New Curriculum

(2019-2020 Academic Year and after)

**Ağrı İbrahim Çeçen University**

**Ağrı Vocational School**

**Department of Electrical and Energy**

**Electrical Program Curriculum and Course Contents**



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| 1. **SEMESTER** | | | | |
| **COURSE NAME** | T | U | Crd | ECTS |
| **ELK-101 Direct Current Circuits**  Basic concepts. Introduction of electrical circuit and its components. Work and power. DC circuit theorems (Thevenin, Norton, Maximum power transfer, node method, superposition method), magnetism. | 2 | 2 | 3 | 4 |
| **ELK-103 Measurement Technique**  What is Measurement, How to do, The importance and definition of measurement, Measurement Tools and Measurement Errors, Length, Area, Volume and Weight, Fluidity and Temperature Measurements, Slope, Cross Section and Diameter, Speed and Rotation, Sound, Pressure, Units of Measurement and Conversions, Tension Current, Power and Energy Measurement. | 2 | 2 | 3 | 5 |
| **ELK-105 Fundamental of Electronics**  Short atomic information, semiconductor technology, diodes and types, Rectifier circuits. Structure of transistors. Polarity calculations amplifier types in BJT transistors, Field effect transistors (FET), MOSFET transistors. | 2 | 2 | 3 | 4 |
| **ELK-107 Basic Physics**  Measurement and unit systems, vectors, mechanics, motion, force and balance, work and energy, momentum, optics and wave motion. | 2 | 0 | 2 | 2 |
| **BIL-101 Computer-I**  Computer hardware information, operating system information, internet usage and mail management | 2 | 0 | 2 | 3 |
| **MAT-101 Mathematics-I**  Basic Concepts (Numbers, Number Systems, Digit Concept etc.), Prime Multipliers, Exact Divisor Number, Division and Divisibility Rules, OBEB and OKEK, Order, Simple Inequalities, Base Arithmetic, Equation Solving, Factorial, Absolute Value, Exponential and Root Numbers , Factorization, Identities, Angles, Angle-Edge Relations, bisector, Kenarortay, Triangles (Right, Equilateral, Special etc.), Polygons | 2 | 0 | 2 | 3 |
| **UZTDE101 Turkish Language - I**  Language, Languages and Turkish Language, Grammar, Word and Sentence, Types of Words, Elements of Expression and Types of Expression, Basic Principles of Proper and Effective Speaking | 2 | 0 | 2 | 2 |
| **UZİNG101 Foreign Language - I**  Speaking, Listening-Understanding, Writing, Reading-Understanding | 2 | 0 | 2 | 2 |
| **UZATA101** **Ataturk's Principles And History Of Turkish Revolution-I**  Republic History, Fundamental Properties of the Republic, Ataturk's Principles and Revolutions | 2 | 0 | 2 | 2 |
| 1. **ELECTIVE COURSES** | | | | |
| **SS-101 Contact**  Communication and Interpersonal Communication, Perception of Person, Verbal Messages, Nonverbal Messages, Listening, Interpersonal Communication and Ethical Principles, Relationship / Interaction Process, Interaction Contexts, Changing Relationships, Communication with Family and Friends, Communication in Close Relationships, Barriers to Communication, Conflict and Reconciliation, Cultural Differences and Communication | 2 | 0 | 2 | 3 |
| **SS-103 Occupational Health and Safety**  Health and Historical Development of Occupational Safety, Health and Purpose and Importance of Safety, Health and Concepts in Safety Area, Worker Health and Overview of Work Safety in Turkey, Job Accidents Occupational Diseases, Occupational Accidents to be Taken Against and Occupational Disease Precautions, Costs from Work Accidents and Occupational Diseases. | 2 | 0 | 2 | 3 |
| **SS-105 Life Skills and Social Activity**  Self-realization, self-knowledge, communication, factors that hinder communication, social skills, saying no, problem solving, self-manifestation, anger, stress, excitement, anxiety and fear, etc. coping with challenging emotions, healthy decision making, public speaking, self-concept, career and career planning, cv preparation, efficient studying, aggressive and entrepreneurial behavior development, emotional intelligence. | 2 | 0 | 2 | 3 |
