Department of Geosciences

Department Head: Dr. John Rodgers
Office: 108 Hilbun
Academic Coordinator: Tina Davis (Starkville campus) and Yasma Jacobs (Distance Learning)

B.S. and M.S. degrees in Geoscience and a PhD in Earth and Atmospheric Sciences are offered with emphasis in sub-disciplines described below. Minors are offered at both B.S. and M.S. levels in Geoscience.

The Department of Geosciences strives for an integrated, interdisciplinary study of the whole Earth from the bachelor's through the Ph.D. levels. Course offerings are grouped into six areas of emphasis:

1. Professional Geology - physical, biological, and chemical aspects of the Earth;
2. Geography - distribution of physical features and human interaction with the Earth;
3. Environmental Geoscience - conservation and management of Earth resources and remediation of natural and human hazards;
4. Broadcast Meteorology/Climatology - radio/television weathercasting;
5. Professional Meteorology/Climatology - atmospheric processes and climatic variability; and
6. Geographic Information Systems - spatial analysis and topological relationships of geographic data.

Within the six areas of emphasis outlined above, a student may further focus interests in a variety of areas including: water resources, hydrogeology and environmental clean-up and monitoring, petroleum exploration and services, construction and urbanization involving geological applications, geophysics and geochemistry, sedimentary geology and paleontology, Quaternary geology and karst processes, Geographic Information Systems, human or physical geography, or analysis and prediction of weather and climate. A minimum of 40 credit hours in geoscience courses is required for the geoscience degree. A grade of C or higher is required on all departmental courses to satisfy graduation requirements. Students in the professional geology concentration are required to take the Association of State Board of Geologists Fundamentals of Geology (ASBOG-FG) exam.

A minor in geoscience consists of a minimum of 14 credit hours in courses numbered 2000 and above, in addition to the first year courses. The following are examples of variations within a geoscience minor. A minor with a Geology emphasis should include physical (GG 1113/GG 1111) and historical geology (GG 1123/GG 1121) plus 14 hours 2000 and above for a total of 22 hours; for an Environmental Geoscience emphasis, physical and historical geology with laboratory plus introduction to environmental geology (GG 3133) and other course work 2000 and above for a total of 22 hours; for emphasis in Geography, cultural geography (GR 2013), world geography (GR 1123) and other course work 2000 and above; and Broadcast Meteorology/climatology, physical geography (GR 1113/GR 1111) and either introduction to environmental geology (GG 3133) or conservation of natural resources (GR 3113) and other course work 2000 and above for a total of 21 hours. Minors in Geoscience are also available at the M.S. level.

Three educational enhancement awards and ten scholarships are available to students majoring in Geoscience, namely the F.F. Mellen, Forrest W. Pace, and Summer Geology Educational Enhancement awards, and the George W. Bishop, the Paul H. Dunn Memorial, the Ronald Greeley Memorial, the Gordon W. Gulmon, the John H. Richards, Jr. Family Endowed, the Sistrunk Endowed, the Mark Worthey Endowed, the Alex Herbst Memorial, the FOX Weather Endowed, and the Dr. Charles Wax Endowed Scholarship. The three Educational Enhancement Awards provide financial assistance to those enrolled in field geology camp during the summer. The ten scholarships are awarded to students for academic excellence. All are restricted to students at junior or senior rank, with the exception of the Richards Endowed, Sistrunk Endowed, the Worthey Endowed, and the Greeley Memorial Scholarships. The Dr. Charles Wax Endowed Scholarship is only for graduate students.

The Department of Geosciences encourages involvement in Sigma Gamma Epsilon, a nationally recognized honorary Earth Science society and Gamma Theta Upsilon, international honor society in geography. Requirements for acceptance in Sigma Gamma Upsilon include a grade-point average of at least 3.00 in 12 or more hours of geoscience and a cumulative average of 2.67. Requirements for Gamma Theta Upsilon are a grade-point average of at least 3.3 overall as well as in at least 9 hours of "GR" courses.

