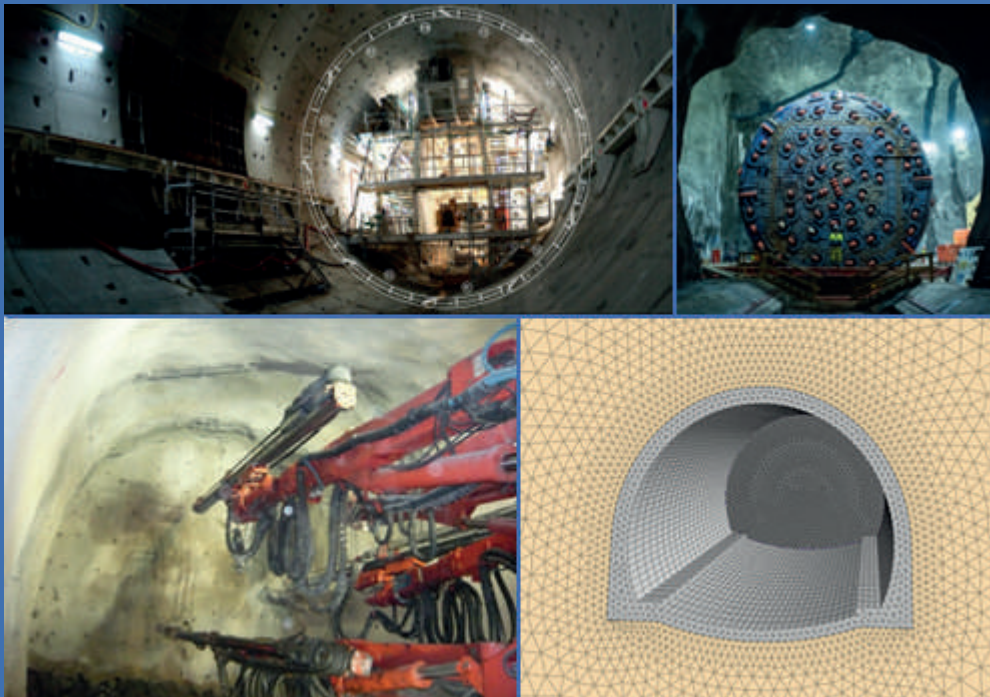


2nd level specializing master in **TUNNEL ENGINEERING:** design, construction and management

2022/2023 - I edition

Directors:
Prof. Claudio di Prisco
Prof. Daniele Peila



The Master course in Tunnel Engineering, is the synthesis of the experiences gathered during the years by two centre of excellence of tunnel teaching **Politecnico di Milano** and **Politecnico di Torino**. It is a **high specializing** course, aimed at providing **multidisciplinary** skills and by defining a complete framework of all the necessary contents to prepare professionals with capabilities in design, construction and project management.



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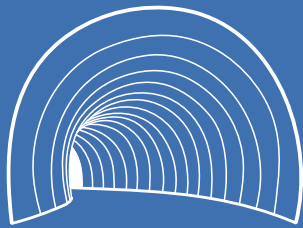


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Introduction

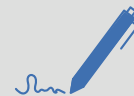
As testified by the number of kilometers of tunnels constructed every year all around the world, the tunnelling is a rapidly expanding sector on the global scale. In this context, suitably trained professionals, with multidisciplinary knowledges are largely demanded. At present, these skills are not provided by the traditional academic courses and cannot be easily acquired during the standard professional activity.



The Master is a full-time course lasting **one year**. The first six months consist in theoretical lessons, seminars and technical visits in construction sites and laboratories. The following six months are devoted to internships in companies active in the sector, under the supervision of professors and professionals.



The candidates will get in touch with academic teachers, professionals and managers active in tunnelling. The career opportunities can be identified in companies of design, construction, manufacturers of materials and technologies, machine producers, roads and railways infrastructure managements.



The Master is open to candidates who have a Master of Science in Civil, Environmental and Mechanical Engineering. For foreign applicants, the Master is open to students holding equivalent qualifications.

Application deadline:
9th December 2022



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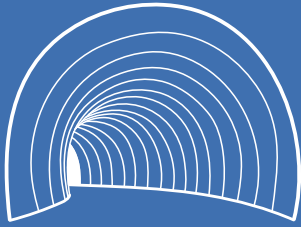


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Master organization

The Master is a full-time course lasting **one year**.

During the first six months the students will attend theoretical lessons, seminars and will take part in technical visits in construction sites and laboratories. Most of the lessons will be **online**, while one month of **face to face** classes is scheduled to facilitate the collaboration among the students and the development of a network with academic teachers, professionals and managers involved in tunnelling. Face to face classes will take place at Campus Lingotto of Politecnico di Torino (Via Nizza, 230 – 10126 Torino, TO).

During the following six months the students will have the opportunity of being involved in **internships/projects** in companies active in the sector, under the supervision of professors and professionals.

Master director

Prof. Claudio di Prisco – PoliMi
Prof. Daniele Peila – PoliTo

Master Scientific Commission

Prof. Claudio di Prisco – PoliMi
Prof. Daniele Peila – PoliTo
Prof. Laura Scesi – PoliMi
Prof. Marilena Cardu – PoliTo

Master Organizing Committee

Andrea Carigi – PoliTo
Luca Flessati – PoliMi
Daniele Martinelli – PoliTo
Irene Redaelli – PoliMi
Carmine Todaro – PoliTo
Matteo Zerbi – PoliMi



LESSONS: 375 h (March–June)
INTERNSHIP: 480 h (Sept – Jan)
INDIVIDUAL STUDY: 1085 h
TECHNICAL VISITS: 40 h
PROJECT WORK: 120 h



Mid-term test
During the mid-term test (Sept. 2023) the participants will present and discuss the classworks and homeworks developed during the course.



