



UNIVERSITÀ DEGLI STUDI DI CAGLIARI

Facoltà di Scienze

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STUDYING IN ENGLISH AT THE FACULTY OF SCIENCE

Teaching at the Faculty of Science is primarily conducted in Italian, including lessons and laboratory activities. However, our teachers are always available to provide study materials and explanations in English upon request.

Additionally, we offer a range of courses and laboratory activities in English, which fall into the following categories:

- **Courses held in English in other faculties**, with content compatible with degrees in the Faculty of Science
- **Courses held in English within the Faculty of Science**
- **Laboratory activities** held in research labs where English is the spoken language
- **Reading courses** with a direct supervision of an English-speaking teacher

Below, we have listed these possibilities, grouped by each **Bachelor of Science degree (BSc)** and **Master of Science degree (MSc)** for your convenience. The student is invited to contact the reference persons (see [Contacts](#) below) to verify in which semester the course will be offered.



Degree in Chemistry (BSc)

Chemical Science (MSc)

COURSES HELD IN ENGLISH

The following courses are given in English and belong to the teaching offer of the Degree in Chemical Science.

COURSE	ECTS
Drew Parsons [SC/0092/EN] Theory and Computation in Physical Chemistry	6

LABORATORY RESEARCH ACTIVITY

The following activity can be chosen as internship/traineeship or laboratory research activity. Students will have to directly contact the teachers to verify the compatibility of the schedule with the different activities listed in the Learning Agreement.

SEM.	ACTIVITY	HOURS	ECTS
spring	M. C. Aragoni Crystal engineering of extended solid-state networks: from CT to noncovalent interactions	up to 150	6
spring	M. Arca Reactions of S/Se-donors with halogens and interhalogens	up to 150	6
spring	M. Arca DFT modelling of coordination compounds and intermolecular interactions	up to 150	6
spring	M. Arca Synthesis of inorganic consolidants for the conservation of cultural heritage stone materials	150	6

SEM.	ACTIVITY	HOURS	ECTS
autumn spring	D. Atzei Development and validation of analytical methods for the detection of toxic elements in the environmental matrices	up to 300	12
autumn	T. Pivetta Synthesis and characterization of molecules with biological activity	up to 150	6
spring	C. Caltagirone Supramolecular chemistry of anions: general principles and applications	up to 125	5
spring	A. Chiappone Development of photocurable monomers for 3D printable flexible materials	up to 150	6
autumn	M. G. Cutrufello Development of solid catalysts for sustainable industrial processes	up to 150	6
autumn	M. Fantauzzi An innovative analytical approach for characterizing ancient potteries	up to 300	12
spring	A. Frongia Synthesis and reactivity of strained carbocycles	up to 300	12
autumn spring	M. L. Mercuri Metal-Organic Frameworks for CO₂ capture and separation and/or molecular spintronics and/or temperature sensing	up to 300	12
spring	E. Rombi Synthesis and characterization of micro- and mesoporous solid catalysts	up to 150	6
autumn spring	A. Rossi Surface chemistry applied to the removal of toxic elements and persistent organic pollutants from wastewaters	up to 300	12
autumn spring	A. Rossi Synthesis and surface analysis of glasses: the influence of metals on the colour of the artefacts	up to 300	12
autumn spring	A. Rossi Chemical characterization of materials used in energy applications	up to 300	12

SEM.	ACTIVITY	HOURS	ECTS
autumn spring	A. Salis Specific ion (Hofmeister) effects of weak and strong electrolytes on biomacromolecules interactions and/or enzyme activities	up to 400	16
autumn spring	A. Salis Enzyme immobilization on inorganic or hybrid nanostructured materials	up to 400	16
autumn spring	M. A. Scorciapino Computer simulations of adsorption processes at the gas/solid and liquid/solid interface	up to 400	16
autumn spring	M. A. Scorciapino Investigation of lipid bilayers permeability and transport processes through spectroscopic techniques	up to 400	16

COURSES OF DIFFERENT FACULTIES

The following courses are given in English and do not belong to the teaching offer of the Faculty of Science. Students will have to directly contact the teachers to verify the compatibility of the schedule with the different activities listed in the Learning Agreement.

