The purpose of this course is to achieve an understanding of the Byzantine, Greek, Roman and Islamic cultures from the perspective of mathematics and engineering and to appreciate the influence of their technical advances on world culture throughout the ages, including contemporary times. We will investigate how they developed such sophisticated levels of mathematics and engineering to design magnificent buildings such as the Parthenon of Athens (468–430 BC), the Coliseum of Rome (70 - 72 AD). We then compare these buildings with the more contemporary buildings designed by Gaudi in Barcelona and see the Islamic influence on his work. We use modern techniques in mathematics, including group theory, linear algebra, and the geometry of ruled surfaces to study their art and architecture from the point of symmetry including characterizing the frieze patterns and tessellations that are found in their buildings, on their domes, columns, and arches. Engineering mechanics of their architecture is studied using concepts such as elastic instability (buckling), inertia and moments, and stability of structures with the aid of software such as MATLAB and Simulink. We also visit different universities on location and have local mathematicians, architects and engineers talk to the students about concepts directly related to the course.

Enrollment Dates
Opens: April 1, 2019
Priority Deadline: April 10, 2019
Final Application Deadline: October 1, 2019
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