



NATIONAL TECHNICAL UNIVERSITY OF ATHENS

Postgraduate Course

Design and Construction of Underground Works

Schools: Mining and Metallurgical Engineering / Civil Engineering

Course Director: Prof. George Tsiambaos, email : gktsiamb@central.ntua.gr

Official course web-site: <http://www.ntua.gr/tunnelling>

Scope

Design and construction of underground works has grown considerably worldwide in recent years. Advances in engineering offers today the necessary background to implement underground projects, mainly tunnels and chambers of such size and under such adverse conditions that a few decades ago their construction would have been impossible. The mountainous geomorphology of Greece, the uneven distribution of groundwater resources, the congested city of Athens and the necessity to upgrade the country's current railway and highway transportation systems have called for an intensive activity all over Greece in the construction of underground works. Funds available from the European Commission made possible the implementation of a radical scheme of underground works which otherwise would have been impaired or postponed for the future. To assure the current and future availability of human resources that would be able to carry out the challenges of the design and construction of such underground works, the National Technical University of Athens (N.T.U.A) implemented an inter-disciplinary post-graduate course offered by the Schools of Mining and Metallurgical Engineering and of Civil Engineering. The course was inaugurated in the academic year 1998-99. The program is managed by a Special Inter-disciplinary Committee (SIC) consisting of nine faculty members representing the two collaborating Schools of N.T.U.A. The current director is Professor George Tsiambaos from the School of Civil Engineering. The SIC decides on the program of studies, the procedure and criteria of selection of the post-graduate students and all other aspects of the educational procedures, within the framework of the existing legislation and decisions of the N.T.U.A. administration.

Degrees awarded

The course awards a “Post Graduate Specialization Diploma (PGSD) in the Design and Construction of Underground Works” after successful completion of courses lasting one academic year (two four-month terms) and the defense a dissertation thesis requiring about one term of research work. Full-time students must attend 8 courses per term (16 courses in total). Each course includes 2-3 lecture hours, giving a total load of 18 lecture hours per week. Part-time students may complete the course (courses and dissertation) in maximum two calendar years. Students wishing to continue their studies towards a PhD degree may be considered for admission in any of the two collaborating Schools, after the successful completion of the program’s courses and the consent of the Special Inter-disciplinary Committee of the Program.

Courses offered

The post-graduate program includes three major fields of study:

- **Engineering Geology and Ground Investigations**
- **Design of Underground Works**
- **Construction and Monitoring of Underground Works**

Each of these fields is supported by a series of compulsory and elective courses, class exercises, laboratory work, field work, completion of a project and attendance of invited lectures. Two field trips are also organized each academic year, one at important construction sites in Greece during the first term and the other outside Greece during the second term. The following is a list of the courses offered during the academic year 2015-16:

1st TERM (Fall)

A. Compulsory:

- Engineering Geology for Underground Works
- Ground Investigation Methods
- Advanced Rock Mechanics
- Design of Underground Works
- Organization and Management of Underground Works
- Technical and Economic Evaluation of Underground Works

- Instrumentation in Geotechnical Engineering

B. Electives (selection of one):

- Electrical and Mechanical Installations – Ventilation
- Earthquake Geotechnical Engineering of Tunnels

2st TERM (Spring)

A. Compulsory:

- Computational Methods for Analysis of Underground Structures
- Drilling and Blasting Techniques for Underground Works
- Tunnel Support Systems
- Mechanical Excavation of Tunnels
- Shallow Tunnels – Retaining Structures – Ground Settlements
- Design of Special Works (Tunnel entrances, Shafts, Chambers)
- Equipment for Excavation, Loading and muck Transportation

B. Electives (selection of one):

- Computer Systems for Management of Engineering Projects
- Risk Management in Issues of Safety and Health

Student enrolment criteria

The annual enrolment is 20 students. Candidates holding a degree in Mining Engineering or Civil Engineering are eligible for acceptance to the course after a selection procedure based on academic performance criteria set by the SIC. Candidates holding a first degree in other 3 relevant engineering or geology courses may also be considered for admission to the program under certain limitations and obligations of the applicant.

Contact details (Course Secretariat)

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