



GIOVANI @RICERCASCIENTIFICA

ANNEX 1

Social Sciences and Humanities

SH1 Individuals, Institutions and Markets: Economics, finance and management

- SH1_1 Macroeconomics
- SH1_2 Development, economic growth
- SH1_3 Microeconomics, behavioural economics
- SH1_4 Marketing
- SH1_5 Political economy, institutional economics, law and economics
- SH1_6 Econometrics, statistical methods
- SH1_7 Financial markets, asset prices, international finance
- SH1_8 Banking, corporate finance, accounting
- SH1_9 Competitiveness, innovation, research and development
- SH1_10 Organization studies: theory & strategy, industrial organization
- SH1_11 Labour economics, income distribution and poverty
- SH1_12 Public economics
- SH1_13 International trade
- SH1_14 History of economic thought and quantitative economic history

SH2 Institutions, Values, Beliefs and Behaviour: Sociology, social anthropology, political science, law, communication, social studies of science and technology

- SH2_1 Social structure, inequalities, social mobility, interethnic relations
- SH2_2 Social policies, work and welfare
- SH2_3 Kinship, cultural dimensions of classification and cognition, identity, gender
- SH2_4 Myth, ritual, symbolic representations, religious studies
- SH2_5 Democratization, social movements
- SH2_6 Violence, conflict and conflict resolution



- SH2_7 Political systems and institutions, governance
- SH2_8 Legal studies, constitutions, comparative law, human rights
- SH2_9 Global and transnational governance, international studies
- SH2_10 Communication networks, media, information society
- SH2_11 Social studies of science and technology

SH3 Environment, Space and Population: Environmental studies, geography, demography, migration, regional and urban studies

- SH3_1 Environment, resources and sustainability
- SH3_2 Environmental change and society
- SH3_3 Environmental regulations and climate negotiations
- SH3_4 Social and industrial ecology
- SH3_5 Population dynamics, aging, health and society
- SH3_6 Households, family and fertility
- SH3_7 Migration
- SH3_8 Mobility, tourism, transportation and logistics
- SH3_9 Spatial development and architecture, land use, regional planning
- SH3_10 Urban studies, regional studies
- SH3_11 Social geography, infrastructure,
- SH3_12 Geo-information and spatial data analysis

SH4 The Human Mind and Its Complexity: Cognitive science, psychology, linguistics, education

- SH4_1 Evolution of mind and cognitive functions, animal communication
- SH4_2 Human life-span development
- SH4_3 Neuropsychology
- SH4_4 Cognitive and experimental psychology: perception, action, and higher cognitive processes
- SH4_5 Social and clinical psychology
- SH4_6 Linguistics: formal, cognitive, functional and computational linguistics
- SH4_7 Linguistics: typological, historical and comparative linguistics
- SH4_8 Psycholinguistics and neurolinguistics: acquisition and knowledge of language, language pathologies
- SH4_9 Use of language: pragmatics, sociolinguistics, discourse analysis, second language teaching and learning, lexicography, terminology
- SH4_10 Philosophy of mind, epistemology and logic
- SH4_11 Education: systems and institutions, teaching and learning Environmental studies, geography, demography, migration, regional and urban studies



SH5 Cultures and Cultural Production: Literature and philosophy, visual and performing arts, music, cultural and comparative studies

- SH5_1 Classics, ancient Greek and Latin literature and art
- SH5_2 History of literature
- SH5_3 Literary theory and comparative literature, literary styles
- SH5_4 Textual philology, palaeography and epigraphy
- SH5_5 Visual arts, performing arts, design
- SH5_6 Philosophy, history of philosophy
- SH5_7 Museums and exhibitions
- SH5_8 Music and musicology, history of music
- SH5_9 History of art and architecture
- SH5_10 Cultural studies, cultural diversity
- SH5_11 Cultural heritage, cultural memory

SH6 The Study of the Human Past: Archaeology, history and memory

- SH6_1 Archaeology, archaeometry, landscape archaeology
- SH6_2 Prehistory and protohistory
- SH6_3 Ancient history
- SH6_4 Medieval history
- SH6_5 Early modern history
- SH6_6 Modern and contemporary history
- SH6_7 Colonial and post-colonial history, global and transnational history, entangled histories
- SH6_8 Social and economic history
- SH6_9 Gender history
- SH6_10 History of ideas, intellectual history, history of sciences and techniques
- SH6_11 Cultural history, history of collective identities and memories
- SH6_12 Historiography, theory and methods of history



