

Attività formative XXXVII ciclo
(il corso è in fase di valutazione per il rinnovo)

I corsi previsti all'interno dell'offerta didattica per il XXXVII ciclo sono suddivisi in due categorie: attività formative specifiche e attività trasversali. Queste ultime sono finalizzate all'integrazione delle conoscenze tecniche mediante l'acquisizione di competenze in ambito linguistico, informatico, nella gestione della ricerca, della conoscenza dei sistemi di ricerca e dei sistemi di finanziamento, e infine per la valorizzazione dei risultati della ricerca e della proprietà intellettuale. È prevista l'integrazione dell'offerta con insegnamenti mutuati dai corsi di Laurea Magistrale.

Le date saranno precisate all'inizio dell'AA 2021-2022 essendo il Dottorato in fase di valutazione per il rinnovo. L'elenco dei corsi che segue è riferito ai primi due anni del ciclo.

The Doctoral School (XXXVII Ciclo) offers a catalogue of PhD courses that can be divided into two categories: technical skills and transversal skills. The latter include linguistic competences, software skills, research management, funding systems, enhancement of research results and patents. Furthermore, the course catalogue can be integrated with courses of master's degree.

The precise dates will be made available at the beginning of the 2021–2022 academic year, since the Course is still under evaluation for renewal. The following courses are planned for the first two years of the cycle.

Attività formative specifiche/Technical skills

Introduction to stochastic and mathematical modelling of discrete systems. Prof. V. Astarita, 2 CFU.

Topics: Introduction to probability theory and Markov Chains; Continuous time Markov Chains; Introduction to Game theory; Introduction to Blockchain systems.

Verification and Validation procedure for CFD simulations. Prof.ssa T. Castiglione, 2 CFU.

Topics: Introduction to 3D numerical modelling; Errors and Uncertainties in numerical simulations; Validation; Examples and applications

Energy performances and design of sustainable buildings. Prof. R. Bruno, 3 CFU.

Topics: Main features of high efficient buildings: the nZEB target; Simplified approaches: the quasi-steady model for heating and cooling requirements; The dynamic model for building energy performances: the standard EN ISO 52016-1. The primary energy needs: highly efficient plants and integration of renewable sources in buildings. Examples and applications: the design of nZEB in transient regime by TRNSYS and Termolog.

GPU-accelerated scientific computing with application to noise and vibration problems. Prof. F. Cosco, 1 CFU.

Topics: Introduction to heterogenous parallel computing; Cuda from matlab; Cuda Parallelism model: streams, kernels, grids, blocks and threads; Memory and Data locality; Application examples in the field of noise and vibrations.

Objectives and methods for systematic literature review. Prof.ssa M. De Simone, 2 CFU.
Topics: Motivation and objectives of a literature review; Methodology; Literature search; Exclusion criteria; Analysis of bibliographic metadata; Analysis of documents.

Città sostenibili: rinnovati paradigmi e strumenti in evoluzione. Prof.ssa A. Palermo e Prof.ssa M. Viapiana, 2 CFU.
Argomenti: Sviluppo sostenibile e Smart City; Certificazione di sostenibilità.

Introduction to TES. Inpath-Tes PhD. Referente: Prof.ssa M. De Simone, 3 CFU.
Topics: Renewable energy policies; Types and role of energy storage and thermal energy storage; Sorption and chemical heat storage.

Thermal energy storage materials. Inpath-Tes PhD. Referente: Prof.ssa M. De Simone, 4 CFU.
Topics: Fundamentals of materials science and engineering; Corrosion issues related to the use of TES materials; Calculation of thermal properties of composite materials and case studies; Introduction to micro & nano-scale modelling and kinetic theory.

Testing and characterisation of TES materials. Inpath-Tes PhD. Referente: Prof.ssa M. De Simone, 5 CFU.
Topics: Approach and Planning for Testing Properties; Thermophysical properties: DSC, TGA, T-history and other home-made techniques; Technologies for measuring thermal diffusivity, thermal conductivity, and thermal expansion; Process-related properties characterisation: Physical properties; Process-related properties characterisation: Chemical properties.

Heat and mass transfer and sizing of energy storage devices. Inpath-Tes PhD. Referente: Prof.ssa M. De Simone, 8 CFU.
Topics: Heat transfer fundamentals; Theoretical and numerical analysis of multi-dimensional heat transfer; Mass transfer fundamentals; Advanced mass transfer; Heat transfer with phase change: analytical and numerical modelling; Modelling of thermochemical storage; Design, modelling and optimization of thermal components; Design and optimization of TES components and systems.

Complexity, scaling and multiscaling in Engineering Systems. Prof. Samuele De Bartolo. 3 CFU.
Topics: The complexity as life at edge of chaos; Scaling and multiscaling in engineering systems; Fractals and multifractals in engineering system; Generalized probabilistic Taylor's law and Tweedie distributions

The material point method for civil and industrial engineering. Ing. Luigi Pugliese. 3 CFU
Topics: Introduction to large deformation analyses for Civil and Industrial Engineering; Fundamentals of the Material Point Method (MPM); Numerical formulations and integration schemes of MPM; Numerical features of MPM; Applications of MPM in the fields of Civil and Industrial Engineering

Attività in ambito linguistico/Linguistic skills

Corso di lingua inglese “Academic skills” erogato dal Centro Linguistico di Ateneo (CLA) comprensivo di attività laboratoriali, 6 CFU.

Attività in ambito informatico/Software skills

Wolfram Mathematica per l'Ingegneria, Prof. Luigi Bruno, 2 CFU.

Argomenti: Introduzione a Wolfram Mathematica; Elementi base di programmazione; Generazione e manipolazione di liste; Funzioni grafiche.

Tools for the scientific calculation, programming and dynamic simulation. Application in the renewable energy field. Ing. D. Mazzeo, 2 CFU.

Topics: MATLAB for the scientific calculation; Matrix and symbolic calculation; Processing, interpolation and graphical representation of data; Programming and case study. TRNSYS for the dynamic simulation of renewable systems; Photovoltaic generators, Wind generators, and electric storage batteries; Case studies.

Gestione della ricerca, della conoscenza dei sistemi di ricerca e dei sistemi di finanziamento/Research management, funding systems

Corso organizzato con il Liaison Office di Ateneo per l'acquisizione e la gestione di fondi di ricerca in progetti nazionali e internazionali. 4 CFU.

Attività di valorizzazione della ricerca e della proprietà intellettuale/Enhancement of research results and patents

Corso organizzati con il Liaison Office di Ateneo, finalizzati all'acquisizione di una adeguata conoscenza delle misure e dei processi a supporto della valorizzazione dei risultati della ricerca e della proprietà intellettuale. 2 CFU.

Intellectual property and patenting ideas. Inpath-Tes PhD. Referente: Prof.ssa M. De Simone, 4 CFU.

Topics: Intellectual Property and Intellectual Property Rights; Dissemination, exploitation and communication plan; Basics of patents and classification systems; Applying for a patent and case studies.

Idea to product development. Inpath-Tes PhD. Ref.: Prof.ssa M. De Simone, 5 CFU.

Topics: Idea generation methods; Idea screening; Idea development and testing; Technical implementation; Business analysis tools.

Research and PhD. Inpath-Tes PhD. Referente: Prof.ssa M. De Simone, 6 CFU.

Topics: The research process and the research method; Error analysis of measurements and in simulations; Management of research data; Definition of RRI; RRI plan; Key elements: engagement; gender equality; science education; open access; ethics; governance; sustainability; social justice/inclusion; Intellectual Property and Intellectual Property Rights.