

Teaching plan - PhD program in Chemical, Geological and Environmental Sciences

38°Cycle a.y. 2022/2023

| Course | Teacher(s) | SSD | hrs | credits | Educational form* | Type of activity** | Mandatory/Chosen activity |
|--|--|-----------------|-----|---------|-------------------------------|---|---------------------------|
| Earth Observation data for environmental monitoring | Micol Rossini | GEO/04 | 16 | 2 | Lecture | Intercurricular | Chosen activity |
| Open source software for spatial data analysis | Micol Rossini | GEO/04 | 16 | 2 | Lecture | Intercurricular | Chosen activity |
| Online tools for atmospheric research | Samuel Albani | GEO/04 | 10 | 1 | Lecture & laboratory training | Intercurricular | Chosen activity |
| Climate Journal Club | Fabien Desbiolles, Agostino Meroni, Mara Murri | GEO/12, GEO/06 | 20 | 2 | Lecture & seminar | Intercurricular | Chosen activity |
| Environmental sustainability | Elena Collina, Valeria Mezzanotte, Antonio Finizio, Francesco Romagnoli | CHIM/12, BIO/07 | 20 | 2 | Lecture & laboratory training | Intercurricular | Chosen activity |
| Machine Learning for Multivariate Data Analysis | Davide Ballabio | CHIM/01 | 16 | 2 | Lecture | Intercurricular | Chosen activity |
| New lignin-based sustainable materials: science and technological aspects. | Luca Zoia, Ruggero Barni, Antonello Cerullo, Jerome Vachon, Massimo Benocci, SABIC | CHIM/01, FIS/03 | 8 | 1 | Lecture | Intercurricular (mutuato dal Corso di Dottorato in Fisica e Astronomia) | Chosen activity |

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| Geophysical Fluid Dynamics | Claudia Pasquero | GEO/12 | 12 | 1 | Laboratory | Intercurricular | Chosen activity |
| Scanning probe microscopy: principles, applications in nanosciences and image handling | Marcello Campione | FIS/01 | 14 | 1,5 | Lecture, computer work | Intercurricular | Chosen activity |
| Raman spectroscopy: a flexible tool for an integrated approach in scientific research | Sergio Andò, Maria Luce Frezzotti, Alberto Resentini, Luca Ferrero, Chiara Urani | GEO/02, GEO/07, CHIM/12, BIO/06 | 16 | 2 | Lecture | Intercurricular | Chosen activity |
| Critical raw materials and their environmental impact | Alessandro Cavallo | GEO/09 | 16 | 2 | Lecture | Intercurricular | Chosen activity |
| Enhancement of fragile cultural heritage | Ezio Giovanni Bolzacchini, Luca Ferrero, Chiara Rostagno | CHIM/12 | 20 | 2 | Lecture & laboratory training | Intercurricular | Chosen activity |
| Scanning and Transmission Electron Microscopy, Principles and Applications | Giancarlo Capitani, Paride Mantecca, Maurizio Acciarri | GEO/06, BIO/06, FIS/01 | 30 | 3 | Lecture & laboratory training | Intercurricular | Chosen activity |
| Ice Core Science | Barbara Delmonte, Valter Maggi | GEO/04 | 16 | 1,5 | Lecture & laboratory training | Intercurricular | Chosen activity |

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| The climatic role of atmospheric aerosol in the Arctic | Luca Ferrero | CHIM/12 | 12 | 1,5 | Lecture | Intercurricular | Chosen activity |
| Seminar Course | Seminario A cura dei dottorandi | Vari | 12 | 1 | Seminar | Chemistry Curricular | Mandatory activity |
| Introduction to photochemistry | Luca Bertini, Claudio Greco, Antonio Papagni | CHIM/02, CHIM/03, CHIM/06 | 16 | 2 | Lecture | Chemistry Curricular | Chosen activity |
| NMR spectroscopy applications to ligand-receptor studies | Cristina Airoidi | CHIM/06 | 20 | 2,5 | Lecture | Chemistry Curricular | Chosen activity |
| Crystallography and Laboratory of X-ray powder diffraction | Massimo Moret, Chiara Ferrara | CHIM/03, CHIM/02 | 18 | 2 | Lecture & laboratory training | Chemistry Curricular | Chosen activity |
| Advanced Theoretical Chemistry | Piercarlo Fantucci | CHIM/03 | 20 | 2,5 | Lecture | Chemistry Curricular | Chosen activity |
| NMR spectroscopy of molecular Inorganic and Organometallic Compounds | Roberto Della Pergola | CHIM/03 | 8 | 1 | Lecture | Chemistry Curricular | Chosen activity |

