

POST GRADUATE
MASTER COURSE

Tunnelling and Tunnel Boring Machines

VII Edition 2009/2010



Master



Guide updated to 03/02/2010

The Second Level International Post Graduate Master Course in “**Tunnelling and Tunnel Boring Machines**” is established by the First School of Engineering of Politecnico di Torino (Italy) and managed by COREP. COREP is a no-profit consortium created in 1987 on the initiative of the three Piedmont Universities – Polytechnic of Turin, University of Eastern Piedmont “A. Avogadro” – local bodies and important Italian industries and associations. One of the main goals of COREP is to provide high qualifying training services to young graduates in order to facilitate their entrance in the labour market, promoting the cooperation between universities and socio-economic actors. As a guaranty of reliability and professionalism, some COREP's branches are certified for education and training activities by Regione Piemonte (for details and updates visit the web site www.corep.it).

The Master is endorsed by :



under patronage of:



Italian Tunnelling Society
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Director : Prof. Daniele Peila, Dipartimento di Ingegneria del Territorio, dell'Ambiente e delle Geotecnologie, Politecnico di Torino.

Educational Project Manager: Prof. Sebastiano Pelizza, Dipartimento di Ingegneria del Territorio, dell'Ambiente e delle Geotecnologie, Politecnico di Torino.

COREP Organizational Coordinator of the Master: Dott. Ing. Ignazio Savino.

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1. WHY THIS MASTER?

The need of experts involved in D&B and in TBM tunnelling as well as tunnel work site management is rapidly increasing throughout the world. The necessary qualifications to cover these roles cannot be supplied by the first and second level University Courses, but a specially drawn up course is needed.

2. JOB OPPORTUNITIES

The students who followed the Post-graduate Master Course are of interest for the design firms, the construction companies involved in tunnelling and for the tunnelling tools suppliers as well as the producers of tunnel boring machines.

The Public Administration and the tunnel owners can also find interest in the skills gained during the course

3. ADMISSION REQUIREMENTS

Graduate MSc in Engineering and Geology, Company and Public Administration Employees involved in tunnelling design and management of job sites. A maximum number of **20 participants** is foreseen.

Professionals interested in specializing competences in this field can subscribe to single training modules.

The course working language will be English.

4. MASTER LOCATION

The lectures and exercises are held at COREP, C.so Trento n. 13 (second floor) – Torino.

The Stage will be performed in Italy and/or abroad.

5. PROGRAMME

The Post-Graduate Master Course on “Tunnelling and Tunnel Boring Machines” will be held from **November 2009 to October 2010** and will start on the **16th of November 2009**. It involves about 484 hours of face-to-face lessons and classroom exercises, 2 months of stage in a tunnel construction site or in a tunnelling design company and a thesis work.

This Course is worth a total of **60 European credits** Transfer System (ECTS) academic credits. The class lessons last 6/8 hours a day, 5 days a week. The official language of the course is English.

The Post-Graduate Master Course is organized in 3 main modules:

- Tunnel design and construction methods.
- Mechanized tunnelling.
- Management and safety of job sites.

6. STAFF

Director: Prof. Daniele Peila, Dipartimento di Ingegneria del Territorio, dell'Ambiente e delle Geotecnologie, Politecnico di Torino.

Educational Project Manager: Prof. Sebastiano Pelizza, Dipartimento di Ingegneria del Territorio, dell'Ambiente e delle Geotecnologie, Politecnico di Torino.

COREP Organizational Coordinator of the Master: Dott. Ing. Ignazio Savino

Lecturers of past edition:

