

POLITO
Politecnico di Torino
Torino, Italy



ABOUT

Politecnico di Torino (POLITO) is internationally ranked among the most important universities in Europe for engineering and architecture studies, with 37,000 students, more than 1000 teaching staff and about 800 contracts yearly with industries, government institutions and local organizations and, since it has received funds amounting to 105 million Euro for 269 projects funded in the framework of the Horizon 2020 Programme. The Department of Environmental, Land and Infrastructure Engineering (DIATI) at POLITO is involved in more than 90 research projects carrying out research activities in the field of Raw Materials, Environmental Engineering, Excavation Engineering and Safety, Mining Plants and Underground works.

DIATI develops knowledge and expertise relating planning, authorizing, and monitoring exploitation activities throughout the mine life cycle, from exploration to post-mining closure and land rehabilitation, with emphasis on critical raw materials characterization and their reuse/recycle in a circular economy perspective and offers a specific track in «Sustainable Mining» within the recently renewed [Master of Science](#) programme in «Georesources and Geoenery Engineering», entirely taught in English and hosting students from all over the world.

EXPERTISE

The Raw Materials, Environmental Engineering and Excavation Engineering and Safety teams carry out the following activities:

Recycling of secondary raw materials and optimization of industrial and mineral processing: secondary raw materials and energy recovery from urban and industrial waste and wastewater; physical-mechanical treatment for WEEE recycling; battery metals recovery and valorisation from primary and secondary resources; critical raw materials and metals recovery from mining tailings by means of physical, chemical, and biological processes.

Mining activities (quarries and mines): excavation techniques and technologies both open pit and underground; petrographic and physical mechanical tests at different scales; occupational safety engineering.

Environmental engineering and circular economy: Life Cycle Assessment (LCA), Life Cycle Risk Analysis (LCRA), Ecological Footprint Analysis; environmental health risk analysis of the use of recycled products; circular economy principles applied to industries and urban contexts; asbestos-containing materials treatment and analysis.

SERVICES

[Raw Materials Laboratory](#) carries out the characterization of raw and secondary materials by means of the following measurement methods based both on optical microscopy and on spectroscopy IR and RAMAN: MOCF, MOLP, SEM, XRD, micro-RAMAN and micro-FTIR. Researches on mineral and secondary raw materials treatment are carried out by means of dimension and shape determinations, comminution tests, magnetic, electrostatic and gravimetric separations, flotation tests.

[Air Water Waste Laboratory](#) carries out basic and applied research projects on topics such as: waste prevention and treatment for the recovery of raw materials and / or energy, wastewater treatment, water purification, groundwater and soil remediation and, finally, greenhouse gas mitigation through innovative technologies including the use of microalgae. The following instruments are available: UV and IR spectrometer, FID gas chromatograph, Mass gas chromatograph, ICP spectrometer, ionic chromatograph, HPLC, COD and BOD devices.

[Geomechanics and Geotechnology Laboratory](#) carries out tests both on-site and in the laboratory for mechanical and technological characterization of rocks; also, it operates in the numerical modeling sector, through «general purpose» calculation codes such as Flac[®], Udec[®], Map3D[®], for analysis related to field problems and specific calculation programs developed for analysis and data processing of various types.

Circular Economy laboratory carries out applied research on waste treatment (physical, mechanical, biological) and conversion into resources and energy. Laboratory equipment: ED-XRF Rigaku spectrometer, Retsch MM200 ball milling unit, centrifuge, UV-Visible spectrometer, UV-Visible portable photometer, COD digester, BOD analyzer (30 reactors), multi-parameter probe (pH, EC, ORP, T), oven, muffle, shaking incubator (T: 5-60°C), anaerobic digestion reactors (batch: 4x2L, 30X0.5L; semi-continuous/continuous: 1x3L) for fermentation processes at 20-50°C, biogas portable analyzer.



MORE INFORMATION

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