

Geosciences

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Admission

The Department of Geosciences offers graduate study leading to the Master of Science degree in Geoscience and the Doctor of Philosophy degree in Earth and Atmospheric Science. An applicant to the program must have an undergraduate GPA of at least 2.75 on a scale of 4.00 for entry to the master's program and at least 3.00 at both the undergraduate and graduate level for entry to the doctoral program. The general GRE is required of all on-campus applicants.

Although helpful, an undergraduate background in Geosciences is not a prerequisite for admission into the M.S. in Geoscience program. Applicants to the master's program in the Broadcast or Professional Meteorology concentrations are required to have passed Calculus I prior to arrival on campus, and the completion of Calculus II will greatly improve the chances of being accepted. All other master's applicants are recommended to have completed Calculus I.

Applicants to the doctoral program are required to have completed a thesis-based master's degree and have a background in one of the departmental emphasis areas. All applicants for the Doctoral program **must** identify a mentor (dissertation supervisor) prior to acceptance into the program. Applicants who have not completed a thesis or are from other science disciplines will be considered on a case-by-case basis through a petition, initiated by the identified mentor, to the department's graduate faculty. The doctoral degree student should anticipate a four-year program of study. Depending on the applicant's emphasis area of interest, Calculus I and II may be required for admission.

The application package must contain the application for admission; at least two letters of reference; official bachelor's degree transcript; official transcripts from all colleges attended after earning the bachelor's degree (both undergraduate and graduate work); and a statement of purpose. An applicant for the Main Campus program is required to take the GRE. A student admitted to the Broadcast Meteorology concentration can only begin studies in the fall term. The application deadline for consideration for assistantship funding is January 1.

Provisional Admission

A student who has not fully met the GPA or other requirements stipulated by the University may be admitted on a provisional basis. The provisionally-admitted student is eligible for a change to regular status after receiving a 3.00 GPA on the first 9 hours of graduate courses at Mississippi State University (with no grade lower than a C). The first 9 hours of graduate courses must be within the student's program of study. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.00 is not attained, the provisional student **shall** be dismissed from the graduate program. Academic departments may set higher standards for students to fulfill provisional requirements; a student admitted with provisional status should contact the graduate coordinator for the program's specific requirements. **While in the provisional status, a student is not eligible to hold a graduate assistantship.**

Academic Performance

The Department of Geosciences follows the Graduate School guidelines regarding academic dismissal from an academic program. Additionally, a grade of U given for thesis or dissertation research hours or a grade of D or F for any regular class will result in dismissal from the program. A student in the Broadcast Meteorology concentration who earns a C in the first year of graduate study will be required to take a proficiency exam in the summer before the second year. Unsatisfactory performance on the exam will result in dismissal from the program.

Concentration Descriptions

- The **Applied Meteorology Program** is designed for individuals with meteorological, environmental or hazards-related careers. This non-thesis concentration is offered through distance education.
- The **Broadcast Meteorology** concentration is designed for students intending to pursue meteorology careers in media. This non-thesis concentration combines meteorology coursework with the Practicum in Broadcast Meteorology sequence.
- **Environmental Geosciences** is a non-thesis concentration intended for students interested in a broader cross-section of the geosciences. It is offered both on-campus and through distance education.

- The **Geography** concentration is a thesis-based program appropriate for students interested in studying the spatial distribution of cultural and physical features across the Earth's surface. It can be tailored toward specific interests in either human or physical geography.
- The **Geology** concentration is thesis-based and intended to prepare students for careers in professional geology or further graduate study.
- The concentration in **Geospatial Sciences** is a thesis-based program designed to prepare students to use geospatial technologies to provide insight into Earth and atmospheric processes.
- The **Professional Meteorology/Climatology** concentration is thesis-based and is intended to prepare students for forecasting careers or further graduate study.
- The **Teachers in Geosciences** concentration is a two-year, 36 credit hour program of study offered through distance education. It is designed primarily for K-12 science teachers.

Master of Science Programs of Study

Both a thesis track and a non-thesis track are available at the master's level for both on-campus and distance learning delivery methods.

General Departmental Requirements

Both options require competency in statistics or a foreign language. A student enrolled in a non-thesis concentration may petition the graduate faculty to complete a thesis. The department will not approve the request unless a faculty member has agreed to serve as major professor and a committee can be assembled. The department follows the Graduate School guidelines regarding the minimum number of course hours that must be at 8000-level or higher.

The department has on-campus concentrations in the following areas.

