

4. DESCRIPTION OF THE STUDY PROGRAMMES

4.2. DESCRIPTION OF THE STUDY PROGRAMME OF ELECTRICAL POWER ENGINEERING

BASICS OF PROFESSIONAL LANGUAGE

Semester: 1

Number of credits: 2

Course Coordinator: Eglė Dumšienė

Objectives:

- To analyse peculiarities of the text in written assignments.
- To assess the importance of the language;
- To identify functional styles and peculiarities of their usage; analyse the texts of scientific style.
- To prepare information without language mistakes.
- To analyse the peculiarities of a written professional text.
- Learn to use the sources of language education.
- To know the fundamentals of professional terms.
- To distinguish language norms from variants and mistakes.
- To consolidate the correct oral and written skills of professional language.
- To learn how to communicate in the imitative professional environment.

Contents:

- Language of written assignments.
- Standard language. Functional language styles.
- Structure of scientific text. Lexical and grammatical peculiarities.
- Professional language.
- Recognition of language norms and mistakes: theory and practice.
- Correct public speech of the future specialist.
- Dictionaries of professional terms.
- Public speaking.

Teaching methods:

- Lecture,
- Discussion,
- In-class instruction,
- Demonstration,
- Group work,
- Self-study tasks,
- Text creation,
- Text editing,
- Text analysis,
- Tasks for imitative speech in professional environment.

Course literature:

1. Barzdžiukienė, L.D., Celiešienė, V., Kaulakienė, A. (2005). *Baigiamasis studijų darbas. Kalbininkų patarimai: teorija ir tvarkyba*. Vilnius.
2. Gaivenis, K. (2002). *Lietuvių terminologija: teorijos ir tvarkybos metmenys*. Vilnius.

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3. Griškevičienė, J., Lapkuvienė, C. et al. (2003). *Lietuvių kalbos kultūros vadovėlis*. Vilnius.

PROFESSIONAL ENGLISH LANGUAGE

Semester: 1, 2

Number of credits: 4

Course Coordinator: Jelena Korosteliova

Objectives:

- To use basic speciality terms in professional activities, analysing texts on speciality, preparing short reports;
- To explain the issues of work safety, the qualification requirements.
- To prepare a motivation letter and CV.
- To be able to use computer terms regularly.

Contents:

- Labour market. Profession.
- Types of Energy. Electric Circuit. Electricity generation and distribution. Electric Networks. Substations. Transformers. Resistance. Resistors. Diodes. Capacitors.
- Batteries. Battery chargers. Ohm's Law. Parallel and series circuits.
- Telecommunications.
- Business letters. Making Contact by Phone.
- Work equipment. Tools. Testing. Work safety. Instructions.
- Employment. Job interview. CV, motivation letter, application forms
- Analysis of speciality texts.

Teaching methods:

- Discussion,
- In-class instruction,
- Report,
- Role play,
- Text analysis,
- Self-study.

Course literature:

1. Bergskaug, F., Sandvik, E. (1997). *Basic Technical English. Practice Book*. Riga.
 2. Vicki Hollet. (2003). *Tech Talk*. Oxford University Press.
 3. Briedienė, V. Pranskevičiūtė, V. Zavistanavičienė. (2001). *English Reader for Faculty of electrical Engineering and Control Systems*. Kaunas.
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PHILOSOPHY OF TECHNOLOGY

Semester: 4

Number of credits: 2

Course Coordinator: Nijolė Borusevičienė

Objectives:

- To describe the sources of the notion of technology and technology as a phenomenon of human existence.
- To analyse the image of world and man in different cultures, variety of world and life notions.
- To evaluate civilization-based relationship of man with nature – ecological humanism.
- To describe concepts and works of famous technical philosophers.

Contents:

- Historic development of the world philosophical mind.
- The New Times: victory of rationalism – advantages and drawbacks.
- The Present Times: triumph of irrationalism and its rationalization.
- Interrelation of Science and Technology, Philosophy and Morality.

Teaching methods:

- Lecture,
- Report or essay,
- Discussion- seminar,
- Group work.

