TECHNICAL SCIENCES VOCATIONAL SCHOOL
ELECTRICAL AND ENERGY DEPARTMENT
ELECTRICAL PROGRAM

COURSE CONTENTS

5301101 Mathematics-I (4+0) 4

Numbers, probability, algebra, geometry, trigonometry

5301102 Mathematics-II (2+0) 2

Vectors, complex numbers, equations and inequalities, matrices, geometry, systems of linear equations, statistics.

5301103 Direct Current Circuits (3+1) 4

Resistance, Ohm's law, work, power and efficiency, Kirchhoff's laws; electrical sources; circuit analysis by node method, circuit analysis by mesh current method, circuit analysis by superposition method, circuit analysis by Thevenin method, circuit analysis by Norton method, capacitors, transient phenomena and time constant in DC, electromagnetism and electromagnetic induction.

5301104 Transformers and Direct Current Machines (3+1) 4

DC dynamos and motors: Structure and operating principles. Dynamo and motor characteristics. Special DC motors. Single and three-phase transformers: Structure and operating principles. Determining polarity and connection groups in single and three-phase transformers.

5301105 Technical Drawing (2+1) 3

The place and importance of technical drawing in industry, drawing tools and equipment, lettering and numbers, lines and their types, geometric drawing, the definition and classification of the concept of view extraction and projection, types of projection planes, dimensioning, the definition and importance of perspective, drawing the perspective of parts expressed in one and two views, the perspective of parts expressed in three views, the definition and importance of sectioning, section lines and angles, hatching principles, sectioning applications.

5301106 Alternating Current Circuits (3+1) 4

Fundamental concepts and theories related to alternating current circuits, alternating current and voltage, behavior of circuit elements in alternating current, AC circuit solution methods, power and energy in AC, AC circuit solutions with complex numbers, three-phase AC systems.

5301107 Access to the Installation (3+1) 4

Conductors and insulators, cable laying materials, low-voltage materials, electrical circuits and types, low-voltage installation circuits, lighting and socket circuit elements, high-voltage installations, cable termination assembly.

5301108 Basic Electronics (3+0) 3

Single-phase rectification with diodes, three-phase rectification with diodes, building filter circuits, using transistors as switching elements, building regulated circuits, transistor amplifier circuits, operational amplifier circuits.

5301109 Measurement Technique (3+1) 4

Length measurement, weight measurement, area measurement and volume measurement, fluid measurement, temperature measurement and slope measurement, cross-section and diameter measurement, speed and rotation measurement, light measurement, sound measurement, pressure and stress measurement, moment measurement, measuring instruments, measurement errors, units and conversions, resistance measurement, coil measurement, capacitor measurement, RLC measurement, current measurement, voltage measurement, frequency measurement, oscilloscope measurement, measuring transformers, power and energy measurement.

5301201 Asynchronous and Synchronous Machines (3+1) 4

Installation and operation of single and three-phase AC motors, installation and operation of generators, installation and operation of synchronous motors.

5301202 Winding Technique (3+1) 4

Performing winding for DA machines, performing manual winding for AA machines, performing half-die winding for AA machines, performing full-die winding for AA machines.

5301203 Systems Analysis and Design I (2+0) 2

The process involves selecting the research topic, presenting the acquired information, defining the functions and variables of the system (product),

selecting the necessary materials, preparing the system specification or flowchart, scheduling the system program or calculations, setting up the environment in which the system will operate, installing the system, testing the system, and presenting the system outputs in a report.

5301204 System Analysis and Design-II (2+0) 2

Feasibility study, project definitions. Gathering appropriate and sufficient information. Selection of appropriate materials and current techniques. Project process, organization of project work. Selection of appropriate equipment and components. Project organization. Identification and correction of deficiencies. Cost analysis. Preparation of the project file. Presentation of written skills, presentation of visual skills, presentation of graphical skills.

5301205 Computer-Aided Project I (2+1) 3

Basic drawing methods, drawing a given object, extracting views and sections from perspective drawings, layers, colors and lines, program features, the drawing screen, dimensioning, basic drawing commands, basic plumbing drawing, plumbing drawing on an architectural plan.

