



University POLITEHNICA of Bucharest

# Faculty of Energy Engineering

313 Splaiul Independentei, EH Building, District 6

[www.energ.upb.ro](http://www.energ.upb.ro)



*Energy for a better life !*



- **The Faculty of Energy Engineering is an elite school of the Romanian technical higher education, being ranked on the first place in the top of the faculties in the country that have university study programs in the field of Energy Engineering.**
- **All Bachelor's and Master's degree programs in the Faculty of Energy Engineering are accredited by Romanian Agency for Quality Assurance in Higher Education (ARACIS) with a high degree of confidence.**
- **The diplomas obtained are internationally recognized.**
- **The study programs are compatible with the European Credit Transfer System (ECTS).**
- **In addition to internships (3 months for Bachelor's and 1 month for Master's degree), students benefit from study trips and double degree programs.**

## University studies in the Faculty of Energy Engineering are organized in three-cycle system:



**BACHELOR** - 7 specializations, all in Energy Engineering domain, 8 semesters, minimum 240 ECTS

**MASTER** - 11 programs (9 in Energy Engineering domain, 1 in Environmental Engineering domain and 1 in Engineering and Management domain), 4 semesters, minimum 120 ECTS

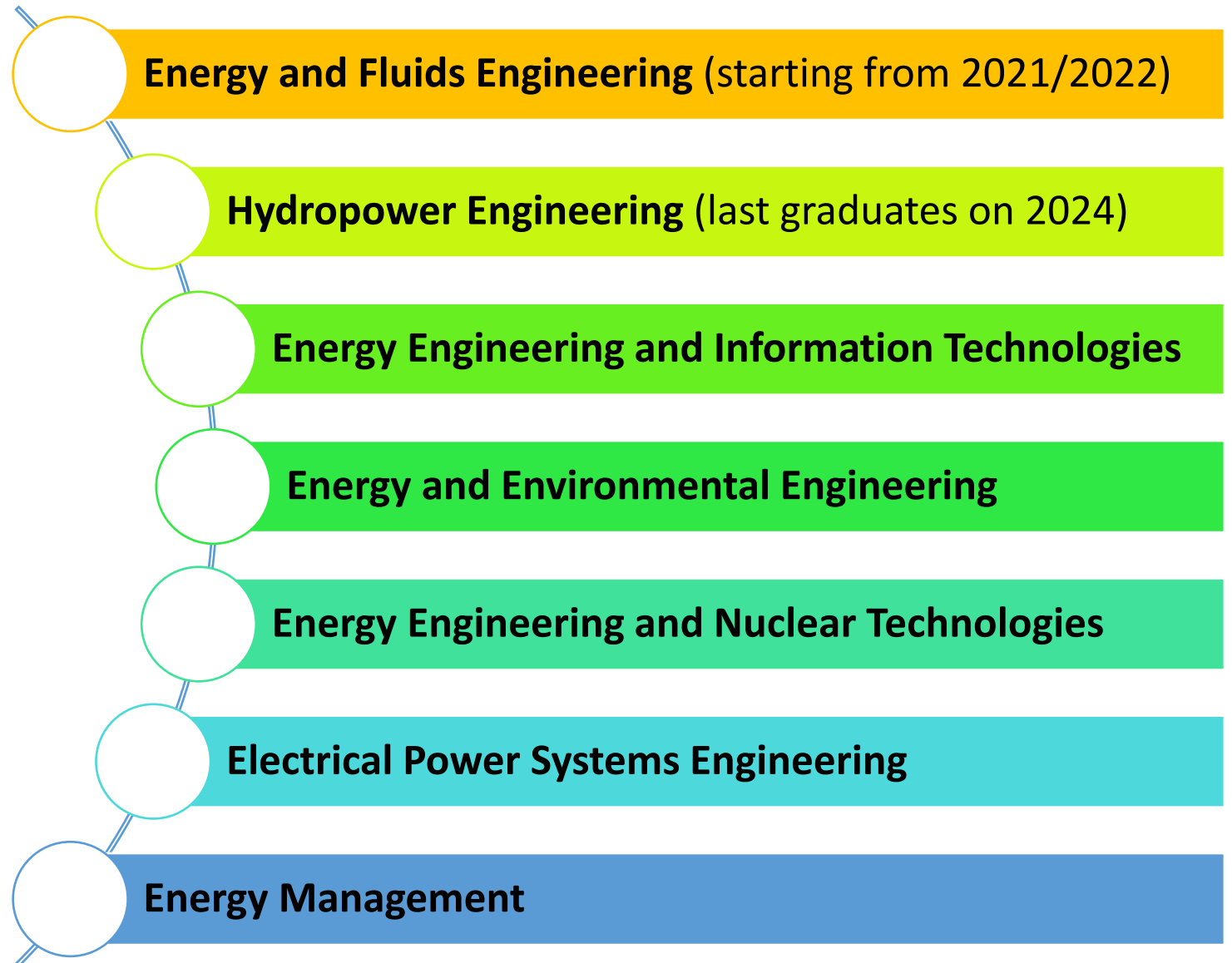
**DOCTORAL studies** - within the Doctoral School of Energy Engineering