- Broadcast Meteorology
- Environmental Geosciences
- Geography
- Geology
- Geospatial Sciences
- Professional Meteorology/Climatology

The department also offers the following concentrations through distance education:

- Applied Meteorology Program (AMP)
- Environmental Geosciences (ENGS)
- Teachers In Geosciences (TIG)

The AMP is designed for individuals who are already in meteorological, environmental, or hazards-related careers. The Environmental Geosciences concentration is intended for individuals interested in a broader cross-section of the geosciences. The TIG concentration is primarily designed for in-service teachers.

A student admitted to the Applied Meteorology program (AMP) must hold a B.S. degree in a science and have completed GR 4713 or its equivalent. A student who is admitted in the graduate program in Geosciences in the Broadcast Meteorology concentration must successfully complete a background assessment test in meteorology. The test will be administered during the spring of each year. A student scoring less than 80% on this test must successfully complete (grade of B or better) GR 1603 from MSU by Distance Learning before starting his or her initial enrollment on campus for study in Broadcast Meteorology. A student admitted to the Environmental Geosciences concentration must have completed GG 1113 and GR 1603 or their equivalents. All prerequisite courses may be taken through distance education prior to enrolling in the graduate programs. Specific classes may require further prerequisites.

Master of Science in Geosciences with Applied Meteorology Concentration

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|---|--|---|
| GR 8553 | Research Methods in Geoscience | 3 |
| GR 6303 | Principles of GIS | 3 |
| GR 8833 | Weather and Society | 3 |
| GR 8453 | Quantitative Analysis in Climatology | 3 |
| GR 8573 | Research in Applied Meteorology | 3 |
| Select at least one of the following: | | 3 |
| GR 6923 | Severe Weather | |
| GR 6943 | Tropical Meteorology | |
| Select at least nine hours from the following: ¹ | | 9 |
| GR 6313 | Advanced GIS | |
| GR 6333 | Remote Sensing of the Physical Environment | |

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|---|---------------------------------|-----------|
| GR 6473 | Numerical Weather Prediction | |
| GR 6603 | Climatology | |
| GR 6753 | Satellite and Radar Meteorology | |
| GR 6823 | Dynamic Meteorology I | |
| GR 6933 | Dynamic Meteorology II | |
| GG 8203 | Ocean Science | |
| GG 8233 | Environmental Geoscience | |
| GG 8613 | Hydrology | |
| GR 8613 | Hydrometeorology | |
| GR 8613 | Hydrometeorology | |
| GR 8633 | Climate Change | |
| GR 8813 | Advanced Hazards and Disasters | |
| GR 8133 | Foundations in Forecasting | |
| GR 8143 | Advanced Forecasting Techniques | |
| Additional graduate-level coursework ² | | 9 |
| Total Hours | | 36 |

¹ Substitutions may be made with the approval of the major professor and committee and with appropriate documentation. They must be noted on the program of study. Note: A split-level course completed at the undergraduate level cannot be repeated on the graduate level for use on the program of study.

² A research project presentation and a written and oral comprehensive examination are required.

Master of Science in Geosciences, Broadcast Meteorology Concentration

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| GR 8553 | Research Methods in Geoscience | 3 |
| Select at least 9 hours from the following: ¹ | | 9 |
| GR 6502 | Practicum in Broadcast Meteorology I | |
| GR 6512 | Practicum in Broadcast Meteorology II | |
| GR 6522 | Practicum in Broadcast Meteorology III | |
| GR 6532 | Practicum in Broadcast Meteorology IV | |
| GR 6613 | Applied Climatology | |
| GR 6623 | Physical Meteorology | |
| GR 6733 | Synoptic Meteorology | |
| GR 6753 | Satellite and Radar Meteorology | |
| GR 6823 | Dynamic Meteorology I | |
| GR 6203 | Geography of North America | |
| GR 6813 | Natural Hazards and Processes | |
| GR 8843 | Advanced Mesoscale Meteorology | |
| GR 8453 | Quantitative Analysis in Climatology | |
| Additional graduate-level coursework ² | | 24 |
| Total Hours | | 36 |

¹ A student who has taken any of these 9 hours in an undergraduate Geosciences program may substitute these or other appropriate MSU graduate-level courses. Substitutions may be made with the approval of the major professor and committee. They must be noted on the program of study. Note: A split-level course completed at the undergraduate level cannot be repeated on the graduate level for use on the program of study.

² A research project presentation and a written and oral comprehensive examination are required.

