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A “geology trip” to Mars: Enhancing teaching activities of geotechnical engineering on a discovery-oriented platform

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Abstract:

Geology and advanced geotechnical engineering comprise core courses of a civil engineering curriculum. In geology, students learn about the physical and mechanical properties of crystals, soils and rocks, while in more advanced topics, students are taught more specialized chapters to enrich their professional and scientific background. Even though such activities include, especially in geology, supporting laboratories and workshops as well as field trips, students do not have that much opportunity to utilize new technologies and perform discovery-enriched activities which are beyond a traditional way to teach core and highly demanding geotechnical courses. This project aims at enhancing the teaching methods and learning outcomes of the geotechnical engineering discipline on a discovery-based component to be included into the syllabus of two major civil engineering courses: Geology for Engineers and Advanced Geotechnical and Foundation Engineering. Students will take the opportunity to utilize advanced facilities to arouse their interest, expand their vision and enhance their knowledge of the subject. Through team- and creative-based work, the students will explore throughout the courses the advantages of using advanced scanning-image methods and 3-D printing in the identification, description and characterization of geological materials (for Geology students) as well as in the analysis of geo-systems (for Advanced Geotechnical and Foundation Engineering students). Emphasis will be given in the exploration of Mars simulant (i.e. a geological material which is equivalent to the soil of the planet Mars), which will expand the interest and curiosity of the students. This will provide the chance to civil engineering students to realize (and be trained on) the important implications of the “geology” and “geotechnical engineering” contexts in human activities on and beyond the Earth.