| **SS-107 University and Career Success**  Career management and conceptual framework, career management process, tools and practices that form the organizational dimension of career development, career cycles of employees, career problems and solutions will be discussed. | 2 | 0 | 2 | 3 |
| 1. **SEMESTER** | | | | |
| **ELK-102 Alternative Current Circuits**  Alternative current and voltage, behavior of circuit elements in AC and circuit solution methods, power and energy in AC, three-phase AC systems. | 2 | 2 | 3 | 4 |
| **ELK-104 Introduction to Installation**  Basic concepts of electrical networks and facilities, L.V. network types and protection measures, electrical installation technology and applications (interior installation materials, definitions, applications, light sources, weak current facilities, connecting conductors, adding, soldering and ending), voltage drop calculations (in DC, in 1 phase AC circuits, 3-phase AC 'circuits), Examination and implementation of electrical interior installation regulations. | 2 | 2 | 3 | 4 |
| **ELK-106 Computer Aided Design**  Establishment of electrical and electronic circuit drawing program and introduction of the program interface, Electric and electronic circuit symbols, Analog circuit symbols and circuit drawing, Digital circuit symbols and circuit drawing, Using visual measurement tools for analog circuits and using graphic (analysis) menu, For digital circuits Using visual measurement tools and using the graphic (analysis) menu, Setting up the printed circuit drawing program, Introduction of the printed circuit drawing program interface, Automatic printed circuit drawing, Printing. | 1 | 2 | 2 | 2 |
| **ELK-108 Transformer and Direct Current Machines**  Working principles, structure and parts of the DC machines, DC voltage and moment induction calculations, DC feeding types and armature reaction in the machines, the basic behaviors (characteristics) of DC generators (dynamo), Starting speed control and braking in DC motors, Structure and working principles of single-phase and three-phase transformers, Transformers at idle, short circuit and load, Equivalent circuit of transformers and efficiency in transformers. Different connection groups of three-phase transformers. | 2 | 2 | 3 | 5 |
| **BIL-102 Computer-II**  Office paket programlarının kullanımı | 2 | 0 | 2 | 3 |
| **MAT-102 Mathematics-II**  Ratio-Proportion, Equation Solving, Problems (Number, Fraction, Age, Worker, Pool, Percentage, Profit, Loss, Mixture, Speed, Time, etc.), Sets, Relationships and Functions, Operation, Modular Arithmetic, Permutation, Combination, Probability, Parallelogram, Trapezoid, Circle, Circle, Area Calculations, Analytical Geometry | 2 | 0 | 2 | 3 |
| **UZTDE102 Turkish Language - II**  Types of Written and Oral Expression, Punctuation and Spelling Rules, Expression Disorders | 2 | 0 | 2 | 2 |
| **UZİNG102 Foreign Language - II**  Speaking, Listening Comprehension, Writing, Reading Comprehension | 2 | 0 | 2 | 2 |
| **UZATA102 Ataturk's Principles And History of Turkish Revolution-II**  Republic History, Fundamental Properties of the Republic, Ataturk's Principles and Revolutions | 2 | 0 | 2 | 2 |
| 1. **ELECTIVE COURSES** | | | | |
| **SS-102 Entrepreneurship**  The Concept of Entrepreneurship and Its Emergence, Small Business Types, Small Business Establishment Processes, Small Business Problems and Solutions, Business idea development Methods of creating business ideas, mind maps, organizing and ordering ideas Decision in a business idea, market research, surveys and analysis , competitor analysis, making SWOT analysis Cost analysis and marketing for entrepreneurs Preparing business plan Business organization and grant-making organizations Application form and application guide reading techniques, Entrepreneurship Approaches, Entrepreneurship Culture, Entrepreneurship Types, Entrepreneurship Functions, Entrepreneurship Areas, Entrepreneurship Process, Business Ideas and Resources , Business Idea Development, Business Plan and Elements, Business Plan Preparation, Local, National and International Context of Entrepreneurship | 2 | 0 | 2 | 3 |