The Department of Geosciences participates with the National Weather Association (NWA) and the American Meteorological Society (AMS) in training individuals for the respective “Weathercaster Seals of Approval”. The Office of the State Climatologist and the MSU Climatology Laboratory are housed in the Department and are strongly involved in programs for all students with interests in professional and broadcast meteorology and climatology.

Distance Learning Programs

The Department of Geosciences offers three distance learning programs listed below that can lead to a degree in Geosciences. Each program utilizes recorded lectures and the Internet for course instruction.

Broadcast and Operational Meteorology Program. A three-year, 17 course, 53 credit hour program of study that can lead to a B.S. degree in Geosciences. Primarily for individuals in television weather.

Applied Meteorology Program. A two-year, 12 course 36 credit hour program of study that leads to a M.S. degree in Geosciences. Primarily for individuals with meteorological, environmental, or hazards-related careers.

Environmental Geoscience Program. A 30-credit hour, non-thesis program that leads to a M.S. degree in Geosciences. It is designed for students interested in graduate study of a broad cross-section of the geosciences and is offered both on-campus and through distance education.

Geosciences Major

General Education Requirements

English Composition		
EN 1103	English Composition I	3
or EN 1104	Expanded English Composition I	
EN 1113	English Composition II	3
or EN 1173	Accelerated Composition II	
Creative Discovery		
A&S core		3
(CO 1503 is required for Broadcast Meteorology concentration)		
Humanities		
History - A&S core		3
Literature - A&S core		3
Social & Behavioral Sciences		
GR 1123	Introduction to World Geography	3
A&S Core [1]		3
(CO 1403 is required for Broadcast Meteorology concentration)		
Quantitative Reasoning (varies by concentration)		
Broadcast Meteorology, Professional Meteorology AND Professional Geology concentrations:		6
MA 1713	Calculus I	
MA 1723	Calculus II	
Environmental Geoscience, Geographic Information Systems AND Geography concentrations:		3
MA 1323	Trigonometry	
Broadcast & Operational Meteorology (online only)		3
MA 1323	Trigonometry	
or MA 1613	Calculus for Business and Life Sciences I	
or MA 1713	Calculus I	
or MA 2113	Introduction to Statistics	
or ST 2113	Introduction to Statistics	
Natural Sciences (vary by concentration)		**9-11**
Broadcast Meteorology		
PH 1113	General Physics I	
PH 1123	General Physics II	
CH 1043	Survey of Chemistry I	
Professional Geology		
CH 1213 & CH 1211	Chemistry I and Investigations in Chemistry I	
CH 1223 & CH 1221	Chemistry II and Investigations in Chemistry II	
PH 1113	General Physics I	
Professional Meteorology		
CH 1213 & CH 1211	Chemistry I and Investigations in Chemistry I	
PH 2213	Physics I	
PH 2223	Physics II	
All other concentrations		
2 lab sciences - See A&S core		
Additional Natural Science (lab not required)		

College Requirements & Major Core

Foreign Language		
Foreign Language I		3
Foreign Language II		3
Major Core		
Introductory Course with lab		
GG 1113 & GG 1111	Survey of Earth Sciences I and Earth Sciences I Laboratory	4
or GR 1113 & GR 1111	Physical Geography and Physical Geography Laboratory	
Oral Communication		
CO 1003	Fundamentals of Public Speaking	3
or CO 1013	Introduction to Communication	

Choose one of the following concentrations:

Professional Geology Concentration (GEOL)

The Professional Geology concentration is designed to prepare students for entry-level employment in the environmental consulting industry; state and federal government agencies; as well as energy and extraction industries, such as oil, gas, and coal. The Professional Geology degree also prepares students for application to a graduate program.

