ALLEGATO 1

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 Lie groups, Lie algebras
PE1_6 Geometry and Global Analysis
PE1_7 Topology
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 optimisation
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 Relativity
PE2_13 Thermodynamics
PE2_14 Non-linear physics
PE2_15 Metrology and measurement
PE2_16 Statistical physics (gases)

PE3 Condensed Matter Physics: Structure, electronic properties, fluids, nanosciences, biological physics

PE3_1 Structure of solids, material growth and characterisation

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, etc.

PE3_5 Physical properties of semiconductors and insulators

PE3_6 Macroscopic quantum phenomena: superconductivity, superfluidity, etc.

PE3_7 Spintronics

PE3_8 Magnetism and strongly correlated systems

PE3_9 Condensed matter – beam interactions (photons, electrons, etc.)

PE3_10 Nanophysics: nanoelectronics, nanophotonics, nanomagnetism, nanoelectromechanics, etc.

PE3_11 Mesoscopic physics

PE3_12 Molecular electronics

PE3_13 Structure and dynamics of disordered systems: soft matter (gels, colloids, liquid crystals, etc.), liquids, glasses, defects, etc.

PE3_14 Fluid dynamics (physics)

PE3_15 Statistical physics: phase transitions, noise and fluctuations, models of complex systems, etc.

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 Characterisation 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, 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 Medicinal 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 cryptography
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, visualisation 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: Electrical, electronic, communication, optical and systems engineering

PE7_1 Control engineering
PE7_2 Electrical engineering: power components and/or systems
PE7_3 Simulation engineering and modelling
PE7_4 (Micro- and nano-) systems engineering
PE7_5 (Micro- and nano-) electronic, optoelectronic and photonic components
PE7_6 Communication technology, high-frequency technology
PE7_7 Signal processing
PE7_8 Networks (communication networks, sensor networks, networks of robots, etc.)
PE7_9 Man-machine interfaces
PE7_10 Robotics
PE7_11 Components and systems for applications (in e.g. medicine, biology, environment)
PE7_12 Electrical energy production, distribution, application

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

PE8_1 Aerospace engineering
PE8_2 Chemical engineering, technical chemistry
PE8_3 Civil engineering, architecture, maritime/hydraulic engineering, geotechnics, waste treatment
PE8_4 Computational engineering

PE8_5 Fluid mechanics, hydraulic-, turbo-, and piston- engines

PE8_6 Energy processes engineering

PE8_7 Mechanical and manufacturing engineering (shaping, mounting, joining, separation)

PE8_8 Materials engineering (biomaterials, metals, ceramics, polymers, composites, etc.)

PE8_9 Production technology, process engineering

PE8_10 Industrial design (product design, ergonomics, man-machine interfaces, etc.)

PE8_11 Sustainable design (for recycling, for environment, eco-design)

PE8_12 Lightweight construction, textile technology

PE8_13 Industrial bioengineering

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, cryology, 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 Palaeoclimatology, palaeoecology

PE10_7 Physics of earth's interior, seismology, geodynamycs

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, cosmochemistry, crystal chemistry, isotope geochemistry, thermodynamics

PE10_12 Sedimentology, soil science, palaeontology, earth evolution

PE10_13 Physical geography, geomorphology

PE10_14 Earth observations from space/remote sensing

PE10_15 Geomagnetism, palaeomagnetism

PE10_16 Ozone, upper atmosphere, ionosphere

PE10_17 Hydrology, hydrogeology, engineering and environmental geology, water and soil pollution
PE10_18 Cryosphere, dynamics of snow and ice cover, sea ice, permafrosts and ice sheets
PE10_19 Planetary geology and geophysics
PE10_20 Geohazards: earthquakes, landslides, tsunamis and other ground instabilities

Life Sciences

LS1 Molecular Biology, Biochemistry, Structural Biology and Molecular Biophysics: Molecular synthesis, modification, mechanisms and interactions, biochemistry, structural biology, molecular biophysics, signalling pathways

