College of Atmospheric and Geographic Sciences

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Administrative Officers
Berrien Moore, III, Ph.D., Dean and Vice President for Weather and Climate Programs
May Yuan, Ph.D., Director of the Center for Spatial Analysis and the Geoinformatics Program
Kevin Kloesel, Ph.D., Associate Dean
Mary Anne Hempe, M.F.A., Assistant Dean

Degrees Offered
• Bachelor of Arts in Geography
• Bachelor of Arts in Geographic Information Science
• Bachelor of Science in Geography
• Bachelor of Science in Geographic Information Science
• Bachelor of Science in Meteorology
• Master of Arts
• Master of Science in Meteorology
• Master of Science in Professional Meteorology
• Doctor of Philosophy

General Information
The College of Atmospheric and Geographic Sciences is a national leader in education, research and development, and scholarship in the areas of weather and regional climate, and human interactions with the Earth’s atmosphere and surface. Areas of particular strength include applied climatology, hydrology, atmospheric dynamics, mesoscale meteorology and severe storms, weather radar, atmospheric physics, geographic information systems, resource management and remote sensing of Earth’s atmosphere and surface. The College’s faculty contribute to the accomplishment of the University mission by preparing students at all levels for leadership roles in science, industry, and government. They conduct basic and applied research to understand and better predict weather and climate, and to understand how human beings live within the Earth System. Since many of the programs are inherently interdisciplinary and environmentally oriented, the College strongly encourages and promotes interaction with the basic sciences, mathematics, engineering, and the social sciences.
The College is composed of academic and research units: the Department of Geography and the School of Meteorology are the academic units; research units include the Atmospheric Radar Research Center, Center for the Analysis and Prediction of Storms, the Center for Spatial Analysis, the Cooperative Institute for Mesoscale Meteorological Studies, the Environmental Verification and Analysis Center, and the Oklahoma Climatological Survey.

The College administrative offices located in the National Weather Center, the University’s new facility for weather education, research, and operations. This 255,000-square-foot facility houses weather research and operations programs of the University of Oklahoma and the U.S. National Oceanic and Atmospheric Administration. The College’s Student Advising Center is located in the Sarkeys Energy Center.

CAREER OPPORTUNITIES

Meteorology

Recipients of undergraduate degrees find employment in both government and private sectors. Within government, the National Weather Service and its parent organization, National Oceanographic and Atmospheric Administration (NOAA) have needs for weather forecasters and research assistants. The U.S. Armed Forces also have opportunities for meteorologists who desire to serve their country in uniform. Many state and local water and environmental agencies also require weather expertise. Private sector companies have growing needs for weather information; examples include broadcast meteorology, consulting, aviation industry and, in general, companies which provide specific weather and climate information for their clients. Recipients of M.S. and Ph.D. degrees are most likely to become involved in research at federal laboratories or in government-sponsored programs at universities while some become faculty at the secondary school, college, and university levels.

Programs for Academic Excellence

PARTICIPATION IN THE HONORS PROGRAM

A high percentage of eligible College of Atmospheric and Geographic Sciences undergraduate students participate in the University-wide Honors Program described elsewhere in this catalog. Specially designed Honors courses and seminars provide the Honors student with small classes and opportunities for interaction with the University’s best and brightest faculty members, both within the student’s major field of study and in other courses used to satisfy curricular requirements.

FIELD COURSES

To atmospheric and geographic scientists, Earth’s atmosphere and surface constitute a natural laboratory. Thus, it is important that students devote a portion of their academic careers to exploring and studying aspects of the Earth away from the OU campus. Field trips in geography are offered in the central and western U.S. and faculty members involve students in their active field research programs around the world. The central U.S. is a vast open-air laboratory for meteorology faculty and students who combine theoretical modeling with extensive field observation and measurement programs.

RESEARCH OPPORTUNITIES

Talented undergraduate students are encouraged to work with faculty on research projects. These student research projects can be an important component of the Honors Program and/or a source of part-time income and scholarship support. Such research participation provides the student with important experience in his or her discipline in addition to meeting normal academic requirements.

Faculty-supervised research is an important component of the College of Atmospheric and Geographic Sciences graduate program. Many graduate students are supported financially through research assistantships funded by federal and private industry grants and contracts. Other graduate students are supported financially through teaching assistantships awarded by their academic units. Faculty-supervised student research leading to master’s theses and doctoral dissertations is an integral component of the overall graduate degree requirements.

Special Facilities and Programs

The academic and research units of the College of Atmospheric and Geographic Sciences are housed in the Sarkeys Energy Center (SEC) and the National Weather Center (NWC).

THE SARKEYS ENERGY CENTER

The College of Atmospheric and Geographic Sciences Student Services Center, as well as the Department of Geography and the Environmental Verification and Analysis Center (EVAC) are housed in the 15-story Sarkeys Energy Center (SEC). Classrooms and laboratory facilities are also located in the building.

THE NATIONAL WEATHER CENTER

The National Weather Center (NWC) building is a new 244,000 square foot, $67 million facility located on the University Research Campus. This building houses the National Weather Center programs, a confederation of state and federal organizations which work together on educational, pure and applied research, and operational activities.

The School of Meteorology, the Atmospheric Radar Research Center, the Cooperative Institute for Mesoscale Meteorological Studies, the Center for Analysis and Prediction of Storms, the Environmental Verification and Analysis Center, the Center for Spatial Analysis, the Natural Hazards and Disaster Prevention Center, and the Oklahoma Climatological Survey, are the University of Oklahoma components of the Weather Center.

The federal agencies that are part of the Weather Center include: the National Severe Storms Forecast Laboratory, the Storm Prediction Center, the National Weather Service Office (Oklahoma City), the WSR-88D (NEXRAD) Radar Operations Center, and the Warning Decision Training Branch. The National Weather Center programs offer a rich educational and research environment for students pursuing undergraduate and graduate study in meteorology, climate, hydrology, remote sensing, and computer applications.

GEOSPATIAL AND IMAGE ANALYSIS LABORATORY

The Geospatial And Image Analysis (GAIA) laboratory facilitates both research and teaching related to spatial data analysis, especially the design and application of Geographic Information Systems, the analysis of remotely sensed data and its integration with other spatial data types, and the statistical analysis of spatial data. The laboratory provides the opportunity for students to obtain “hands-on” experience in geospatial techniques in both UNIX workstation and PC-based computational environments.

CENTER FOR SPATIAL ANALYSIS (CSA)

The Center for Spatial Analysis promotes geographic thinking and spatiotemporal reasoning through research, education, outreach, and other collaborative activities. CSA offers research opportunities in geographic information science and technology, including Geographic Information Systems (GIS), Remote Sensing, and Global Positioning Systems to faculty, staff, and graduate and undergraduate students across OU campuses as well as state and local governments in Oklahoma. CSA
leads the OU delegation to participate in the University Consortium of Geographic Information Science (UCGIS) to set national agendas in GIS research and education. CSA serves the university community by providing technical support for students, faculty, and researchers to develop collaborative projects that incorporate geospatial technology. In addition, learning opportunities are provided through outreach activities, internships, training courses and workshops for students as well as to the broader community beyond the campus. CSA is a member of the state GIS council and an active participant in national and international programs. Please visit our Web site at http://csa.ou.edu for further information.

College Honor Roll
The College of Atmospheric and Geographic Sciences Honor Roll is compiled at the close of each fall and spring semester. It includes students who have completed at least 12 grade point hours and have earned an average of 3.50 or higher during the semester.

