

## **Spanish National Evaluation and Prospection Agency (ANEP)**

### **Description of Subject Areas**

#### **Basic Sciences**

##### **Earth Sciences (CT)**

The Earth Sciences Area (CT) encompasses research into the earth system, including the history and evolution of the Biosphere, Lithosphere, Hydrosphere and Atmosphere, their interactions and the current state and possible future evolution. Earth sciences are highly interdisciplinary in that they integrate several basic disciplines to study complex problems, both of a basic and applied nature, presented by the Earth on different scales of time and space. Earth sciences include Climatology, Edaphology, Stratigraphy, Geodesy, Geophysics, Structural Geology, Geomorphology, Geochemistry, Hydrology, Meteorology, Mineralogy, Oceanography, Palaeontology, Petrography, Sedimentology, Seismology, Tectonics and Volcanology.

##### **Sub-areas:**

- Mineralogy
- Petrology
- Paleobiology
- Taphonomy
- Geomorphology
- Hydrology
- Internal Geodynamics
- Geophysics
- Stratigraphy
- Sedimentology
- Meteorology
- Climatology and the Atmosphere
- Environmental Geochemistry
- Pollution

##### **Physics and Space Sciences (FI)**

Together with the areas of knowledge specific to modern physics, such as Quantum Physics, Special and General Relativity and the different ways in which these can be applied to the structure of matter and the universe, this area also includes subjects such as Biophysics, Optics, Complex Systems, Nonlinear Phenomena, Nanotechnology, Quantum Computing and others.

##### **Sub-areas:**

- Optics
- Nonlinear Dynamics
- Experimental High Energy Physics
- Condensed Material Physics
- Astrophysics
- Astronomy

## Mathematics (MTH)

The area of Mathematics (MTH) encompasses the area of mathematics research, including Algebra, Real Analysis, Complex Analysis, Functional Analysis, Harmonic Analysis, Numerical Analysis, Combinatorics, Functional Equations, Mathematical Education, Statistics, Mathematical Physics, Geometry, History of Mathematics, Operational Research, Mathematical Logic, Applied Mathematics, Discrete Mathematics, Optimisation, Control Theory, Theory of Probability, Theory of Numbers and Topology.

### Sub-areas:

- Geometry
- Topology
- Numerical Analysis
- Applied Mathematics
- Algebra
- Mathematical Analysis
- Statistics and Operational Research

## Chemistry (QMC)

From molecular to macroscopic levels, this area deals with research into the composition, structure, preparation and properties of natural and synthetic substances or samples containing these, the interactions and transformations they undergo, their mechanisms, the instrumentation thereof for analysis and experimental methodology and/or theoretical methodology require for studying these.

### Sub-areas:

- Inorganic Chemistry
- Organometallic Chemistry
- Catalysis
- Supramolecular Chemistry
- Molecular Matter
- Nanochemistry
- Biological Chemistry
- Biotechnological Chemistry
- Physical Chemistry
- Analytical Chemistry
- Environmental Chemistry
- Organic Chemistry
- Enantioselective Catalysis

## Life and Health Sciences

### Fundamental and Systems Biology (FSB)

This covers research into the molecular and structural bases of biological functions and their interactions, from molecules to organisms. The FSB area encompasses basic studies in Molecular and Cellular Biology, Genetics, Neurobiology and Development, Microbiology, Virology, Plants, Cancer and Differentiation, Physiology, Immunology and Computational, structural and systems biology, with the exception of those whose main goal directly relates to pathologies and/or the improvement of human

health (these fall under the Biomedicine area or the area of Clinical Medicine and Epidemiology).

**Sub-areas:**

- Neurobiology and Development
- Differentiation
- Cancer
- Structural Biology
- Biocomputing
- Cellular Biology
- Microbiology
- Biotechnology
- Plants
- Immunology
- Metabolisms
- Genomics
- Population Genetics
- Virology

**Biomedicine (BMED)**

Biomedicine deals with research and basic studies with a high biomedical impact: basic models and mechanisms of diseases, molecular or cellular diagnosis, therapeutic strategies, molecular pharmacology and systems for identifying and discovering bioactive molecules. All research into human health largely dealing with human matter or calling for experimentation on human subjects falls under the area of Clinical Medicine and Epidemiology.

**Sub-areas:**

- Cellular and Molecular Biology
- Immunology
- Cardiovascular
- Neurosciences
- Anatomy
- Haematology
- Cellular Death
- Genetics
- Cancer
- Endocrinology
- Metabolic Illnesses
- Microbiology
- Pharmaceutical Breakthroughs
- Molecular Pharmacology

- General and Systems Pharmacology
- Cellular and Systems Physiology

### **Clinical and Epidemiological Medicine (MCLI)**

This encompasses all studies aimed at enhancing knowledge about an illness or disease, its mechanisms or possible treatments, when a significant part of the studies are carried out on human subjects.

