List of topics for the diploma exam

Field of study: **Electrical Engineering**	Level of study: **Second-cycle studies**
Area of Study (Specialization): **Smart Measurement Systems**	

No.	Topics
1	**Inheritance, encapsulation, and polymorphism in object-oriented programming** *[Object oriented programming]*
2	**Passive two-point synthesis** *[Electrical engineering]*
3	**Nonlinear DC and AC circuits and methods of their analysis** *[Electrical engineering]*
4	**Structures of rectifier systems with quasi-sinusoidal current** *[Electronics and power electronics]*
5	**Cogeneration system – principle of operation, efficiency, basic parameters, examples** *[Renewable energy sources]*
6	**Measurements of non-electrical quantities, methods, and assessment of measurement inaccuracy** *[Electrical measurements of non-electrical quantities]*
7	**Calculating forces and torques in linear and nonlinear electromagnetic systems** *[Electromechanical propulsion systems]*
8	**Electrical machines operation mode** *[Electromechanical propulsion systems]*
9	**Identification of remotely controlled measuring instruments via RS232C, USB, GPIB, LAN in the Windows system** *[Electronic measuring systems]*
10	**The idea of pipeline processing** *[Microprocessor technology]*
11	**Heat exchange methods** *[Lighting engineering and electroheat]*
12	**Digital filter designing methods** *[Selected problems of signal processing]*
13	**Methods of coupling electromagnetic interference** *[Electromagnetic compatibility]*
14	**Statistical methods of data analysis and presentation** *[Statistical process control]*
15	**Hydropower plants - types, role and tasks in the power system** *[Generation of electric energy]*
16	**Operation rules and application of evolutionary algorithms in optimization tasks** *[Decision algorithms in the electric power engineering]*
17	**Cybersecurity threats to ICT systems - classification and attack methods** *[Cyber security and telecommunications in the power industry]*
18	**Higher harmonics of currents and voltages - their essence, causes of formation, and their interference** *[Disturbances in electric power systems]*
19	**A method of measuring high DC voltage using a microcontroller** *[Designing of measurement and control system]*
20	**Partial discharges in electrical power devices - detection and location methods** *[High voltage engineering]*
21	**Applications of operational amplifiers in measurements** *[Electronic measuring systems]*
22	**Overvoltage protection for circuits with operational amplifiers** *[Electronic measuring systems]*
23	**Ideal and real voltage and current sources** *[Electronic measuring systems]*
24	**Electronic circuits for measuring currents** *[Electronic measuring systems]*
25	**Analysis of discrete stationary and non-stationary signals - signal sampling, frequency, time and time-frequency analysis** *[Smart signal processing]*
26	**Signal feature extraction - filtration, decomposition, demodulation** *[Smart signal processing]*
27	**Internal structure and operating principle of a digital sensor** *[Advanced sensory systems]*
28	**Interfaces used for communication with sensors and AFE systems** *[Advanced sensory systems]*
29	**Sensory systems in navigation, topography, meteorology and biomedical engineering** *[Advanced sensory systems]*
30	**Voltage quality measures in an electrical power grid** *[Advanced metering infrastructure in power grids]*

31	**Voltage fluctuation meter - flickermeter** *[Advanced metering infrastructure in power grids]*
32	**Features of an ideal voltage in an electrical power grid** *[Advanced metering infrastructure in power grids]*
33	**SCADA system - architecture and principle of operation** *[PLC controllers and SCADA in measurement and industrial automation]*
34	**Communication protocols used in SCADA systems** *[PLC controllers and SCADA in measurement and industrial automation]*
35	**Factors influencing the thermal imaging temperature measurement result** *[Diagnostyka termowizyjna]*
36	**Microbolometer detector - operating principle** *[Thermal imaging diagnostics]*
37	**Spectral characteristics of thermal imaging cameras** *[Thermal imaging diagnostics]*
38	**Measurements of electrical and non-electrical signals with a DAQ card** *[Modern systems for the acquisition of measurement signals]*
39	**A/D signal processing in the measurement chain with a DAQ card** *[Modern systems for the acquisition of measurement signals]*
40	**D/A signal processing in the measurement chain with a DAQ card** *[Modern systems for the acquisition of measurement signals]*