Part-time students enrolled for both the fall and spring semesters of an academic year will be included on the spring semester honor roll provided that, as a result of combining the work completed during the fall and spring semesters, they earn at least 12 grade point hours with no withdrawals and an average of 3.50 or better.

Student Organizations

- The University of Oklahoma Geography Club
- Association of Geography Graduate Students
- Student Chapter of the American Meteorological Society
- Student Affairs Committee (Meteorology)
- Oklahoma Weather Lab (OWL)

STUDENT ACTIVITIES

Students majoring in Geography and Meteorology form lasting friendships while at OU, drawn together by the rigor of their degree programs, a devoted faculty and staff, and social activities sponsored by the College of A&GS and by the College’s individual academic units, including photo contests, Movie Mondays in the National Weather Center Library, the annual Bevo Barbeque, Sophomore Spotlight, the Multi-Cultural Festival, Groundhog’s Day Party, trips to TV stations and sporting events, forecast contests, the activity-filled A&GS Week, the Weather Festival, and the Geography Bowl, to name just a few.

Students also form strong bonds through participation in student clubs, such as the OU student chapter of the American Meteorological Society (OUSCMS) at http://weather.ou.edu/~ouscams/; the Oklahoma Weather Lab (OWL) at http://owl.ou.edu/; the Student Affairs Committee (SAC) at http://weather.ou.edu/~sac/; and the Geography Club (please contact faculty sponsor Dr. Aondover Tarhule at atarahule@ou.edu for more information).

Scholarships and Financial Aid

Students entering the University are eligible to apply for any of the general scholarships awarded by the University Scholarship Committee. General scholarships are awarded on the basis of academic achievement and financial need. Scholarship and other forms of financial aid information is available from the Office of Financial Aid Services, University of Oklahoma, Norman, OK 73019.

In addition, scholarships are awarded to geography and meteorology students by the programs in the College of Atmospheric and Geographic Sciences. For additional information, please refer to the academic unit sections in the following pages.

Computing

The College of Atmospheric and Geographic Sciences has made a major commitment to integrate and expand computer and network technology in its courses and programs. A&GS students access and use a rich variety of materials and educational experiences through local and Internet-based resources. While the University provides computer labs for student use, the College of Atmospheric and Geographic Sciences provides specialized computing labs for exclusive use by its majors. Media Lab North is located in Sarkeys Energy Center, Room 543; and, Media Lab South is located in the National Weather Center, Room 4803. Both labs contain equipment geared toward the special needs of students majoring in the College of Atmospheric and Geographic Sciences. The College is a partner in the University of Oklahoma SuperComputing Center. For additional information, please refer to the academic unit sections in the following pages.

Undergraduate Study

Students may expect the advising staff in the Student Services Center to:
- Work with you to establish realistic goals and objectives.
- Encourage you to be responsible for your own academic progress and to realize your full potential as a student at the University of Oklahoma.
- Understand and communicate the Atmospheric and Geographic Sciences curriculum, graduation requirements, and University of Oklahoma policies and procedures.
- Be accessible for meetings by appointment.
- Respond promptly respond to your e-mails and telephone calls.
- Make referrals to resources outside the College when needed.
- Help you monitor your progress toward graduation.
- Assist you with any problems of an academic nature.

As a student in the College of Atmospheric and Geographic Sciences, you are expected to:
- Learn the requirements for your degree, which are posted on the College’s Web site (ags.ou.edu) and in the OU General Catalog.
- Become familiar with Degree Navigator (degree.ou.edu), the University’s online system that monitors progress toward the completion of your degree.
- Become knowledgeable about University policies and procedures, e.g., drop/add deadlines, enrollment, how to apply for financial aid.
- Set a projected graduation date and develop a semester-to-semester plan to complete your degree.
- Stay up to date with College events and opportunities by reading Monday Memo, the College’s weekly online newsletter which is e-mailed to you every week during the spring and fall semesters.
- Meet with your faculty advisor at least once every semester.
- Schedule a degree check in the College’s Student Services Center (Sarkeys Energy Center, Room 710) by the first semester of your junior year.
- Save a copy of every paper or major assignment, along with all official University documents (e.g., receipts) until you are cleared for graduation.
- Be responsible for your actions and decisions.

ADMISSION TO THE UNIVERSITY

Students must be admitted to the University of Oklahoma before being admitted to the College of Atmospheric and Geographic Sciences. First-year students and all other prospective A&GS students who have not yet met the requirements for admission to the College of Atmospheric and Geographic Sciences are admitted to University College. Inquiries concerning admission to the University and University College should be addressed to the Office of Admissions. Students are cautioned however, that the admission requirements for the College of Atmospheric and Geographic Sciences programs are more stringent than the requirements for admission to the University. New students considering majoring in any of the College’s programs should complete as a minimum the following high school preparatory work:
- Mathematics — four years of college-preparatory mathematics.
- Sciences — a year each of physics, chemistry, biology and/or Earth sciences.
- English — four years (including grammar and composition).
- Foreign Language — two years (same language).
Additional College Regulations

ADMISSION TO THE COLLEGE

Students will be admitted to the College of Atmospheric and Geographic Sciences from University College once they declare a geography or meteorology major and complete the following requirements:

- A minimum of 24 semester hours of college credit.
- A minimum combined retention grade point average of 2.00.

Academic credit from any division of the University of Oklahoma — Norman campus, Health Sciences Center, OU-Tulsa, and Claremore, or Continuing Education — is considered resident credit at the University of Oklahoma. Grades and hours earned at any of these divisions are included in the OU retention and cumulative grade point averages for purposes of admission or readmission to the University, and to the individual colleges within the University.

STUDENT ADVISEMENT

The College of Atmospheric and Geographic Sciences believes that faculty members are best qualified to provide curricular, professional, and career advisement. Students in the College are required to meet with their faculty adviser every semester prior to each enrollment period.

In addition to your A&GS faculty adviser, the professional staff in the College’s Student Services Center (located in Sarkeys Energy Center, Room 710) is available to assist students with degree checks, transfer equivalencies, and any problems of an academic nature. Students may call (405) 325-3101 to schedule an appointment.

Please note that the responsibility for meeting graduation requirements lies with the student and not with the adviser, the school/deptartment, or the Dean.

COLLEGE GRADE POINT AVERAGE REQUIREMENTS

To remain in good standing in the College of Atmospheric and Geographic Sciences, students must maintain a 2.00 combined retention grade point average in all coursework attempted, a 2.00 grade point average in all coursework attempted in the major area, and a 2.00 retention grade point average in all coursework attempted at OU.

ENROLLMENT AGREEMENT

Students whose major, combined retention or OU retention grade point averages fall below 2.00 are placed on enrollment agreement. Students on enrollment agreement will be denied enrollment privileges through the College of Atmospheric and Geographic Sciences following any semester in which satisfactory scholastic progress toward a 2.00 has not been made.

Grade point deficiencies must be made up through reenrollment in major courses in which the student had a last-recorded grade of D or F. Should all D or F grades in curriculum courses be raised to a C or above, and the student still has grade point scholastic deficiencies, the student may then enroll in non-major courses. For the freshman and sophomore years any course may be used, but for the junior and senior years, the courses must be numbered 2000 or above, unless the course so elected is approved as an elective in the last two years of the student’s major curriculum.

