# GROUNDWATER HYDROLOGY (M.S.)

## Non-thesis Professional Option

This program is designed for individuals who wish to place less emphasis upon research in their plan of study, but who want to gain experience in applying their knowledge to a substantial project of an applied nature. Projects may be aligned with internships or other work experiences. The student's advisory committee will consist of two faculty members from the Department. Projects must be documented and presented according to guidelines in the department handbook and approved by the student's committee.

## Thesis Option

Each student's training and research plan is developed by the student and the major professor with the advisory committee's approval. Admission is based on the compatibility of the student's research interests with the areas of concentration offered by the department and the availability of a faculty member to serve as the student's mentor. A written thesis is required, but the thesis may be comprised of a manuscript in a form acceptable for publication in a refereed journal, while otherwise fulfilling the requirements of the Graduate College.

| Code | Title | Hours |
|---|---|---|
| ENVS 450 | Environmental Hydrology | 3 |
| or SOIL 450 | Environmental Hydrology | |
| GEOL 534 | Geostatistics | 3 |
| HYDR 509 | Quantitative Hydrogeology | 3 |
| HYDR 512 | Environmental Hydrogeology | 3 |
| HYDR 576 | Fundamentals of Modeling Hydrogeologic Systems | 3 |
| TM 482 | Project Engineering | 3 |
| TM 510 | Technology Management Fundamentals | 3 |
| **Choose Thesis on Non-Thesis Option from Below:** | | **9** |
| *Thesis Option:* | | |
| Advisor-approved electives (3-6 credits) | | |
| GEOL 500 | Master's Research and Thesis (3-6 credits) | |
| or HYDR 500 | Master's Research and Thesis | |
| *Non-Thesis Option:* | | |
| Advisor-approved electives (6 credits) | | |
| GEOL 599 | Research (3 credits) | |
| or HYDR 599 | Research | |
| **Total Hours** | | **30** |

The objective of this degree is to introduce students to concepts and professional practices used in the environmental and groundwater industry. After completing the required coursework, students will be able to:

- Understand fundamental concepts of groundwater hydrology (e.g., hydraulic conductivity, porosity, hydraulic head, Darcy's law), and apply these concepts to the solution of groundwater problems;
- Make and understand common measurements used in groundwater investigations, such as depth to water in wells, water pH and temperature, and well discharge, and interpret the results with a level of understanding expected of a groundwater professional;
- Plan, execute, and interpret data from groundwater tests commonly used in industry (i.e., aquifer slug and pumping tests);
- Understand groundwater quality issues and the fate and transport of groundwater constituents (contaminants and naturally-occurring substances) as they apply to site assessment, site characterization, and remediation;
- Have received an introduction to the basics of groundwater modeling using standard industry tools (i.e., MODFLOW), and be able to assess the application of groundwater simulations to consulting-type problems in work done by others;
- Have experience writing consulting-style reports, keeping legal-standard field notes, and an understanding of the process of planning for fieldwork in a professional setting, including such factors as logistics, budgeting, and the development of safety plans;
- Have an in-depth knowledge of some area of specialization, chosen by the student and relevant to the student's professional interests, within the broader field of groundwater hydrology. This knowledge is gained during the preparation of the professional paper required for completion of the degree requirements.