# Bachelor's degree studies



## *7 specializations in Energy Engineering*

*Language: Romanian*





# Learning outcomes

## KNOWLEDGE

- specific to each study programs

## APTITUDES

## RESPONSIBILITY AND AUTONOMY

- ✓ *use various methods and tools to communicate information effectively*, to describe activities and to communicate their results to specialists and non-specialists audiences in national and international contexts and society at large;
- ✓ *communicate with higher hierarchical structures and the subordinate team*;
- ✓ *function as team leader* that may be composed of people with different specializations and qualification levels;
- ✓ *identify and apply the most appropriate and relevant management strategies* of the subordinate team;
- ✓ *make decisions* in order to solve current or unpredictable problems that arise in the process of operating power plants, instalations and equipment according to the specialization graduated in the field of energy engineering;
- ✓ *manage projects* in the field of energy engineering;
- ✓ *engage independently in lifelong learning*;;
- ✓ *inform, document and interpret information and data* in at least one international language.

# Internship (3 months)

➤ in companies in the field of study program:

**Veolia**

**Regional and national water companies**

**National Water Administration “Apele Române”**

**R&D National Institute for Environmental Protection**

**Agencies for Environmental Protection**

**Environmental National Guard**

**Wilo**

**KSB**

**INCD Turboengines COMOTI**

**NUCLEARELECTRICA – NPP Cernavoda**

**Center for Technological Engineering and Nuclear Objectives Măgurele**

**Institute for Nuclear Research Pitești**

**National Commission for the Control of Nuclear Activities**

**Electrica**

**TRANSELECTRICA**

**National Energy Dispatcher Enel**

**CEZ Distribution**

**Hidroelectrica**

**Voith Turbo**

**Siemens Romania**

**EFACEC Central Europe**

**Electrocentrale Bucharest**

**Engie Services**

**OMV Petrol**

**Lukoil Energy & Gas Romania**

**Bucharest Institute of Energy Studies and Designs**

## Which are the perspectives after graduation?

- Electricity generation companies;
- Electricity and heat transmission and distribution companies;
- Water companies;
- Construction-assembly and maintenance companies in the energy field;
- National energy authorities;
- Energy and environmental protection consultancy firms; Multinational energy companies;
- Energy equipment companies;
- Public and private research and design institutes in the field of energy and environmental protection;
- Central and local public administrative institutions;
- Energy engineer, energy manager in any company