COURSE	ECTS
C. M. Calò, N. Grandi, A. Lupia [BF/0034/E] Bioinformatics	link 9
A. Olianas, F. Pintus [BF/0036/EN] Metabolic Biochemistry	link 7
A. Cau, to be defined [BF/0039/EN] Basis of scientific methodology	link 7
A. Cincotti [IA/0187/EN] Chemical and Biotechnological Reactors	link 9
A. Concas [IA/0188/EN] Safety and Environmental Chemical Engineering with Design Project	link 12
D. Maiorca [IA/0129/EN] Computer forensics techniques	link 5

	COURSE	ECTS
A. Muntoni	[IN/0320/EN] Sustainable solid waste management: materials and energy recovery	link 9
G. Cappai	[IN/0245/EN] Control and treatment of atmospheric emissions	link 6
A. Carucci, G. Cappai	[IA/0155/EN] Wastewater Treatment Plants	link 9
A. Riggio	[60/68/3/EN] Astrophysics	link 6

Degree in Computer Science (BSc-MSc) Applied Informatics and Data Analytics (BSc)

COURSES HELD IN ENGLISH

The following courses are given in English and belong to the teaching offer of the Degree in Computer Science.

COURSE		ECTS
D. Reforgiato Recupero [SM/0124/EN] Big Data	link	6
G. Puglisi, D. Reforgiato Recupero [SM/0163/EN] Deep Learning and Applications	link	6
L. D. Spano [SM/0099/EN] User Interface Technologies	link	6
R. Scateni [SM/0138/EN] Graphic Algorithms	link	6
M. Atzori [SM/0132/EN] Natural Language Processing and Knowledge Graphs	link	6
M. Di Francesco [SM/0121/EN] Network Flow Optimization	link	6
G. M. Pinna [SM/0122/EN] Formal Methods	link	6
R. Scateni, M. Di Francesco [SM/0130/EN] Graphs & Network Optimization	link	9

LABORATORY RESEARCH ACTIVITY

The following activity can be chosen as internship/traineeship or laboratory research activity. Students will have to directly contact the teachers to verify the compatibility of the schedule with the different activities listed in the Learning Agreement.

ACTIVITY	HOURS	ECTS
<p>L. D. Spano</p> <p>Virtual Reality Development Fundamentals</p> <p><i>The traineeship will cover the fundamental concepts for creating immersive interactions in Virtual Reality. The student will practice these concepts by creating a small yet interactive environment in Unity 3D.</i></p>	60	5
<p>D. Reforgiato Recupero</p> <p>AI and Big Data Fundamentals</p> <p><i>The traineeship will cover the fundamental concepts for handling big data using state-of-the-art tools. The student will design a small cluster using cloud systems such as Amazon AWS and will develop AI approaches for different tasks (e.g., sentiment analysis, object detection, natural language processing and generation, anomaly detection, etc.).</i></p>	60	5
<p>G. Cherchi</p> <p>Interactive Booleans Applications in Computer Graphics</p> <p><i>The traineeship will cover the fundamental concepts for creating interactive applications to compute Boolean operations between Digital 3D models. The student will practice these concepts by creating a small interactive application with web technologies.</i></p>	60	5
<p>G. Rodriguez</p> <p>Applied Numerical Analysis</p> <p><i>The traineeship will involve the development of algorithms and prototypal software for selected problems, ranging from ill-posed problems to image processing, from the solution of integral equations to computer vision and complex network analysis. The student should have already taken an introductory course of Numerical Analysis.</i></p>	60	5
<p>M. Bartoletti</p> <p>Formal Verification of Smart Contracts</p> <p><i>The traineeship will explore the use of verification tools for smart contracts, with particular focus on those running on the Ethereum blockchain (for instance, SolC MC and Certora). The student will practice with some of these verification tools, applying them to verify relevant properties of simple smart contracts.</i></p>	60	5

COURSES OF DIFFERENT FACULTIES

The following courses are given in English and do not belong to the teaching offer of the Faculty of Science. Students will have to directly contact the teachers to verify the compatibility of the schedule with the different activities listed in the Learning Agreement.