#### **Sub-areas:**

- Surgery and Maxillofacial Surgery
- Epidemiology
- Health Services
- Metabolic Illnesses
- Cardiovascular Illnesses
- Cancer
- Infectious Diseases
- Neurology
- Psychiatry
- Miscellaneous

### **Plant, Animal and Ecological Biology (BVAE)**

This area takes in research on the diversity of living organisms and how these evolve and interact in the biosphere. It considers structural, functional and dynamic aspects on different space-time scales of the biology of organisms and ecosystems.

#### **Sub-areas:**

- Marine Ecology
- Microbiology
- Systematic Evolution
- Genetics
- Plant Conservation
- Terrestrial Ecology
- Physiology
- Plant Biotechnology
- Animal Systematics

### **Agriculture (AGR)**

The Agriculture Area (AGR) includes all areas aimed at contributing to the sustainability of agricultural and natural systems, from the most basic to the most applied, the objective being to study herbaceous and woody crops and forest systems. Research activities include studies on soil-water-plant-atmosphere interactions in relation to crop production and quality, the effects of biotic and abiotic stresses and maintenance strategies for crops in adverse conditions, genetic enhancement of plants and phytogenetic resources, physiology and plant biotechnology and agroforestry systems and agricultural economics.

#### **Sub-areas:**

- Soil-plant interaction

- Fertilisation
- Water-plant interaction
- Environmental Stress
- Plant Pathology
- Agricultural Entomology
- Malherbology
- Genetic Enhancement
- Phyto-genetic Resources
- Plant Physiology
- Plant Biotechnology
- Agroforestry Systems
- Agricultural Economics

### **Food Science and Technology (TA)**

This area deals with research focused on studying the characterisation of food quality including the physical, chemical and biochemical bases; microbiology and biotechnology of foodstuffs; sourcing, bioavailability and evaluation of functional ingredients in foods; nutrigenomics; food safety; development of new products and technological processes in the food industry and development of advanced analytical techniques.

#### **Sub-areas:**

- Metabolism
- Nutrition
- Advanced Analytical Techniques
- Biological Macromolecular Chemistry
- Food Safety
- Functional Foods
- Antioxidant Properties and their Health Implications
- Analysis in Biological Systems
- Food Microbiology
- Technological Processes
- New Preservation Technologies
- Biochemical and Molecular Characterisation of Implied Enzymatic Systems
- Analytical Evaluation Methodologies
- Post-harvest Technology

### **Livestock and Fisheries (GAN)**

This area deals with research related with production, diseases and prevention strategies, reproduction and genetics pertaining to animal species of interest to the livestock and fish farming sectors and wild fauna.

**Sub-areas:**

- Aquacultural Production
- Animal Health
- Animal Production
- Genetics
- Reproduction
- Aquacultural Health

**Engineering and Technologies**

**Material Science and Technology (TM)**

This is a multidisciplinary field that includes various areas of science and engineering dealing with the physical macroscopic properties of materials (structure-property relationships and the design of specific properties) with respect to their application in building projects, machines, or products vital to or required by society.

It encompasses elements of chemistry and physics, chemical engineering, mechanics, civil and electrical engineering, as well as nanoscience and nanotechnology in those aspects related to nanostructures and nanomaterials. It also covers materials for the production of energy, electrical, magnetic, structural materials, polymers and biomaterials, ceramics, building, optical and photonic materials.

**Sub-areas:**

- Polymerisation within a dispersed medium
- Synthesis
- Characterisation and modelling of polymeric colloids useful in biomedical applications
- Magnetic Materials
- Amorphic, nanostructural and crystalline magnetic alloys
- Magnetic alloys with shape memory
- Magneto-transport
- Magneto-impedance
- Magneto-resistance
- Magneto-calorific effect
- Magnetic Sensors
- Solid State Chemistry
- Materials for the production of energy (small and large batteries, catalysis)
- Electrical Materials
- Building Materials (characterisation, preparation and applications)
- Conglomerates
- Durability
- Sustainability
- Reusing Waste
- Building Technology

### **Computer and Information Technology Sciences (INF)**

Research projects related with Computer Sciences, Software Engineering, Computer Engineering, Artificial Intelligence, Information Systems and Information Technologies and IT Services.

#### **Sub-areas:**

- Information Management
- Advanced Interfaces
- Open Distributed Systems
- High-performance Computing
- Intelligent Systems
- Software Engineering
- Computer Sciences

### **Civil Engineering and Architecture (ICI)**

This area takes in basic and applied research into the fields of Civil Engineering and Architecture. This includes all of the research done into the improved planning, design, construction, conservation and control of civil infrastructures, as well as that related to architectural constructions, town and spatial planning.