# Study programs coordination

- **Departament of Hydraulics, Hydraulic Machinery and Environmental Engineering (DHMHIM)**
  - Energy and Environmental Engineering (ETM)
  - Hidropower Engineering (HE)
- **Departament of Producing and Using Energy (DPUE)**
  - Energy and Nuclear Technologies (ETN)
  - Energy Management (ME)
  - Thermal Power Engineering (TE)
- **Departament of Electrical Power Systems (DSEE)**
  - Energy and Informatic Technologies (ETI)
  - Electrical Power Systems Engineering (ISE)





## Energy and Environmental Engineering – ETM

### Learning outcomes– aptitudes

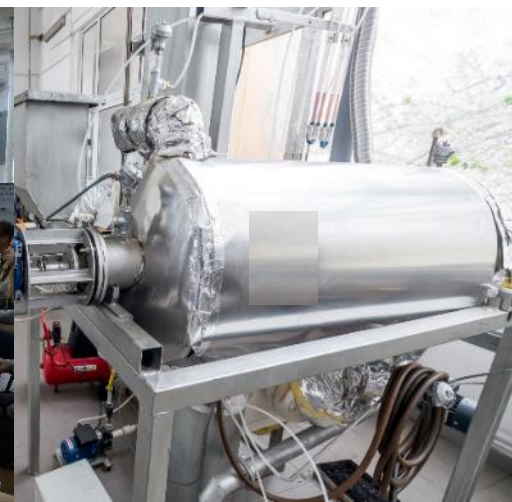
- ✓ *apply specific knowledge of the processes and structure* related to the distribution and use of energy *in order to ensure safe operation, in accordance with the established plans for this operation;*
- ✓ *solve unpredictable problems* that may occur during the operation of energy systems, considering the impact on the environment;
- ✓ *design, operate and maintain systems, processes and equipment for the control, management or treatment of wastewater, air or soil quality,* taking into account the non-technical implications - social, health and safety, environmental, economic and industrial;
- ✓ *assess the operational effectiveness of industrial and municipal activities, facilities and programs* to ensure compliance with environmental regulations and environmental impact reporting;
- ✓ *provide environmental technical assistance* for the analysis of energy systems, installations and equipment or in other areas, the analysis of regulations and the planning or revision of environmental documentation;
- ✓ *monitor and increase the energy and environmental performance of energy systems;*
- ✓ *use basic knowledge related to the management of energy and environment systems,* correlated with the legislation in the field and with the principles of the energy market, to fulfill tasks within the timeframe and the allocated budget;
- ✓ *perform technical, economic and financial analyzes of energy and environmental projects,* correctly interpret the results and present the necessary measures, taking into account the requirements and constraints;
- ✓ *develop and implement new, innovative solutions* for the equipment and operation of energy and environment systems.





# Energy and Environmental Engineering – ETM

Certified EUR-ACE® (European Accreditation of Engineering Programmes)







## Hydropower Engineering – HE

### Learning outcomes– aptitudes

- ✓ *apply specific knowledge of the processes and structure* of systems and equipment for the generation and use of hydraulic and electrical energy, *in order to ensure safe operation, in accordance with established plans for such operation;*
- ✓ *solve unpredictable problems* that may occur during the operation of hydropower developments and pumping stations;
- ✓ *size, operate and maintain* equipment and installations related to hydropower developments and pumping stations;
- ✓ *monitor and increase the energy and environmental performance* of hydropower developments and pumping stations;
- ✓ *use basic knowledge related to the management* of hydropower developments and pumping stations, respectively to the management of water resources, correlated with the legislation in the field and with the principles of the energy market, , to fulfill tasks within the timeframe and the allocated budget;
- ✓ *perform technical, economic and financial analyzes of energy and environmental projects*, correctly interpret the results and present the necessary measures, taking into account the requirements and constraints;
- ✓ *develop and implement new, innovative solutions* for the equipment and operation of hydropower developments, pumping stations and hydraulic and pneumatic drive systems;