Master of Science in Geosciences with Environmental Geosciences Concentration

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| GR 8553 | Research Methods in Geoscience | 3 |
| GR 8410 | Field Methods Seminar | 3 |
| or GR 8573 | Research in Applied Meteorology | |
| Select at least 9 hours from the following: ¹ | | 9 |
| GG 6033 | Resources and the Environment | |

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| GG 6063 | Development of Fossil Fuel Resources | |
| GR 6303 | Principles of GIS | |
| GR 6313 | Advanced GIS | |
| GR 6333 | Remote Sensing of the Physical Environment | |
| GG 6503 | Geomorphology | |
| GG 6523 | Coastal Environments | |
| GR 6123 | Urban Geography | |
| GG 6613 | Physical Hydrogeology | |
| GR 6813 | Natural Hazards and Processes | |
| GR 6603 | Climatology | |
| GR 6613 | Applied Climatology | |
| GG 8203 | Ocean Science | |
| GG 8233 | Environmental Geoscience | |
| GR 8633 | Climate Change | |
| GR 8813 | Advanced Hazards and Disasters | |
| Additional graduate-level coursework ² | | 15 |
| Total Hours | | 30 |

¹ A student who has taken any of these 9 hours in an undergraduate Geosciences program may substitute these or other appropriate MSU graduate-level courses. Substitutions may be made with the approval of the major professor and committee. They must be noted on the program of study. Note: A split-level course completed at the undergraduate level cannot be repeated on the graduate level for use on the program of study.

² A capstone research project (oral presentation and paper) and a written and oral comprehensive examination are required.

Master of Science in Geosciences with Geography Concentration

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| GG 8561 | Geoscience Seminar | 1 |
| GR 8542 | Geographic Literature | 2 |
| or GG 8572 | Geologic Literature | |
| Select at least 9 hours from the following: ¹ | | 9 |
| GR 6123 | Urban Geography | |
| GR 6203 | Geography of North America | |
| GR 6213 | Geography of Latin America | |
| GR 6223 | Geography of Europe | |
| GR 6233 | Geography of Asia | |
| GR 6243 | Geography of Russia and the Former Soviet Republics | |
| GR 6253 | Geography of Africa | |
| GR 6263 | Geography of the South | |
| GR 6283 | Geography of Islamic World | |
| GR 8313 | Advanced Cultural Geography | |
| Additional graduate-level coursework | | 12 |
| GR 8000 | Thesis Research/ Thesis in Geography ² | 6 |
| Total Hours | | 30 |

¹ A student who has taken any of these 9 hours in an undergraduate Geosciences program may substitute these or other appropriate MSU graduate-level courses. Substitutions may be made with the approval of the major professor and committee. They must be noted on the program of study. Note: A split-level course completed at the undergraduate level cannot be repeated on the graduate level for use on the program of study.

² A thesis defense / comprehensive exam is required.

Master of Science in Geosciences with Geology Concentration

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| GG 8561 | Geoscience Seminar | 1 |
| GR 8542 | Geographic Literature | 2 |
| or GG 8572 | Geologic Literature | |
| Select at least 9 hours from the following: ¹ | | 9 |

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|--------------------------------------|---|-----------|
| GG 6033 | Resources and the Environment | |
| GG 6063 | Development of Fossil Fuel Resources | |
| GG 6114 | Mineralogy | |
| GG 6123 | Petrology | |
| GG 6153 | Engineering Geology | |
| GG 6201 | Practicum in Paleontology | |
| GG 6203 | Principles of Paleobiology | |
| GG 6233 | Applied Geophysics | |
| GG 6304 | Principles of Sedimentary Deposits I | |
| GG 6403 | Gulf Coast Stratigraphy | |
| GG 6413 | Structural Geology | |
| GG 6433 | Subsurface Methods | |
| GG 6443 | Principles of Sedimentary Deposits II | |
| GG 6503 | Geomorphology | |
| GG 6523 | Coastal Environments | |
| GG 6613 | Physical Hydrogeology | |
| GG 6623 | Chemical Hydrogeology | |
| GG 8713 | Regional Geology of Eastern North America | |
| Additional graduate-level coursework | | 12 |
| GG 8000 | Thesis Research/ Thesis in Geosciences ² | 6 |
| Total Hours | | 30 |

¹ A student who has taken any of these 9 hours in an undergraduate Geosciences program may substitute these or other appropriate MSU graduate-level courses. Substitutions may be made with the approval of the major professor and committee. They must be noted on the program of study. Note: A split-level course completed at the undergraduate level cannot be repeated on the graduate level for use on the program of study.