LS1_1 Macromolecular complexes including interactions involving nucleic acids, proteins, lipids and carbohydrates
LS1_2 Biochemistry
LS1_3 DNA synthesis, modification, repair, recombination, degradation
LS1_4 RNA synthesis, processing, modification, degradation
LS1_5 Protein synthesis, modification, turnover
LS1_6 Lipid biology
LS1_7 Glycobiology
LS1_8 Molecular biophysics (e.g. single-molecule approaches, bioenergetics, fluorescence)
LS1_9 Structural biology and its methodologies (e.g. crystallography, cryo-EM, NMR and new technologies)
LS1_10 Molecular mechanisms of signalling pathways
LS1_11 Fundamental aspects of synthetic biology and chemical biology

LS2 Genetics, 'Omics', Bioinformatics and Systems Biology: Molecular genetics, quantitative genetics, genetic epidemiology, epigenetics, genomics, metagenomics, transcriptomics, proteomics, metabolomics, glycomics, bioinformatics, computational biology, biostatistics, systems biology

LS2_1 Molecular genetics, reverse genetics, forward genetics, genome editing
LS2_2 Non-coding RNAs
LS2_3 Quantitative genetics
LS2_4 Genetic epidemiology
LS2_5 Epigenetics and gene regulation
LS2_6 Genomics (e.g. comparative genomics, functional genomics)
LS2_7 Metagenomics
LS2_8 Transcriptomics
LS2_9 Proteomics
LS2_10 Metabolomics
LS2_11 Glycomics/Lipidomics
LS2_12 Bioinformatics
LS2_13 Computational biology
LS2_14 Biostatistics
LS2_15 Systems biology

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

LS3_1 Morphology and functional imaging of cells and tissues
LS3_2 Cytoskeleton and cell behaviour (e.g. control of cell shape, cell migration and cellular mechanosensing)
LS3_3 Organelle biology and trafficking
LS3_4 Cell junctions, cell adhesion, cell communication and the extracellular matrix

LS3_5 Cell signalling and signal transduction

LS3_6 Cell cycle, division and growth

LS3_7 Cell death (including senescence) and autophagy

LS3_8 Cell differentiation, physiology and dynamics

LS3_9 Developmental genetics in animals and plants

LS3_10 Embryology and pattern formation in animals and plants

LS3_11 Tissue organisation and morphogenesis in animals and plants (including biophysical approaches)

LS3_12 Stem cell biology in development, tissue regeneration and ageing, and fundamental aspects of stem cell-based therapies

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

LS4_1 Organ physiology and pathophysiology

LS4_2 Comparative physiology and pathophysiology

LS4_3 Molecular aspects of endocrinology

LS4_4 Fundamental mechanisms underlying ageing

LS4_5 Metabolism, biological basis of metabolism-related disorders

LS4_6 Fundamental mechanisms underlying cancer

LS4_7 Fundamental mechanisms underlying cardiovascular diseases

LS4_8 Non-communicable diseases (except for neural/psychiatric and immunity-related diseases)

LS5 Neuroscience and Neural Disorders: Neural cell function and signalling, systems neuroscience, neural bases of cognitive and behavioural processes, neurological and psychiatric disorders

LS5_1 Neural cell function, communication and signalling, neurotransmission in neuronal and/or glial cells

LS5_2 Systems neuroscience and computational neuroscience (e.g. neural networks, neural modelling)

LS5_3 Neuronal development, plasticity and regeneration

LS5_4 Sensation and perception (e.g. sensory systems, sensory processing, pain)

LS5_5 Neural bases of cognitive processes (e.g. memory, learning, attention)

LS5_6 Neural bases of behaviour (e.g. sleep, consciousness, addiction)

LS5_7 Neurological disorders (e.g. neurodegenerative diseases, seizures)

LS5_8 Psychiatric disorders (e.g. affective and anxiety disorders, autism, psychotic disorders)

LS5_9 Neurotrauma and neurovascular conditions (including injury, blood-brain barrier, stroke, neurorehabilitation)

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

LS6_1 Innate immunity in animals and plants

LS6_2 Adaptive immunity

LS6_3 Regulation and effector functions of the immune response (e.g. cytokines, interferons and chemokines, inflammation, immune signalling, helper T cells, immunological memory, immunological tolerance, cell-mediated cytotoxicity, complement)

