Code ..... **Course item: .....**

1. INFORMATION ABOUT THE COURSE

A. Basic information

Name of course	*Principles of Electrical Power Engineering*
Study level	*first degree*
Unit running the study programme	*Faculty of Telecommunication and Electrical Engineering*
Study programme	*Electrical Engineering*
Speciality	
Name of teacher (s) and his academic degree	*Maria Derecka, PhD*
Introductory courses	*Introduction to Electrical Engineering, Materials Engineering, Circuits Theory, Physics*
Prerequisites	*the knowledge about basic laws and notions of the thermodynamics, the knowledge about basic laws of the electrotechnics, the basic knowledge about conductor and isolating materials*

B. Semester/week schedule of classes

Semester	Lectures	Classes	Laboratories	Project	Seminars	Field exercises	ECTS
winter or summer	30		15				8

2. EFFECTS OF EDUCATION (acc. to National Qualifications Framework)

Knowledge	*On successful completion of the course student is supposed to understand rules of the functioning of electric power systems; to understand processes of the production and the delivery of the electrical energy to the energy consumers.*
Skills	*On successful completion of the course student should be able to use the enthalpy-entropy diagram or the suitable computer program accordingly, to count the efficiency of the thermodynamic cycle in steam-power stations; to know to count the load flow, voltage drops and the active power loss in simple network systems.*
Competences	*On successful completion of the course student student is conversant with the variety methods of generation of electricity and conscious of necessity of the spread of such technologies of the production which in the small degree degrades the environment.*

3. TEACHING METHODS

multimedia lecture, laboratory, a visit in a thermal-electric power station

4. METHODS OF EXAMINATION

llecture - written exam, laboratory - realization of all practices and the positive opinions with all reporting

5. SCOPE

Lectures	*Basic knowledge about the electric power system: functions realized by the electric power system, their components and subsystems. Operating conditions of the electric power system. Power and frequency control. The cooperation between electric power systems. Classification of the power stations. Steam-conventional power stations - energy conversions, thermodynamic cycles, devices in power stations, the efficiency of the power*

	generation. Combined heat and power generation in thermal-electric power stations (CHP). Basic knowledge about nuclear power plants. Renewable sources of energy: Wind and water power stations - energy conversions, devices in power stations, the efficiency of the electrical power generation. Advantages and disadvantages of wind and water power stations. Other renewable sources of energy - the biomass, the radiation of the Sun, the energy of seas, the geothermic energy. *Subsystems of the transmission and distribution. Functions realized by network components (lines, transformers, capacitors, reactors, switchgear, protections). Basic knowledge about the construction of network components.* *Mathematical models (equivalent circuits) of network components used in basic electrical calculations. Load flows - calculation of simple systems. Voltage drops and complex voltage drops. Basic knowledge about the voltage control in power networks. Reactive power compensation.* *Power losses. Thermal and mechanical issues in overhead lines – sag and tension.* *Basic knowledge about short-circuits.*
Laboratories	*They take place in the computer laboratory and illustrate most important problems of the operation of the electrical power system. The subject matter of exercises:* • *proprieties of water and the water vapor as the working medium in power stations. The enthalpy-entropy diagram,* • *the efficiency of the thermodynamic cycle of the thermal steam-power station,* • *equivalent diagrams of power lines, transformers and circuits with transformers,* • *calculations of load flows and voltage drops in radial networks,* • *calculations of load flow and voltage drops in meshed networks,* • *voltage drops and power losses for different reactive power flowing through network.*

6. **LITERATURE**

Basic literature	*Grigsby L. L., 2012. The Electric Power Engineering Handbook, Third Edition. CRC Press.* *Ceraolo M., Poli D., 2014. Fundamentals of electric power engineering: from electromagnetics to power system. Wiley-IEEE Press. ISBN: 978-1-118-67969-2* *Short T.A., 2014. Electric power distribution handbook. CRC Press. ISBN 9781466598652*
Supplementary literature	*Bosela T., 1997. Introduction to electrical power system technology. Prentice-Hall.* *Grainger J. J., Stevenson W. D., 1994. Power system analysis. McGraw-Hill.*