5301206 Computer-Aided Project-II (2+1) 3

Reading architectural, electrical, and mechanical projects; transferring architectural, electrical, and mechanical projects to a computer environment; planning projects; drawing low-voltage installation projects in a computer environment; drawing lighting projects in a computer environment; performing project calculations; drawing power projects in a computer environment; drawing facility projects in a computer environment.

5301207 Digital Electronics (3+1) 4

Number systems, logic gate circuits, integrated circuit families and their specifications, circuit design from logic functions, finding the logic function of a drawn circuit, conversions between logic circuits and electrical circuits, Boolean mathematics, Karnough map, deriving and simplifying the logic function of a problem, creating a time diagram of a problem, building and operating a logic circuit for a problem.

5301208 Electromechanical Control Systems (3+1) 4

Control input elements, control output elements, electric motor protection relays, electric motor control, contactors, magnetic and thermal circuit breakers and electromagnetic elements, limit switches, pressure switches, time relays, thermostats and valves, control and operation characteristics of DC and AC motors, motor starting, stopping and braking techniques.

5301210 Electricity Transmission and Distribution (3+1) 4

Energy transmission line materials, electrical energy transmission, pole types, pole types according to their structure, network types and calculations.

ELECTIVE COURSE CONTENTS

5301010 Energy Management (2+0) 2

The importance and principles of energy management in industry, relevant databases and legal regulations; energy consumption analyses; energy-efficient technologies in electricity, lighting, boiler, furnace, steam, and compressed air systems; insulation and waste heat recovery techniques; energy audits and monitoring, measuring instruments and measurement techniques; economic analysis methods.

5301011 Occupational Health and Safety (2+0) 2

First aid training, first aid supplies, personal safety, employee safety, workplace safety.

5301012 Professional Ethics (2+0) 2

Examining the concepts of ethics and morality, studying ethical systems, examining the factors that play a role in the formation of morality, studying professional ethics, examining professional corruption and the consequences of unethical behavior in professional life, and social...

5301013 Office Programs (1+1) 2

Document processing, formatting, document control, printing, table operations, object operations, advanced features, macros, customization and workspace, data entry, formatting, formulas, functions, charting, data analysis and printing, macros, customizing the workspace, slide operations, design, slide objects, presentation settings and printing, customizing internet concepts, email.

5301014 Electric Power Plants (2+0) 2

Knowing the methods of generating electrical energy, understanding the operation of thermal power plants, nuclear power plants, hydroelectric power plants, renewable energy power plants, knowing the faults that occur in power plants, selecting and installing protection relays, installing surge arresters and fuses, and installing surge protectors.

5301020 Special Installation (1+1) 2

Installation of compensation systems, lightning protection systems, grounding systems, and security systems.

5301021 Computer-Aided Design (2+0) 2

This involves teaching the commands of a commonly used CAD program related to two-dimensional drawings and modeling, performing various applications with the taught commands, and classifying these applications as part modeling and assembly modeling. The drawings are then printed or plotted on paper using printers or plotters, or transferred as data to another program.

5301022 Fault Analysis (1+1) 2

Fault isolation, locating the faulty unit or component, fault and maintenance record book, catalog, archiving.

5301023 Smart Grids (1+1) 2

Smart Grid Definitions, Smart Grid Technologies, Advanced Metering Infrastructures, Smart Meters, Smart Switchyards and Components: Synchrophasors, Phasor metering units, Microgrids, Electric Vehicle Integration, Information and Communication Technologies for Smart Grids, Smart Grid Standards, Smart Grid Challenges, Demand management and dynamic pricing, Sample Smart Grid Structures, Cybersecurity.

5301024 Lighting Technology (1+1) 2

Light theories. The eye, visual sensitivity, and types of vision. Light reflection, absorption, and transmission phenomena. Definition of lighting terms. Types of lighting. Interior lighting systems and calculations. Principles for preparing preliminary lighting projects. Formation of branch, line, column, and main column lines. Principles for preparing implementation projects. Introduction to road lighting. Methods for correcting low power factor in interior installations, voltage drop calculations. Exterior lighting calculations.