Physical Sciences and Engineering

PE1 Mathematics:
All areas of mathematics, pure and applied,
plus mathematical foundations of computer science,
mathematical physics and statistics

- PE1_1 Logic and foundations
- PE1_2 Algebra
- PE1_3 Number theory
- PE1_4 Algebraic and complex geometry
- PE1_5 Geometry
- PE1_6 Topology
- PE1_7 Lie groups, Lie algebras
- PE1_8 Analysis
- PE1_9 Operator algebras and functional analysis
- PE1_10 ODE and dynamical systems
- PE1_11 Theoretical aspects of partial differential equations
- PE1_12 Mathematical physics
- PE1_13 Probability
- PE1_14 Statistics
- PE1_15 Discrete mathematics and combinatorics
- PE1_16 Mathematical aspects of computer science
- PE1_17 Numerical analysis
- PE1_18 Scientific computing and data processing
- PE1_19 Control theory and optimization
- PE1_20 Application of mathematics in sciences
- PE1_21 Application of mathematics in industry and society

PE2 Fundamental Constituents of Matter:
Particle, nuclear, plasma, atomic, molecular, gas,
and optical physics

- PE2_1 Fundamental interactions and fields
- PE2_2 Particle physics
- PE2_3 Nuclear physics
- PE2_4 Nuclear astrophysics
- PE2_5 Gas and plasma physics
- PE2_6 Electromagnetism
- PE2_7 Atomic, molecular physics



- PE2_8 Ultra-cold atoms and molecules
- PE2_9 Optics, non-linear optics and nano-optics
- PE2_10 Quantum optics and quantum information
- PE2_11 Lasers, ultra-short lasers and laser physics
- PE2_12 Acoustics
- PE2_13 Relativity
- PE2_14 Thermodynamics
- PE2_15 Non-linear physics
- PE2_16 General physics
- PE2_17 Metrology and measurement
- PE2_18 Statistical physics (gases)

PE3 Condensed Matter Physics: Structure, electronic properties, fluids, nanosciences, biophysics

- PE3_1 Structure of solids and liquids
- PE3_2 Mechanical and acoustical properties of condensed matter, Lattice dynamics
- PE3_3 Transport properties of condensed matter
- PE3_4 Electronic properties of materials, surfaces, interfaces, nanostructures...
- PE3_5 Semiconductors and insulators: material growth, physical properties
- PE3_6 Macroscopic quantum phenomena: superconductivity, superfluidity...
- PE3_7 Spintronics
- PE3_8 Magnetism and strongly correlated systems
- PE3_9 Condensed matter - beam interactions (photons, electrons...)
- PE3_10 Nanophysics: nanoelectronics, nanophotonics, nanomagnetism, nanoelectromechanics...
- PE3_11 Mesoscopic physics
- PE3_12 Molecular electronics
- PE3_13 Structure and dynamics of disordered systems: soft matter (gels, colloids, liquid crystals...), glasses, defects...
- PE3_14 Fluid dynamics (physics)
- PE3_15 Statistical physics: phase transitions, noise and fluctuations, models of complex systems...
- PE3_16 Physics of biological systems



PE4 Physical and Analytical Chemical Sciences: Analytical chemistry, chemical theory, physical chemistry/chemical physics

- PE4_1 Physical chemistry
- PE4_2 Spectroscopic and spectrometric techniques
- PE4_3 Molecular architecture and Structure
- PE4_4 Surface science and nanostructures
- PE4_5 Analytical chemistry
- PE4_6 Chemical physics
- PE4_7 Chemical instrumentation
- PE4_8 Electrochemistry, electrodialysis, microfluidics, sensors
- PE4_9 Method development in chemistry
- PE4_10 Heterogeneous catalysis
- PE4_11 Physical chemistry of biological systems
- PE4_12 Chemical reactions: mechanisms, dynamics, kinetics and catalytic reactions
- PE4_13 Theoretical and computational chemistry
- PE4_14 Radiation and Nuclear chemistry
- PE4_15 Photochemistry
- PE4_16 Corrosion
- PE4_17 Characterization methods of materials
- PE4_18 Environment chemistry

PE5 Synthetic Chemistry and Materials: Materials synthesis, structure-properties relations, functional and advanced materials, molecular architecture, organic chemistry

- PE5_1 Structural properties of materials
- PE5_2 Solid state materials
- PE5_3 Surface modification
- PE5_4 Thin films
- PE5_5 Ionic liquids
- PE5_6 New materials: oxides, alloys, composite, organic-inorganic hybrid, nanoparticles
- PE5_7 Biomaterials synthesis
- PE5_8 Intelligent materials - self assembled materials
- PE5_9 Coordination chemistry
- PE5_10 Colloid chemistry
- PE5_11 Biological chemistry