#### **Sub-areas:**

- Construction
- Architecture
- Building
- Transport Engineering
- Hydraulics
- Environmental Engineering

### **Electrical, Electronic and Automatic Engineering (IEL)**

This field completely encompasses such disciplines as classical electrical and control engineering and, partially, that of electronic engineering. The field of classical Electrical Engineering contains research areas linked with the design and use of electrical machines (generators, transformers and motors), with the processes used to generate, transport and distribute electrical energy and the management thereof. Control Engineering includes subjects linked with the modelling of systems, the application of the theory of control to these systems and the development and use of automatic process control devices and equipment, both industrial and domestic (including robots and domotics systems).

Finally, Electronic Engineering includes the development of electronic devices, integrated circuits and electronic equipment and systems essentially for the industrial and domestic sectors, excluding those targeting communications.

#### **Sub-areas:**

- Control Engineering
- Electrical Engineering
- Electronic Devices
- Microelectronics

### **Mechanical, Naval and Aeronautical Engineering (IME)**

Lines of research, both basic and applied, into the fields of Mechanical, Naval and Aeronautical Engineering. Among others, it is worth highlighting the following: the kinematics and dynamics of mechanisms and machines, vehicular dynamics, the calculation, construction and testing of machines, the control and governance of machines, mechatronics, vibrations, acoustics, the design of mechanical elements and vehicles, mechanical design using finite elements, continuous media mechanics, the mechanics of fluids, numerical methods in solids and fluids, biomechanics, mechanobiology, stress, fatigue, plasticity, characterization of materials, structural mechanics, manufacturing processes (mechanisation, plastic moulding, casting, etc.), manufacturing engineering, automation of production, quality engineering, metrology, ship design, lading and rigging systems, nuclear engineering, aerospace engineering, transport engineering, thermodynamics, heat and mass transport, combustion hydraulic machines, thermal machines and motors, thermal engineering, thermoenergy engineering, thermo-technics and energy.

#### **Sub-areas:**

- Structural Mechanics
- Modelling of Materials
- Biomechanics
- Computational Mechanics
- Energy
- Thermal Energy Storage
- Energy Optimisation
- Manufacturing
- Plastic Moulding
- Sheet Steel Moulding
- Cracking and Fatigue under Degrees of Stress
- The Growth of Small Cracks due to Fatigue
- Machines and Mechanisms
- Computational Fracture Mechanics
- Finite Elements Method

### **Chemical Technology (TQ)**

The aim of this line of research is that of searching for improvements in the conception or in the performance of the physical, chemical or biochemical operations that go to make up industrial processes, as well as to research into new alternative processes. This field also includes R&D in environmental technologies and processes aimed at reducing pollution at source or at diminishing its effects. All of this is carried out using sustainability criteria, in other words by combining economic, social and environmental viability.

#### **Sub-areas:**

- Preparation and Application of Adsorbents and Catalysers
- Using Biomass Waste
- Biotechnological Processes
- Environmental Remediation

- Sustainable Energy Management
- Advanced Separation Processes
- Environmental Technologies

### **Electronic and Communications Technology (COM)**

This is a multidisciplinary field with a clear technological bent requiring applied research aimed at the development of new products, systems and services. It encompasses every level involved in electronic systems the purpose of which is the transmission and processing of signals, in telecommunications and in the processing of information. The lower levels involve: the development of electronic devices and integrated circuits for communications applications, the analogical and digital processing of signals for telecommunications systems, the electromagnetic components for guided media and for radio (antennae), and the radiofrequency and microwave subsystems for radio communication systems.

At the higher levels: complex signal modulation and multiplexing systems and telematic engineering with respect to the development of telecommunications and information processing systems, including software and communications protocol development.

#### **Sub-areas:**

- Electronics
- Photonics Technology
- Optic Communications
- Telematics
- Signals Processing

### **Social Sciences and Humanities**

#### **Educational Sciences (EDUC)**

Research projects related with Pedagogy in general as well as with the specific didactics of the different areas of education. Also included in this field are lines of research into the historic, psychological and methodological aspects of education. This research, which is of both a theoretical and applied nature, includes the diagnosis of educational situations and processes as well as the analysis of educational interventions and evaluations.