5301030 Electronic Circuit Design (2+1) 3

Soldering materials, soldering, printed circuit boards, placing materials on the board, placing components in the power supply box, testing the power supply.

5301031 Power Electronics- I (3+0) 3

Thyristors, thyristor triggering circuits, triacs and diacs, MOSFETs, single-phase uncontrolled rectifier circuits, single-phase controlled rectifier circuits, three-phase uncontrolled rectifier circuits, three-phase controlled rectifier circuits, inverters.

5301032 Professional Foreign Language (2+0) 2

This course covers updating and reviewing general English skills that will form the basis of professional foreign language proficiency, basic electrical units and definitions, measuring instruments and methods, DC circuit analysis, installation technology, and specialized installation technology.

5301033 Sensors and Transducers (1+1) 2

Installing temperature and humidity sensors, installing speed, vibration, acceleration, position, and proximity sensors, installing pressure, flow, and level sensors.

5301034 Home Appliances (3+0) 3

Washing and drying appliances and their use, heating and cooking appliances and their use. Refrigeration appliances, the use of refrigeration appliances, cleaning and aerating appliances.

5301035 Refrigeration Technology (2+0) 2

Cleaning compressors, condensers, dryers, capillary tubes, evaporators, and gas circulation systems; gas charging/discharging.

5301036 Contract Exploration and Planning (3+0) 3

Building regulations / survey and regulations, specifications / overhead line regulations, overhead line specifications / topographic information, underground cable installation / regulations / specifications, safety systems / installation and equipment information, safety system regulations / pre-assembly planning. Pre-demounting planning / project cost estimate summaries, project cost estimate summaries, microcontroller program commands, tender specification and file preparation.

5301037 Research Methods and Techniques (2+0) 2

Selecting research topics, conducting literature review, evaluating research results, compiling research results into a report, preparing for the presentation, and delivering the presentation.

5301040 Panel Design and Assembly (2+1) 3

Preparing the panel for assembly, installing busbars, cables and insulators in the panels, mounting the panel in place and making cable connections.

5301041 Quality Assurance and Standards (2+0) 2

Standardization, quality and quality concepts, quality assurance, professional standards.

5301042 Programmable Controllers (2+1) 3

The basic technology of PLCs, PLC units, PLC interface programming, programming with ladder diagrams, using sequential function block programs, writing sequential function block programs, using operator panels/touch panels, operating pneumatic circuits with PLCs, operating hydraulic circuits with PLCs, and controlling motors with PLCs.

5301043 Power Electronics II (3+0) 3

Voltage-fed inverters, Current-fed inverters, Direct frequency converters, DC intermediate frequency converters.

5301044 Alternative Energy Sources (2+0) 2

Classification of alternative energy sources, wind energy, solar energy, wave energy, and methods of generating electricity. Similarities and differences between methods used to generate electricity from wind, solar, and wave energy. Geothermal energy, biogas energy, and methods of generating electricity from biogas energy. Examination of the similarities and differences of renewable energy sources.

5301045 Custom Designed Motors (2+0) 2

Identifying, connecting, and operating universal motors. Identifying, distinguishing, and driving different types of stepper motors. Identifying and driving different types of servo motors.

5301046 Vocational Technical Methods (2+0) 2

Soldering materials, soldering, printed circuit boards, placing materials on the board, placing components in the power supply box, testing the power supply.

5301047 Contact (2+0) 2

The concepts of management and office administration, the functions of office administration, filing and archiving techniques, the definition and meaning of the concept of communication, and the meaning and function of organizational communication.

5301048 SCADA Systems (2+1) 3

Vijeo Citect Introduction, Configuration Environment, Project Management, Communication Settings, Graphics, Commands and Controls, Genies (enable the combined use of graphics and objects), Popups and Super Genies, Devices, Events, Alarm Systems, Trends, Process Analysis, Reports, Menu Configuration.