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| Advanced techniques for sample preparation | Fabio Gosetti, Veronica Termopoli | CHIM/01 | 16 | 2 | Lecture | Chemistry Curricular | Chosen activity |
| Seminar Course | Seminario A cura dei dottorandi | Vari | 12 | 1 | Seminar | Geology Curricular | Mandatory activity |
| Field and remote-sensing techniques for the advanced characterization of rock fractures in outcrops | Federico Agliardi, Andrea Bistacchi | GEO/05, GEO/03 | 20 | 2 | Lecture & Laboratory training | Geology Curricular | Chosen activity |
| Provenance analysis: how to integrate single grain and bulk techniques | Sergio Andò, Alberto Resentini | GEO/02 | 16 | 2 | Lecture | Geology Curricular | Chosen activity |
| Detrital geochronology and thermochronology | Igor M. Villa, Marco G. Malusà | GEO/08, GEO/02, GEO/03 | 16 | 2 | Lecture | Geology Curricular | Chosen activity |
| Introduction to geodynamic and landscape evolution numerical modeling | Pietro Sternai | GEO/02, GEO/03, GEO/04, GEO/10 | 20 | 2 | Lecture, computer work | Geology Curricular | Chosen activity |
| Geotechnical modelling for slope stability and underground geotechnical structures | Riccardo Castellanza | ICAR/07 | 20 | 2 | Lecture & Laboratory training | Geology Curricular | Chosen activity |

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| Advanced experimental testing and monitoring on geomaterials (laboratory and in situ) | Riccardo Castellanza | ICAR/07 | 20 | 2 | Lecture & Laboratory training | Geology Curricular | Chosen activity |
| Seminar Course | Seminario A cura dei dottorandi | Vari | 12 | 1 | Seminar | Environment Curricular | Mandatory activity |
| Spatial variability of environmental characteristics and mapping methodologies | Chiara Ferré | AGR/14 | 16 | 2 | Lecture | Environment Curricular | Chosen activity |
| Native plant assemblages to restore degraded lands | Rodolfo Gentili, Sandra Citterio | BIO/01 | 8 | 1 | Lecture | Environment Curricular | Chosen activity |
| Antimicrobial resistance in the environment and risk assessment of veterinary medicinal products (VMPs) | Sara Villa, Andrea Franzetti | BIO/07, BIO/19 | 16 | 2 | Lecture | Environment Curricular | Chosen activity |
| Seafloor mapping, biogenic habitats and marine management | Daniela Basso Alessandra Savini | GEO/01, GEO/04 | 8 | 1 | Lecture | Environment Curricular | Chosen activity |
| Isotopes as environmental tracers | Barbara Leoni, Marco Rotiroti | BIO/07, GEO/05 | 18 | 2 | Lecture & Laboratory training | Environment Curricular | Chosen activity |
| Environmental Risks Assessment of Chemicals | Antonio Finizio | BIO/07 | 16 | 2 | Lecture | Environment Curricular | Chosen activity |

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| Data analysis applied to the environment: Soundscape as index | Giovanni Zambon | FIS/07 | 20 | 2 | Lecture & Laboratory training | Environment Curricular | Chosen activity |
| Advanced Human Ecology | Emilio Padoa-Schioppa | BIO/07 | 16 | 2 | Lecture | Environment Curricular | Chosen activity |
| Application of Next Generation Sequencing and bioinformatics tools to ecological studies | Andrea Franzetti, Isabella Gandolfi | BIO/19 | 16 | 1,5 | Lecture & Laboratory training | Environment Curricular | Chosen activity |
| Ecosystem services | Emilio Padoa-Schioppa, Ioannis Vogiatzakis | BIO/07 | 16 | 2 | Lecture | Environment Curricular | Chosen activity |
| 40 | | | 590 | 65,5 | | | |

Educational form*

 lecture
 laboratory training
 seminar

Type of activity**

 curricular
 cross-curricular