- PE5_12 Chemistry of condensed matter
- PE5_13 Homogeneous catalysis
- PE5_14 Macromolecular chemistry
- PE5_15 Polymer chemistry
- PE5_16 Supramolecular chemistry
- PE5_17 Organic chemistry
- PE5_18 Molecular chemistry
- PE5_19 Combinatorial chemistry

PE6 Computer Science and Informatics: Informatics and information systems, computer science, scientific computing, intelligent systems

- PE6_1 Computer architecture, pervasive computing, ubiquitous computing
- PE6_2 Computer systems, parallel/distributed systems, sensor networks, embedded systems, cyber-physical systems
- PE6_3 Software engineering, operating systems, computer languages
- PE6_4 Theoretical computer science, formal methods, and quantum computing
- PE6_5 Cryptology, security, privacy, quantum crypto
- PE6_6 Algorithms, distributed, parallel and network algorithms, algorithmic game theory
- PE6_7 Artificial intelligence, intelligent systems, multi agent systems
- PE6_8 Computer graphics, computer vision, multi media, computer games
- PE6_9 Human computer interaction and interface, visualization and natural language processing
- PE6_10 Web and information systems, database systems, information retrieval and digital libraries, data fusion
- PE6_11 Machine learning, statistical data processing and applications using signal processing (e.g. speech, image, video)
- PE6_12 Scientific computing, simulation and modelling tools
- PE6_13 Bioinformatics, biocomputing, and DNA and molecular computation

PE7 Systems and Communication Engineering: Electronic, communication, optical and systems engineering

- PE7_1 Control engineering
- PE7_2 Electrical and electronic engineering: semiconductors, components, systems
- PE7_3 Simulation engineering and modelling
- PE7_4 Systems engineering, sensorics, actorics, automation
- PE7_5 Micro-and nanoelectronics, optoelectronics
- PE7_6 Communication technology, high-frequency technology



- PE7_7 Signal processing
- PE7_8 Networks (communication networks, sensor networks, networks of robots...)
- PE7_9 Man-machine-interfaces
- PE7_10 Robotics

PE8 Products and Processes Engineering:
Product design, process design and control,
construction methods, civil engineering,
energy systems, material engineering

- PE8_1 Aerospace engineering
- PE8_2 Chemical engineering, technical chemistry
- PE8_3 Civil engineering, maritime/hydraulic engineering, geotechnics, waste treatment
- PE8_4 Computational engineering
- PE8_5 Fluid mechanics, hydraulic-, turbo-, and piston engines
- PE8_6 Energy systems (production, distribution, application)
- PE8_7 Micro (system) engineering
- PE8_8 Mechanical and manufacturing engineering (shaping, mounting, joining, separation)
- PE8_9 Materials engineering (biomaterials, metals, ceramics, polymers, composites...)
- PE8_10 Production technology, process engineering
- PE8_11 Industrial design (product design, ergonomics, man-machine interfaces...)
- PE8_12 Sustainable design (for recycling, for environment, eco-design)
- PE8_13 Lightweight construction, textile technology
- PE8_14 Industrial bioengineering
- PE8_15 Industrial biofuel production
- PE8_16 Architectural engineering

PE9 Universe Sciences:
Astro-physics/chemistry/biology; solar system;
stellar, galactic and extragalactic astronomy,
planetary systems, cosmology, space science,
instrumentation

- PE9_1 Solar and interplanetary physics
- PE9_2 Planetary systems sciences
- PE9_3 Interstellar medium
- PE9_4 Formation of stars and planets
- PE9_5 Astrobiology
- PE9_6 Stars and stellar systems



- PE9_7 The Galaxy
- PE9_8 Formation and evolution of galaxies
- PE9_9 Clusters of galaxies and large scale structures
- PE9_10 High energy and particles astronomy - X-rays, cosmic rays, gamma rays, neutrinos
- PE9_11 Relativistic astrophysics
- PE9_12 Dark matter, dark energy
- PE9_13 Gravitational astronomy
- PE9_14 Cosmology
- PE9_15 Space Sciences
- PE9_16 Very large data bases: archiving, handling and analysis
- PE9_17 Instrumentation - telescopes, detectors and techniques

PE10 Earth System Science:
Physical geography, geology, geophysics,
atmospheric sciences, oceanography, climatology,
ecology, global environmental change, biogeochemical
cycles, natural resources management