Additional Sciences		
PH 1123	General Physics II	3
PH 1133	General Physics III	3
or GG 4233	Applied Geophysics	
or GG 4633	Introduction to Geochemistry	
Concentration Requirements		
GG 1121	Earth Sciences II Laboratory	1
GG 1123	Survey of Earth Sciences II	3
GG 3133	Introduction to Environmental Geology	3
GG 3613	Water Resources [1]	3
GG 4114	Mineralogy	4
GG 4124	Petrology	4
GG 4201	Practicum on Paleontology	1
GG 4304	Principles of Sedimentary Deposits I	4
GG 4333	Geowriting [2]	3
GG 4414	Structural Geology	4
GG 4443	Principles of Sedimentary Deposits II	3
GG 4503	Geomorphology	3
GR 4303	Principles of GIS	3
GR 4633	Statistical Climatology	3
or ST 2113	Introduction to Statistics	
or ST 3123	Introduction to Statistical Inference	
GG 4446	Summer Geology Field Camp [3]	6
Choose one of the following:		3
GG 4113	Micropaleontology	3
GG 4133	Principles of Paleoecology	
GG 4203	Principles of Paleobiology	
Choose one of the following:		6
GG 1133	Planetary Geology	
GG 3603	Introduction to Oceanography	
GG 4523	Coastal Environments	
GR 1133	Weather and Climate	
Choose three additional courses from the following lists:		9

Environmental Professional Emphasis		
GG 4153	Engineering Geology	
GG 4613	Physical Hydrogeology	
GG 4633	Introduction to Geochemistry	
Petroleum Professional Emphasis		
GG 4063	Earth and Atmospheric Energy Resources	
GG 4233	Applied Geophysics	
GG 4433	Subsurface Methods	
Geospatial Professional Emphasis		
GR 4313	Advanced GIS	
GR 4333	Remote Sensing of the Physical Environment	
GR 4343	Advanced Remote Sensing in Geosciences	
GR 4363	Geographic Information Systems Programming	
Total Hours		**120**

Environmental Geoscience Concentration (ENGS)

The Environmental Geoscience concentration is designed to be a flexible degree that provides a broad cross-section of the geosciences with emphasis on environmental stewardship. The degree can be molded with the assistance of an academic adviser to suit individual goals of students that do not readily align with other geosciences curricula. The degree prepares students to work as a geoscientist or prepares students for graduate school in the geosciences or other related fields.

Concentration Requirements		
GG 3133	Introduction to Environmental Geology	3
or GR 3113	Conservation of Natural Resources	
GG 3603	Introduction to Oceanography	3
GG 3613	Water Resources	3
GG 4333	Geowriting [2]	3
GR 1133	Weather and Climate	3
GR 1131	Weather and Climate Laboratory	1
GR 4303	Principles of GIS	3
ST 2113	Introduction to Statistics	3
GG/GR 4000+ Electives		18
Choose one of the following:		3
GG 1133	Planetary Geology	
GG 3133	Introduction to Environmental Geology (if not taken as a concentration course)	
or GR 3113	Conservation of Natural Resources	
GG 4523	Coastal Environments	
GG 4543	Community Engagement in Environmental Geosciences	
GR 2313	Maps and Remote Sensing	
GR 3113	Conservation of Natural Resources	
GR 4113		
GR 4813	Natural Hazards and Processes	
General Electives - consult advisor		33-35
Total Hours		**124**

Geography Concentration (GPHY)

This program prepares students to work in a variety of fields across the social and natural sciences. A geography degree can provide the multidisciplinary foundation necessary for careers in government, environmental management, education, planning, and development. People with geography degrees have found employment with: the US Census Bureau, National Parks Service, the National Forest Service, and other federal government agencies, non-profit organizations focusing on community and international development, the environmental assessment industry, the GIS/geospatial industry, environmental and historical interpretation, and urban and regional planning. Our students also receive a strong foundation for further graduate studies in geography and related disciplines.