Airoldi S.	Atlas Copco CMT
Amberg F.– Dickmann T.	Amberg Engineering Ltd, ITA WG 14 "Mechanized Tunnelling", (Switzerland)
Anagnostou G.	Professor, ETH - Swiss Federal Institute of Technology - Zurich (Switzerland)
Arrigoni G.A.	Consultant, FICE, Fellow Chartered Institute of Arbitrarians
Artigiani E.	Golder Associates srl
Assis A.	Professor, University of Brasilia – Former President ITA/AITES (Brasil)
Barbero M.	Researcher, Politecnico Torino
Barla G.	Professor, Politecnico di Torino
Bertino E.	Cifa S.p.A.
Bilgin N.	Professor, Istanbul Technical University, Faculty of Mines (Turkey)
Borgonovo G.	Golder Associates srl
Brino L.	Lyon-Turin Ferroviaria
Cardu M.	Professor, Politecnico di Torino
Concilia M.	Todini Costruzioni S.p.A.
Cravero M.	CNR – IGAG Torino
Dal Negro E.	Mapei S.p.A.
Della Valle N.	Consultant – Technical Director L9 Metro Barcellona (Spain)
Forchino F.	P.M. & E. Project Management & Engineering srl
Gecchele G.	Professor, Politecnico di Torino
Lovat R.- Giorelli M.	Lovat inc. (Canada)
Grandori R.	S.E.L.I. S.p.A.
Grasso G.	Geodata S.p.A. – ITA/AITES Vice President
Gruebl F.	Professor, Stuttgart University – PSP Consulting Engineers – (Germany)
Guardini C	Research Assistant, Politecnico di Torino
Guglielmetti V	Consultant
Iabichino G.	CNR – IGAG Torino
Innaurato N.	Professor, Politecnico di Torino
Knights M.	Jacobs Ltd – President ITA-AITES (UK)
Kovari K.	Professor, ETH – Swiss Federal Institute of Technology – Zurich (Switzerland)
Marchionni M.-Rhem U.	Herrenknecht
Morino A.	Gdtest S.p.A.
Narvaez G.	Golder Associates srl
Nicola A.	Impreglio S.p.A.
Oggeri C.	Researcher, Politecnico di Torino -
Oreste P.	Professor, Politecnico di Torino
Palmieri S.	Palmieri S.p.A.
Patrucco M.	Professor, Politecnico di Torino
Peila D.	Professor, Politecnico di Torino - ITA-AITES WG 18 Animateur
Pelizza S.	Professor, Politecnico di Torino - Former President ITA/AITES
Pescara M.	Geodata S.p.A.
Petrucco V.	ICOP S.p.A.
Pichler J.	Sandvik Mining and Construction
Plizzari G.	Professor, University of Bergamo
Ricci G.	Geodata S.p.a.
Roberds B.	Golder Associates Inc.
Russo G.	Geodata S.p.A.
Salminen P.	Sandvik Mining and Construction
Sambuelli L.	Professor, Politecnico di Torino
Schulkins R.	Mapei Far East (Singapore)
Smirnov T. P.	Parsons Brinckerhoff Quade & Douglas, Inc. (USA)
Soldo L.	Geodata S.p.A.
Sorlini A.	Geodata S.p.A.
Sterling R.	Professor, Louisiana Tech. University - (USA)
Torta P.	P.M. & E. Project Management & Engineering srl
Wagner H.	Independent Consulting Engineer and Expert of ITA Executive Council

7. HOW TO APPLY

In order to apply for a Master or a specializing Course please fill in the Subscription Form (download: [.doc](#) from or [.pdf](#) from) and send it by the deadline in one of the following way:

- by electronic mail (iscrizioni@corep.it)
- by fax (+ 39 011 197.42419)
- hand delivered to Master Corep Secretariat (Corso Trento, 13 – 10129 Turin, ITALY)
- by ordinary mail. Please send a closed envelope to: Segreteria Master Corep (Corso Trento, 13 – 10129 Turin, ITALY)

The deadline to apply is:

for NOT Italian students : 2nd OCTOBER 2009

for Italian students : 20th October 2009

The application is unbinding. It only aims to be admitted to the selection.

The enrolment of NOT Italian students are evaluated on arrival (see below **Confirmation of registration**).

The enrolment of Italian students who are applying for scholarship established by other bodies could be evaluated on arrival.

