

INTEGRATING ENGINEERING AND GEOSCIENCE IN A CLASSROOM

An approach to integrate engineering and geoscience in a classroom is engaging students in active learning and providing them with a hands-on activity that requires understanding of the basic geoscience concepts and solving them with engineering applications. The application of this approach may involve:

1. Analyzing the problem with a multidisciplinary approach
2. Providing a project that incorporates topics/issues from engineering and geoscience and encouraging students to identify problems and to figure out the best solution
3. Simplifying the complex problems into small components and understanding each component separately; some components may need engineering and some may need geoscience concepts to understand

Many problems around us are multidisciplinary in nature. A multidisciplinary teaching approach broadens the thinking of a student with a wide realm of knowledge. A project based study would strengthen the idea of a multidisciplinary approach when a specific class project involves the understanding of geosciences, engineering, and environmental issues. Environmental consideration is also very important to achieve a sustainable solution of a real world problem.

In general, geoscience refers to all sciences dealing with the study of earth, concepts and processes of earth's systems, and understanding the natural environment and resources. There are various engineering problems related to hill slope processes, exploration and utilization of earth resources, construction of infrastructures such as roads, dams, and foundations. Without the sound knowledge of geological processes and earth materials, it would be difficult to plan the effective mitigation methods for these problems. Simplifying complex problems by presenting models and comparing them with daily life examples from real world situations would help students to understand the scientific concepts.

Working in a group or peer setting can also be effective to understand complex problems. As it is important for an engineer to understand geoscience concepts to address those problems and provide them with sustainable solution, a geoscientist need to know the options and availability of engineering technologies to understand and to provide the appropriate recommendations or suggest proper models. A soil slope stabilization project can be an example where the multidisciplinary approach can be applied. It involves understanding the soil type and its behavior, determining mechanics of the slope movement, analyzing driving and resisting forces, determining possible pore pressure condition, protecting environmental sustainability, and finally providing an appropriate method of stabilization and design criteria. The concepts of both engineering and geoscience are necessary for the successful completion of such projects.