² Thesis defense / comprehensive exam is required.

Master of Science in Geosciences with Geospatial Sciences Concentration

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|--|---|-----------|
| GG 8561 | Geoscience Seminar | 1 |
| GR 8542 | Geographic Literature | 2 |
| or GG 8572 | Geologic Literature | |
| Select at least 9 hours from the following: ¹ | | 9 |
| GR 6303 | Principles of GIS | |
| GR 6313 | Advanced GIS | |
| GR 6323 | Cartographic Sciences | |
| GR 6333 | Remote Sensing of the Physical Environment | |
| GR 6363 | Geographic Information Systems Programming | |
| GR 6411 | Remote Sensing Seminar | |
| GR 8303 | Advanced Geodatabase Systems | |
| Additional graduate-level coursework | | 12 |
| GR 8000 | Thesis Research/ Thesis in Geography ² | 6 |
| Total Hours | | 30 |

¹ A student who has taken any of these 9 hours in an undergraduate Geosciences program may substitute these or other appropriate MSU graduate-level courses. Substitutions may be made with the approval of the major professor and committee. They must be noted on the program of study. Note: A split-level course completed at the undergraduate level cannot be repeated on the graduate level for use on the program of study.

² A thesis defense / comprehensive exam is required.

Master of Science in Geosciences with Professional Meteorology/Climatology Concentration - Thesis

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|---------|-----------------------|---|
| GG 8561 | Geoscience Seminar | 1 |
| GR 8542 | Geographic Literature | 2 |

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|--|---|-----------|
| or GG 8572 | Geologic Literature | |
| Select at least 9 hours from the following: ¹ | | 9 |
| GR 6613 | Applied Climatology | |
| GR 6623 | Physical Meteorology | |
| GR 6733 | Synoptic Meteorology | |
| GR 6753 | Satellite and Radar Meteorology | |
| GR 6823 | Dynamic Meteorology I | |
| GR 6933 | Dynamic Meteorology II | |
| GR 6813 | Natural Hazards and Processes | |
| GR 8843 | Advanced Mesoscale Meteorology | |
| GR 8453 | Quantitative Analysis in Climatology | |
| Additional graduate-level coursework | | 12 |
| GR 8000 | Thesis Research/ Thesis in Geography ² | 6 |
| Total Hours | | 30 |

¹ A student who has taken any of these 9 hours in an undergraduate Geosciences program may substitute these or other appropriate MSU graduate-level courses. Substitutions may be made with the approval of the major professor and committee. They must be noted on the program of study. Note: A split-level course completed at the undergraduate level cannot be repeated on the graduate level for use on the program of study.

² Thesis defense / comprehensive exam is required.

Master of Science in Geosciences with Teachers in Geosciences Concentration

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| GR 8553 | Research Methods in Geoscience | 3 |
| Select 15 hours from the following: ¹ | | 15 |
| GR 6603 | Climatology | |
| GG 8203 | Ocean Science | |
| GG 8233 | Environmental Geoscience | |
| GR 8400 | Field Methods in Geosciences | |
| GR 8410 | Field Methods Seminar ² | |
| Additional graduate-level coursework ³ | | 18 |
| Total Hours | | 36 |

¹ Substitutions may be made with the approval of the major professor and committee and with appropriate documentation. They must be noted on the program of study. Note: A split-level course completed at the undergraduate level cannot be repeated on the graduate level for use on the program of study.

² Four (4) credits required, may also be repeated for 3 hours of electives.

³ A research project presentation and a written and oral comprehensive examination are required.

Doctoral Program of Study

Doctor of Philosophy in Earth and Atmospheric Sciences

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|--|---|-----------|
| GG 8913 | Research, Readings, and Techniques in Geosciences | 3 |
| GR 8913 | Philosophy and Ethics in Geosciences | 3 |
| GG 9000 | Dissertation Research /Dissertation in Geology | 20 |
| or GR 9000 | Dissertation Research /Dissertation in Geography | |
| Additional courses offered within the Department of Geosciences ¹ | | 10 |
| Total Hours | | 36 |

¹ At the discretion of the student's Ph.D. committee, other courses offered from MSU may also be used to satisfy this requirement. Six hours must be at the 8000 level. Note: A split-level course completed at the undergraduate level cannot be repeated on the graduate level for use on the program of study.

The doctoral program will include 36 hours beyond the master's and the completion of a dissertation. Written and oral comprehensive examinations are administered at the end of required coursework. A dissertation proposal defense is also required.