



Ministry of Energy of the Russian Federation
Ministry of Education and Science of the Russian Federation
Ivanovo State Power Engineering University (ISPEU)
Open joint stock company "System Operator of United Power System" (SO UPS)
"Russian National Committee of International Council on Large Electric Systems" (CIGRE RNC)
Charitable foundation «Reliable Rising Generation» JSC "Schneider Electric"

	<h1>ELECTRICAL POWER ENGINEERING-2014</h1> <p>INTERNATIONAL STUDENT COMPETITION ON ELECTRICAL POWER ENGINEERING, IVANOVO, RUSSIA, NOVEMBER 18-22, 2014</p>	
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Tasks subjects

There will be **12 tasks** of different difficulty levels in the following disciplines:

- Theoretical Basics of Electrical Engineering
- High-Voltage Engineering
- Relay Protection and Automation
- Electric Power Stations' and Substations' Electrical Equipment
- Electric Systems and Nets
- Electric Power Supply

Task subject are:

HIGH-VOLTAGE ENGINEERING

1. High voltage power equipment electrical insulation, electrical and thermal design of this equipment;
2. High-voltage transmission line and substation equipment engineering factors calculation (clearance choice);
3. Grids overvoltage calculation and line and substation equipment influence on transients during overvoltage.

ELECTRICAL POWER SYSTEMS AND GRIDS

1. Non-continuous electrical power network steady mode calculation:
 - 1.1. Operating conditions determination (power flow, voltage);
 - 1.2. Voltage vector diagram;
 - 1.3. Voltage regulation by means of transformer ratio variation;
 - 1.4. Line and transformer losses determination;
 - 1.5. Line and transformer electric loss determination.
2. Ring mains steady mode calculation:
 - 2.1. Ring mains power flow calculation;
 - 2.2. Consumption point of power determination;
 - 2.3. Ring mains line section proof by heating.

RELAY PROTECTION AND ELECTRIC SYSTEM AUTOMATION

1. Stepped-curve time protection of single side power supply lines and transformers;
2. Overcurrent protection with definite and reverse characteristic time curve;
3. Double way feed line directional current protection;
4. Double way feed line distance protection;
5. Primary current phasor diagrams in fault location, secondary current phasor diagrams in current transformers and relays;
6. Restrained differential current protection of transformers;
7. Line automatic reclosure;
8. Transformer reserve switching device.

ELECTRIC POWER STATIONS

1. Electric power station auxiliary system circuit breaker check;
2. Ground-fault neutralizer choice;
3. Multipole bus bar choice;
4. Power station generators modes acceptability determination with power diagram usage;
5. Transformer insulation heat aging determination.

POWER SUPPLY

1. Power-supply system elements design load determination;
2. The choice of number and capacity of 6 (10) / 0.4 kV shop transformers;
3. Cable core section choice and checkup in power-supply schemes of the rated voltage 6 – 10 kV;
4. Reactive power compensation in manufacturing plant power-supply systems. Capacitor banks and synchronous motors characteristics.

ELECTRICAL ENGINEERING THEORETICAL FOUNDATIONS

1. Direct current circuits;
2. Alternative current circuits including nonsinusoidal current;
3. Three-phase circuits;
4. Transients in linear electric circuits of the first and second order except themes connected with incorrect initial conditions and Duhamel integral.