Semmering Base Tunnel
The Semmering Base Tunnel is a railway tunnel under construction with two tubes between Gloggnitz and Mürzzuschlag in Austria underneath the Semmering Pass. The Tunnel will be 27.3 km in length and therefore 14 km shorter than the existing Semmering route with many tunnels and viaducts. Construction began on the 25th of April 2012 and the link is expected to enter service in 2026. The tunnel is built in five sections: Portal area Gloggnitz, Tunnel section Gloggnitz, Tunnel section Fröschlitzgraben, Tunnel section Grautschenhof, Portal area Mürzzuschlag.

The construction of the tunnel is based on geological and hydrogeological conditions. In several exploratory phases, about 280 core drillings with a total drilling length of more than 41,000 meters to a depth of 850 m have been drilled.

Two different tunneling methods are used:
- a) Cyclic tunneling, also known as the "New Austrian Tunneling Method" (NÖT), in which the rock is broken by blasting or excavating. The tunnel walls are supported with reinforced shotcrete and anchors and in a second stage with a concrete lining.
- b) Continuous tunneling using about 200 meters long tunnel boring machines. Prefabricated concrete segments support the tunnel walls.

Construction site transports are handled by rail, where possible. This minimizes the impact on people and the environment. In the case of sites which are not located in the immediate vicinity of the existing railway, the transports are carried out via specially roadworks. At Fröschlitzgraben, the excavated rock is transported directly to the nearby landfill Longsgraben via conveyor belts and deposited there [1].

Vienna Water Supply Museum Kaiserbrunn
History and construction of the First Vienna Spring Water Main and of Vienna’s drinking water supply from 1869 to the present is the main focus of this excursion.

In 1864, the Vienna City Council voted the construction of the First Vienna Spring Water Main, which to this day covers approximately 40 percent of Vienna's water requirements. It was planned by the geologist and City Council member Eduard Suess and implemented under Mayor Cajetan Felder. The main task was to provide an adequate drinking water supply even for the suburbs and to improve its quality, thereby excluding any further health hazards for the population.

In 1965, the entire Rax-Schneeberg-Schneealpe Massif was declared as a water protection zone. In December 1988, the Pfannbauer Spring (which originates in Aschbach Valley on the federal road to Mariazell) was added to the existing spring resources and incorporated into the network of the First Vienna Spring Water Main. Since the utilization of this spring in the network, it is possible – under normal conditions – to supply all of Vienna with mountain spring water.

Technology and water protection is presented in the Museum and an open-air exhibition presents interesting technologies.

DEVELOPMENT OF GENERAL AND SPECIFIC COMPETENCIES (max. 500 characters – describe main goal of the subject in terms of knowledge and skills that a student would acquire by taking the course):
After having attended the excursions the students are able to comprehend the relationships between soil/rock-structure interaction and ground water processes according to different construction technologies and economic conditions.

RECOMMENDED LITERATURE (with detailed data on publisher and year of publication):
QUALITY ASSURANCE METHODS:
An anonymous questionnaire will be filled in by all of the course participants. This procedure is compulsory for all subjects and is aimed at evaluation both of the teacher's performance (quality of delivery) and of the overall content and structure of the course.

Grading of the course: successfully completed, not completed.