Concentration Requirements		
GG 4333	Geowriting [2]	3
GR 1133	Weather and Climate	3
GR 1131	Weather and Climate Laboratory	1
GR 2013	Human Geography	3
GR 2313	Maps and Remote Sensing	3
GR 4203	Geography of North America	3
GR 4303	Principles of GIS	3
ST 2113	Introduction to Statistics	3
GG/GR 4000+ Electives		15
Choose four of the following:		12
GG 3133	Introduction to Environmental Geology	
GG 3603	Introduction to Oceanography	
GG 3613	Water Resources	
GG 4523	Coastal Environments	
GR 3113	Conservation of Natural Resources	
GR 4113		
GR 4813	Natural Hazards and Processes	
Choose four of the following:		12
GR 4123	Urban Geography	
GR 4213	Geography of Latin America	
GR 4223	Geography of Europe	
GR 4233	Geography of Asia	
GR 4243	Geography of Russia and the Former Soviet Republics	
GR 4253	Geography of Africa	
GR 4263	Geography of the South	
GR 4283	Geography of Islamic World	
General Electives - consult advisor		15-17
Total Hours		**124**

Broadcast Meteorology Concentration (BMP)

This program focuses on preparing students for a career in radio/television weathercasting. The coursework does not meet the requirements for the American Meteorological Society's Certified Broadcast Meteorological Seal of Approval because it lacks some of the math and physics requirements. Individuals can, however, be qualified to earn the National Weather Association Seal of Approval after working in the industry for three years.

Concentration Requirements		
GR 1133	Weather and Climate	3
GR 1131	Weather and Climate Laboratory	1
GR 3011	Weather Analysis	1
GR 4423	Weather Forecasting I	3
GR 4433	Weather Forecasting II	3
GR 4633	Statistical Climatology	3
or ST 3123	Introduction to Statistical Inference	
GR 4643	Physical Meteorology and Climatology I	3
GR 4693	Physical Meteorology and Climatology II	3
GR 4733	Synoptic Meteorology	3
GR 4783	Satellite Meteorology	3
or GR 4883	Radar Meteorology	
GR 4823	Dynamic Meteorology I	3
GR 4963	Mesoscale Meteorology	3
GR 4502	Practicum in Broadcast Meteorology I	2
GR 4512	Practicum in Broadcast Meteorology II	2
GR 4522	Practicum in Broadcast Meteorology III	2

GR 4532	Practicum in Broadcast Meteorology IV	2
CO 2333	Television Production	3
CO 2413	Introduction to News Writing and Reporting	3
CO 3313	News Writing for the Electronic Media [2]	3
CO 3333	Advanced Television Production	3
Choose three of the following:		9
GG 3603	Introduction to Oceanography	
GG 3613	Water Resources	
GG 4523	Coastal Environments	
GR 3113	Conservation of Natural Resources	
GR 4203	Geography of North America	
GR 4303	Principles of GIS	
GR 4553	Computer Methods in Meteorology	
GR 4563	Aviation Meteorology	
GR 4613	Applied Climatology	
GR 4783	Satellite Meteorology ((if not taken as a concentration course))	
or GR 4883	Radar Meteorology	
GR 4813	Natural Hazards and Processes	
GR 4933	Dynamic Meteorology II	
GR 4943	Tropical Meteorology	
General Electives - consult advisor		14
Total Hours		**124**

Professional Meteorology Concentration (PMET)

This program focuses on the study of atmospheric processes and climatic variability. Upon completion of the program (operational emphasis), students will have met the coursework requirements for the National Weather Service, the private meteorology sector, or continue their education in graduate school. Students choosing the program with the broadcast emphasis can also work for the National Weather Service and also earn the American Meteorological Society's Certified Broadcast Meteorologist Seal of Approval.

Additional Mathematics		
MA 2733	Calculus III	3
MA 2743	Calculus IV	3
MA 3253	Differential Equations I	3
Concentration Requirements		
GG 4333	Geowriting [2, 4]	3
or CO 3313	News Writing for the Electronic Media	
GR 1133	Weather and Climate	3
GR 1131	Weather and Climate Laboratory	1
GR 3011	Weather Analysis	1
GR 4423	Weather Forecasting I	3
GR 4433	Weather Forecasting II	3
GR 4633	Statistical Climatology	3
or ST 3123	Introduction to Statistical Inference	
GR 4643	Physical Meteorology and Climatology I	3
GR 4693	Physical Meteorology and Climatology II	3
GR 4733	Synoptic Meteorology	3
GR 4783	Satellite Meteorology	3
or GR 4883	Radar Meteorology	
GR 4823	Dynamic Meteorology I	3
GR 4933	Dynamic Meteorology II	3
GR 4963	Mesoscale Meteorology	3
Choose three of the following:		9
GG 3603	Introduction to Oceanography	

