NEST4WB

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Univerzitet Sinergija Bijeljina

Innovated study program

- presentation -

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Purpose of the study program

- ***To prepare students*** for specialized careers in computer science with a focus on data analysis, simulation, and clustering techniques that enhance energy management, grid stability, and optimization of energy distribution.
- ***To equip students*** with the skills to independently tackle tasks involving modern IT applications, including computer networks, databases, sensor networks, video monitoring systems, intelligent systems, computer visualization, and the Internet of Things, specifically in the realm of energy efficiency and grid safety.

Aims of the study program

- ***Education of professionals***
  - The primary goal of this program is to educate professionals who will be capable of working in various fields related to renewable energy sources, their integration into smart electrical grids, and the use of artificial intelligence and IoT resources in modeling electrical networks.

- ***Comprehension of Smart Grid Technologies***
  - Students will gain a foundational understanding of smart grid technologies, including smart measurement and monitoring systems, IoT applications, and the integration of renewable energy sources. They will learn about the functionalities of smart meters, sensors, card computers, and microcontrollers

Aims of the study program

- ***Data Collection and Analysis***
  - Students will develop skills in collecting, managing, and analyzing data related to energy consumption and power quality. They will be trained to interpret this data for optimizing operational processes, improving grid efficiency, and establishing real-time monitoring systems.

- ***Remote Management and Control***
  - Students will acquire practical skills in remote management techniques applicable to electrical grids. This includes the ability to respond to fluctuations in energy consumption, troubleshoot issues, and enhance the reliability and sustainability of energy systems.

Aims of the study program

- ***Integration of Renewable Energy Sources***
  - Students will explore the principles and methodologies for integrating renewable energy systems into electrical grids. They will understand the challenges and solutions associated with renewable energy management to improve grid efficiency and safety.

- ***Software Modeling and Simulation***
  - Students will learn to utilize software tools for modeling the utilization of solar and wind energy. This includes techniques for simulation and forecasting that support effective energy resource management and planning.

- ***Application of IoT in Smart Grids***
  - Students will become proficient in the application of IoT technologies for remote data collection, transmission, and centralized aggregation. They will explore methods for leveraging data analytics to support decision-making and enhance power grid monitoring and control.

Outcomes of the study program

- ***Graduates will be able to participate in the activities of state agencies***
  - Regulatory Agency for Energy in both entities and national levels
  - Institute for Standardization of BiH
  - Other governmental bodies in formulating regulations and laws pertaining to smart grids and the deregulation of the electricity market.
- ***Demonstrate Proficiency in Smart Grid Technologies***
  - Understand and explain the principles and functionalities of smart measurement and monitoring systems, IoT devices, and renewable energy integration in electrical grids.

Outcomes of the study program

- ***Conduct Data Analysis***
  - Collect, analyze, and interpret energy consumption and power quality data to identify patterns and trends, enabling informed decision-making for optimizing grid operations.
- ***Implement Remote Management Techniques***
  - Effectively apply remote management strategies to monitor and control electrical grids, respond to real-time changes in energy consumption, and troubleshoot issues to enhance system reliability.
- ***Integrate Renewable Energy Solutions***
  - Develop and apply strategies for integrating renewable energy sources into existing electrical grids, addressing challenges related to efficiency, stability, and safety.

Outcomes of the study program

- ***Utilize Software Modeling Tools***
  - Employ software tools for modeling and simulating the use of solar and wind energy, supporting planning and optimization of energy resource management.
- ***Leverage IoT Technologies***
  - Design and implement IoT-based solutions for real-time data collection, transmission, and centralized aggregation, enhancing communication and operational efficiency within smart grids.
- ***Collaborate Effectively in Multidisciplinary Teams***
  - Work collaboratively with peers from various fields, applying project management skills to address complex challenges in smart grid development and implementation

Outcomes of the study program

- ***Engage in Continuous Learning***
  - Cultivate a mindset of lifelong learning, staying current with emerging technologies and trends in smart grid systems and renewable energy solutions.
- ***Contribute to Sustainable Energy Practices***
  - Advocate for and implement practices that promote sustainability and energy efficiency, contributing to the development of resilient and environmentally friendly electrical networks.
- ***Communicate Technical Information Clearly***
  - Articulate technical concepts related to smart grids and renewable energy to diverse audiences, including stakeholders, policymakers, and the general public.

Quality and international compliance

- ***The program*** aligns with contemporary scientific trends, ensuring it remains comparable to similar offerings at foreign higher education institutions, particularly within the EU.
- ***This study program*** provides students with cutting-edge scientific and technical knowledge in the field of Computer Science, specifically aimed at enhancing smart grid technologies and energy management.
- ***The curriculum*** is structured as a one-year Master's program (second cycle academic studies) in Bosnia and Herzegovina, designed to reflect current advancements in the economy and society. It adheres to the Bologna Declaration and supports the ongoing reform of higher education across Europe.

Master curriculum update

Nr.	Courses	S	Course status	Hours			ECTS
				L	E	Other	
1	Scientific Research Methodology	1	O	4	3	-	10
2	Contemporary Computer Networks (in Electrical Power Grid)	1	O	4	3	-	10
Elective courses 1 (elect 1 out of 5 elective fields)							
3	Computer Network Security (ZIS)	1	E	4	3	-	10
4	Process Management in Information Systems (DF)	1	E	4	3	-	10
5	Internet marketing (SIS)	1	E	4	3	-	10
6	Contemporary Web Technologies and Applications (SWTA)	1	E	4	3	-	10
7a	Improving traffic safety using IoT (RSBS)	1	E	4	3	-	10
7b	Application of computer vision in traffic control (RSBS)	1	E	4	3	-	10
7c	**Integration of renewable energy sources into the Smart Grids**	**1**	**E**	**4**	**3**	**-**	**10**
7d	**Software modeling of the use of solar energy and wind energy**	**1**	**E**	**4**	**3**	**-**	**10**

Legend
S = semester
L = lectures
E = exercises

Course status
O = obligatory
E = elective

Elective lines
- Information Systems Security (ZIS)
- Digital Forensics (DF)
- Contemporary Information Systems (SIS)
- Contemporary Web Technologies and Applications (SWTA)
- Information systems in traffic safety (RSBS)
- **Smart Electric Power Grids**

Master curriculum update

Nr.	Courses	S	Course status	Hours			ECTS
				L	E	Other	
8.	Generation and Distribution of Cryptografic Keys (ZIS)	2	E	3	2	-	8
9	Digital Forensics (DF)	2	E	3	2	-	8
10	Inovation Management (SIS)	2	E	3	2	-	8
11	Intelligent Technology Application in Contemporary Business Systems (SWTA)	2	E	3	2	-	8
Elective courses 2 (elect 1 out of 5 elective fields)							
12a	Databases in transport and traffic engineering (RSBS)	2	E	3	2	-	8
12b	Intelligent traffic systems (RSBS)	2	E	3	2	-	8
12c	**Smart systems for measurement and monitoring in Smart Grids**	**2**	**E**	**3**	**2**	**-**	**8**
12d	**IoT infrastructure in Smart Grids**	**2**	**E**	**3**	**2**	**-**	**8**
13	Research paper	2	O	-	-	4	6
14	Student Internship	2	O	-	-	4	6
15	Master thesis	2	O	-	-	7	10

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- Contemporary Information Systems (SIS)
- Contemporary Web Technologies and Applications (SWTA)
- Information systems in traffic safety (RSBS)
- **Smart Electric Power Grids**

Appendices

- Catalogue of courses with competencies matrix
- Syllabuses in english and local language