After a student has been reinstated in the University following an unsatisfactory scholastic record, the student must apply to the Dean of the College of Atmospheric and Geographic Sciences for reinstatement in the College. The Dean will determine whether to readmit the student and may prescribe the conditions for reinstatement in the College in accordance with the policies established by the faculty and the Dean.

COLLEGE CREDIT HOUR REQUIREMENTS

To be recommended for a bachelor’s degree in the College of Atmospheric and Geographic Sciences, a student must complete:

- A minimum of 124 semester credit hours applicable toward an Atmospheric and Geographic Sciences bachelor’s degree.
- A minimum of 48 semester credit hours of upper division credit (courses numbered 3000 or above) must be earned at an accredited senior institutions.

- A minimum of 60 semester credit hours must be completed at accredited senior institutions.
- Transfer credit may be accepted from two-year colleges to meet lower division requirements only.
- A minimum of two semesters must be spent in residence in the College of Atmospheric and Geographic Sciences.
- At least 36 of the last 48 hours must be earned in residence at OU.
- No more than 52 of the minimum 124 semester credit hours may be taken in one department of the college (geography or meteorology).
- No more than six hours of independent study or directed readings may be applied toward degree requirements.
- A minimum 2.00 must be maintained in the major, on all OU work attempted, and on the student’s combined retention grade point average.
- No more than six semester credit hours of military science may be applied toward degree requirements.

ADDITIONAL ACADEMIC REGULATIONS

1. Any departure by a student from the curriculum requirements and scholastic rules must be approved by a petition and must not conflict with existing University regulations.

2. The College of Atmospheric and Geographic Sciences requires comprehensive examinations to be given during the regular scheduled examination periods in all undergraduate courses excluding directed readings, pure laboratory courses and project-type courses and seminars. No member of the faculty is authorized to depart from this regulation or from the published examination schedule for either a class or an individual without prior approval. Special early examinations given to individual students or groups of students as substitutes for final examinations are prohibited. A student will not be expected to take more than two examinations in one day.

3. Full-time students may enroll in 12-19 hours of coursework. Enrollment in more than 19 credit hours is permitted only with the approval of the student’s adviser and the Dean of the College of Atmospheric and Geographic Sciences. Permission to carry more than 19 hours will depend primarily on the student’s scholarship record and his/her ability to carry increased loads.

4. Academically superior students are encouraged to contact the Honors College office to investigate their participation in the University’s Honors College.

5. Pass/no pass enrollments may not be used to satisfy College of Atmospheric and Geographic Sciences requirements.

TEN-YEAR LIMITATION RULE

Credit in a student’s major that is more than 10 years old may not be applied toward a bachelor’s degree unless it is validated by the major department or by each department if the student’s major is interdisciplinary.

Minors

The College of Atmospheric and Geographic Sciences offers students the option of declaring a minor subject. Minors in the College are available in geography, geographic information science, hydrologic science, physical geography, weather and climate, and meteorology. The specific minor requirements will be found in the section of the catalog describing the major program offered by the College and at http://ags.ou.edu/academics_minors.php. Minors in hydrologic science and Weather and Climate offered by the College are described below. The successful completion of a minor will be entered on the student’s permanent record at the time the degree is recorded. The College of Atmospheric and Geographic Sciences also offers these approved minors to students registered in other colleges within the University. In addition, A&GS students are eligible to declare a minor offered through other OU colleges.

Minor in Hydrologic Science

Hydrologic science is the study of the occurrence, distribution, movement and properties of water and its relationship with the Earth’s environment. Thus, hydrologic science is a cross-disciplinary area which blends aspects of
civil engineering, environmental science, geography, geology, geophysics, and meteorology. Persons with backgrounds in hydrologic science will have the expertise to investigate the water cycle including techniques on measuring the various components with various tools such as radar, GIS, and remote sensing platforms. This will allow for preparing plans for the wise, long-term use of water resources in agriculture, industry, municipal planning, and recreation.

The minor offers two options designed to address the most prominent areas of hydrologic science: Hydroclimatology and Groundwater-Subsurface Environment. Academic requirements for either option include 15 credit hours from the hydrologic-related disciplines listed above. This minor requires a minimum 2.00 GPA in all minor courses. Consult the School of Meteorology for complete requirements.

Minor in Weather and Climate

The College of Atmospheric and Geographic Sciences offers students in other colleges a minor in Weather and Climate. This minor requires the successful completion of 15 hours of courses acceptable for major credit in Geography and Meteorology, to include nine hours at the upper-division level. This minor is not available to Geography or Meteorology majors.

College Requirements for Graduation

GRADUATION GRADE POINT AVERAGE

A minimum 2.00 must be maintained in the major, on all OU work attempted, and on the student’s combined retention grade point average to earn a bachelor’s degree through the College of Atmospheric and Geographic Sciences.

DISTINCTION AND SPECIAL DISTINCTION DEGREES

The faculty may recommend that the degree “With Distinction” be conferred on graduates who have a retention grade point average at OU of 3.50 or higher and “With Special Distinction” on students who have an OU retention grade point average of 3.75 or higher.

BACHELOR OF ARTS DEGREE

In addition to University requirements which include 40 hours of University-Wide General Education, and College of Atmospheric and Geographic Sciences requirements, which include a minimum of 48 hours of upper-division coursework, the following must be completed for the Bachelor of Arts in Geography or the Bachelor of Arts in Geographic Information Science:

- Humanities — one course in addition to General Education requirements.
- Natural Science elective — one course in addition to General Education requirements.
- Two courses (six hours) intermediate-level foreign language. Students who demonstrate proficiency in a foreign language (through placement or competency exam) may replace the six hours of foreign language with adviser approved electives.
- Twenty-four hours of adviser approved coursework outside the Department of Geography.

Please note that although the Bachelor of Arts in Geography requires the completion of GEOG 3924 (Analytic Methods in Geography), a course that carries General Education math credit, students must complete an additional General Education math course.

Total Minimum Curriculum Hours Required for Graduation: 124.

BACHELOR OF SCIENCE DEGREES

In addition to University requirements which include 40 hours of University-Wide General Education, and College of Atmospheric and Geographic Sciences requirements, which include a minimum of 48 hours of upper-division coursework, the following must be completed for the Bachelor in Science in Geography, the Bachelor of Science in Geographic Information Science, or the Bachelor of Science in Meteorology:

- CHEM 1315, General Chemistry*
- PHYS 2514, General Physics I for Science and Engineering Majors*, and PHYS 2524, General Physics II for Science and Engineering Majors
- MATH 1823, Calculus & Analytic Geometry I,* MATH 2423, Calculus & Analytic Geometry II, MATH 2433, Calculus & Analytic Geometry III, and MATH 2443, Calculus & Analytic Geometry IV
- C S 1313, Computer Programming for Non-Majors
- A minimum of nine hours of approved courses in biologic science, chemistry, computer science, mathematics, physics, engineering and geosciences science courses outside the major area. A minimum of three hours of the required nine credit hours must be in a geography, geology, geophysics, or meteorology science course outside the student’s major area. A minimum of six hours of the required nine credit hours must be upper-division coursework.

* Also fulfills a General Education requirement

Total Minimum Curriculum Hours Required for Graduation: 124.

For specific requirements for individual degrees, please refer to the academic unit sections in the following pages.

Second Bachelor’s Degrees

A student who has completed the requirements for a bachelor’s degree may receive a second bachelor’s degree upon the completion of the curriculum prescribed for the second degree, provided that the work completed includes at least 30 additional credit hours of upper-division geography, meteorology, applied science and elective courses appropriate to the field of the second degree. These courses must be over and above the credit hours required for the first degree.