Final discussion
The course ends with a final presentation, during which a project work/thesis carried out during the Master course or the internship is discussed.



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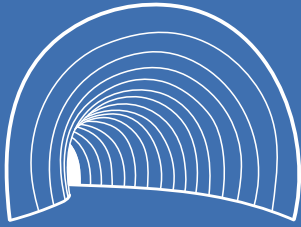


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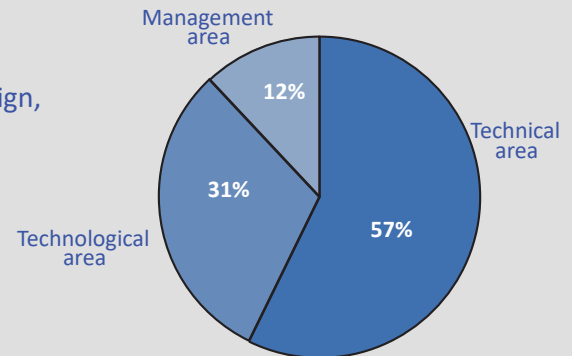


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Teaching content

The Master courses can be subdivided into three areas:

- Technical area: geology, hydrogeology, geotechnics, rock mechanics, design, computational modelling, monitoring
- Technological area: construction methods and plants
- Management area: project management, tendering and contracts



Teaching modules

1. Tunnel design: general concepts & risk management in tunnelling
2. Geology, hydrogeology, geophysics and risk analysis
3. Soil and rock mechanics & investigations
4. Computational methods
5. Construction methods: conventional tunnelling
6. Construction methods: Improvements and presupports (technology)
7. Construction methods: mechanized tunnelling
8. Assessment of excavation related hazard and design of mitigation measures
9. Plants
10. Monitoring
11. Environment, Contracts, Management and Safety
12. Maintenance & refurbishment



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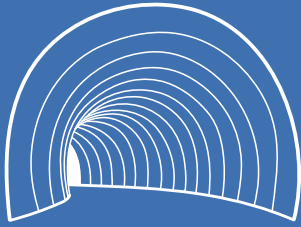


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Career opportunities

The candidates will get in touch with academic teachers, professionals and managers active in tunnelling. The course aims not only at providing an internationally recognized academic title but also at creating a centre of excellence on tunnel engineering, where the different professionals are capable of interpreting and managing the complexity of the problems and becoming active and innovative actors in the research of new engineering solutions as well as capable of assuming position of responsibility in project management. The career opportunities can be identified in companies of design, construction, manufacturers of materials and technologies, machine producers, roads and railways infrastructure managements.

Examples of previous internships:

Arup:

Numerical analyses of sequential tunnelling in soft soils

Chennai Metro Rail Limited:

Study of Risks and Control Measures for Rail Projects

C.M.C. di Ravenna:

TBM Ground conditioning in heterogeneous geological conditions

COWI A/S:

Structural competence of TBM ring/ segment while construction

Geodata Engineering S.p.A.:

Design of River and Railway Crossing Using Pipejacking-Microtunneling

Herrenknecht Italia S.r.l.:

Validation of the flow behavior with real EPB machine tunnel drives

Implenia Construction GmbH:

Grouting Technology pertaining to the backfilling of annular gaps

Land Transport Authority (LTA) Singapore:

Tunnelling under existing Metro and New Construction Techniques

M4 S.p.A.:

Securing a historical building close to metro tunnel

Metro C S.C.p.A.:

TBM crossing of station and launching procedure

Porr AG:

Gas pipeline replacement project: analysis of excavation performance

Pavimental S.p.A.:

Underpassing of a highway: optimization of the construction site

Impresa Pizzarotti & C. S.p.A.:

Selection criteria of TBM tunnelling in high urbanized areas

Pro Iter – Infrastrutture e Territorio S.r.l.:

Comparison of 2D and 3D Analysis of Shallow Overburden Tunnels

PricewaterhouseCoopers:

PMO support for tunnel project

Rocksoil S.p.A.:

Numerical analyses for TBM jamming



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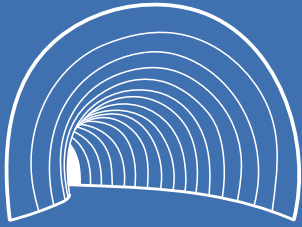


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Applications and selections

Admission requirements

The Master is open to candidates with a Master of Science in Civil, Environmental or Mechanical Engineering. For foreign applicants, the Master is open to students holding equivalent qualifications. Different M.Sc. Degrees will be considered in case the candidates have previous experience in tunnelling.



Application detail

www.mastertunnelling.polimi.it

Deadline: 9th December 2022

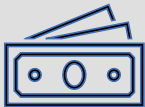
Selections

The selections will start on the 19th December 2022.



The Master students will be selected by a Committee on the basis of titles, previous experiences of the candidate and after an on-line interview, employed to assess also the motivation of the candidate. In case of equal score, the Master student will be selected on the basis of the application reception date.

Fees



Total amount: **€ 8 000.00**

Payment is scheduled in two instalments:

1st instalment: € 4 000.00 by the 31st January 2023

2nd instalment: € 4 000.00 by the 30th June 2023



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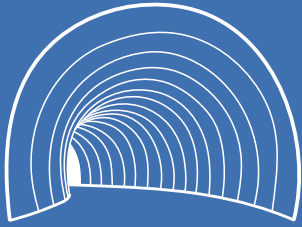


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