

## EUROPEAN RESEARCH COUNCIL (ERC)

### MACRO-SETTORE PE (Physical Sciences and Engineering)

#### SETTORE PE1 Mathematics

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

##### SOTTO-SETTORI

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

#### SETTORE PE2 Fundamental Constituents of Matter

Particle, nuclear, plasma, atomic, molecular, gas, and optical physics

##### SOTTO-SETTORI

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)

## **SETTORE PE3 Condensed Matter Physics**

Structure, electronic properties, fluids, nanosciences, biological physics

### **SOTTO-SETTORI**

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

## **SETTORE PE4 Physical and Analytical Chemical Sciences**

Analytical chemistry, chemical theory, physical chemistry/chemical physics

### **SOTTO-SETTORI**

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, electro dialysis, 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

## **SETTORE PE5 Synthetic Chemistry and Materials**

Materials synthesis, structure-properties relations, functional and advanced materials, molecular architecture, organic chemistry

### **SOTTO-SETTORI**

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

## **SETTORE PE6 Computer Science and Informatics**

Informatics and information systems, computer science, scientific computing, intelligent systems

### **SOTTO-SETTORI**

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

## **SETTORE PE7 Systems and Communication Engineering**

Electrical, electronic, communication, optical and systems engineering

### **SOTTO-SETTORI**

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

## **SETTORE PE8 Products and Processes Engineering processes, material**

Product design, process design and control, construction methods, civil engineering, energy processes, material engineering

### **SOTTO-SETTORI**

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

## **SETTORE PE9 Universe Sciences**

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

### **SOTTO-SETTORI**

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

## **SETTORE PE10 Earth System Science**

Physical geography, geology, geophysics, atmospheric sciences, oceanography, climatology, cryology, ecology, global environmental change, biogeochemical cycles, natural resources management

### **SOTTO-SETTORI**

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, 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, palaeomagnetism
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

## **MACRO-SETTORE LS (Life Sciences)**

### **SETTORE LS1 Molecular Biology, Biochemistry, Structural Biology and**

Molecular synthesis, modification, mechanisms and interactions, biochemistry, structural biology, molecular biophysics signalling pathways

### **SOTTO-SETTORI**

LS1_1	Macromolecular complexes including interactions involving nucleic acids, proteins, lipids and
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

**SETTORE 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

**SOTTO-SETTORI**

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

**SETTORE 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

**SOTTO-SETTORI**

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

## **SETTORE LS4     Physiology, Pathophysiology and Endocrinology**

Organ physiology, pathophysiology, endocrinology, metabolism, ageing, tumorigenesis, cardiovascular diseases, metabolic syndromes

### **SOTTO-SETTORI**

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)

## **SETTORE LS5     Neuroscience and Neural Disorders**

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

### **SOTTO-SETTORI**

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)

## **SETTORE 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

### **SOTTO-SETTORI**

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

## **SETTORE LS7     Applied Medical Technologies, Diagnostics, Therapies and**

Development of tools for diagnosis, monitoring and treatment of diseases, pharmacology, clinical medicine, regenerative medicine, epidemiology and public health

#### SOTTO-SETTORI

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

#### SETTORE LS8 Ecology, Evolution and Environmental Biology

Population, community and ecosystem ecology, evolutionary biology, behavioural ecology, microbial ecology

#### SOTTO-SETTORI

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, paleobiology
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

#### SETTORE LS9 Applied Life Sciences, Biotechnology, and Molecular and

Applied plant and animal sciences, forestry, food sciences, applied biotechnology, environmental, and marine biotechnology, applied bioengineering, biomass and biofuels, biohazards

#### SOTTO-SETTORI

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)

## MACRO-SETTORE SH (Social Sciences and Humanities)

### SETTORE SH1 Individuals, Markets and Organisations

Economics, finance and management

SOTTO-SETTORI	
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

### SETTORE SH2 Institutions, Values, Environment and Space

Political science, law, sustainability science, geography, regional studies and planning

SOTTO-SETTORI	
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

### SETTORE SH3 The Social World, Diversity, Population

Sociology, social psychology, social anthropology, demography, education, communication

### **SOTTO-SETTORI**

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

## **SETTORE SH4 The Human Mind and Its Complexity**

Cognitive science, psychology, linguistics, philosophy of mind

### **SOTTO-SETTORI**

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

## **SETTORE SH5 Cultures and Cultural Production**

Literature, philology, cultural studies, study of the arts, philosophy

### **SOTTO-SETTORI**

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
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SH5_12 Computational modelling and digitisation in the cultural sphere
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<b>SETTORE SH6    The Study of the Human Past</b>
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Archaeology and history
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<b>SOTTO-SETTORI</b>
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SH6_1 Historiography, theory and methods in history, including the analysis of digital data
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SH6_2 Classical archaeology, history of archaeology
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SH6_3 General archaeology, archaeometry, landscape archaeology
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SH6_4 Prehistory, palaeoanthropology, palaeodemography, protohistory
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SH6_5 Ancient history
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SH6_6 Medieval history
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SH6_7 Early modern history
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SH6_8 Modern and contemporary history
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SH6_9 Colonial and post-colonial history
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SH6_10 Global history, transnational history, comparative history, entangled histories
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SH6_11 Social and economic history
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SH6_12 Gender history; cultural history; history of collective identities and memories
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SH6_13 History of ideas, intellectual history, history of economic thought
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SH6_14 History of science, medicine and technologies
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