Following documentation (the list of documents is also provided in Italian at the **note¹**) must be provided in attachment:

- **ALL STUDENTS** must also enclose:
 - the Subscription Form (download: [.doc](#) or [.pdf](#))
 - Copy of the MSc (or MSc equivalent) degree together with the transcript of records of the sustained examinations
 - Curriculum Vitae according to the European standard (Europass CV in [.doc](#) or [.pdf](#) format). It must include the authorization to the treatment of the personal data (Italian DL 196/2003). In any case **the curriculum must be sent in electronic format to iscrizioni@corep.it**
 - 1 passport photo with name and surname reported on the back (if the application has been sent by email, the photo is not mandatory, but has to be provided in case of admission.)
 - Copy of a passport or identity card valid
 - Copy of "Codice Fiscale" (Italian individual tax code)

¹ Note

- Domanda di iscrizione (in formato [.doc](#) o [.pdf](#))
- Certificato di laurea con esami; per laureandi certificato degli esami con voti. È ammessa anche l'autocertificazione (in formato [.doc](#) o [.pdf](#));
- Curriculum vitae secondo lo standard europeo (Europass CV in formato [.doc](#) o [.pdf](#)). Il curriculum dovrà riportare in calce l'autorizzazione al trattamento dei dati personali (D.Lgs.196/2003);
- 1 fotografia formato tessera con indicati nome e cognome sul retro (se la domanda viene spedita in formato elettronico, la fotografia non è obbligatoria, ma deve essere consegnata in caso di selezione);
- copia di un documento di identità in corso di validità (Carta di Identità o Passaporto)
- Copia del Codice Fiscale
Chi non possedesse il Codice Fiscale, lo potrà richiedere presentandosi all' [Ufficio locale dell'Agenzia delle Entrate](#) con un documento di riconoscimento (gli stranieri devono presentare passaporto o permesso di soggiorno). I residenti all'estero possono rivolgersi anche ai Consolati, se collegati al sistema informativo dell' Anagrafe Tributaria. [Per maggiori informazioni](#)
- Titolo della tesi accompagnato da una breve sintesi (massimo una pagina) della medesima.

It is obtainable at the "Agenzia delle Entrate" local office (Italian Internal Revenue Service)) by presenting a document of identification (foreigners must present Passport or Permit of Stay). Residents abroad can refer also to Italian Consulates. **For further information**

- Title of the MSc (or MSc equivalent) final project together with a short summary of its contents (max one page)

- **STUDENTS WITH ITALIAN DEGREE** must also enclose:
 - Degree thesis with all exams. For final year student it is sufficient a certificate of exams with marks. It's also accepted the self declaration ex art. 445/2000, articles 46-47 (**doc.** or **pdf**).

- **STUDENTS WITH FOREIGN DEGREE** must also enclose:
 - declaration of value and certificate with the translation of all the passed exams. This declaration must be requested to the Italian Consulate in the country where the student had the degree. Community citizens may submit certified copies of the titles about the Declaration of Value. Extra-community citizens have to submit originals of the titles about the Declaration of Value.

- **FOREIGN STUDENTS FROM COUNTRIES INDICATED IN THE VISA SYSTEM AND THE ENTRY OF ALIENS INTO ITALY AND THE SCHENGEN AREA** (www.esteri.it/visti/home.asp) **LIVING IN ITALY** must also enclose:
 - Entry Visa and residence permit

Incomplete application forms won't be considered as valid.

The COREP Secretariat Office will send an acknowledge of receipt (by e-mail) of the application in 3 working days. If you don't receive any communications, please contact our Office by phone or e-mail **For more info please call the Info-Point: Tel +39 011 19742401. E-mail: formazione@corep.it**

CONFIRMATION OF REGISTRATION

The enrolment of NOT Italian students are evaluated on arrival. Admission will be communicate to candidates within 10 working days from the date of arrival of the application and up to the available places. In case of admission to the Course, NOT Italian candidates will have to **confirm their participation by the 19th of October 2009.**

FOR ITALIAN CANDIDATES (or valid for those applications of foreign students arrived after the 2nd of October 2009 but by the 20th of October 2009): At the end of the selection a definitive classification list of the eligible candidates will be written. These candidates will receive, subject to available places, the proposal to be registered to the Master.

The student will regularize the registration through the apposite form ("Confirmation of registration").

It is correct to specify that:

- **STUDENTS WITH ITALIAN DEGREE** will have to deliver copy of the original of the Thesis Degree.

