COURSE DESCRIPTION

- Course name: **Acceptance and operating tests of electrical installations and devices**

Form of course	***Lecture***	***Tutorial***	***Laboratory***	***Project***	***Seminar***
Total number of hours	***4***	***-***	***-***	***42***	***14***
Form of completion	***completion based on attendance***	***-***	***-***	***Final grade***	***Oral presentation***

- Initial requirements: Basic knowledge of electrical engineering

  Name, surname, title of teacher: Wiktoria Grycan PhD, Joanna Budzisz PhD

- Aims of course and educational outcomes: Understanding the standards of evaluation of the effectiveness of protection against electric shock and acquiring the ability of working conditions assessment of receiving electrical devices

- Form of teaching (traditional / e-learning): traditional
  Short description of the course content: This course explains basic concepts and practical aspects related to electric shock protection in low voltage installation and evaluation of safety work of electrical devices. After the introduction of the theme of the low voltage installation and electric shock protection, there are presented and discussed methods of evaluation of the protection effectiveness. Studied methods are: examining the effectiveness of protection by automatically turning off the power in circuits with RCDs, resistance and continuity of the protective and equipotential bonding conductors testing. Measurements of standing resistance, effective touch voltages and loop impedance. The further part of the course discusses issues of diagnosis of appliances and installation by thermal imaging studies, using of M2M measurer of efficiency and computer programs. The result of the completion of the course is creating of the final report evaluating installation condition and conditions of electrical equipment work using the measurements made during laboratory classes.

- Lecture – content:

Form of classes - lecture		**Number of hours**
Lec1	Introduction. Basic terminology and designations used to protection against electric shock. Electric current on the human body. Levels of protection provided by enclosures. Protection class of electrical appliances. Network systems and low voltage electrical installations. Criteria for dimensioning of shock protection. Basic protection measures used in low voltage installations..	4h
	Total hours	**4h**

- Project/Seminar - content:

Form of classes – project/seminar		**Number of hours**
Proj1	Means and methods of technical diagnostics for low-voltage electrical installations: Practical diagnostic procedures for the diagnosis of low voltage power networks.	4h
Sem1	*Presentation and discussion of the project result. Stage 1*	4h
Proj2	Evaluation of electrical equipment and low-voltage installations insulation. The use of thermography in research and diagnostics of electrical	4h

	equipment. Assessment of the level of electromagnetic fields emitted by electro-thermal equipment. Laboratory classes with usage special meters.	
Proj3	Assessment of the level of electromagnetic fields emitted by electro-thermal equipment. Laboratory workshop with usage special meters.	5h
Proj4	Analysis of operating parameters of electrical devices using M2M network parameter analyzer with an example of an arc furnace.	4h
Sem2	*Presentation and discussion of the project result. Stage 2*	4h
Proj5	Studying of the impact of TN and TT network parameters on electric shock threat. Workshops using mock-ups of TN, TT networks	4h
Proj6	Measurements of parameters in IT networks. Workshops using mock-ups of IT networks.	4h
Proj7	Technical method and specialist meters (Sonel: MZ303, MPI520) for examination of protection by automatic disconnection of power supply by overcurrent protection.	4h
Sem3	*Presentation and discussion of the project result. Stage 3*	4h
Proj8	Examination of effectiveness of protection by automatic disconnection of power supply in circuits with RCDs (Residual-current devices) using MRP and AMPROBE meters. Examination of resistance and continuity of protective and protecting bonding conductors using MPI520, MIC30 meters. Measurements of stand resistance and touch voltages.	4h
Proj9	Modeling of electric shock hazard using Matlab simulink / ATP EMTP software	5h
Proj10	Working of the final protocol of assessment of the installation and operating conditions of electrical equipment	4h
Sem4	*Presentation of the final project.*	4h
	Total hours	**56**

- Basic literature:
  (1) Electrical Engineer's Reference Book, M.A Laughton, M G Say
  (2) Design of electrical installations, ER. V.K. Jain, E.R. Amitabh Bajaj, 2004 r. Laxmi Publications LTD

- Additional literature:
  (1) IEC 60050-826:2004 [IDT] - International Electrotechnical Vocabulary. Live working
  (2) EN 61140:2002/A1:2006 [IDT]- Protection against electric shock. Common aspects for installation and equipment
  (3) HD 60364– multipart norm

- Completion rules:

  Attendance over 80%

  Active participation in classes assessed during the course