Graduate Study

For specific information about graduate studies, please refer to the academic unit sections in the following pages.

Department of Geography

Aondover Tarhule, Acting Chair
Sarkeys Energy Center, Suite 684
Norman, OK 73019-1007
Phone: (405) 325-5325
FAX: (405) 325-6090
Internet: http://geography.ou.edu

Faculty Roster

Professors Greene, Shelley, Wallach; Associate Professors Hoagland, Offen, Rundstrom, Tarhule; Assistant Professors Julian, Purcell, Rashed, Smith; Adjunct Professor Kessler; Lecturers Gress, Gros, Rood.

Degrees Offered

- Bachelor of Arts in Geography
- Bachelor of Arts in Geographic Information Science
- Bachelor of Science in Geography
- Bachelor of Science in Geographic Information Science
- Master of Arts
- Doctor of Philosophy

General Information

Geography is one of the oldest organized fields of study. Natural curiosity and a desire to seek resources prompted early people to migrate across land and oceans. As knowledge of the world and its people grew, so too did the discipline of geography. The known world was mapped, and
cartography developed as a specialized profession highly dependent on mathematics. Continued exploration produced information that was synthesized, and the world was defined and interpreted by geographers.

Modern geography continues to analyze global environments and the role of human life in these systems. The study of the interaction of physical and biological systems with social systems forms a central focus for many geographers. No other scholarly field addresses the interplay between patterns of human activity and the Earth’s climates, landforms, vegetation and soils. In this sense, geography is a field of extraordinary breadth, which attempts to understand connections among the dynamic systems operating on the surface of the Earth.

Modern technologies that allow the collection of geographic information from maneuverable or fixed orbital air and spacecraft provide today’s geographer with holistic perspectives of the Earth at frequent intervals in time. Devices to store and analyze these data have given the geographer the means to study a wide array of physical and human phenomena across the entire Earth surface. Geographers examine rhythms in the Earth’s ocean and atmosphere and their impacts on its land surface, land use and cover, and the evolution of physical and cultural patterns on the surface of the Earth.

Programs for Academic Excellence

The department currently works across the broad spectrum of geography. Faculty research interests in physical geography include hydrology, global and tropical climatology, and biogeography. In human geography, faculty research interests include cultural and historical studies focusing on economic and natural resource development, land use, cross-cultural contacts, political geography, and the geography of cyberspace. Active research interests of the faculty in techniques include geographical information systems (GIS), quantitative methods, statistical climatology, and remote sensing. The faculty is involved in research associated with areas of common interest between geography and meteorology, including natural hazards and disasters, water resources, land use and land cover change, and sustainability. Among them, the entire faculty is currently working in many geographical areas, including the United States, Canada, Latin America, Eastern Europe, West Africa, the Middle East, and South and East Asia.

Special Facilities and Programs

Department offices are housed primarily on the fourth and sixth floors of Sarkeys Energy Center, while laboratories are located on the first floor of the same building. Among these laboratories is a GIS complex which includes PCs, digitizers, printers, and plotters. Available software includes ERDAS, ARC/INFO, ATLAS/GIS, MAP INFO, and IDRISI. The department also has laboratories for physical geography, cartography, and remote sensing.

University resources include the Bizzell Memorial Library which has an extensive collection of journals and books on geography, a large collection of maps and aerial photographs, and special collections in Western History, the History of Science, and the Geosciences. The Department houses the Center for Spatial Analysis, the Environmental Verification and Analysis Center, and the Oklahoma Alliance for Geographic Education.

Scholarships

The Ralph E. Olson and Margaret Olson Scholarship Fund provides awards to students who have attained high achievement in the field of geography. Undergraduate geography majors are eligible after completion of the junior year. The Clyde Bollinger Award provides awards to graduating seniors who demonstrate outstanding scholarship and enthusiasm for geography. Additional awards and scholarships are provided annually to outstanding graduate and undergraduate students.

Undergraduate Study

All undergraduate students majoring in geography or geographic information science are required to complete a 32-hour core of coursework, which provides students with an introduction to the major areas of geography. Both the Bachelor of Arts and Bachelor of Science degrees contain electives that allow the student (in consultation with the adviser) to craft a degree program that meets their interests in the various facets of geography. Students are encouraged to meet with the departmental faculty adviser early in the student’s academic career to begin discussing the courses best suited to the student’s interests.

Degree Requirements

For detailed semester by semester curriculum requirements, please consult: checksheets.ou.edu/atmosgeogindex.htm.

BACHELOR OF ARTS IN GEOGRAPHY

1. General Education: 40 semester hours distributed in accordance with University requirements.

2. College of Atmospheric and Geographic Sciences Requirements: 30 semester hours of adviser-approved coursework which must be:
   a. outside the student’s major school or department, and which
   b. must contain two foreign language courses at the intermediate level, or the student must demonstrate competency (via placement or competency exam) at the intermediate level.

3. Department of Geography Core Requirements: 32 semester hours including Geography 1113 or 2503, 3001, 3023, 3213, 3243, 3924, 3930, one course in Geographic Information Science, two Geography courses as electives and the capstone (4953).

4. Department of Geography Additional Requirements: Seven additional hours of humanities/natural science electives chosen from the approved University-Wide General Education list (Core Areas III or IV). These hours are in addition to those required for 1 and 2 listed above.

5. Electives chosen in consultation with the departmental faculty adviser to complete the 124-126 hours required (including 48 upper-division).

BACHELOR OF ARTS IN GEOGRAPHIC INFORMATION SCIENCE

For detailed semester by semester curriculum requirements, please consult: checksheets.ou.edu/atmosgeogindex.htm.

1. General Education: 40 semester hours distributed in accordance with University requirements.

2. College of Atmospheric and Geographic Sciences Requirements: 30 semester hours of adviser-approved coursework which must be:
   a. Outside the student’s major school or department, and which
   b. Must contain two foreign language courses at the intermediate level, or the student must demonstrate competency (via placement or competency exam) at the intermediate level.

3. Department of Geography Core Requirements: 35 semester hours, including Geography 2453, 3001, 3023, 3213, 3243, 3924, 3930, 4133, 4233, 4453, 4553, and the capstone (4953).

4. Department of Geography Additional Requirements: Seven additional hours of humanities/natural science electives chosen from the approved University-Wide General Education list (Core Areas III and IV). These hours are in addition to those required for 1 and 2 listed above.

5. Electives chosen in consultation with the departmental faculty adviser to complete the minimum 124 hours required (including 48 at the upper-division level).

BACHELOR OF SCIENCE IN GEOGRAPHY

1. General Education: 40 semester hours distributed in accordance with University requirements.

2. College of Atmospheric and Geographic Sciences Requirements: 46 semester hours including:
   - Math 1823, 2423, 2433, 2443, Computer Science 1313, Chemistry 1315,1415, English 3153, Physics 2514, and 2524;
   - Additional Science Requirements: A minimum of nine hour of approved biological science, chemistry, computer science, mathematics, physics, engineering and geosciences courses outside the major. A minimum of three of these hours must be in a geosciences course outside the student's major; a minimum of six hours must be upper-division.
5. **Electives**

**Department of Geography Core Requirements:** 32 semester hours including Geography 1113 or 2503, 3001, 3023, 3213, 3243, 3924, 3930, 3903, 3933, 4133, 4233, 4453, 4553, and the capstone (4953).

