

## KS A1 - POWER GENERATION AND ELECTROMECHANICAL ENERGY CONVERSION



1. Advanced control systems in photovoltaic station and wind farm.
2. Energy efficiency connected with power generation.
3. Excitation systems of generators in small hydropower plants and the application of advanced programming techniques for calculating the parameters of the excitation system
4. Diagnosis and monitoring of rotating machines.
5. The impact of transient processes on rotating machines.
6. Factors influencing the vibrations of rotating machines.

## KS A2 - POWER TRANSFORMERS AND REACTORS



1. Various experiences with the operation of transformers in the power system (Generation, Transmission, Distribution).
2. On-site maintenance of transformers, preventive inspection, their revitalization, and transformer monitoring
3. Digitalization and online monitoring of power transformers.
4. Standardization and testing of power transformers and reactors for the requirements of the modern grid.
5. Methodology for the optimal replacement of power transformers based on their health index
6. Power transformers and their impact on the environment.

## KS A3 - TRANSMISSION AND DISTRIBUTION EQUIPMENT



1. Digitalization and smart devices in energy transmission and distribution
2. Alternative options for  $Sf_6$  and their impact on the environment
3. Advanced diagnostics and monitoring for efficient asset management
4. Specific operating conditions of transmission and distribution equipment
5. Life cycle management and strategies for extending the lifespan of aging equipment.
6. Integration of renewable energy sources into transmission and distribution networks.
7. The use of new technologies to enhance the security and stability of electrical grids.

## KS B1 - INSULATED CABLES



1. Trends and experiences in the maintenance, operation, and optimization of cable lines.
2. Design of new lines and reconstruction of existing cable lines.
3. Condition monitoring and diagnostic techniques.
4. Assessment of lifespan and environmental impacts on cable systems.
5. Experiences in the installation and operation of medium and high voltage cables.
6. Grounding methods for cable lines.
7. Challenges of connecting renewable energy sources (RES) with cables.

## KS B2 - OVERHEAD LINES



1. Challenges of integrating renewable energy sources and the energy transition.
2. Technical aspects and environmental impacts of overhead lines.
3. Advanced high-capacity conductor technologies for transmission and distribution lines.
4. Integration of Dynamic Line Rating (DLR) and advanced monitoring systems.
5. Overhead lines and information technology.
6. Climatic, environmental, and safety aspects of overhead lines.

## KS B3 - SUBSTATIONS AND ELECTRICAL INSTALLATIONS



1. Integration of renewable energy sources into substations
2. Substation design, engineering, construction, renovation, implementation of IEC standards, and their application.
3. Battery Energy Storage Systems (BESS), hydrogen, synchronous compensators, reactors (parallel, series), hybrid systems (HESS).
4. Operational experiences and asset management, application of advanced technologies, asset management through IoT and AI.
5. Electrical substations, planning, modernization, application of smart grids, advanced SCADA, maintenance, and reconstruction.
6. Advanced monitoring, diagnostics, control, and predictive maintenance of substation equipment.
7. Substation performance, application of advanced technologies in the inspection of electrical substations.

## KS B4 - DC SYSTEMS AND POWER ELECTRONICS



1. Renovation and improvement of existing DC systems.
2. Service and operational experiences of DC systems.
3. Applications of DC systems enabling the energy transition.
4. Power electronics for grid stability and flexibility.
5. New concepts, technologies, and designs of DC/AC and AC/DC converters for transmission and distribution systems.
6. Advances in power electronics equipment technologies.
7. Integration of renewable energy sources into DC systems for sustainable energy solutions.

## KS B5 - PROTECTION AND AUTOMATION



1. Advanced practices and requirements for preventive maintenance of microprocessor-based relay protections.
2. Acceptance, commissioning, and field testing of relay protection, automation, and control systems.
3. Relay protection principles for future distribution networks.
4. Challenges of relay protection, control, and measurement in emergency situations.
5. Modern energy grid systems — operational experiences.
6. Challenges in integrating renewable energy control systems and energy storage systems at the substation and dispatch center level.
7. Protection of the energy sector from cyberattacks in the era of digitalization.
8. The use of SCADA and EMS for intelligent management of grids

## KS C1 - POWER SYSTEM DEVELOPMENT AND ECONOMICS



1. Flexibility as a Pivotal Criterion for System Development
2. Resilience in Power System Planning and Development
3. Economic and System Analysis Methods for Power System Development
4. Impact of Electrification and Sector Coupling on Power System Development
5. Long-Term Planning of Energy Security and Security of Supply
6. Modeling and Forecasting Techniques for Power System Planning and Economics
7. Power System modeling and simulations