Course literature:

1. *Filosofija: žmogus – klausianti būtybė* (2005). Sudarė N. Borusevičienė. Šiauliai.
 2. *Mokslas, technologija ir visuomenė: harmoningos raidos paieškos: monografija* (2002). Daujotytė, V., Klimka, L. [et. al.]. Kaunas.
 3. *Šiuolaikinė filosofija: globalizacijos amžius*. (2004). Sudarė J. Morkūnienė. Vilnius.
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INFORMATION TECHNOLOGIES

Semester: 1

Number of credits: 3

Course Coordinator: Gražina Tautvydienė

Objectives:

- To define working principles and advantages of operating systems.
- To draw graphical objects, edit them.

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- To draw diagrams and graphs.
- To use antivirus software.
- To define the principles of operation of OS and their advantages.
- To format a drawing.
- To format a drawing, recording a text, measurements, selecting style.
- To use packages of instruments preparing drawings.
- To project technical objects and documentation.
- To carry out the search using different search systems.
- To compare and summarise search results.
- To store and manage information.
- To make structural schemes, diagrams and edit them.
- To analyse and summarise calculations.
- To project the structure of data bases.
- Prepare tables and forms, requests, reports.

Contents:

- Information Society and Information Technologies.
- Operating Systems. OS Windows, its features. Administering and Storage of Information in the Computer.
- Means of Information Communication.
- Preparation of Textual Documents.
- Technologies of Projecting and Management of Documents with Countable Elements.
- Means of Designing Structural Schemes and Diagrams.
- Computer Projecting Using AutoCAD Programme.
- Computerized Administration of Data Basis.

Teaching methods:

- Lectures,
- Practical classes,
- Self-study tasks.

Course literature:

1. Dulinskienė, T., Sturienė, R. (2004). *Microsoft Visio. Laboratoriniai darbai*. Kaunas
 2. Gulbinienė, E., Petrauskienė, J. (2006). *Duomenų bazių valdymo sistema MS ACCESS. Mokomoji knyga*. Šiauliai.
 3. Tautvydienė, G. (2005). *Grafinė automatizuoto projektavimo sistema AutoCAD. Mokomoji knyga*. Šiauliai.
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MATHEMATICS

Semester: 1, 2

Number of credits: 6

Course Coordinator: Lijana Stancevičiūtė

Objectives:

- To define mathematical concepts, formulae and apply them in calculating the parameters of electric circuit.
- To solve linear equation systems and to apply their solution methods in different calculations.
- To define various functions, understand their properties and apply them in assessing electric loads and making graphs.
- To be able to calculate limits of various functions, to determine continuity of functions.
- To apply mathematical knowledge in studying professional subjects.
- To solve linear inequalities and to apply them in evaluating the efficiency of using electric energy.
- To acquire calculation skills related to the evaluation of qualitative and quantitative information; to calculate integrals, to solve elementary differential equations, random events and characteristics of variables and to collect statistical information.
- To perform operations with matrixes and to apply them in solving equations.
- To define vectors and perform calculations.

Contents:

- Fundamentals of Business Mathematics.
- Complex numbers.
- Sets and functions.
- Derivative and its applications.
- Integrals and their applications.
- Differential equations.
- Linear equation systems.
- Linear inequalities and optimal planning.
- Matrices and vectors.
- Relativity theory.
- Mathematical statistics.

Teaching methods:

- Lectures,
- In-class instruction,
- Self-study.

Course literature:

1. Apynis, A., Stankus, E. (1997). *Elementarus matematikos taikymas ekonomikoje*. Vilnius.

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2. Stasiūnienė, D., Šedžiuvienė, N. (2005). *Matematika (mokomoji knyga kolegijų studentams)*. Šiauliai.

3. Laurutis, A., Šiaučiūnas, D. (2004). *Tiesinė algebra ir analizinė geometrija. Diferencialinis ir integralinis skaičiavimas*. Šiauliai.

PHYSICS

Semester: 1, 2

Number of credits: 6

Course Coordinator: Antanas Garbaliuskas

Objectives:

Physics program will enable the students to acquire deeper analysis of fundamental Physics theories, phenomena, regularities, the limits of their validity and opportunities of their application in professional activity.