**Department of Geography Additional Requirements:** Seven additional hours of humanities/natural science electives chosen from the approved University-Wide General Education list (Core Areas III or IV). These hours are in addition to those required for 1 and 2 listed above.

**Electives** chosen in consultation with the departmental faculty adviser to complete the 124-126 hours required (including 48 upper-division).

### Bachelor of Science in Geographic Information Science

For detailed semester by semester curriculum requirements, please consult: [checksheets.ou.edu/atmosgeogindex.htm](http://checksheets.ou.edu/atmosgeogindex.htm).

1. **General Education:** 40 semester hours distributed in accordance with University requirements.

2. **College of Atmospheric and Geographic Sciences requirements:** 46 semester hours including:
   - Math 1823, 2423, 2433, 2443, Computer Science 1313, Chemistry 1315, Physics 2514, 2524, and English 3153.
   - **Additional Science Requirements:** A minimum of 15 hours of upper-division faculty-approved courses in biologic science, chemistry, computer science, mathematics, physics, or geoscience courses outside the major.

3. **Department of Geography Core Requirements:** 35 semester hours including Geography 2453, 3001, 3023, 3213, 3243, 3924, 3930, 4133, 4233, 4453, 4553, and the capstone (4953).

4. **Department of Geography Additional Requirements:** Seven additional hours of humanities/natural science electives chosen from the approved University-Wide General Education list (Core Areas III and IV). These hours are in addition to those required for 1 and 2 listed above.

5. **Electives** chosen in consultation with the departmental faculty adviser to complete the minimum 124 hours required (including 48 at the upper-division level).

### Minor in Geography

A minor in geography requires a minimum of 15 hours of courses acceptable for major credit, including at least nine upper-division hours. In fulfilling the minor requirements, a student must complete two introductory courses from 1103, 1113, or 1213; and an introductory-level techniques course from 3924, 3933, 4133, 4353, or 4453. The remainder of the 15 required hours must come from upper-division graded geography courses selected in consultation with a departmental adviser.

### Minor in Geographic Information Science

A minor in geographic information science requires a minimum of 15 hours of courses acceptable for major credit, including at least nine upper-division hours. In fulfilling the minor requirements, a student must complete two introductory courses from 1103, 1113, or 1213; and an introductory-level techniques course from 3353, 3924, 3930, 3933, 4133, 4233, 4453, or 4453.

### Minor in Physical Geography

A minor in physical geography requires a minimum of 15 hours of upper-division courses acceptable for major credit, to be chosen from GEOG 3023, 4133, 4203, 4233, 4273, 4283, 4293, 4314, and 4343. Topics in GEOG 3890 (Selected Topics in Geography) and GEOG 4990 (Independent Study) that are related to Physical Geography will also apply. In addition to GEOG 4133, one upper-division course from the minor in Geographic Information Science may be substituted for a course in this minor. This minor is not available to Geography majors.

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### Graduate Study

#### Admission Requirements

In addition to meeting the requirements of the Graduate College, students seeking admission to the geography program must have an undergraduate grade point average of at least 3.00, be able to define the goals and objectives for their degree program, and submit at least three letters of recommendation. The department encourages the submission of results from the Graduate Record Examination as additional evidence of promise, but they are not required for admission and no minimum score is required. Students who have some deficiencies in their academic background can be admitted conditionally at the discretion of the department. Prospective students are strongly encouraged to contact the Department and to identify and contact prospective advisers before applying for graduate work.

#### Master of Arts

The M.A. degree certifies that a student has a professional grasp of the concepts and techniques of geography and has demonstrated competence and originality in their use. The M.A. degree can be acquired by one of two methods-a thesis option or a non-thesis option.

The thesis option degree requires a total of 30 hours of graduate credit, with at least a B average. Specific coursework requirements include: satisfactory completion of Contemporary Geographical Thought (6973); Research Methods (6953); three three-credit hour research seminars or graduate courses, one field course, and a minimum of four hours and no more than six hours of thesis credit. In addition, the student will:

- a. Present a thesis acceptable to the advisory committee.
- b. Satisfactorily complete an oral examination.

No student may be examined orally more than once. Only after the advisory committee agrees that the thesis is essentially complete will the oral examination be scheduled.

The non-thesis option requires a total of 36 hours of graduate credit, with at least a B average. Specific coursework requirements include: satisfactory completion of Contemporary Geographical Thought (6973), Research Methods (6953), a field course, three three-credit hour research or graduate courses, and six hours of advisor-approved electives. In addition, the student will satisfactorily complete a comprehensive final examination within his or her chosen field of study.

In order to assure that an M.A. program is completed without undue delay, the evaluation process must be successfully completed before the student has completed more than 42 credit hours of graduate coursework. Courses beyond this total can be counted toward a Ph.D. degree only if the student has completed the M.A. degree or its equivalent.

#### Doctor of Philosophy

The Ph.D. degree certifies that a student has mastered a significant body of geographical knowledge and has demonstrated a high degree of professional competence as a geographer by making an important, original contribution to knowledge. The Ph.D. requires:

- a. a total of at least 90 semester hours of graduate credit beyond the bachelor’s degree;
- b. successful completion of Contemporary Geographical Thought (6973), Research Methods (6953), and three three-credit hour seminars or graduate courses, and one field course;
- c. the demonstration of an acceptable level of competence in two areas of specialization;
- d. development of a cognate field; and,
- e. the completion of an acceptable written dissertation followed by an oral defense of that dissertation.

All Ph.D. students must identify an advisory committee which will consist of the adviser and four other faculty members, one of whom must be from a discipline other than geography. The committee must be approved by the Department faculty, upon the recommendation of the adviser and student.
Each student will develop and declare primary and secondary areas of specialization that are acceptable to the advisory committee. Students are expected to declare provisional specialties, in consultation with the advisory committee, by the end of the second semester of residence in the Ph.D. program. Coursework requirements in connection with this specialty, as well as with the cognate field, are determined by the student and the advisory committee in a formal conference held before the end of the first year of residence.

Each student must select a cognate field or discipline related to his or her area of specialization. A cognate field will normally consist of at least nine hours of courses in more than one discipline. The advisory committee must approve both the cognate field and the courses which fulfill this requirement.

The readiness of a student to proceed with dissertation research will be evaluated by written and oral examinations. These will be administered by an examining committee of at least four faculty members from geography, one of whom will be the student’s adviser, and one faculty member from outside the discipline. The written portion of the examination will cover the degree specializations and cognate field. The examination will be prepared by the adviser from questions suggested by members of the examining committee. The oral examination will consist of follow-up questions related to the written portion and to the student’s knowledge of geographic thought and methodology. Satisfactory completion of the written and oral portions of the general examination is followed by formal certification of candidacy for the Ph.D. degree.

After taking the general examination, a formal dissertation proposal must be presented in a meeting open to the geography faculty and graduate student body. If the proposal is judged to be inappropriate or in need of additional work, a second presentation may be required. It is the responsibility of the adviser to determine the consensus of the committee to authorize the student to proceed with the dissertation. No formal vote of approval shall be required of the faculty as a whole, but the proposal must have the sanction of all members of the dissertation committee.

Before the presentation of the proposal, the following procedure will be employed:

a. the membership of the dissertation committee shall be established,
b. the time and place of the presentation shall be publicized, including a written announcement to the geography faculty, and,
c. a written statement of the proposal shall be given to each member of the dissertation committee and to the remaining members of the faculty.