LS6_4 Immunological mechanisms in disease (e.g. autoimmunity, allergy, transplantation immunology, tumour immunology)

LS6_5 Biology of pathogens (e.g. bacteria, viruses, parasites, fungi)

LS6_6 Mechanisms of infection (e.g. transmission, virulence factors, host defences, immunity to pathogens, molecular pathogenesis)

LS6_7 Biological basis of prevention and treatment of infection (e.g. infection natural cycle, reservoirs, vectors, vaccines, antimicrobials)

LS6_8 Infectious diseases in animals and plants

LS7 Applied Medical Technologies, Diagnostics, Therapies and Public Health: Development of tools for diagnosis, monitoring and treatment of diseases, pharmacology, clinical medicine, regenerative medicine, epidemiology and public health

LS7_1 Imaging for medical diagnosis
LS7_2 Genetic tools for medical diagnosis
LS7_3 Other medical technologies for diagnosis and monitoring of diseases
LS7_4 Pharmacology and pharmacogenomics (including drug discovery and design, drug delivery and therapy, toxicology)
LS7_5 Applied gene and cell therapies, regenerative medicine
LS7_6 Radiation therapy
LS7_7 Analgesia and surgery
LS7_8 Epidemiology and public health
LS7_9 Environmental health, occupational medicine
LS7_10 Health services, health care research, medical ethics

LS8 Ecology, Evolution and Environmental Biology: Population, community and ecosystem ecology, evolutionary biology, behavioural ecology, microbial ecology

LS8_1 Ecosystem and community ecology, macroecology
LS8_2 Biodiversity, conservation biology, conservation genetics
LS8_3 Population biology, population dynamics, population genetics
LS8_4 Evolutionary ecology
LS8_5 Evolutionary genetics
LS8_6 Phylogenetics, systematics, comparative biology
LS8_7 Macroevolution, palaeobiology
LS8_8 Coevolution, biological mechanisms and ecology of species interactions (e.g. symbiosis, parasitism, mutualism, food-webs)
LS8_9 Behavioural ecology and evolution
LS8_10 Microbial ecology and evolution
LS8_11 Marine biology and ecology

LS9 Applied Life Sciences, Biotechnology, and Molecular and Biosystems Engineering: Applied plant and animal sciences, forestry, food sciences, applied biotechnology, environmental and marine biotechnology, applied bioengineering, biomass and biofuels, biohazards

LS9_1 Applied biotechnology (including transgenic organisms, applied genetics and genomics, biosensors, bioreactors, microbiology, bioactive compounds)
LS9_2 Applied bioengineering, synthetic biology, chemical biology, nanobiotechnology, metabolic engineering, protein and glyco-engineering, tissue engineering, biocatalysis, biomimetics
LS9_3 Applied animal sciences (including animal breeding, veterinary sciences, animal husbandry, animal welfare, aquaculture, fisheries, insect gene drive)
LS9_4 Applied plant sciences (including crop production, plant breeding, agroecology, forestry, soil biology)
LS9_5 Food sciences (including food technology, food safety, nutrition)
LS9_6 Biomass production and utilisation, biofuels
LS9_7 Environmental biotechnology (including bioindicators, bioremediation, biodegradation)
LS9_8 Biohazards (including biological containment, biosafety, biosecurity)
LS9_9 Marine biotechnology (including marine bioproducts, feed resources, genome mining)

Social Sciences and Humanities

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

SH1_1 Macroeconomics; monetary economics; economic growth

SH1_2 International management; international trade; international business; spatial economics

SH1_3 Development economics, health economics, education economics

SH1_4 Financial economics; banking; corporate finance; international finance; accounting; auditing; insurance

SH1_5 Labour and demographic economics; human resource management

SH1_6 Econometrics; operations research

SH1_7 Behavioural economics; experimental economics; neuro-economics

SH1_8 Microeconomics; game theory

SH1_9 Industrial organisation; strategy; entrepreneurship

SH1_10 Management; marketing; organisational behaviour; operations management

SH1_11 Technological change, innovation, research & development

SH1_12 Agricultural economics; energy economics; environmental economics

SH1_13 Public economics; political economics; law and economics

SH1_14 Competition law, contract law, trade law, Intellectual Property Rights

SH1_15 Quantitative economic history and history of economics; institutional economics; economic systems