- PE10_1 Atmospheric chemistry, atmospheric composition, air pollution
- PE10_2 Meteorology, atmospheric physics and dynamics
- PE10_3 Climatology and climate change
- PE10_4 Terrestrial ecology, land cover change
- PE10_5 Geology, tectonics, volcanology
- PE10_6 Paleoclimatology, paleoecology
- PE10_7 Physics of earth's interior, seismology, volcanology
- PE10_8 Oceanography (physical, chemical, biological, geological)
- PE10_9 Biogeochemistry, biogeochemical cycles, environmental chemistry
- PE10_10 Mineralogy, petrology, igneous petrology, metamorphic petrology
- PE10_11 Geochemistry, crystal chemistry, isotope geochemistry, thermodynamics
- PE10_12 Sedimentology, soil science, palaeontology, earth evolution
- PE10_13 Physical geography
- PE10_14 Earth observations from space/remote sensing
- PE10_15 Geomagnetism, paleomagnetism
- PE10_16 Ozone, upper atmosphere, ionosphere
- PE10_17 Hydrology, water and soil pollution
- PE10_18 Cryosphere, dynamics of snow and ice cover, sea ice, permafrosts and ice sheets



Life Sciences

LS1 Molecular and Structural Biology and Biochemistry: Molecular synthesis, modification and interaction, biochemistry, biophysics, structural biology, metabolism, signal transduction

- LS1_1 Molecular interactions
- LS1_2 General biochemistry and metabolism
- LS1_3 DNA synthesis, modification, repair, recombination and degradation
- LS1_4 RNA synthesis, processing, modification and degradation
- LS1_5 Protein synthesis, modification and turnover
- LS1_6 Lipid synthesis, modification and turnover
- LS1_7 Carbohydrate synthesis, modification and turnover
- LS1_8 Biophysics (e.g. transport mechanisms, bioenergetics, fluorescence)
- LS1_9 Structural biology (crystallography and EM)
- LS1_10 Structural biology (NMR)
- LS1_11 Biochemistry and molecular mechanisms of signal transduction

LS2 Genetics, Genomics, Bioinformatics and Systems Biology: Molecular and population genetics, genomics, transcriptomics, proteomics, metabolomics, bioinformatics, computational biology, biostatistics, biological modelling and simulation, systems biology, genetic epidemiology

- LS2_1 Genomics, comparative genomics, functional genomics
- LS2_2 Transcriptomics
- LS2_3 Proteomics
- LS2_4 Metabolomics
- LS2_5 Glycomics
- LS2_6 Molecular genetics, reverse genetics and RNAi
- LS2_7 Quantitative genetics
- LS2_8 Epigenetics and gene regulation
- LS2_9 Genetic epidemiology
- LS2_10 Bioinformatics
- LS2_11 Computational biology
- LS2_12 Biostatistics
- LS2_13 Systems biology
- LS2_14 Biological systems analysis, modelling and simulation



LS3 Cellular and Developmental Biology:
Cell biology, cell physiology, signal transduction,
organogenesis, developmental genetics,
pattern formation in plants and animals,
stem cell biology

- LS3_1 Morphology and functional imaging of cells
- LS3_2 Cell biology and molecular transport mechanisms
- LS3_3 Cell cycle and division
- LS3_4 Apoptosis
- LS3_5 Cell differentiation, physiology and dynamics
- LS3_6 Organelle biology
- LS3_7 Cell signalling and cellular interactions
- LS3_8 Signal transduction
- LS3_9 Development, developmental genetics, pattern formation and embryology in animals
- LS3_10 Development, developmental genetics, pattern formation and embryology in plants
- LS3_11 Cell genetics
- LS3_12 Stem cell biology

LS4 Physiology, Pathophysiology and Endocrinology:
Organ physiology, pathophysiology, endocrinology,
metabolism, ageing, tumorigenesis, cardiovascular
disease, metabolic syndrome

- LS4_1 Organ physiology and pathophysiology
- LS4_2 Comparative physiology and pathophysiology
- LS4_3 Endocrinology
- LS4_4 Ageing
- LS4_5 Metabolism, biological basis of metabolism related disorders
- LS4_6 Cancer and its biological basis
- LS4_7 Cardiovascular diseases
- LS4_8 Non-communicable diseases (except for neural/psychiatric, immunity-related, metabolism-related disorders, cancer and cardiovascular diseases)