The final requirement is the preparation and oral defense of a Ph.D. dissertation, which must be a major piece of research recognized by the dissertation committee as a significant contribution to knowledge. The dissertation committee must consist of at least five faculty members (except by petition to and approval by the faculty); three or more of them must be geographers and at least two of them, including the adviser, must be on the geography graduate faculty of the University. Members of the advisory committee will normally remain as members of the examination and dissertation committees. All changes in committee membership must be forwarded to the Graduate College for approval at least 30 days prior to defense of the dissertation.

After advancement to candidacy for the Ph.D. degree, a student is expected to submit a dissertation manuscript within four years. After this time, at the discretion of the Department of Geography faculty, the student may be required to repeat the general examinations and/or to resubmit a dissertation proposal as a condition for remaining a degree candidate. As long as there is clear evidence that a student is making progress and is keeping up-to-date professionally, the four-year time period may be extended on recommendation of the dissertation committee. Experience shows, however, that long delays tend to increase the likelihood of problems in completing a dissertation.

The final defense of the dissertation will be scheduled only after the committee has agreed to approve the draft as nearly complete. Procedures for this defense shall follow those outlined by the Graduate College. Major points of conflict regarding substance or style should be resolved before the final defense. However, minor additions and revisions may be expected after the defense.
Analysis and Prediction of Storms, the Atmospheric Radar Research Center, the Environmental Verification and Analysis Center, the National Severe Storms Laboratory, the National Weather Service Forecast Office, the Storm Prediction Center, the WSR-88D Doppler Radar Operations Center, and the Warning Decision Training Branch. These organizations provide part- and full-time employment opportunities for undergraduate and graduate students as well as opportunities to participate in state-of-the-art research projects and observational field programs. The high concentration of research and operational institutions also attracts a large number of distinguished visiting scientists for stays varying in length from a day to a year. Nearly all of these organizations have been housed together in the new National Weather Center building since Fall 2007.

Facilities available to students and faculty include a PC LINUX-based lab/classroom (25 machines), a general purpose Apple Macintosh computer lab as well as departmental servers for e-mail, World Wide Web, and weather data. Departmental computing resources are augmented by the College of Atmospheric and Geographic Sciences Amoco PC lab and the resources of the OU Supercomputing Center, OSCER. All these resources are interconnected through the campus network of wired and wireless connections and to the Internet for access to national super-computer centers, the World Wide Web, and other stops on the information superhighway. The school provides a full suite of current weather data, radar data and forecast products from the National Weather Service. Data are also available from the Oklahoma Mesonet, a unique network of remotely operated ground-based sensors providing current weather at the county level for the entire state. The school also helps support two large mobile Doppler radar vehicles (SMART-R) for the detailed study of tornadoes, thunderstorms, hurricanes, fronts and other small-scale phenomena. Observational and experimental work and instrument development are pursued in laboratories located in the School, OCS, and on the roof of the NWC. Hands-on experience is an important part of the degree programs of the School of Meteorology. Facilities at the National Weather Center and its partners taken together provide unique opportunities and challenges for students of all levels.

ATMOSPHERIC RADAR RESEARCH CENTER (ARRC)

Under the auspices of the University of Oklahoma’s Strategic Radar Initiative, faculty members from the Schools of Meteorology and Electrical and Computer Engineering have united to form an interdisciplinary team of scientists and engineers to solve challenging Doppler radar research problems and prepare the next generation of students. Through the collaborative nature instilled in its members, the ARRC has proven effective at developing synergy in the field of weather radar between science and engineering. In the National Weather Center and its laboratory facilities in One Partner’s Place, meteorology and engineering faculty and students work side-by-side to learn from each other in a true team environment. This interdisciplinary esprit de corps has already had a profound effect on both the undergraduate and graduate educational experiences in radar provided to OU students. Since being established in 2004, the ARRC has grown to include 10 faculty members, over 30 graduate students, and several postdoctoral fellows. Areas of research concentration are in radar configuration/design, optimization, signal processing, phased array/imaging, retrieval algorithm development, quantifications of radar performance and measurement uncertainty, cloud/precipitation microphysics, severe convective storms, boundary layer dynamics, wind-field retrieval, radar-based model parameterization and initialization, electro-magnetic signatures of targets, birds, insects, and hydrometeors, waves in random media, and polarimetry/interferometry techniques. The ARRC offers graduate research assistantships, post-doctoral fellowships, visiting scientist appointments, and undergraduate fellowships. For additional information, visit the ARRC’s web site at http://arrc.ou.edu.

CENTER FOR ANALYSIS AND PREDICTION OF STORMS (CAPS)

CAPS originated in 1989 as a National Science Foundation Science and Technology Center and graduated from this program in 2000. It continues to be supported by a number of agency grants as well as private industry, and its primary mission remains the development of techniques for the prediction of high-impact local weather with an emphasis on thunderstorms and mesoscale phenomena. Its research programs include numerical modeling and computational fluid dynamics, data assimilation, small-scale predictability, physical process studies, Doppler radar analysis and forecast evaluation. CAPS recently helped initiate a new NSF Engineering Research Center for Collaborative Adaptive Sensing of the Atmosphere (CASAS) that is focused on developing new Doppler radar technology and also leads an NSF Information Technology Research grant known as Linked Environments for Atmospheric Discovery (LEAD). CAPS offers graduate research assistantships, post-doctoral fellowships, visiting scientist appointments, and undergraduate fellowships. For additional information, visit the Center’s web site at www.caps.ou.edu.

COORDINATING CENTER FOR MISCELLANEOUS INSTRUMENTATION AND DATA RESOURCE (CCMIDR)

A joint University of Oklahoma/NOAA cooperative institute designed to improve the effectiveness of research and instruction by providing a stimulating environment where scientists can meet and work on problems of mutual interest. Current research themes include convective and mesoscale processes, forecast improvements, climatic effects of/controls on mesoscale processes, socioeconomic impacts of mesoscale weather systems and regional-scale climate variations, Doppler weather radar research and development, and climate change monitoring and detection. CIMMS is also the home of the Site Scientist for the DOE Atmospheric Radiation Measurement (ARM) Program for the Southern Great Plains, and the Data Quality Office for all three ARM Sites (Southern Great Plains, Tropical Western Pacific, North Slope of Alaska). CIMMS is housed on the second and third floors in the National Weather Center. For additional information, visit the Institute’s Web site at www.cimms.ou.edu.

ENVIRONMENTAL VERIFICATION AND ANALYSIS CENTER (EVAC)

The Environmental Verification and Analysis Center (EVAC) brings together scientists to work as a team to develop, apply, and teach geostatistical methods used to verify model and remote sensing data. The center includes representatives from different university and government programs and the Mesonet network of environmental monitoring stations capable of providing a variety of measurements at high time and space resolution. For additional information, visit the center’s web site at http://www.evac.ou.edu/.