#### **Sub-areas:**

- Pedagogy
- Didactics
- Educational psychology

#### **Social Sciences (CS)**

Scientific objectives related with the following disciplines: Regional Geographical Analysis, Social Anthropology, Librarianship and Documentation, Political and Administrational Science, Audiovisual Communication and Advertising, Human Geography, the History of Thought and of Social Movements, Journalism, Sociology, Social Work and Social Services, and Town and Spatial Planning. There are other disciplines within the field of Social Sciences, such as Economics, or the Educational Sciences, which have their own evaluation area within the ANEP and are therefore not included in this area.

**Sub-areas:**

- Sociology
- Social Research Techniques
- Political and Administrative Science
- Journalism
- Audiovisual Communication
- Advertising
- Human Geography

**Law (DER)**

Integrated into all of the sectors and disciplines of the legal system, both from a domestic (Spanish) and international perspective, this area includes everything involved with Public Law (organisation of the State, governmental action, fiscal, penal and procedural aspects, etc.) and Private Law (the individual and his/her legal patrimonial activities, the family and inheritance; the market, consumption and the body corporate), without forgetting other questions such as the legal regulation of labour, which falls somewhere between both categories.

Furthermore, also included are aspects relative to the historical development of the Law (the study of Roman Law), as well as the characteristics of the theoretical and philosophical vision of the legal system.

**Sub-areas:**

- Constitutional Law
- Administrative Law
- Civil Law
- Civil Procedural Law
- Criminal Law
- Criminal Procedural Law
- International Public Law
- International Private Law
- European Community Law

**Economics (ECO)**

Research into the basic theories of the economy, the use and development of quantitative methods, and the way in which these are empirically applied to a wide range of economic problems. Studying the performance of individuals, families and companies and their interrelation with the institutions, all of which are determined by the various local, national and international regulations, and the consequences of these on both an individual and collective level. The economic disciplines include Economic Theory (which is subdivided into Microeconomics and Macroeconomics), the Financial Economy, Corporate Economy, Accountancy, Economic History and Quantitative Economy, from the perspective of both Theoretical Econometrics and Applied Economics.

**Sub-areas:**

- Applied Economics
- Microeconometrics
- Labour Economics
- Family Economics
- Corporate Organisation
- Corporate Governance
- Banking and Services Applications
- Organisational Economics
- Corporate Regulation, Competition and Performance
- Corporate Social Responsibility
- Basic Economic Analysis
- Economic Theory
- Economic Mathematics
- Information Economics
- Evolutionary Game Theory
- Industrial Economics
- Macroeconomics
- International Economics
- Empirical Finance

**Philology and Philosophy (FFI)**

This covers two main areas: Philology and Philosophy. The philological area involves the study of Language and Literature and how these relate with culture and society. Included here are those works that not only approach these disciplines from a theoretical or general perspective, but also those which concentrate on the languages or literature particular to any period of history. Also forming part of this subarea are the lines of research into Translation and Interpreting, as well as those that set out to develop language- and literature-related technological applications and resources. As far as the area of Philosophy is concerned, research here deals with the more general questions regarding the study of reality, our possible knowledge thereof, the human constitution and the human being's place in the world, and all of those methodological and conceptual discussions of a general nature which the private sciences propound.

**Sub-areas:**

- Literature
- Spanish Literature
- Philosophy
- Philosophy of Logic and of Language
- Literary Theory
- Comparative Literature
- Language
- General Linguistics
- Classical Philology
- Greek Linguistics
- Modern Philologies

- English Literature
- Genre Studies
- Logic
- Philosophy of Science

### History of Art (HA)

The History area includes all of the disciplines by era – Prehistory, Ancient History, Medieval History, Modern and Contemporary History- and by speciality –American History, the History of Science, Arabic and Islamic Studies and Hebrew and Aramaic Studies-, together with Archaeology and the Historiographic Sciences and Techniques, the Theory of History and Historiography. The Art study area brings together Art History, Aesthetics and Art Theory, the History of Music, of Cinema and of the Audiovisual Media, Architectural Composition, Town Planning and Spatial Planning, Sculpture, Painting and Drawing, as well as the sciences and techniques related with the restoration and conservation of artistic heritage.

#### Sub-areas:

- Arte
- Prehistory and Archaeology
- Medieval History
- Modern History
- Ancient History
- Contemporary History

### Psychology (PS)

This field includes the scientific study of the human learning processes, be they cognitive, emotional, motivational, personality based, interpersonal and social, as well as of the methods for gauging them. The fundamental objective is to understand the role of these processes, and their neurofunctional bases, with respect to both individual and collective behaviour, and their development from infancy to old age.

The knowledge gained is applied to different aspects of human activity such as the family, education, physical and sporting activity, organisations, working relationships, and the law, as well as the prevention, diagnosis and treatment of health problems.

#### Sub-areas:

- Personality
- Assessment
- Psychological Treatments
- Social Psychology
- Psychobiology
- Methodology

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