| **SS-104 First Aid**  Basic applications of first aid, First and second evaluation, Basic life support in adults, Basic life support in children and infants, First aid in respiratory tract obstruction, External and internal bleeding, Wound and wound types, First aid in regional injuries, head and spine fractures, Upper extremity First aid in fractures, dislocations and sprains, First aid in hip and lower extremity fractures, dislocations and sprains, First aid in diseases requiring emergency care. Poisoning, heat stroke, burns and freezes, first aid in foreign body escape, Emergency transportation techniques, Fast transportation techniques in short distance, Transporting patients or injured by creating stretcher. | 2 | 0 | 2 | 3 |
| **SS-106 Environmental Protection**  Environmental Definitions, Environmental Problems, Environmental Protection Measures, Nature Pollution, Noise, Environmental Regulation Information, Risk Analysis, Waste Storage, Personal Protection Measures International Health and Safety Alerts | 2 | 0 | 2 | 3 |
| **SS-108 Professional Ethics**  Ethical and moral concepts, Factors that play a role in the formation of morality, Ethical systems, Professional ethics, Professional corruption and consequences of unethical behavior in professional life, Social responsibility | 2 | 0 | 2 | 3 |
| 1. **SEMESTER** | | | | |
| **ELK-201 Digital Electronics**  Digital concepts, Number systems, Logic circuits, Boolean expressions, Compound circuits, Logic families | 2 | 2 | 3 | 4 |
| **ELK-203 Electromechanical Control Systems**  Control elements, protection relays, Three-phase asynchronous motors cut and continuous operation, two different (remote) start, change direction of rotation, three-phase asynchronous motors, braking in three-phase asynchronous motors, control in double-speed motors, one-phase asynchronous motor control changing circuits and direction of rotation, starting direct current motors and changing direction of rotation, braking in direct current motors. | 2 | 2 | 3 | 5 |
| **ELK-205 Asynchronous and Synchronous Machines**  Structure, properties and working principle of three-phase asynchronous motors, Equivalent circuits of three-phase asynchronous motors, Idle operation in three-phase asynchronous motors, short circuit and load operation, Starting speed control and braking in asynchronous motors, Single-phase motors, Synchronous generators and structure of synchronous motors working methods and principles, phasor diagram for inductive and capacitive loads in synchronous generators, parallel connection of synchronous generators, starting in synchronous motors, phase diagram in case of inductive capacitive and ohmic operation of synchronous motors, loading of synchronous machine. | 2 | 2 | 3 | 5 |
| **ELK-207 Computer Aided Project-1**  Basic drawing methods, Drawing of a given object, Viewing and sectioning from perspective picture, layers, colors and lines, Drawing on architectural plan, Basic drawing commands, Basic installation drawing, Program features, drawing screen, dimensioning, basic drawing commands. | 2 | 0 | 2 | 2 |
| **ELK-209 Panel Design and Installation**  It is aimed to select the materials in accordance with the project and the standards and to install them on the panel, to make the cable and busbar connections between the devices in an accurate and in accordance with the standards, to make all kinds of tests of the panels and to assemble them in place. | 1 | 2 | 2 | 4 |
| **ELK-211 Algorithm and Programming**  Algorithm and programming logic, algorithms, flow diagrams, arrays, loops, decision structures. | 2 | 2 | 3 | 5 |
| 1. **ELECTIVE COURSES** | | | | |
| **ELK-213 Renewable Energy Systems**  Basic mechanical processes, small wind turbine installation, small solar panel installation knowledge. Basic technical drawing, basic mechanical operations, small wind turbine installation, small solar panel installation | 3 | 0 | 3 | 5 |
| **ELK-215 Energy Conversion Systems**  Energy Conversion and Efficiency Concept, Combustion Based Technologies (Internal Combustion Engines, Gas Tribunes, Steam Tribunes, Catalytic Reactors), Non-Combustion Based Technologies (Fuel Cells, Biological Reactor, Solar Eyes, Water Tribunes, Wind Tribunes) | 3 | 0 | 3 | 5 |
