather map analysis. Laboratory (National Weather Service analyses and forecast products. Laboratory makes use of computer-generated offerings. Offered in alternate years. GE credit: ScEng | QL, QL, SE, VL—I. (I.) Anastasio

111. Weather Analysis and Prediction (3)

Lecture—3 hours. Prerequisite: courses 110, 121B, 111L (concurrently), knowledge of a programming language. Tools for analyzing observed properties of mid-latitude weather systems. The analysis-forecast process, including various weather forecast models. General structure and properties of mid-latitude weather systems. Offered in alternate years. GE credit: ScEng | QL, SE, VL—I. (I.) Grotjahn

111LY. Weather Analysis and Prediction Laboratory (2)

Lecture—2 hours; web virtual lecture—4 hours. Prerequisite: course 111 (concurrently). Subjective and objective analysis of weather data. Web-based learning of the analysis-forecast system and various weather forecasting situations. Weather map inter- pretation and forecast discussions. (P/NP grading only) Offered in alternate years. GE credit: ScEng | QL, QL, SE, VL—I. (I.) Grotjahn

112. Weather Forecasting Practice (2)

Discussion—2 hours; laboratory—1 hour. Prerequi- site: course 110. Formal practice in preparing local weather forecasts. Analysis of current weather conditions and recent model performance. Verification and discussion of prior forecast. Interpretation of current forecast model guidance. Posting of forecast. May be repeated for credit up to three times. (P/NP grading only)—I. (I.) Grotjahn

115. Hydroclimatology (3)

Lecture—3 hours. Prerequisite: course 60. Examina- tion of climate as the forcing function for the hydro- logic system. Emphasis on analysis and variations in the relationship between precipitation and evapotranspi- ration for meso-scale areas. Watershed modeling of floods and drought for evaluating the effects of cli- mate change. GE credit: ScEng | QL, SE, SL—I. (I.)

116. Climate Change (4)

Lecture—3 hours; extensive writing. Prerequisite: University Writing Program 1; consent of instructor. Climate trends and variations in the recent past and the future. Emphasis on natural processes that produce climate variations and human influence on these processes. Evidence of climate change and the role of global climate models in understanding cli- mate variability. GE credit: ScEng | QL, SE, WE—III. (III.)

120. Atmospheric Thermodynamics and Cloud Physics (4)

Lecture—3 hours, extensive problem solving. Prerequi- site: Mathematics 21C, Physics 9B, course 60 (may be taken concurrently). Introduction to composition and structure, thermodynamics of atmospheric gases, thermal properties of dry and moist air, atmo- spheric stability; cloud nucleation, cloud growth by condensation and collision, cloud microphysics. GE credit: ScEng | QL, SE, VL—I. (I.) Falaona

121A. Atmospheric Dynamics (4)

Lecture—3 hours, extensive problem solving. Prerequi- site: course 120, Mathematics 21D, Physics 9B. Fundamental forces of the atmosphere, potential vorticity, frontal reference frames; development of the equations of motion for rotating stratified atmospheres; isobaric and natural coordinate systems; geostrophic flow; thermal wind; circulation and vorticity. GE credit: ScEng | QL, SE—II. (II.) Nathan

121B. Atmospheric Dynamics (4)

Lecture—3 hours, extensive problem solving. Prerequi- site: course 121A. Dynamics of fluid motion in geophysical systems; quasi-geostrophic theory, funda- mentals of wave propagation in fluids; Rossby waves; gravity waves; fundamentals of hydrody- namic instability; two-level model; baroclinic instabil- ity and cyclogenesis. GE credit: ScEng | QL, SE—III. (III.) Chen

124. Meteorological Instruments and Observations (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 60; Physics 5C. Monitoring and measuring instruments and their use in meteorological observa- tions and measurements. Both standard and micro- meteorological instruments are included. Offered in alternate years. GE credit: ScEng | QL, SE, VL—I. (I.) Paw U

128. Radiation and Satellite Meteorology (4)

Laboratory/discussion—3 hours; extensive problem solving—1 hour. Prerequisite: course 60, Physics 9B, Mathematics 22B, 21D. Concepts of atmospheric radiation and the use of satellites in remote sensing. Emphasis on the modification of solar and infrared radiation by the atmosphere. Emphasis on satellite data of atmospheric variables such as tempera- ture and cloudiness. GE credit: ScEng | QL, SE, VL—I. (I.) Nathan