LS5 Neurosciences and Neural Disorders: Neurobiology, neuroanatomy, neurophysiology, neurochemistry, neuropharmacology, neuroimaging, systems neuroscience, neurological and psychiatric disorders

- LS5_1 Neuroanatomy and neurophysiology
- LS5_2 Molecular and cellular neuroscience
- LS5_3 Neurochemistry and neuropharmacology
- LS5_4 Sensory systems (e.g. visual system, auditory system)
- LS5_5 Mechanisms of pain
- LS5_6 Developmental neurobiology
- LS5_7 Cognition (e.g. learning, memory, emotions, speech)
- LS5_8 Behavioural neuroscience (e.g. sleep, consciousness, handedness)
- LS5_9 Systems neuroscience
- LS5_10 Neuroimaging and computational neuroscience
- LS5_11 Neurological disorders (e.g. Alzheimer's disease, Huntington's disease, Parkinson's disease)
- LS5_12 Psychiatric disorders (e.g. schizophrenia, autism, Tourette's syndrome, obsessive compulsive disorder, depression, bipolar disorder, attention deficit hyperactivity disorder)

LS6 Immunity and Infection: The immune system and related disorders, infectious agents and diseases, prevention and treatment of infection

- LS6_1 Innate immunity and inflammation
- LS6_2 Adaptive immunity
- LS6_3 Phagocytosis and cellular immunity
- LS6_4 Immunosignalling
- LS6_5 Immunological memory and tolerance
- LS6_6 Immunogenetics
- LS6_7 Microbiology
- LS6_8 Virology
- LS6_9 Bacteriology
- LS6_10 Parasitology
- LS6_11 Prevention and treatment of infection by pathogens (e.g. vaccination, antibiotics, fungicide)
- LS6_12 Biological basis of immunity related disorders (e.g. autoimmunity)
- LS6_13 Veterinary medicine and infectious diseases in animals



LS7 Diagnostic Tools, Therapies and Public Health: Aetiology, diagnosis and treatment of disease, public health, epidemiology, pharmacology, clinical medicine, regenerative medicine, medical ethics

- LS7_1 Medical engineering and technology
- LS7_2 Diagnostic tools (e.g. genetic, imaging)
- LS7_3 Pharmacology, pharmacogenomics, drug discovery and design, drug therapy
- LS7_4 Analgesia and Surgery
- LS7_5 Toxicology
- LS7_6 Gene therapy, cell therapy, regenerative medicine
- LS7_7 Radiation therapy
- LS7_8 Health services, health care research metabolism-related disorders, cancer and cardiovascular diseases)
- LS7_9 Public health and epidemiology
- LS7_10 Environment and health risks, occupational medicine
- LS7_11 Medical ethics

LS8 Evolutionary, Population and Environmental Biology: Evolution, ecology, animal behaviour, population biology, biodiversity, biogeography, marine biology, eco-toxicology, microbial ecology

- LS8_1 Ecology (theoretical and experimental; population, species and community level)
- LS8_2 Population biology, population dynamics, population genetics
- LS8_3 Systems evolution, biological adaptation, phylogenetics, systematics, comparative biology
- LS8_4 Biodiversity, conservation biology, conservation genetics, invasion biology
- LS8_5 Evolutionary biology: evolutionary ecology and genetics, co-evolution
- LS8_6 Biogeography, macro-ecology
- LS8_7 Animal behaviour
- LS8_8 Environmental and marine biology
- LS8_9 Environmental toxicology at the population and ecosystems level
- LS8_10 Microbial ecology and evolution
- LS8_11 Species interactions (e.g. food-webs, symbiosis, parasitism, mutualism)



LS9 Applied life Sciences and Non-Medical Biotechnology: Agricultural, animal, fishery, forestry and food sciences; biotechnology, genetic engineering, synthetic and chemical biology, industrial biosciences; environmental biotechnology and remediation

- LS9_1 Applied genetic engineering, transgenic organisms, recombinant proteins, biosensors
- LS9_2 Synthetic biology, chemical biology and new bio-engineering concepts
- LS9_3 Agriculture related to animal husbandry, dairying, livestock raising
- LS9_4 Aquaculture, fisheries
- LS9_5 Agriculture related to crop production, soil biology and cultivation, applied plant biology
- LS9_6 Food sciences
- LS9_7 Forestry, biomass production (e.g. for biofuels)
- LS9_8 Environmental biotechnology, bioremediation, biodegradation
- LS9_9 Applied biotechnology (non-medical), bioreactors, applied microbiology
- LS9_10 Biomimetics
- LS9_11 Biohazards, biological containment, biosafety, biosecurity