NATIONAL SEVERE STORMS LABORATORY (NSSL)

The NOAA National Severe Storms Laboratory (NSSL) is dedicated to improvement of our understanding of severe convective and mesoscale events. Areas of emphasis include forecasting and analysis techniques, radar development and applications, and applications of multi-scale numerical forecast models. Research assistantships are available through CIMMS and adjunct faculty at the NSSL supervise graduate student research in the School of Meteorology.
The Atmospheric and Geographic Sciences. conducted many joint projects with programs in the College of improve the timeliness and accuracy of hazardous weather forecasts. The temporary position opportunities are available for OU students. southern Oklahoma, and eight counties in western north Texas. Intern and hazardous weather conditions affecting 48 counties in central, western and short term forecasts of mesoscale features associated with hazardous winter weather and excessive precipitation. The SPC is one of the organizing partners of the NOAA Hazardous Weather Testbed which explores ways to improve the timeliness and accuracy of hazardous weather forecasts. The SPC collaborates with meteorologists from around the world, and has conducted many joint projects with programs in the College of Atmospheric and Geographic Sciences. The WARNING DECISION TRAINING BRANCH develops and delivers training on the integrated elements of the warning process within a National Weather Center forecast office. OKLAHOMA CLIMATOLOGICAL SURVEY (OCS) The OCS is a state agency housed at the University of Oklahoma and serves as one component of the School of Meteorology’s current research cluster. The OCS is a dual-purpose organization functioning as a service provider and conducting cutting-edge research. OCS contributes data resources and expertise in a broad field of interests such as climate and climate change, real-life application of weather data, and the operation of the Oklahoma Mesonet, Oklahoma’s weather network. Research interests include K-20 education, first-responder instruction and support, surface transportation monitoring systems, and weather instrumentation research. The main office of OCS is located in the National Weather Center, part of the new Norman Research Campus. For additional information, visit the agency’s Web site at www.oc.s.ou.edu. RADAR OPERATIONS CENTER (ROC) The ROC, a NOAA organization partially located in the National Weather Center provides life-cycle hardware and software engineering and maintenance support for a world-class network of 167 Doppler weather radars (also known as NEXRAD) installed nationwide and at several overseas locations. The ROC uses a co-located WR-88D radar for development and testing, operates a 24/7 helpdesk to support operations and maintenance activities, and deploys teams of engineers and technicians to perform major maintenance. Working in collaboration with NSSL and OU researchers, the ROC transitions new radar techniques and products to operations to continually improve the nation’s weather radar capabilities. Special Facilities and Programs The School of Meteorology is located in the National Weather Center building, which contains the largest combination of academic, research and operational meteorologists in the world. Located in OU’s Research Campus, the 500 people working in the NWC facility are also in close proximity to other OU research centers, the Oklahoma Supercomputer Center for Education and Research (OSCER), and a variety of private sector weather companies. The facility contains state-of-the-art classrooms, laboratories, computer labs, a library, food court, student center, several lounge areas distributed around a spacious atrium, an observation deck on the roof, and a high-bay garage for the mobile radar vehicles. The School’s 80 offices and classrooms occupy all of the fifth (top) and parts of other floors, allowing students and faculty to interact closely with the researchers and practitioners in the other NWC organizations. Scholarships and Financial Aid Depending on availability of funds, the School offers approximately 10-20 scholarships per year for each of its freshman, sophomore, junior and senior classes. These awards are primarily based on merit and qualified students will receive application forms from the School in advance of the next academic year. The School of Meteorology encourages all applicants to seek University-wide scholarships and financial aid for which they may be eligible. The department offers graduate teaching and research assistantships to highly qualified applicants with undergraduate degrees in meteorology or atmospheric science, physics, mathematics, computer science, engineering, or other related fields. For information, please write to: Director, School of Meteorology University of Oklahoma 120 David L. Boren Blvd. Norman, OK 73072 Undergraduate Study BACHELOR OF SCIENCE IN METEOROLOGY For detailed semester by semester curriculum requirements, please consult: http://checksheets.ou.edu/atmosgeoindex.html. Lower-Division Requirements The lower division (1000 and 2000-level courses) requirements of 64-65 hours are to be met as follows: Communications: six hours. English 1113 and 1213 or EXPO 1213. Foreign Language: 0 - 10 hours. Two courses in the same language (can be met by successfully completing 2 years of the same foreign language in high school). Science and Mathematics: 34-35 hours. Physics 1311, 1321, 2514, and 2524; Chemistry 1315; Lower-Division Science Elective (one of AGSC 1013, AGSC 2014, GEOL 1114, ASTR 1504, CHEM 1415, BOT 1114, ZOO 1114); Computer Science 1313; Math 1823, 2423, 2433, and 2443. (Students must earn a grade of C or better in all CS, ENGR, MATH, METR, and PHYS courses that are direct prerequisites for METR courses.) Humanities: 12 hours. History 1483 or 1493; one course from each of the following three fields: Understanding Artistic Forms, Western Civilization and Culture, Non-Western Cultures. Behavioral and Social Sciences: six hours. PS 1113 and a Social Sciences Elective (to be chosen from the University-Wide General Education Approved Course List for Core III (Social Science). Basic Meteorology Courses: nine hours. METR 1111, 2011, 2013, 2021, 2023. Other: three hours. A&GS college elective from outside the major. Upper-Division Requirements Writing/Communications Elective: three hours. One course chosen from the following: Communications 1113, 2613; English 3153; Geology 3333, or Honors 3980 (must be in the Honors College). Engineering and Mathematics: 12 hours. Math 3413 and 4753 or METR 4303, plus an upper-division Math elective. The upper-division Math elective may be replaced by a course from an adviser-approved area of concentration or minor. Science Electives: 12 hours. (These electives may be replaced by courses required for an area of concentration or minor). Minimum of 12 upper-division hours of faculty-advisor-approved courses in geosciences, engineering, math, physical sciences and/or biological sciences. Meteorology: 31 hours. METR 3113, 3123, 3213, 3223, 3613, 4133, 4233, 4424, 4433, 4911, 4922 and a meteorology or climatology elective. NOTE: No more than 52 hours may be taken in one department of the college.
Area of Concentration in Computer Science

The School of Meteorology has joined with the School of Computer Science in the College of Engineering to provide an area of concentration within the meteorology curriculum for students interested in further developing their skills in the use of computers in science, engineering, and business. These courses may be taken in lieu of the upper-division math elective and the nine credit hours of science in the undergraduate meteorology curriculum.

The required courses are CS 1323, CS 2334, CS 2413, CS 2603, and CS 2813. These courses substitute for the math elective and three science electives in the Meteorology curriculum. Note that CS 1323 can replace CS 1313 in the curriculum.

*Three hours must be upper-division.

Minors

MINOR IN METEOROLOGY

The College of Atmospheric and Geographic Sciences offers students in the physical sciences and engineering majors a minor in Meteorology. The minor requires the successful completion of 17 hours of courses acceptable for major credit, including METR 2011, 2013, 2021, 2023 and nine hours of upper-division meteorology courses. Students majoring in engineering or one of the physical sciences who have demonstrated academic excellence may be exempt from the lower division requirements for the minor in meteorology; the School of Meteorology will determine which student are eligible for this exemption. Students who are not required to complete lower division requirements must complete a minimum of 15 hours of upper division coursework in meteorology.

MINOR IN BROADCASTING FOR MAJORS IN METEOROLOGY

The minor includes 13 hours of JMC classes to be inserted into the three upper-division science and one upper-division mathematics elective in the meteorology curriculum. Ten JMC hours are upper-division and three JMC hours are lower-division. Course requirements include: COMM 2613 or DRAM 1603; JMC 2033, 3622, 3663, 3011, “TV News Editorial,” 3011, “TV News Production Crew,” and 3773.

Meteorology majors are also encouraged to consider minors offered through other OU academic programs. Possible minors include math, physics, computer science, physical geography, geographic information science, interdisciplinary perspectives on the environment, hydrologic science, general business, entrepreneurship, astronomy, chemistry or geology.