# Hydropower Engineering – HE

Laboratories of the study program





## Energy Engineering and Nuclear Technologies – ETN

### Learning outcomes– aptitudes

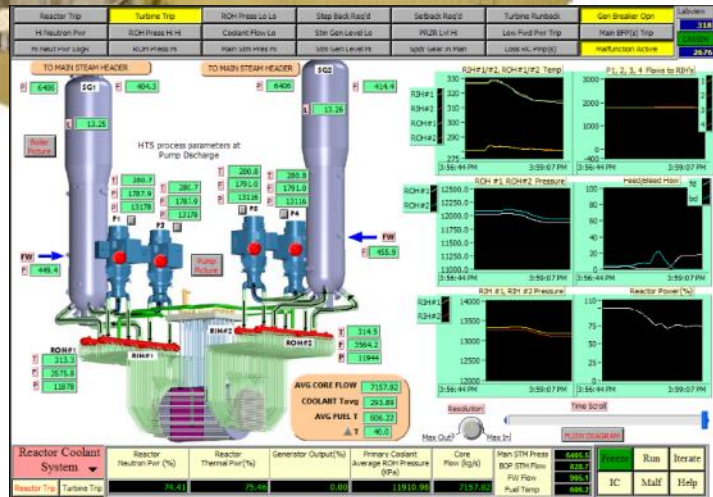
- ✓ *apply specific knowledge of the processes and structure* of nuclear power plants *to ensure safe operation, in accordance with established plans for such operation;*
- ✓ *solve unpredictable problems* that may occur during the operation of nuclear power plants;
- ✓ *size, operate and maintain* the equipment and installations within the nuclear power plants;
- ✓ *monitor and increase the energy performance* of nuclear power plants;
- ✓ *monitor and increase the operational safety and environmental performance* of nuclear power plants;
- ✓ *use basic knowledge related to the management of energy systems,* correlated with the legislation in the field and with the principles of the energy market, to fulfill tasks within the timeframe and the allocated budget;
- ✓ *perform technical, economic and financial analyzes of energy projects,* correctly interpret the results and present the necessary measures, taking into account the requirements and constraints;
- ✓ *develop and implement new, innovative solutions* for the equipment and operation of nuclear power plants;





# Energy Engineering and Nuclear Technologies – ETN

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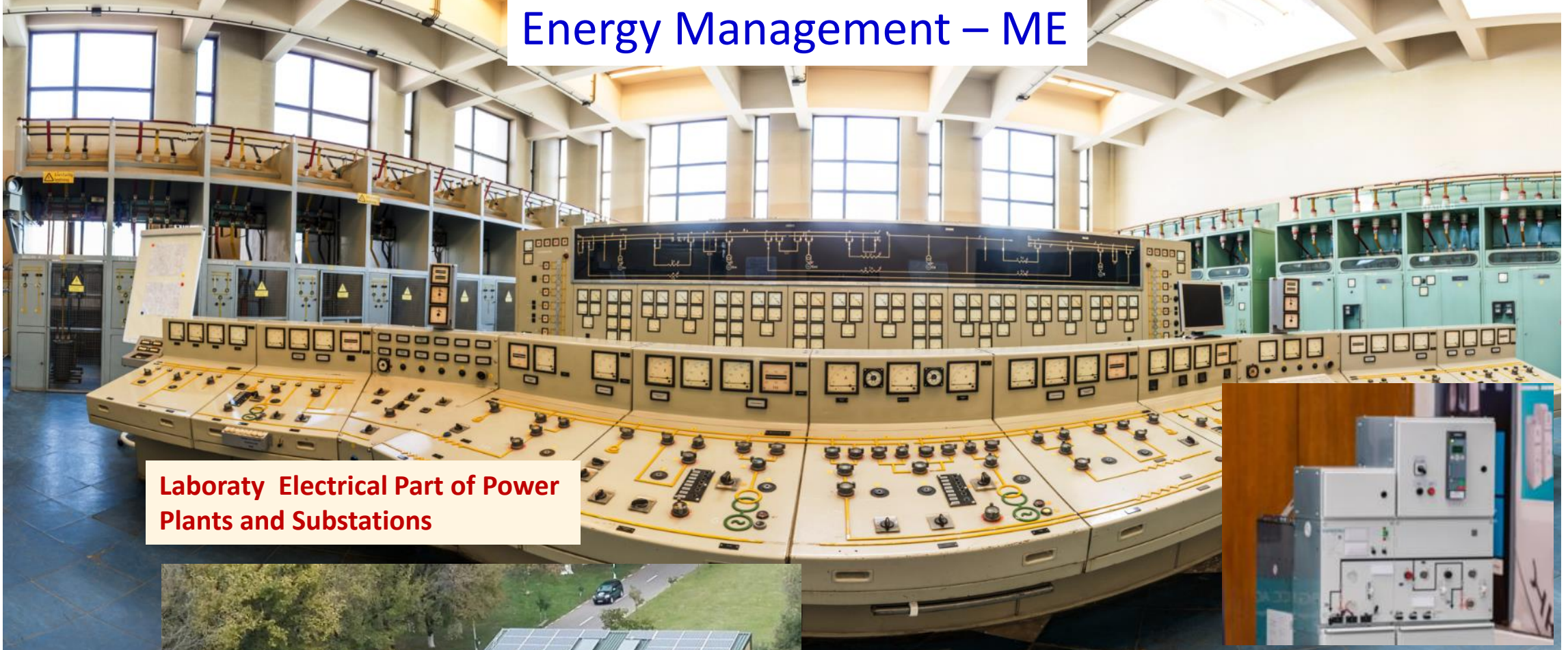
## Energy Management – ME