133. Biometeorology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: one course in a biological discipline and Mathematic 16B or consent of instructor. Atmospheric and biological interactions. Physical and biological basis of weather effects, including carbon dioxide and energy exchanges with the atmosphere associated with plants and animals, including humans. Microclimate of plant canopies and microclimatic modification such as frost protection and windbreaks. GE credit: ScEng | QL, SE, SL, VL—I. (I.) Paw U, Snyder

149. Air Pollution (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D, 22B, Chemistry 2B. Atmospheric Science 121A or Engineering 103. Physical and technical aspects of air pollution. Emphasis on geo- physical processes and air pollution meteorology as well as physical and chemical properties of pollut- ants. (Same course as Civil and Environmental Engi- neering 149.) GE credit: ScEng | QL, SE, SL—I. (I.) Cappa

150. Introduction to Computer Methods in Physical Sciences (4)

Lecture—3 hours; lecture/discussion—2 hours. Prerequisite: Mathematics 22B, Physics 9B, and a com- puter programming course such as Engineering Computer Science 30. Additional courses in fluid dynamics (course 121A or Engineering 103) and in Fourier transforms (Mathematics 118C or Physics 104A) are helpful, but not required. Computational techniques used in physical sciences. Integral and differential equation numerical solution: mainly finite
differencing and spectral (Fourier transform) methods. Time series applications (time-permitting). Specific topics vary from semester to semester. Accelerated introduction to FORTRAN including programming assignments. Enrollment limited to 12, preference to Atmospheric Science majors. Offered in alternate years. CE credit: SE—II, I. (I.) Grotjahn

158. Boundary-Layer Meteorology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 121A. Dynamics of the atmosphere nearest the Earth’s surface. Friction and heat transfer. Properties of turbulent flows; statistical and spectral techniques; use and interpretation of differential equations. Emphasis on the importance to weather, air pollution, and the world’s oceans. GE credit: SciEng | GL, SE, VL—II, III. (I.) Faloon

160. Introduction to Atmospheric Chemistry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 2B. Qualitative examination of current local, regional and global problems in atmospheric chemistry (including photochemical smog, acid deposition, climate change, and stratospheric ozone depletion) using surface, atmosphere, and hydrologic system. Basic chemical modeling of atmospheric reaction systems. Offered in alternate years. GE credit: SciEng | GL, SE, SL, VL—II, III, I. (I.) Anastasio

192. Atmospheric Science Internship (1-12)
Internship—3 hours. Prerequisite: completion of 84 units and consent of instructor. Internship off and on campus in atmospheric science. Internship supervised by a member of the faculty. (P/NP grading only.)(I, II, III, I, II, III, I.)

198. Directed Group Study (1-5)
Prerequisite: three upper division units in Atmospheric Science (P/NP grading only.)(I, II, III, I, II, III, I.)

199. Special Study for Advanced Undergraduates (1-15)
Prerequisite: three upper division units in Atmospheric Science and at least an overall B average. (P/NP grading only.)(I, II, III, I, II, III, I.)

Graduate

215. Advanced Hydroclimatology (3)
Lecture—3 hours. Prerequisite: course 115. Theoretical and applied aspects of energy and mass fluxes linking terrestrial, atmospheric, and hydrologic system. Emphasis on regional scale analysis and modeling, spatial data representation, and climatic change influences on precipitation and its hydroclimatic expression. Offered in alternate years. —(III.)

221. Advanced Atmospheric Dynamics (3)
Lecture—3 hours. Prerequisite: course 121B. Conditions for instability in stratified atmospheres; baroclinic instability, forced topographic Rossby Waves; wave-mane flow interaction theory; tropical dynamics; stratospheric dynamics. Offered in alternate years. —(II.) Nathan

225. Advanced Boundary-Layer Meteorology (3)
Lecture—3 hours. Prerequisite: course 230. Characteristics of the atmospheric boundary layer under convective and nocturnal conditions. Heat budget at the surface and boundary layer forcing. Similarity theory and scaling of the boundary layer. Measurement and simulation techniques. Offered in alternate years. —(I.) Faloon

230. Atmospheric Turbulence (2)
Lecture—3 hours. Prerequisite: + course 121B or 154. Dynamics and energetics of turbulence in the atmosphere including vorticity dynamics. Statistical description of turbulence; Eulerian and Lagrangian scales; spectral analysis; conditional sampling techniques. Turbulent diffusion; the closure problem, gradient-diffusion and second-order methods. Offered in alternate years. —II, Paw U

231. Advanced Air Pollution Meteorology (3)
Lecture—2 hours. Prerequisites: Course 149A, 160 and one course in fluid dynamics. Processes determining transport and dispersion of primary and secondary pollutants. Models of chemical transformations in atmospheric boundary layer and of mesoscale wind fields, as applicable to pollutant dispersion problems. Offered in alternate years. —(I.)

