Ministry of Energy of the Russian Federation
Ministry of Education and Science of the Russian Federation
FSFEI HPE «Ivanovo State Power Engineering University» (ISPEU)
Open Joint-Stock Company «System Operator of the United Power System» (OJSC «SO UPS»)
Russian National Committee of International Council on Large Electric Systems (RNC CIGRE)
Charitable Foundation «Reliable Rising Generation»
PJSC «Federal Grid Company of the Unified Energy System» (PJSC «FGC UES»)

ELECTRICAL POWER ENGINEERING-2015
INTERNATIONAL STUDENT COMPETITION
ON ELECTRICAL POWER ENGINEERING, IVANOVO, RUSSIA, NOVEMBER 17-21, 2015

A.F. DYAKOV[1] INTERNATIONAL STUDENT COMPETITION ON ELECTRICAL POWER ENGINEERING

SECOND PUBLIC INFORMATION NOTICE

Ivanovo State Power Engineering University (ISPU) and Charitable Foundation «Reliable Rising Generation» in accordance with the plan of joint events for the year of 2015 with the assistance of OJSC «SO UPS», PJSC «FGC UES», CIGRE RNC hold the **International Student Competition on Electrical Power Engineering** for Master Degree students of electrical power and electrical engineering programs of study.

The Competition has been held in ISPU since 2011. The teams from leading higher educational institutions of Russia, Belarus and Germany declared their participation in the competition. The expected number of participants exceeds 100 students.

The Competition participants are:

1. **Belarusian National Technical University (Republic of Belarus)**
2. **Vologda State University**
3. **Vyatka State University**
4. **Ivanovo State Power Engineering University**
5. **Donetsk National Technical University (Ukraine)**
6. **Irkutsk State Technical University**
7. **Kazan State Power Engineering University**
8. **Moscow Power Engineering Institute (National Research University)**
9. **Nizhny Novgorod State Technical University**
10. **Saint-Petersburg State Polytechnic University**
11. **Novosibirsk State Technical University**
12. **Omsk State Technical University**
13. **Smolensk Branch of Moscow Power Engineering Institute (National Research University)**
14. **North Caucasus Federal University**
15. **Samara State Technical University**
16. **National Research Tomsk Polytechnic University**
17. **Ulyanovsk State Technical University**
18. **Ural Federal University named after the first President of Russia B.N. Yeltsin**
19. **South Ural State University**
20. **Technishe Universität Darmstadt (Technical University of Darmstadt, Germany)**

[1] Anatoliy F. Dyakov (1936-2015) – an outstanding Russian power engineer, Minister of Fuel and Energy of RF (1991), President of OJSC RAO “UES of Russia” (1992), Chairperson (1989-2009) and Honorary Chairperson (since 2009) of CIGRE RNC.

Competition Venue

Ivanovo State Power Engineering University (ISPEU)
Address: 34, Rabfakovskaya Street, Ivanovo, Russia, 153003

The Competition held in lecture rooms **B-301 и B-316** of the main ISPU building (Building B). The Head of the team is a member of Competition jury and takes part in checking the participant's works. To solve problems the participants do not need any technical reference materials. All necessary reference data are included in the task statement. The participants must have a passport, a student's card, a calculator, and a pen.

Important Dates

1.	Collection of tasks from other institutions	**Before November 1, 2015.**
2.	Submission of passport copies and notification on arrival and departure dates	**Before November 5, 2015**
3.	Competition	**November 18, 2015**
4.	Visit to the electrical energy industry	**November 19, 2015**
5.	Announcement of Competition results	**November 19, 2015**
6.	Visit to the electrical energy industry of PJSC «FGC UES» **,** Moscow	**November 20, 2015**
7.	Participation in Youth Day of «ENES 2015», Moscow *	**November 21, 2015**

*To visit the exhibition "ENES 2015", please register here

ORGANIZING COMMITTEE

Vladimir V. Tyutikov,
Chairperson, ISPU Vice-Rector for Research
Andrey V. Gofman,
Vice-Chairperson, Head of Organizing Committee of Youth Section of CIGRE Russian National Committee
Elizavta A. Nikolova,
Vice-Chairperson, Head of PJSC "FGC UES" Personnel Training Center
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Competition Program

Time	Item of Program	Place
November 17, Tuesday		
0:00 AM	Arrival and accommodation of Competition participants. Accommodation at the hotel "Ivanovo" http://www.hotel-ivanovo.ru/	Hotel "Ivanovo"
2:30 PM – 5:00 PM	Tour of ISPU. Gathering at 2:15 PM in "Ivanovo" hotel hall	"Ivanovo" hotel hall
November 18, Wednesday		
8:00 AM – 8:30 AM	Transfer of participants from the hotel to ISPU by bus. Gathering at 7:45 AM in "Ivanovo" hotel hall	"Ivanovo" hotel
8:45 AM – 9:15 AM	Photographing of Competition participants	Assembly Hall, Building B
9:20 AM – 9:45 AM	Competition opening ceremony	Assembly Hall, Bldg. B
10:00 AM – 2:00 PM	Competition	Build. B room - 301, room-316
2:00 PM – 3:00 PM	Lunch	
3:30 PM –	Conference social program	
November 19, Thursday		
8:00 AM – 17:00 PM	Visit to the electrical energy industry	
17:00 PM – 19:00 PM	Announcement of Competition results. Awarding ceremony. Photographing.	Build. B room - 240
November 20, Friday		
7:00 AM – 1:00 PM	Transfer of participants from Ivanovo to Moscow	
1:00 PM – 2:00 PM	Accommodation at the hotel *	
3:00 PM – 6:00 PM	Visit to the electrical energy industry	
November 21, Saturday		
8:00 AM – 9:00 AM	Registration of participants of «ENES 2015» Youth Day	
9:00 AM – 1:30 PM	Participation in «ENES 2015» events.	
1:15 PM – 2:45 PM	Meeting with the Minister of Energy of the Russian Federation A. Nowak.	

*The participants of the panel discussion in PJSC «FGC UES» and «ENES 2015» Youth Day free accommodated in one of Moscow hotels 20-21 November 2015.

APPENDIX 1. TASKS SUBJECTS

HIGH-VOLTAGE ENGINEERING

1. Electrical isolation of high voltage power equipment, electrical and thermal calculation of the equipment isolation;
2. Calculation of engineering factors of high-voltage transmission line and substation equipment (clearance choice);
3. Grids overvoltage calculation. Line and substation equipment influence on transients during overvoltage.

ELECTRICAL POWER SYSTEMS AND GRIDS

1. Calculation of non-continuous electrical power network steady mode:
   - 1.1. Determination of operating conditions (power flow, voltage);
   - 1.2. Voltage vector diagram;
   - 1.3. Voltage regulation by means of transformer ratio variation;
   - 1.4. Determination of line and transformer power losses;
   - 1.5. Determination of line and transformer electric loss.
2. Calculation of ring mains steady mode:
   - 2.1. Calculation of ring mains power flow;
   - 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 of 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. Determination of power station generators modes acceptability by using a power diagram;
5. Determination of transformer insulation heat ageing.

POWER SUPPLY

1. Determination of power-supply system elements design load;
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.

THEORETICAL FOUNDATIONS OF ELECTRICAL ENGINEERING

1. Direct current circuits;
2. Alternative current circuits including non-sinusoidal 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.

APPENDIX 2. LAYOUT OF ISPU BUILDINGS

APPENDIX 3. MAP OF IVANOVO CITY