### Learning outcomes– aptitudes

- ✓ *apply specific knowledge of processes and structure related to* the distribution and use of electrical and thermal energy, *in order to ensure safe operation, in accordance with established plans for such operation;*
- ✓ *solve unpredictable problems* that may occur during the operation of electrical and thermal energy distribution and utilization systems;
- ✓ *operate and maintain* equipment and installations related to electrical and thermal energy distribution and utilization systems;
- ✓ *monitor and increase the energy performance* of electrical and thermal energy distribution and utilization systems;
- ✓ *monitor and increase the operational safety and environmental performance* of electrical and thermal energy distribution and utilization systems;
- ✓ *use basic knowledge related to the management of energy systems*, correlated with the legislation in the field and with the principles of the energy market, to fulfill tasks within the timeframe and the allocated budget;
- ✓ *perform technical, economic and financial analyzes of energy projects*, correctly interpret the results and present the necessary measures, taking into account the requirements and constraints;
- ✓ *develop and implement new, innovative solutions* for the equipment and operation of electrical and thermal energy distribution and utilization systems;



# Energy Management – ME



**Laboratory Electrical Part of Power Plants and Substations**



**Passive House**





## Thermal Power Engineering– TE

### Learning outcomes– aptitudes

- ✓ *apply specific knowledge of the processes and structure* of thermal power systems *to ensure safe operation, in accordance with established plans for such operation;*
- ✓ *solve unpredictable problems* that may occur during the operation of thermal power systems;
- ✓ *size, operate and maintain* of the equipment and installations related to thermal power systems;
- ✓ *monitor and increase the energy performance* of thermal power systems;
- ✓ *monitor and increase the operational safety and environmental performance* of thermal power systems;
- ✓ *use basic knowledge related to the management of energy systems*, correlated with the legislation in the field and with the principles of the energy market, to fulfill tasks within the timeframe and the allocated budget;
- ✓ *perform technical, economic and financial analyzes of energy projects*, correctly interpret the results and present the necessary measures, taking into account the requirements and constraints;
- ✓ *develop and implement new, innovative solutions* for the equipment and operation of thermal power systems;