Contents:

- Introduction. Physics in Lithuania. SI system of units.
- Electric Circuits. Current Circuit. Resistance. Ohm's Law.
- Electrostatics, potential.
- Electromagnetic induction.
- Self-induction.
- Inductivity.
- Energy in magnetic field.
- Alternating Current.
- Understanding of three-phase current.

Teaching methods:

- Lectures,
- In-class instruction,
- Work with literature,
- Laboratory work,
- Self-study.

Course literature:

1. *Fizičeskaja enciklopedija, 1-4* (1990-1993). Maskva.
 2. Augulis, L., Rutkūnienė, D. (2005). *Fizika. Mechanika, termodinamika. elektromagnetizmas*. Kaunas.
 3. Požėla, I., Sukackas, V., Radvilavičius, Č. (2005). *Fizika. Elektromagnetizmas, optika, atomo fizika*. Kaunas:.
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ENGINEERING AND COMPUTER GRAPHICS

Semester: 1

Number of credits: 3

Course Coordinator: Audronė Ramonienė

Objectives:

- To master drawing fundamentals and learn the requirements for typography.
- To get acquainted with standards.
- To perceive the principles of design.
- To be able to draw and analyze drawings and electric diagrams.
- To use AutoCAD program for preparing graphic documentation, making and editing drawings.
- To be able to draw electric circuits and graphs on the computer.

Contents:

- Developing general drawing skills.
- Drawing essentials. Descriptive geometry. Projection drawing. Patterns, sections, axonometry.
- Technical drawings. Standards.
- Peculiarities of drawing electric circuits.
- Application of AutoCAD program for drawing contours of parts, projections, sections and in making the block library of electric scheme characters. Drawing circuits on the computer. Making a plan of a building and installing equipment.

Teaching methods:

- Lectures,
- Practical classes,
- Computer-aided and hand made graphs (drawings).

Course literature:

1. Ramonienė, A., Bakutienė, V. (2006). *Inžinerinės grafikos pagrindai. Mokomoji knyga*. Šiauliai.
 2. Ramonienė, A., Bakutienė, V. (2007). *Inžinerinės grafikos praktikumai. Pratybos*. Šiauliai.
 3. Roličius, J., Petronis, V., Ramonienė, A. (2003). *AutoCAD 2002 pagrindai. Mokomoji knyga*.
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ELECTROTECHNICAL MATERIALS

Semester: 4

Number of credits: 2

Course Coordinator: Zita Svirskienė

Objectives:

- To analyze the main parameters and characteristics of electrotechnical materials.
- To compare and choose the most suitable electrotechnical material according to the parameters.
- To analyse the main areas of electrotechnical material application.
- To know how the characteristic of isolating materials vary in cases of obsolescence of material.
- To know conductor and cable marking.
- To analyse electroisolating materials, used in the isolation of cables and conductors.
- To know constructive materials used in installation.
- To choose the best conductors, cables according to characteristic.

Contents:

- General Knowledge about Electrotechnical Materials. Mechanic, Electric, Thermal, Physical, Chemical Characteristics.
- Conductor Materials.
- Conductors and Cables.
- Semiconductors.
- Dielectric Materials.
- Magnetic Materials.

Teaching methods:

- Lectures,
- Practical classes.
- Self-Study.

Course literature:

1. Rinkevičius, G. J., Mukuly, R. J. (2006). *Elektrotechninės medžiagos*. Kaunas.
 2. Rinkevičius, G. J., Mukuly, R. J. (2001). *Elektrotechninės medžiagos. Metodiniai nurodymai*. Kaunas.
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TECHNICAL MECHANICS

Semester: 1

Number of credits: 2

Course Coordinator: Eugenijus Petrušis

Objectives:

- To calculate the reactions of plate strength systems.
- To determine geometric characteristics of plate figures.
- To calculate the strength of parts.
- To select dimensions of joints.
- To know the mechanical drives used, joints, parts of drives.
- To be able to select the material for parts of drives.

Contents:

- Theoretical mechanics.
- Strength of materials.
- Parts of machines.