- **FOREIGN STUDENTS FROM COUNTRIES INDICATED IN THE VISA SYSTEM AND THE ENTRY INTO ITALY OF ALIENS AND THE SCHENGEN AREA** (www.esteri.it/visti/home.asp) before to regularize the registration about the form ("Confirmation of registration"), must give to the Secretary, within expiration date, the Visa of entrance for study reason type D with multiple entrances and the residence permit.

Further information about documents for foreign students are available on the site: www.esteri.it/visti/home.asp

Personal data will be used by COREP according to Italian laws (Article n. 13 Legislative decree n. 196/03).

8. SELECTION OF APPLICANTS

The selection of the students is based on the curricula.

N.15 places will be reserved to NOT Italian students candidates until the 2nd of October 2009; those that won't be covered will be then available to Italian participants.

The enrolment of NOT Italian students are evaluated on arrival. Admission will be communicate to candidates within 10 working days from the date of arrival of the application and up to the available places. In case of admission to the Course, NOT Italian candidates will have to **confirm their participation by the 19th of October 2009** (see How to apply).

9. TUITION FEE AND CONDITIONS FOR THE MASTER TO BE ACTIVATED

The Post Graduate Master Course has been approved and funded by the European Social Fund (Bando Regionale per i Master Universitari di I e II Livello 2009/2010. D.n.349 del 03/07/2009).

The tuition fee is **5000,00 Euro** (including university fees).

Participants are responsible for the journey and accomodation while in Torino.

Two scholarships of **2.000 Euro** are available for **foreign students**. Scholarships will be assigned between the admitted students before the beginning of the course on the basis of criteria established by the Scientific Committee.

The Master Course will be activated on condition there are at least 10 students.

All Italian students enrolled in Post-graduated Master Courses managed by COREP can get an "**ad honorem loan**" for an amount of **5.000 Euro** per year given by UniCredit Bank. To get the loan it is sufficient to present an Enrolment Certification to the Master, without other requirements.

For all students who submit an application by 11 September 2009 there is a reduction of 10% on entry fee.

Further information can be asked to the COREP Master Secretariat +39-011-19742401 ; formazione@corep.it .

It will be also possible to follow single modules, whose fees are:

- 1st module (Tunnel design and construction methods): 1500,00 €
- 2nd module (Mechanized tunnelling): 2500,00 €
- 3rd module (Management and safety of job sites): 1500,00 €

10. ATTENDANCE, EVALUATION AND DEGREE AWARDING

A Master Thesis followed by a discussion concludes the course and finally leads to the award of the **Master degree by Politecnico di Torino** (60 University Credits).

In order to get the Master Degree the participants have to attend at least to 2/3 of the lectures hours (certificated by signature), to pass all foreseen examinations and to successfully conclude the Project Work activities.

11. COURSE ORGANIZATION

SUBJECTS	CREDITS	LECTURES (L) & EXERCISES (E) HOURS
MODULE 1		
TUNNEL DESIGN AND CONSTRUCTION METHODS (18 credits) 182		
Tunnel Construction	1	12 L
Rock Mass Characterization and "geo" investigations	6	50 L 10 E
Conventional Tunnelling and Tunnel supports	8	70 L 10 E
Risk Assessments	1	10 L
Ground reinforcing for tunnelling	2	10 L 10 E
MODULE 2		
MECHANIZED TUNNELLING (18 credits) 180		
General Aspects of mechanized tunnelling	2	15 L 5 E
Hard Rock Tunneling mechanized	4	30 L 10 E
Soft rock and ground mechanized tunnelling	6	50 L 10 E
Tunnels in difficult conditions	1	10 L
Plants	2	20 L
Microtunnelling	3	30 L
MODULE 3		
MANAGEMENT AND SAFETY OF JOB SITES (9 credits) 90		
Contractual and legislative aspects, work sites management, quality	3	30 L
Safety of work sites and equipment	4	40 L
Fire protection and environment	2	10 L 10 E
ADDITIONAL LECTURES 22		
Equal Opportunities	–	10 L
Enhancement of personal resources	–	12 L
FINAL WORK (MASTER THESIS)	7	170
TECHNICAL VISITS	1	10
STAGE	7	280
TOTAL	60	934