## KS C2 - POWER SYSTEM OPERATION AND CONTROL



1. Operational resilience to extreme and unexpected events
2. Increasing system flexibility and ancillary services in systems with high RES participation
3. Management of consumption connected to TSO and DSO as an opportunity for ancillary services in the system
4. Operation of power system in conditions of extensive integration of distributed generation and power park modules interconnected through power electronics
5. System safety and regional safety coordination
6. Advanced monitoring and control techniques for network stability and reliability
7. Automation and autonomous control of the operation of the power system (special system protection schemes).

## KS C3 - POWER SYSTEM SUSTAINABILITY AND ENVIRONMENTAL PERFORMANCE



1. Integration of new technologies in the energy sector and their environmental impacts.
2. Resilience to climate change and adaptation measures for the powers system
3. Paths and strategies for the decarbonization of the power system
4. Implementation of the Energy Strategy: challenges and environmental impacts.
5. Energy efficiency and reducing the impact of the power system on climate change.
6. Biodiversity conservation and land use in the power system planning.
7. Life cycle analysis of components in the power system.

## KS C4 - POWER SYSTEM TECHNICAL PERFORMANCE



1. Coordination of Insulation and Lightning Arrester Performance in Developing Power Systems
2. Innovative Inverter Technologies for Power Quality Enhancement
3. Artificial Intelligence and Machine Learning for Power System Performance and Optimization
4. Dynamic Analysis of the Power System in the Energy Transition
5. The Impact of Distributed Energy Resources (DER) on Technical Performance of the Grid
6. Performance of Protection and Automatic Systems

## KS C5 - ELECTRICITY MARKETS AND REGULATION

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1. Market Design Developments to Facilitate the Integration of New Participants and Renewable Resources.
  2. Flexibility and Market Mechanisms (Balancing markets, Balancing Platforms, Congestion Management, Aggregators, DSM, storage facilities, etc.).
  3. The role and importance of cybersecurity in the electricity market.
  4. Regulatory Challenges for Integration of Renewable Energy Sources and Battery Storage (connection costs, flexibility incentives, appropriate tariff models, etc.).
  5. The impact of distributed generation on the electricity market.
  6. Market Coupling (regional initiatives for market coupling, Kosovo – Albania Market Coupling, etc.).
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## KS C6 - ACTIVE DISTRIBUTION SYSTEMS AND DISTRIBUTED ENERGY RESOURCES

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1. Distribution network planning and asset management,
  2. Impact of RES on the power system,
  3. Active management and control of distribution networks,
  4. The importance of grid development in accommodating RES,
  5. Application of advanced metering infrastructure (AMI) and smart grid technologies in the distribution system,
  6. Impact of electric vehicles (EVs) and charging infrastructure on distribution networks,
  7. The role of prosumers in the energy transition.
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## KS D1 - MATERIALS AND EMERGING TEST TECHNIQUES

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1. Advanced materials for high-voltage equipment and components in the power system
  2. Innovative materials for testing and diagnostics of the power system components.
  3. Advanced materials for high-voltage insulation in transformers and electric motors.
  4. Transforming the power system through AI: Strategies for Testing, Monitoring, and Recycling for Energy Sustainability.
  5. Testing techniques for underground and overhead cables for condition monitoring and defect detection.
  6. Analysis of insulating materials in distribution transformers and the environmental impact on their degradation
  7. Testing methods for batteries and energy storage systems in the power system
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## KS D2 - INFORMATION SYSTEMS TELECOMMUNICATIONS AND CYBERSECURITY

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1. New Cybersecurity Challenges in the Changing Electricity Industry
  2. Meeting the Challenges of Energy Transition with Reliable, Scalable, and Efficient Telecommunications Networks
  3. Digital Platforms for Acquisition, Processing and Analysis of Big Data in Power Systems and Exchange Between Market Participants
  4. Telecommunication Networks for Real-Time Grid Monitoring and Control
  5. Interoperability and Communication Protocols for Smart Grid Devices and Distributed Energy Resources (DERs) Integration.
  6. Blockchain for secure P2P energy trading, grid management, and data integrity in decentralized systems
  7. Machine learning for predicting solar and wind power generation
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