Harold Hamm School of Geology and Geological Engineering

Geological Engineering Bachelor Degree Program

Program Educational Objectives

*Program Educational Objective 1*: Program graduates shall be able to pursue satisfying careers in geological engineering or related fields that contribute to the well-being of society.

Program Educational Objective 2: As professionals, program graduates shall enhance productivity through technical innovations, improve communication skills, and acquire new knowledge, including licensure if it is required to accomplish their goals.

Desired Student Outcomes

a) Students will demonstrate the ability to apply knowledge of mathematics, science and engineering to solve engineering problems

b) Students will demonstrate the ability to design and conduct experiments, as well as collect and interpret experimental data

c) Students will demonstrate the ability to design an engineering system, system component or process meeting specific needs

d) Students will demonstrate the ability to collaborate, communicate and work effectively with others on multi-disciplinary teams

e) Students will demonstrate the ability to identify, formulate and solve a range of engineering problems

f) Students will demonstrate an understanding and appreciation of professional and ethical responsibility in the practice of engineering

g) Students will demonstrate the ability to communicate effectively in both written and oral forms

h) Students will possess the broad education necessary to understand the impact of engineering solutions in global and societal contexts

i) Students will demonstrate an understanding of the importance of life-long learning and continuing education

j) Students will possess knowledge of important contemporary issues in the world as they relate to engineering

k) Students will demonstrate the ability to use techniques, skills and modern engineering tools required for the practice of engineering and related engineering disciplines
Desired Student Outcomes and Performance Criteria Used for Assessment

a) Students will demonstrate the ability to apply knowledge of mathematics, science and engineering to solve engineering problems
   a1. Can use numerical models to solve real world science and engineering problems
   a2. Can solve differential equations
   a3. Understands the importance of boundary conditions on natural and model systems
   a4. Can solve complex partial differential equations using iterative methods

b) Students will demonstrate the ability to design and conduct experiments, as well as collect and interpret experimental data
   b1. Develop an experimental plan.
   b2. Conduct experiments.
   b3. Analyze experimental data.
   b4. Interpret experimental results.

c) Students will demonstrate the ability to design an engineering system, system component or process meeting specific needs
   c1. Identifying specific project objectives, standards, and constraints based on general project requirements
   c2. Applying appropriate engineering analysis
   c3. Considering the non-technical issues and incorporating them into the design
   c4. Generating and analyzing alternative solutions
   c5. Synthesizing all data and choosing the optimal solution based on evaluation of project criteria

d) Students will demonstrate the ability to collaborate, communicate and work effectively with others on multi-disciplinary teams
   d1. Research and gather information
   d2. Fulfill individual role in team’s overall duties
   d3. Share in work of the team
   d4. Listen to other teammates.
   d5. Team is multidisciplinary.

e) Students will demonstrate the ability to identify, formulate and solve a range of engineering problems
   e1. Apply Mathematical Analysis
   e2. Apply Mathematical Analysis
   e3. Apply Process
   e4. Present Final Result

f) Students will demonstrate an understanding and appreciation of professional and ethical responsibility in the practice of engineering
   f1. Demonstrate knowledge of the professional code of ethics
   f2. Demonstrate an ability to make informed ethical choices
   f3. Understand and demonstrate professional responsibilities
   f4. Understanding and demonstrate social responsibilities

g) Students will demonstrate the ability to communicate effectively in both written and oral forms
   g-written 1. Organization
   g-written 2. Content
   g-written 3. Writing Style Grammar
h) Students will possess the broad education necessary to understand the impact of engineering solutions in global and societal contexts
   h1. Understand environmental effects of engineering solutions
   h2. Understand societal effects of engineering solutions
   h3. Understand economic effects of engineering solutions
   h4. Understand political effects of engineering solutions

i) Students will demonstrate an understanding of the importance of life-long learning and continuing education
   i1. Percentage of GeoE students voluntarily participating in the GSA Student Chapter
   i2. Percentage of GeoE students voluntarily participating in the FE Exam
   i3. Ability to analyze the knowledge and skills needed and develop strategies for acquiring missing knowledge and skills.

j) Students will possess knowledge of important contemporary issues in the world as they relate to engineering
   j1. Understand environmental effects of engineering solutions.
   j2. Understand societal effects of engineering solutions.

k) Students will demonstrate the ability to use techniques, skills and modern engineering tools required for the practice of engineering and related engineering disciplines
   k1. Use of Software
   k2. Use of Resources
   k3. Use of Labs
   k4. Maintenance of Equipment