Graduate Study

Admission

The general requirements for admission to the Graduate College must be fulfilled (see http://gradweb.ou.edu). The application form for the School of Meteorology Graduate Program can be found under Graduate Information at the school’s web site. The School encourages applications from B.S. graduates in physics, math, computer science and other science and engineering disciplines as well as from meteorology majors. Students from other disciplines may need to take some undergraduate meteorology, math, and other courses depending on their background. Acceptance into the Graduate College does not guarantee admission into the School of Meteorology.

KNOWLEDGE EXPECTATIONS

Incoming graduate students in the School are normally expected to have a working knowledge of calculus, vector analysis, linear algebra, ordinary differential equations, partial differential equations, statistics, and computer programming (e.g. UNIX and either FORTRAN or C). However, because of the diverse educational backgrounds of incoming students, some may need to complete courses for prerequisite material. This is usually completed during the first year. In particular, please note that a course in partial differential equations (or equivalent, such as a course on mathematical methods for physicists) is a prerequisite for one of the core classes, METR 5113. For further information, please consult the courses listings at http://weather.ou.edu/courses.htm or contact the appropriate course instructor.

Master of Science in Meteorology

THESIS OPTION:

- 30 graduate credit hours are required.
  - A minimum of 21 credit hours of graduate-level meteorology courses, numbered 5000 or above, subject to the following constraints:
    - 12 credit hours are required core courses, which must be passed with a grade of B or better:
      These two are mandatory:
      METR 5113, Advanced Atmospheric Dynamics I
      METR 5413, Advanced Synoptic Meteorology
      Two courses are required from the following four:
      METR 5223, Atmospheric Radiation
      METR 5233, Cloud and Precipitation Physics
      METR 5503, Climate Dynamics
      METR 5673, Weather Radar Theory and Practice
    - METR 6970, Seminar, one credit hour required (may be repeated for up to 4 credit hours)
    - METR 5980, Research for Master’s Thesis, 4 credit hours required
    - A maximum of 8 credit hours of METR 5990, Independent Study.
    - Satisfactorily defend the master’s thesis.

NON-THESIS OPTION:

- 32 graduate credit hours are required.
  - A minimum of 21 credit hours of graduate-level meteorology courses, numbered 5000 or above, subject to the following constraints:
    - 12 credit hours are required core courses, which must be passed with a grade of B or better:
      These two are mandatory:
      METR 5113, Advanced Atmospheric Dynamics I
      METR 5413, Advanced Synoptic Meteorology
      Two courses are required from the following four:
      METR 5223, Atmospheric Radiation
      METR 5233, Cloud and Precipitation Physics
      METR 5503, Climate Dynamics
      METR 5673, Weather Radar Theory and Practice
    - METR 6970, Seminar, one credit hour required (may be repeated for up to 4 credit hours)
    - A maximum of 8 credit hours of METR 5990, Independent Study
    - Pass the Comprehensive Exam particular to the Master of Science in Meteorology.

Pursuit of the nonthesis program requires approval of the Graduate Studies Committee. The non-thesis option includes completion of a special scholarly paper acceptable to a faculty advisor and two readers. Both thesis and non-thesis students present a seminar to the School or Meteorology.

Master of Science in Professional Meteorology

This degree program is designed to prepare its graduates for employment in private industry or with other organizations whose mission is directed primarily toward customer service or product development. Prospective students must possess an undergraduate degree in meteorology, atmospheric science, or the equivalent, and meet the regular graduate admission standards for the School of Meteorology. The degree requirements consist of 36 graduate credit hours including 15 hours in meteorology coursework, 12 hours in a secondary area of study, and nine hours of advisory committee approved electives. A project approved by the student’s advisory committee must also be completed. Specific oral and written requirements must be satisfied. Examples of possible secondary areas of study include computer science, decision science, operations research, statistics, GIS, MIS, electrical engineering, business,
economics, hydrology, environmental science, and technical writing. Private companies and other interested organizations will be invited to sponsor students and assist in structuring a student's course of study, which will include a year-long project of value to the sponsor. Additional information about the program can be obtained by contacting the School of Meteorology.

Doctor of Philosophy
Students seeking the degree of Doctor of Philosophy through the School of Meteorology at the University of Oklahoma (hereafter referred to as candidate) must satisfy all general requirements set forth by the Graduate College as well as all particular requirements set forth by the School of Meteorology. The principal requirements of both are listed below.

- Total number of graduate credit hours required: 90 (Up to 44 credit hours may be approved for transfer from a master's degree).
- Maximum number of credit hours of METR 6980, Research for Doctor's Dissertation: 30 (METR 6980 hours contribute to the 90 required hours).
- Required coursework: 1 hour of METR 6970, Seminar (may be repeated for up to 4 credit hours).

Exams:
1. The School of Meteorology's General Exam and its subsidiary Qualifying Exam.
2. Dissertation defense.

Ph.D. QUALIFYING EXAMINATION
Every student who wishes to pursue the Ph.D. degree must pass the Ph.D. Qualifying examination covering topics in the following five categories: dynamics, synoptic and mesoscale meteorology, climatology, physical meteorology, and analytic and computational tools. The exam is usually attempted shortly after completion of the MS program.

In each category, five questions are given. The score of the exam is based on the average of the best eight answers, with no more than two answers counted from any single category. The answer to each question is graded on a scale of 0 to 5. The criteria for passing the Ph.D. qualifying exam are:

- **Unconditional Pass** — An average greater than or equal to 2.5 over all 8 question.
- **Remedial Pass** — An average less than 2.50 but greater than or equal to 2.0 over all 8 questions. The candidate passes the exam upon completing remedial actions that have been approved by a majority vote of the faculty. The remedial actions should insure competence in the breadth of meteorological knowledge, and reveal the intellectual capacity needed for Ph.D. research, at levels comparable to that of an unconditional pass on the qualifying exam. The candidate’s advisory committee proposes the remedial actions to the faculty.
- **Unconditional Fail** — An average less than 2.0 over all 8 questions. The candidate must retake the entire exam. Normally, a candidate will be permitted only two attempts at the entire exam, and will not be permitted to transfer scores from the first to second attempt. If a candidate does not obtain at least a Remedial Pass on the second attempt, the faculty may elect by majority vote to use his/her performance in other aspects of our graduate program to assess the candidate’s intellectual capacity to pursue the Ph.D.

Ph.D. GENERAL EXAMINATION
The General Exam may be attempted after passing the Qualifying Exam, and the student submits a formal application to the Graduate College for permission to attempt the General Examination at this time. In the School of Meteorology, the General Exam consists of the student writing and defending a "Prospectus of Dissertation Research," as well as answering any other questions about science or meteorology that the committee asks in the oral exam.

In the Prospectus, the student advocates that the dissertation topic is worthy of research. The student also justifies the methods that will be applied in the research, states the ultimate goal of the research, and argues that the outcome of the research has the potential to be an original contribution. The Chairman of the Doctoral Committee will define for the student any further requirements of an acceptable Prospectus. The student defends the Prospectus in an oral examination before the student’s Doctoral Committee. The members of the Doctoral Committee must possess the Prospectus for a mutually agreeable length of time prior to the oral examination. The student has the responsibility for negotiating this length of time with the individual members.

The General Examination thus serves not only a gatekeeping assessment purpose, but may also be a valuable mid-course correction to the dissertation research. The occasion of the General Exam tends to be propitious for eliciting thoughtful advice from the Doctoral Committee about the ongoing research. The student may also learn what standards the Doctoral committee expects to be met in the Dissertation.