SH2 Institutions, Values, Environment and Space: Political science, law, sustainability science, geography, regional studies and planning

SH2_1 Political systems, governance

SH2_2 Democratisation and social movements

SH2_3 Conflict resolution, war, peace building

SH2_4 Constitutions, human rights, comparative law, humanitarian law, anti-discrimination law

SH2_5 International relations, global and transnational governance

SH2_6 Sustainability sciences, environment and resources

SH2_7 Environmental and climate change, societal impact and policy

SH2_8 Energy, transportation and mobility

SH2_9 Urban, regional and rural studies

SH2_10 Land use and regional planning

SH2_11 Human, economic and social geography

SH2_12 GIS, spatial analysis; big data in political, geographical and legal studies

SH3 The Social World, Diversity, Population: Sociology, social psychology, social anthropology, demography, education, communication

SH3_1 Social structure, social mobility

SH3_2 Inequalities, discrimination, prejudice, aggression and violence, antisocial behaviour

SH3_3 Social integration, exclusion, prosocial behaviour

SH3_4 Attitudes and beliefs

SH3_5 Social influence; power and group behaviour

SH3_6 Kinship; diversity and identities, gender, interethnic relations

SH3_7 Social policies, welfare

SH3_8 Population dynamics; households, family and fertility

SH3_9 Health, ageing and society

SH3_10 Religious studies, ritual; symbolic representation

SH3_11 Social aspects of learning, curriculum studies, educational policies

SH3_12 Communication and information, networks, media

SH3_13 Digital social research

SH3_14 Science and technology studies

SH4 The Human Mind and Its Complexity: Cognitive science, psychology, linguistics, philosophy of mind

SH4_1 Cognitive basis of human development and education, developmental disorders; comparative cognition

SH4_2 Personality and social cognition; emotion

SH4_3 Clinical and health psychology

SH4_4 Neuropsychology

SH4_5 Attention, perception, action, consciousness

SH4_6 Learning, memory; cognition in ageing

SH4_7 Reasoning, decision-making; intelligence

SH4_8 Language learning and processing (first and second languages)

SH4_9 Theoretical linguistics; computational linguistics

SH4_10 Language typology; historical linguistics

SH4_11 Pragmatics, sociolinguistics, linguistic anthropology, discourse analysis

SH4_12 Philosophy of mind, philosophy of language

SH4_13 Philosophy of science, epistemology, logic

SH5 Cultures and Cultural Production: Literature, philology, cultural studies, study of the arts, philosophy

SH5_1 Classics, ancient literature and art

SH5_2 Theory and history of literature, comparative literature

SH5_3 Philology and palaeography

SH5_4 Visual and performing arts, film, design

SH5_5 Music and musicology; history of music

SH5_6 History of art and architecture, arts-based research

SH5_7 Museums, exhibitions, conservation and restoration

SH5_8 Cultural studies, cultural identities and memories, cultural heritage

SH5_9 Metaphysics, philosophical anthropology; aesthetics

SH5_10 Ethics; social and political philosophy

SH5_11 History of philosophy

SH5_12 Computational modelling and digitisation in the cultural sphere

SH6 The Study of the Human Past: Archaeology and history

SH6_1 Historiography, theory and methods in history, including the analysis of digital data

SH6_2 Classical archaeology, history of archaeology

SH6_3 General archaeology, archaeometry, landscape archaeology

SH6_4 Prehistory, palaeoanthropology, palaeodemography, protohistory

SH6_5 Ancient history

SH6_6 Medieval history

SH6_7 Early modern history

SH6_8 Modern and contemporary history

SH6_9 Colonial and post-colonial history

SH6_10 Global history, transnational history, comparative history, entangled histories

SH6_11 Social and economic history

SH6_12 Gender history; cultural history; history of collective identities and memories

SH6_13 History of ideas, intellectual history, history of economic thought

SH6_14 History of science, medicine and technologies