| **ELK-217 Boron Technology**  General information about inorganic boron compounds, sodium borates, dehydration and drying of Borax, Borax Production, Tincal from Borax Production in Turkey, anhydrous borax production, Boric Use and Features of Acid Production Methods, colemanite from Sulfate Acid With Boric Acid Production of Boron Compounds and Pipe Biological Properties, Environmental Pollution of Boron, Usage of Boron in Energy Field (Boron Solid Fuels, Sodium Borohydride Applications, Storage of Solar Energy, Solar Cell Protector | 3 | 0 | 3 | 5 |
| **OSD-** **Common Elective Courses** | 3 | 0 | 3 | 5 |
| 1. **SEMESTER** | | | | |
| **ELK-202 System Analysis and Design**  Feasibility study (To be able to prepare the foreseen project), Project process (To be able to implement the projected project), Presentation (To be able to present the projected project) | 2 | 0 | 2 | 3 |
| **ELK-204 Computer Aided Project-2**  Reading architectural, electrical and mechanical projects and transferring them to computer environment, planning a project, drawing weak current installation projects in computer environment, drawing lighting projects in computer environment, making project calculations, drawing power projects in computer environment, drawing facility projects in computer environment. | 1 | 2 | 2 | 3 |
| **ELK-206 Electric Power Plants**  Knowing the methods of obtaining electrical energy, Knowing the operation of thermal power plants, Knowing the operation of nuclear power plants, Knowing the operation of hydroelectric power plants, Knowing the operation of renewable energy power plants, Knowing the failures occurring in Power Plants, choosing and assembling protection roles, Installing Parafure, Insurance, Installing the curator. | 2 | 0 | 2 | 2 |
| **ELK-208 Power Electronics**  Semiconductor switching elements, Power converters: classification, basic (DC / DC, AC / AC, DC / AC, AC / DC) topologies and operating principles of converters | 2 | 2 | 3 | 5 |
| **ELK-210 Programmable Controllers**  Basic technology of PLC, PLC units, PLC interface program, Writing programs with Ladder diagram, Writing sequential function blocks programs, Using operator panel / touch panel, Programing operator panel / touch panel, Running pneumatic circuit with PLC, Running hydraulic circuit with PLC Motor control with PLC. | 2 | 2 | 3 | 5 |
| **ELK-212 Microcontrollers**  To know microcontroller architecture and hardware, to choose microcontroller, to design algorithm and flow diagram, to write program for microcontroller, to install program to microcontroller and to make basic applications. | 2 | 2 | 3 | 5 |
| **ELK-214 Electric Energy Transmission and Distribution**  In this course, it is aimed to introduce the materials of all kinds of high voltage networks and to gain competencies for the processes of their assembly. | 2 | 0 | 2 | 2 |
| 1. **ELECTIVE COURSES** | | | | |
| **ELK-216 Special Design Motors**  Universal motors, Stepper motors, Servo motors. In this course, it is aimed to gain competencies for finding, connecting and operating the ends of all kinds of specially designed engines. | 3 | 0 | 3 | 5 |
| **ELK-218 Laser Application Techniques**  Principles of laser theory, CO2 gas and fiber lasers, two and three dimensional laser benches, laser cutting, welding, coating, alloying, bending, heat treatment, laser cleaning and etching, direct metal laser sintering, laser beam shaping, laser prototyping , laser machine maintenance, mirror and lens cleaning, optical settings, CAD-CAM programs used in laser machines, laser applications on ceramic, polymer and textile materials, femtosecond laser machines and applications. | 3 | 0 | 3 | 5 |
| **ELK-220 Electric Power Transmission and Distribution**  Basis of Electrical Power System Theory, Electrical Power Transfer, Electric Power Transfer Model, Distribution Systems and Planning, Lightning Protection, Grounding and Safety, Production at Distribution Level | 3 | 0 | 3 | 5 |
| **OSD- Common Elective Courses** | 3 | 0 | 3 | 5 |