# Thermal Power Engineering– TE

Power and Heating Plant Laboratory, UPB







# Energy Engineering and Information Technologies - ETI

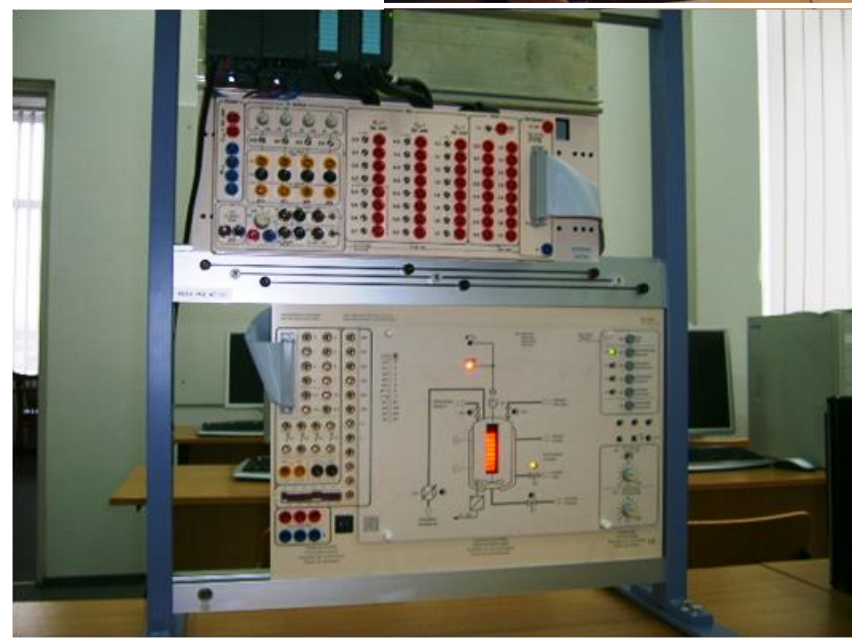
## Learning outcomes – aptitudes

- ✓ *apply specific knowledge of the processes* and structure of power systems *to ensure safe operation, in accordance with established plans for such operation;*
- ✓ *solve unpredictable problems* that may occur during the operation of power systems by using specific informatic systems;
- ✓ *create, test and implement* microprocessor and controller based control loops (PLC and/or DCS);
- ✓ *apply specific knowledge for the analysis, modeling and simulation of energy processes and equipment;*
- ✓ *design and implement information system architectures* for supervision, command, control and management of energy / industrial processes in order to increase the energy performance of energy systems;
- ✓ *configure, implement and operate* the teletransmitted and / or telemetry data acquisition systems;
- ✓ *use basic knowledge related to the management of energy systems*, correlated with the legislation in the field and with the principles of the energy market, to fulfill tasks within the timeframe and the allocated budget ;
- ✓ *perform technical, economic and financial analyzes of energy projects*, correctly interpret the results and present the necessary measures, taking into account the requirements and constraints
- ✓ *develop and implement new, innovative informatic solutions* for the equipment and operation of energy systems.





## Energy Engineering and Information Technologies - ETI







## Electrical Power Systems Engineering – ISE

### Learning outcomes – aptitudes

- ✓ *apply specific knowledge of the processes and structure* of electrical power systems *to ensure safe operation, in accordance with established plans for such operation;*
- ✓ *solve unpredictable problems* that may occur during the operation of electrical power systems;
- ✓ *size, operate and maintain* equipment and installations related to electrical power systems;
- ✓ *monitor and increase the energy performance* of electrical power systems;
- ✓ *use basic knowledge related to the management of electrical power systems*, correlated with the legislation in the field and with the principles of the energy market, to fulfill tasks within the timeframe and the allocated budget;
- ✓ *perform technical, economic and financial analyzes of energy projects*, correctly interpret the results and present the necessary measures, taking into account the requirements and constraints;
- ✓ *develop and implement new, innovative solutions* for the equipment and operation of electrical power systems;
- ✓ *develop mathematical models and IT applications* specific to optimizing the sizing and operation of electrical power installations.



# Electrical Power Systems Engineering – ISE

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