



WHAT IS GEOTECHNICAL ENGINEERING?



Geotechnical engineering is a specialization within civil engineering that involves investigating and understanding what is beneath the ground's surface: soil, rock, and water. Geotechnical engineers use earth materials as building materials in structures

such as dams, embankments, and landfills. They are involved with projects that extract energy from the sub-surface, including geothermal energy and oil and gas production. Geotechnical engineers design foundations for all types of structures, buildings, and roads and design underground structures such as tunnels and mines. They find solutions for rock slope instability and landslides. Geotechnical engineering is increasingly using sophisticated numerical and geophysical methods to aid in understanding subsurface conditions. This career has amazing possibilities, from marine operations, to floating ice platforms in the Arctic, to mining operations.

Sample job titles: Geotechnical engineer, product engineer, systems engineer, design engineer, facilities engineer, project engineer, senior geotechnical engineer.

JOB PROSPECTS

Geotechnical Engineers

- U.S. News & World Report ranked civil engineering (including geotechnical engineer) as #4 in Best Jobs 2021
- 2021 median salary \$88,570
- Unemployment rate 1%
- Bureau of Labor Statistics forecasts increase of 1.7% in new civil engineering jobs 2019-2029

DEGREES OFFERED

- BS Civil Engineering
- MS Civil Engineering – Geotechnical
- MENG – Geotechnical
- Ph.D. Civil Engineering – Geotechnical

WHAT TYPE OF EDUCATION DO YOU NEED?

Geotechnical engineers are typically graduates of a **four-year civil engineering program** and some hold a master's degree.

Geotechnical engineers are usually licensed and regulated as **Professional Engineers (PEs)** in most states. State governments will typically license engineers who have graduated from an ABET-accredited school, passed the Fundamentals of Engineering examination, completed several years of work experience under the supervision of a licensed Professional Engineer, and passed the Professional Engineering examination.



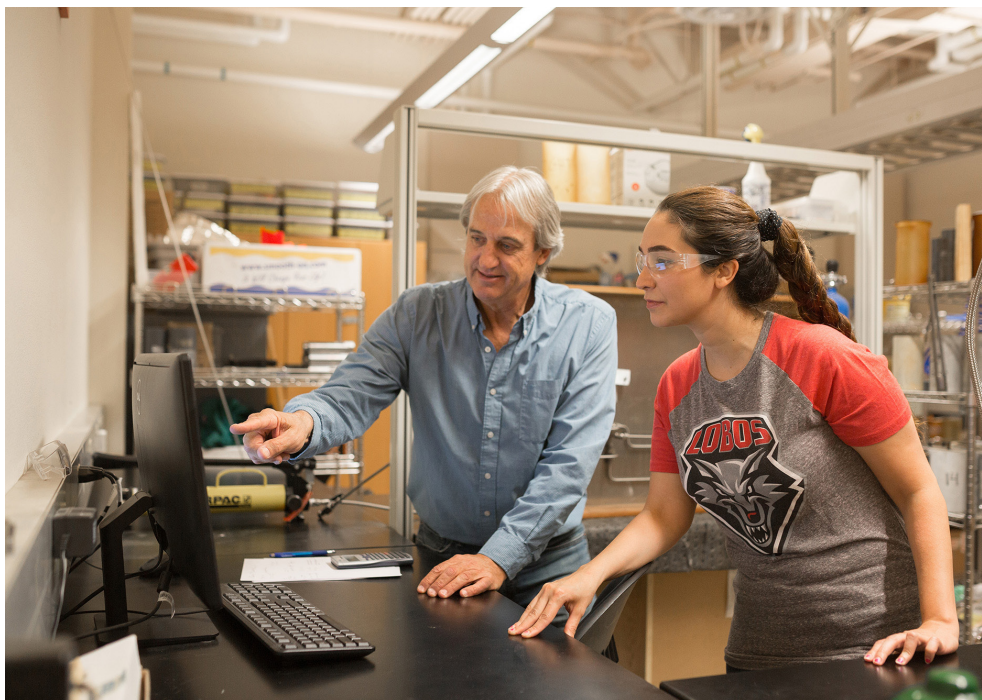
WHAT WILL YOU DO IN A DAY?

Geotechnical engineers are involved in field exploration, laboratory testing, and design using computer-based modeling.

In the field, exploration often includes drilling to extract subsurface samples that can be subsequently tested for measuring engineering properties.

In addition, they:

- Use principles of soil mechanics and rock mechanics
- Investigate subsurface condition and materials
- Determine the types of foundations, earthworks, and/or pavement subgrades required for the intended man-made structures to be built
- Determine the relevant physical/mechanical and chemical properties of these materials
- Evaluate the stability of natural slopes and man-made soil deposits
- Use ground-penetrating radar and seismic surveys to remotely visualize subsurface conditions
- Use laboratory measurements such as computer-based models to create 3-D models of the subsurface
- Work with a team of architects, project managers, and site owners
- Assess risks posted by site conditions



- Design earthworks and structure foundations
- Monitor site conditions, earthwork, and foundation construction