233. Advanced Biometeorology (3)
Lecture/discussion—3 hours. Prerequisite: course 1213 or consent of instructor. Current topics in biometeorology. Physical and biological basis for water vapor, other gases, and energy exchange with the atmosphere. Topics include modeling and measuring turbulent transport in the atmosphere, surface temperatures and energy budgets, bio-aerosol physics and aerobiology. Offered in alternate years. —(II.) Paw U

240. General Circulation of the Atmosphere (4)
Lecture/discussion—4 hours. Prerequisite: course 121B. Large-scale, observed atmospheric properties. Radiation, momentum, and energy balances derived and compared with observations. Lectures and homework synthesize observations and theories, then apply them to understand the large-scale circulation. Offered in alternate years. —I. Grotjahn

241. Climate Dynamics (3)
Lecture/discussion—3 hours. Prerequisite: course 121B. Dynamics of large-scale climatic variations over time periods from weeks to centuries. Description of the appropriate methods of analysis of atmospheric and oceanic time series. Conservation of mass, energy and momentum. Introduction to the range of climate simulations. Offered in alternate years. —(II.) Ulreich

250. Meso-Scale Meteorology (3)
Lecture—3 hours. Prerequisite: graduate standing, course 150, a course in partial differential equations; or consent of instructor. The study of weather phenomena with horizontal spatial dimensions between 2.5 and 2500 kilometers. Methods of observational study and numerical modeling of the structure and temporal behavior of these weather systems. Offered in alternate years. —II, Chen

255. Numerical Modeling of the Atmosphere (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 121B and Engineering 5; course 150 recommended. Principles of numerical modeling of the dynamic, thermodynamic and physical processes of the atmosphere. Hands-on experiments on model development using the shallow water equations and the primitive equations. Operational forecast models. Offered in alternate years. —II, Chen

260. Atmospheric Chemistry (3)
Lecture—3 hours. Prerequisite: course 160. Chemistry and photochemistry in tropospheric condensed phases (fog, cloud, and rain drops and aerosol particles). Gas-phase and gas-particle partitioning of compounds and effects of reactions in condensed phases on the fates and transformations of tropospheric chemical species. Offered in alternate years. —II, III. Zhang

270A-G. Topics in Atmospheric Science (1-3)
Discussion—1.3 hours. Applications and concepts in (A) Meteorological Statistics; (B) Computer Modeling of the Atmosphere; (C) Design of Experiments and Field Studies in Meteorology; (D) Solar and Infrared Radiation in the Atmosphere; (E) Aerosol and Cloud Physics; (F) Atmospheric Chemistry; (G) General Meteorology. —I, II, III. (I, II, III.)

280A. Air Quality Policy in the Real World (4)
Project. Prerequisite: consent of instructor, Atmospheric Science 149 or Engineering: Civil and Environmental 145. Seminar. Emphasis on current air quality problems and policy, with a team and mentor from government or industry. Science, engineering and policy will be involved. Findings will be presented orally and in writing. Offered irregularly. (Deferred grading only, pending completion of sequence.)—II, III, I. (II, III, I.)

280B. Air Quality Policy in the Real World (4)
Project. Prerequisite: course 280A; consent of instructor. In-depth investigation of an air quality problem with a team and mentor from government or industry. Science, engineering and policy will be involved. Findings will be presented orally and in writing. (Deferred grading only, pending completion of sequence.) Offered irregularly. —II, III, I. (II, III, I.)

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing in Atmospheric Science or related field. Current developments in selected areas of atmospheric research. Topics will vary according to student and faculty interests. (S/U grading only.)—I, II, III, I. (II, III, I.)

291A-F. Research Conference in Atmospheric Science (1-3)
Lecture/discussion—1.3 hours. Prerequisite: consent of instructor. Review and discussion of current literature and research in: (A) Air Quality Meteorology; (B) Biometeorology; (C) Boundary Layer Meteorology; (D) Climate Change; (E) Chemical Weathering; (F) Atmospheric Chemistry. May be repeated up to a total of 6 units per segment. (S/U grading only.)—I, II, III, I. (II, III, I.)

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)—II, III, I. (II, III, I.)

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)—II, III, I. (II, III, I.)

Professional

393. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (P/NP grading only.)—I, II, III, I. (II, III, I.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—II, III, I. (II, III, I.)