GG 3613	Water Resources	
GR 4363	Geographic Information Systems Programming [2]	
GG 4523	Coastal Environments	
GR 3113	Conservation of Natural Resources	
GR 4203	Geography of North America	
GR 4303	Principles of GIS	
GR 4553	Computer Methods in Meteorology	
GR 4563	Aviation Meteorology	
GR 4613	Applied Climatology	
GR 4813	Natural Hazards and Processes	
GR 4783	Satellite Meteorology (if not taken as a concentration course)	
or GR 4883	Radar Meteorology	
GR 4943	Tropical Meteorology	
Specified Electives - consult advisor		18
Total Hours		**124**

Geographic Information Systems (GIS) Concentration

This program provides a fundamental background in the geospatial sciences, including geographic information systems, remote sensing, spatial analysis, database management, geospatial modeling, and spatial programming. The geospatial sciences are applicable to many different fields and will prepare students for careers in: government agencies, urban and regional planning, environmental management, intelligence, natural areas management, local government, transportation planning and many others. This program also prepares students for further graduate studies in geospatial disciplines.

Concentration Requirements		**56**
GR 1133	Weather and Climate	3
GR 1131	Weather and Climate Laboratory	1
GR 2313	Maps and Remote Sensing	3
GR 3303	Survey of Geospatial Technologies	3
GR 3113	Conservation of Natural Resources	3
GR 4303	Principles of GIS	3
GR 4313	Advanced GIS	3
GR 4323	Cartographic Sciences	3
GR 4333	Remote Sensing of the Physical Environment	3
GR 4343	Advanced Remote Sensing in Geosciences	3
GR 4353	Geodatabase Design	3
GR 4363	Geographic Information Systems Programming	3
GR 4373	Web GIS	3
GR 4411	Remote Sensing Seminar	1
GG 4333	Geowriting [2]	3
CSE 1284	Introduction to Computer Programming	4
ST 3123	Introduction to Statistical Inference	3
or GR 4633	Statistical Climatology	
Choose two of the following:		6
GG 3133	Introduction to Environmental Geology	
GG 3603	Introduction to Oceanography	
GG 3613	Water Resources [1]	
GG 4523	Coastal Environments	
GR 4813	Natural Hazards and Processes	
GG/GR 4000+ Electives		12
General Electives - consult advisor		10-12
Total Hours		**124**

Broadcast & Operational Meteorology Concentration (Distance Learning only)

Concentration Requirements		
GR 1133	Weather and Climate	3
GR 1131	Weather and Climate Laboratory	1
GR 4443	Weather Prediction I	3
GR 4453	Weather Prediction II	3
GR 4473	Numerical Weather Prediction	3
GR 4613	Applied Climatology	3
GR 4623	Physical Meteorology	3
GR 4633	Statistical Climatology	3
GR 4643	Physical Meteorology and Climatology I	3
GR 4713	Synoptic Meteorology I	3
or GR 4733	Synoptic Meteorology	
GR 4753	Satellite and Radar Meteorology	3
GR 4813	Natural Hazards and Processes	3
GR 4913	Thermodynamic Meteorology	3
or GR 4823	Dynamic Meteorology I	
GR 4923	Severe Weather	3
or GR 4963	Mesoscale Meteorology	
GG 3603	Introduction to Oceanography	3
GG 3613	Water Resources	3
GG 4333	Geowriting [2]	3
or CO 3313	News Writing for the Electronic Media	
General Electives - consult advisor		27-29
Total Hours		**124**

Note: Students must complete 31 upper division hours in A&S in residence at MSU.

1 Social Science courses must cover two disciplines and come from A&S core.
2 Satisfies Jr/Sr Writing requirement
3 From an approved university. Consult advisor.
4 CO 3313 must be taken for the Broadcast Meteorology concentration.