COURSE		ECTS
P. Meloni [IA/0125/EN] Advanced Embedded Systems	link	8
G. Fumera [IA/0205/EN] Artificial Intelligence	link	6
S. Lai [IA/0152/EN] Biosensors and Bioelectronics	link	6
M. Barbaro, R. Collu, G. Leone [IA/0146/EN] Mixed-signal circuits and systems	link	6
C. Melis [IA/0154/EN] Nanoelectronics	link	5
To be defined [IA/0148/EN] Cyber-Physical System Architectures	link	5
P. A. Pegoraro, P. Castello [IA/0153/EN] Data acquisition technologies	link	6
M. Nitti [IA/0020/EN] Internet of things	link	6
P. Cosseddu [IA/0151/EN] Wearable and flexible electronics	link	7
G. Giacinto [IA/0123/EN] Operating Systems	link	7
G. Giacinto, G. Fumera [IA/0116/EN] Cybersecurity technologies and Risk Management	link	10
B. Biggio, L. Didaci [IA/0113/EN] Industrial software development	link	8
C. Seatzu, E. Usai [IA/0015/EN] Supervisory control and monitoring	link	9
M. Franceschelli [IA/0117/EN] Fault diagnosis and estimation in dynamical systems	link	5

COURSE	ECTS
B. Biggio, F. Roli [IA/0207/EN] Machine learning	link 6
S. Ruggeri [IA/0120/EN] Critical infrastructures for innovative power distribution	link 2
A. Damiano [IA/0119/EN] Industrial informatics for energy storage systems	link 2
P. A. Pegoraro [IA/0121/EN] Measurements and cyber security for Smart Grid	link 2
A. Montisci [IA/0139/EN] Data driven models for system engineering	link 6
G. L. Marcialis [IA/0131/EN] Biometric technologies and behavioural security	link 5
D. Maiorca [IA/0129/EN] Computer Forensics Techniques	link 5
M. Farina [IA/0130/EN] Computer law	link 5
To be defined [IA/0134/EN] Stochastic models	link 5
D. Maiorca [IA/0127/EN] Web security and malware analysis	link 6
M. Franceschelli [IA/0140/EN] Networked control systems and security	link 5
G. Mazzarella [IA/0122/EN] Physical-layer techniques for Wireless communication security	link 6
A. Giua [IA/0147/EN] Analysis and control of cyber-physical systems	link 7
B. Biggio [IA/0207/EN] Machine learning security	link 5
M. Martalò [IA/0218/EN] Network security	link 4

Degree in Geology (BSc)

Geological Science and Technology (MSc)

LABORATORY RESEARCH ACTIVITY

The following activity can be chosen as internship/traineeship or laboratory research activity. Students will have to directly contact the teachers to verify the compatibility of the schedule with the different activities listed in the Learning Agreement.

SEM.	ACTIVITY	HOURS	ECTS
autumn	S. Fais Precise measurements of ultrasonic velocity in stone materials	up to 36	3
autumn	G.B. De Giudici Mine waste and their environmental impact	up to 20	2
spring	S. Ferrero Melt and fluid inclusions in natural rocks as probes to investigate the Earth	up to 24	2
spring	C. Rossignol Dating sedimentary rocks using u-pb geochronology on zircon	up to 10	1
autumn	S. Columbu Compositional and chemical-physical characterization of pozzolanic binders for construction	up to 24	2
autumn	S. Columbu Petrophysical investigations and conservation of geomaterials used in monuments of high historical and cultural significance	up to 24	2
autumn	S. Da Pelo, C. Arras, Marras P. From the field data to the modeling approaches for the slope stability evaluation	up to 36	3
autumn	S. Da Pelo, C. Arras, Marras P. From the field data to the modeling approaches for the water balance evaluation	up to 36	3

Degree in Mathematics (BSc-MSc)

READING COURSES HELD IN ENGLISH

The 'reading courses' belong to the teaching offer of the Degree in Mathematics and, at the request of the student, they will be provided in English language by the course manager. Reading courses are organized as follows: the course manager selects a particular topic and the relative material. The interested students will autonomously study the material under the guide of the teacher. Students will have to directly contact the teachers to verify the compatibility of the schedule with the different activities listed in the Learning Agreement.