Teaching methods:

- Lectures,
- Self-study tasks,
- Practical classes,
- Laboratory tasks,
- Tests.

Course literature:

1. Čižas, A., Viršilas, V., Žalėvičius, J. (2000). *Aiškinamasis medžiagų atsparumo uždavinynas*. Vilnius.
 2. Krenevičius, A., Šukšta, M. (2001). *Medžiagų atsparumas. Laboratoriniai darbai*. Vilnius.
 3. Žiliukas, A. (2004). *Medžiagų mechanika*. Kaunas.
-

THERMOHYDROMECHANICS

Semester: 3

Number of credits: 2

Course Coordinator: dr. Ričardas Viktoras Ulozas

Objectives:

- To get acquainted with fundamental concepts of thermohydromechanics.
- To provide students with fundamental knowledge of hydroaerostatics, hydrokinematics, thermohydrodynamics, basics of similarity theory, flow of propellant fluid, propellant fluid and two-phase flows.

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Contents:

- Main concepts of thermohydraulics.
- Hydroaerostatics.
- Hydrokinematics.
- Thermohydrodynamics.
- Fundamentals of similarity theory.
- Flow of viscous fluid through pipelines.
- Flow of propellant fluid.
- Two-phase flows.

Teaching methods:

- Lectures,
- Practical tasks,
- Self-study.

Course literature:

1. Sluckuvienė, Z., Ulozas, R.V. (2005). *Hidraulika. Mokomoji knyga*. Šiauliai.
 2. Staponkus, V. (2004). *Hidraulika. Mokomoji knyga*. Kaunas.
 3. Valiūnas, K. (2002). Hidraulikos ir pneumatikos uždaviniai bei sprendimai. Kaunas.
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THEORETICAL ELECTROTECHNICS

Semester: 2

Number of credits: 5

Course Coordinator: Ina Šaučiūnienė

Objectives:

- To know materials used in electric circuits and their properties.
- To analyse the types of schemes, the standard signs and marking of the elements, choose proper methods of research.
- To analyse and systemize the research data and evaluate the results of practical tasks.
- To calculate sophisticated direct and alternating current in electrical circuits.
- To compare and evaluate the outcome results, applying various calculating methods.
- To interpret the data received from laboratory observations and measurements from the point of view of their importance.

Contents:

- Electric field. Main concepts of electric circuits.
- Direct current linear electrical circuit.
- The calculation of direct current linear electrical circuits.

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- Electromagnetism and magnetic circuits.
- Single-phase sinusoidal current circuit.
- Main knowledge about alternating current.
- Three-phase current circuit.
- Non-sinusoidal voltage and electrical current circuits.
- Non-linear alternating current electrical circuits.
- Transitive processes in electrical circuits.

Teaching methods:

- Lectures,
- Laboratory work,
- In-class instruction,
- Self-study tasks.

Course literature:

1. Masiokas, S. (1994). *Elektrotechnika*. Kaunas, Candela.
 2. Pukys, P. (1990). *Teorinė elektrotechnika, 1 dalis*. Vilnius.
 3. Rinkevičius, L., Stonys, J. (2003). *Teorinės elektrotechnikos uždavinynas*. Kaunas.
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ELECTRICAL MEASUREMENTS

Semester: 3

Number of credits: 4

Course Coordinator: Marius Kernagis

Objective:

- To provide students with theoretical knowledge and practical skills in reading electric circuits, wiring electric circuits, selecting necessary measurement devices and measurement of different electric and non-electric parameters.

Contents:

- Design and research of electric circuits.
- Construction and operating principle of electrical measuring devices.
- Assessment of electrical parameter measuring results.
- Measuring electric and non-electric parameters.
- Electronic and digital measurement devices.
- Laboratory tasks.

Teaching methods:

- Lectures,
- Practical and laboratory tasks,
- Self-study tasks.

