

***Thematic Programme I:***

**QUALITY OF LIFE**

***(Thematic) Sub-programme No.1: Human Health***

Molecular biological and genetic methods and devices in the prevention, diagnostics and treatment of the most important diseases

Use of new technological and information approaches and instrumentation in prevention, diagnostics and treatment of the most important diseases

Preparation and characterization of pharmacologically active substances based on new principles of action

Mechanisms of action and fate of medicaments in the organism

Health and its determinants including environmental factors

***(Thematic) Sub-programme No.2: Quality and Safe Nourishment of Population***

Diagnostics, therapy and prevention of diseases of livestock, alimentary infections and zoonoses

Development of methods for the appraisal of agricultural raw materials and food for ensuring their quality and safety

Genetically modified organisms, their utilization and risk assessment

Plant health

Phytopharmaceuticals and food supplements in the prevention and health protection against chronic diseases

***(Thematic) Sub-programme No.3: Landscape and Settlements of the Future***

Man and landscape

Planning of the infrastructure of large cities and underground urbanism

Design of buildings with intelligent behaviour

***(Thematic) Sub-programme No.4: Environment and Protection of Natural Resources***

The interaction between man and environment

Reduction of the anthropogenic pressure on the environment

Waste generation and processing

Material flows and protection of natural resources

Instruments, methods and indicators for monitoring and protection of the environment

*Thematic Programme II:*

## **INFORMATION SOCIETY**

### ***(Thematic) Sub-programme No.1: Intelligent Systems for Decision Making, Management and Diagnostics***

Systems for automatic control and data acquisition

Artificial intelligence and its applications

Development of sensors, actuators and means for interactive man-machine communication

Development of transport telematics and development of intelligent transport systems

### ***(Thematic) Sub-programme No.2: Knowledge and Information Management***

Design, implementation and applications of large distributed computing, database and information systems

Medical information and knowledge-based systems including personal systems

Electronic documentation in the systems of health care, social security and public administration

### ***(Thematic) Sub-programme No.3: Communication Infrastructure and Technology***

Multifunctional communication networks including safety and protection of data

Digital television and radio, providing interactive information services by exploring digital terrestrial television

Devices and equipment working on the principles of quantum, statistical and wave optics, including devices and equipment for optical communications

***(Thematic) Sub-programme No.4: Computer-based Modelling and Design of Systems and Processes***

Devices for mathematical and computer-based modelling, simulation, and design of systems and visualisation

Complex integrated circuits and systems, modelling, description and design including complex systems on one chip

Software engineering

***Thematic Programme III:***

**COMPETITIVENESS AT SUSTAINABLE DEVELOPMENT**

***(Thematic) Sub-programme No.1: Production Processes and Systems***

Technologies for the protection and improvement of the environment

Textile materials and their technologies

Advanced steels and related technologies

New principles of elements, machine mechanisms and equipment of higher use value

New generation machines and equipment using modern top components

Catalytic processes

Organic syntheses for more sophisticated products

Reactor engineering, transport phenomena, multifunctional bioreactors

Progressive technologies for machining/tooling, cutting, joining and chipless material processing

Anorganic glasses and their technologies

Experimental research of machines and their components, devices and operational diagnostics

***(Thematic) Sub-programme No.2: Safe and Economic Transport***

Improvement of public transport and development of integrated passenger transport systems

Improvement of the technical conditions, modernisation of transport infrastructure and means of transport

New techniques and instruments for investment modelling of transport networks development

Sustainable transport systems and technologies

Ground communications of a new generation

***(Thematic) Sub-programme No.3: Buildings and Constructions***

Research and development of new technologies for supporting structures and their foundation

Development of methods for the optimization of materials and constructions and to the enhancement of reliability and durability of structures

Improvement of instruments for the optimization of economic characteristics at designing and realization of buildings

***(Thematic) Sub-programme No.4: Advanced Materials***

Materials of a high strength-density ratio

Materials for high temperatures and stresses

Technical polymers and their composites

Advanced ceramic materials

Materials for biomedical applications

Advanced materials for buildings and constructions

Electronic and photonic materials and structures

***(Thematic) Sub-programme No.5: Emerging Technologies***

Nanotechnologies and nanomaterials

Intelligent materials and structures

Modern biotechnology

***(Thematic) Sub-programme No.6: Utilization of Natural Resources***

Boosting competitiveness through development of higher consumer quality food

Development of technologies for non-alimentary use of agricultural raw materials using production potential of agricultural crop

Improving biological potential of production mechanisms

Competitive production systems for sustainable and multifunctional agriculture

Enhanced utilisation of renewable agricultural, petrochemical and tar-products for obtaining chemical products of higher value

Development of technologies for water treatment and purification and rationalisation of water management in the country

Sustainable forest management, producing and non-wood-producing roles of forestry

Enhanced use of non-ore raw materials for materials of a wide application spectrum

***Thematic Programme IV:***

**ENERGY FOR ECONOMY AND SOCIETY**

***(Thematic) Sub-programme No.1: Safe and Effective Nuclear Power Engineering***

Securing nuclear safety and reliability during the whole operating time of a nuclear power-plant

Increased effectiveness of the operation of the existing nuclear power plants

Treatment of radioactive wastes and irradiated nuclear fuel and management of the end of the fuel cycle in a nuclear power plant

***(Thematic) Sub-programme No.2: Power- and Non-Power-Producing Utilization of Coal and Carbonaceous Raw Materials***

Processing of coal in clean technologies

Use of methane bound in coal deposits

Providing for complex exploitation of coal substance

Power engineering using fossil fuels

Effective expansion of a combined production of power and heat and reliability of power-producing systems

***(Thematic) Sub-programme No.3: Rational Use of Energy and Renewable Energy Sources***

Instruments for enhancing the efficiency of energy use

Utilization of renewable power resources

Advanced technologies for power production, renewable power sources and energy conservation

Development of less power demanding technologies in the agricultural and food production

***Thematic Programme V: MODERN SOCIETY AND ITS CHANGES***

***(Thematic) Sub-programme No.1: Performance-Oriented, Safe and European-Integrated Society***

Economic performance and market relations – social, political and environmental context

Formation and stabilisation of the political and legal institutional framework

International integration and globalisation

Social, economic and safety aspects of health and disease

Economic and social context of sustainable development

***(Thematic) Sub-programme No.2: Social Cohesion, Social Differentiation and National Identity***

Social and cultural cohesion in a differentiated society

Open society : social and cultural adaptability

Knowledge society and new forms of education

Socioeconomic, sociological and demographic conditions for the preservation and development of the countryside

Conditions and effects of the population reproduction and demographic aging in the process of modernisation