COURSE	ECTS
G. Bande Topological groups	4
M. Di Francesco Optimization model	4
F. Demontis Complements of analytic mechanics. Part 1 and Part 2	6
S. Montaldo Global theorems on the theory of the surfaces	3
S. Montaldo Global plane curves	3
I.I. Onnis Complements of affine geometry	4
G. Bande Introduction to differential forms. Part 1 and Part 2	6
C. Fenu Introduction to complex networks. Part 1 and part 2	6
L. Fermo Numerical methods of Approximation Theory. Part 1 and part 2	6

COURSE	ECTS
A. Iannizzotto Mathematical Game Theory. Part 1 and part 2	6
M. Infusino Introduction to the theory of topological vector spaces	4
B. Manca Optimization methods for the classification problem. Part 1 and part 2	6
S. Montaldo CMC surfaces in euclidean space	4
S. Montaldo Introduction to algebraic geometry 1. Part 1 and part 2	6
G. Placini Geometric Group Theory 1. Part 1 and part 2	6
G. Rodriguez Mathematics of signal processing. Part 1 and part 2	6
G. Bande Introduction to the Hodge Theory	3
S. Bonzio An introduction to Universal Algebra	3
S. Bonzio Lattices and Boolean algebras	6
S. Columbu Introduction to finite mixture models	3
A. Iannizzotto Introduction to nonlinear analysis. Part 1 and part 2	6
G. Placini Homological Algebra. Part 1 and part 2	6
C. Van Der Mee Dynamical Systems. Part 1 and part 2	6

LABORATORY RESEARCH ACTIVITY

The following activity taken from the Degree in Computer Science can be chosen as internship/traineeship or laboratory research activity. Students will have to directly contact the teachers to verify the compatibility of the schedule with the different activities listed in the Learning Agreement.

ACTIVITY	HOURS	ECTS
G. Cherchi Interactive Booleans Applications in Computer Graphics <i>The traineeship will cover the fundamental concepts for creating interactive applications to compute Boolean operations between Digital 3D models. The student will practice these concepts by creating a small interactive application with web technologies.</i>	60	5
G. Rodriguez Applied Numerical Analysis <i>The traineeship will involve the development of algorithms and prototypal software for selected problems, ranging from ill-posed problems to image processing, from the solution of integral equations to computer vision and complex network analysis. The student should have already taken an introductory course of Numerical Analysis</i>	60	5

COURSES OF DIFFERENT FACULTIES

The following courses are given in English and do not belong to the teaching offer of the Faculty of Science. Students will have to directly contact the teachers to verify the compatibility of the schedule with the different activities listed in the Learning Agreement.

COURSE		ECTS
D. Reforgiato Recupero [SM/0124/EN] Big Data	link	6
G. Puglisi, D. Reforgiato Recupero [SM/0163/EN] Deep Learning and Applications	link	6
R. Scateni [SC/0138/EN] Graphics Algorithms	link	6

COURSE	ECTS
M. Atzori [SC/0132/EN] Natural Language Processing and Knowledge Graphs	link 6
M. Di Francesco [SM/0132/EN] Graphs & Network Optimization	link 6
G. Fumera [IA/0205/EN] Artificial intelligence	link 6
B. Biggio and F. Roli [IA/0013/EN] Machine learning	link 6
To be defined [IA/0134/EN] Stochastic models	link 5

Degree in Physics (BSc-MSc)

COURSES HELD IN ENGLISH

The following courses are given in English and belong to the teaching offer of the Degree in Physics.

COURSE		ECTS
G. Bongiovanni [SM/0102/EN] Optoelectronics	link	6
C. Melis [IA/0154/EN] Nanoelectronics	link	6
M. Ceccarelli [SM/0048/EN] Biophysics	link	6
A. Riggio [60/68/3/EN] Astrophysics	link	6
A. V. Vargiu [SM/0179/EN] Molecular Modelling of Biological Systems	link	6
A. Simbula [SM/0180/EN] Quantum Optics	link	6

CONTACTS

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