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Course literature:

1. Dailidė, S. (1993). *Technologiniai matavimai*. Kaunas.
 2. Tališauskas, R. J. (2002). *Elektriniai matavimai ir prietaisai*. Kaunas.
 3. Kažys, R. (1997). *Neelektrinių dydžių matavimo metodai*. Kaunas.
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BASICS OF AUTOMATION

Semester: 3

Number of credits: 2

Course Coordinator: Rimtas Virgilijus Žukauskas

Objectives:

- To analyse the construction of sensors and the possibilities of their use.
- To analyse the methods of non-electrical value control.
- To apply the elements of automatics in the control schemes of technological processes.
- To analyse the construction of electrical and non-electrical controllers and the principles of their operation.
- To evaluate the stability of control system.
- To make mounting schemes of automatic systems.
- To carry out the exploitation and maintenance of automatic systems.

Contents:

- Sensors in automatics technologies.
- Amplifiers in automatics technologies.
- Stabilizers in automatics technologies.
- The commutation equipment.
- Systems of automatic regulation.
- Automatic control systems of discrete processes.
- Automatic control systems of technological processes.
- The application and characteristics of pneumo-automatic systems.
- Application of microprocessors.
- Application of flexible production systems.
- Projection of electrical schemes. AutoCad Electrical Pack.

Teaching methods:

- Lectures,
- Practical tasks,
- Self-study tasks.

Course literature:

1. Aleksa, V. (2002). *Technologinių procesų automatizavimas*. Kaunas.
 2. Ivanauskas, A. (2005). *Automatinio valdymo teoriniai pagrindai*. Kaunas.
 3. Geleževičius, V. (1996). *Loginė automatika*. Kaunas.
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ELECTRICAL MACHINES AND TRANSFORMERS

Semester: 3

Number of credits: 3

Course Coordinator: Marius Kernagis

Objectives:

- To be able to apply subject knowledge in solving quantitative and qualitative tasks of known and unknown character.
- To analyse the equipment of electrical machines and transformers, their construction, principles of operation.
- To evaluate the lasting and reliable operation of electrical machines.
- To ensure the safety exploitation and keeping requirements in standard documentation.
- To evaluate safety equipment and exploitation of electrical machines and transformers and its compliance to international regulations and EU standards.

Contents:

- Classification of electrical machines and transformers.
- Safety instructions for work with electrical machines and transformers.
- Direct current machines.
- Transformers.
- The basics of theory of non-collector alternating current machines.
- Asynchronous machines.
- Synchronous machines.

Teaching methods:

- Lectures,
- Practical tasks,
- Laboratory work,
- Self-study tasks.

Course literature:

1. Alijev, I. (2000). *Spravochnik po elektrotehnikе i elektrooborudovaniju*. Moskva.
 2. Japulse, D., Barnes, N. C. (1995). *Introduction to Turbomachinery*. New York
 3. Smilgevičius, A. (1996). *Elektros varikliai. Elektromechaninių savybių žinynas*. Vilnius.
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ELECTRIC DRIVES

Semester: 4

Number of credits: 2

Course Coordinator: Marius Kernagis

Objectives:

- To analyse the structure of control systems, the purpose of elements, reliability.
- To assess the principles of contact and non-contact control of the electric drives.
- To select the type of electric drive, the structure of its control and elements.
- To make technical and technological documentation of control systems of electric drives.
- To service electrical equipment safely.

Contents:

- General information about the electric drives. Classification of the electric drives. The mechanics of the electric drives.
- Electromechanical characteristics of direct and alternating current motors.
- Speed control of the electric drives.
- Calculation of resistance in start, control and stop.
- Transition processes in the electric drives. Formation of transition processes by speed converters.
- Energetics of the electric drives.
- The selection of electric motors for the electric drives. Standard work regimes S1-S8 for the electric drives.
- Control devices of the electric drives.
- Control of the electric drives by relays, contactors and no-contact devices.
- Control of the electric drives by remote systems.
- Automatic control systems of direct and alternating current and digital electric drive control systems.

Teaching methods:

- Lectures,
- Practical classes,
- Laboratory tasks,
- Self-study tasks.

Course literature:

1. Geleževičius, V. (1990). *Elektros pavarų valdymo sistemos*. Vilnius.
 2. Masteika, R. (2002). *Elektros pavaros*. Kaunas.
 3. Smilgevičius, A. (1996). *Elektros varikliai. Elektromechaninių savybių žinynas*. Vilnius.
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