CONTENT OF COMPULSORY COMMON COURSES

0101101 Turkish Language-I (2+0) 2

Spelling rules, punctuation marks (with usage and examples). General information about composition (Definition, types, effectiveness, plan and varieties). Memoir, definition and points to consider in practice; historical and literary value. Definition and types of language. Grammar and its divisions. Historical development of the Turkish language. Language groups in the world and the place of Turkish among them. Types of spoken language, types of written language. Phonological phenomena; Conversation, definition, features to consider in practice and examples.

0101102 Turkish Language-II (2+0) 2

In Turkish, emphasis and types of emphasis; Selective emphasis, natural emphasis. Verbs (Simple and compound tenses). Verb voices; Auxiliary verbs, correspondence, letters and their types. Petition, resume. Word, noun and verb roots. Affixes, derivational affixes and their types; Inflectional affixes and their types. Sentences according to their structure, predicates, arrangement and meaning. Criticism.

0102101 Atatürk's Principles and the History of the Revolution - I (2+0) 2

The purpose of studying "Turkish Revolutionary History and Atatürkism" and the concept of revolution, a comprehensive overview of the causes that led to the collapse of the Ottoman Empire and the Turkish Revolution, the disintegration of the Ottoman Empire, the Armistice of Mondros, the situation of the country in the face of occupations and Mustafa Kemal Pasha's reaction, Mustafa Kemal Pasha's arrival in Samsun, organization through congresses, the National Forces and the National Pact, the opening of the Grand National Assembly of Turkey and its taking over the management of the War of Independence, the National Struggle up to the Battle of Sakarya, the Battle of Sakarya and the Great Offensive, the National Struggle in the fields of education and culture, the National Struggle in the social and economic fields, and from Mudanya to Lausanne.

0102102 Atatürk's Principles and the History of the Revolution - II (2+0) 2

The reforms and historical origins that formed the foundation of the new Turkish State, the efforts to establish the Republic, Mustafa Kemal Atatürk's domestic and foreign policies, the era of single-party rule in Türkiye, the attempt and results of the transition to a multi-party political life, geopolitics and Türkiye's geopolitical situation, the threat of psychological warfare targeting university youth. The definition and importance of Atatürkism, the formation and fundamental characteristics of the "Atatürkist Thought System," Atatürk and intellectual life, Atatürk and economics, secularism and religion.

0103101 English-I (3+0) 3

Speaking, Listening Comprehension, Writing, Reading Comprehension

0103102 English-II (3+0) 3

Using the structures they have been taught, they can speak in appropriate settings with correct pronunciation and intonation, understand what they hear through any means, write the structures and words they have been taught correctly and appropriately, and read and explain topics related to their field in the foreign language they have learned.

0112100 Digital Literacy (2+0) 3

The aim of this course is to enable students to become familiar with digital technologies, digital environments, and tools, and to reach a level where they can use them competently. Finding, processing, organizing, sharing, evaluating, and analyzing information using digital technologies constitutes the core topics of the course. By the end of the course, students are expected to have mastered the use of digital environments and tools, and to have increased their awareness and critical thinking skills in these areas.

Internship (0+240) 8

The purpose of this internship program is to familiarize students with the organization and internship location, to familiarize them with the general equipment and materials relevant to the program's objectives, and to enable them to apply their theoretical knowledge through practical work (30 working days). The student is required to prepare their internship logbook and submit it to the jury by the specified date.

CONTENT OF ELECTIVE COMMON COURSES

0104101 Physical Education-I (1+1) 0

The purpose and history of physical education and sports lessons, the place and importance of sport in society, types of sport, sociology of sport and leisure education, preparing the organism for sport; warm-up, athlete health, physical education and sport in different environments.

0104102 Physical Education-II (1+1) 0

The effects of physical education and sport on the human organism, athlete health; nutrition, first aid and rehabilitation, health and training, training principles, sports law, sports philosophy, lifelong sport. Applications.

0105101 Music-I (1+1) 0

The course will cover the definition of music, its importance in social life, the formation and history of music, orchestral instruments, genres of Western music, Western music composers and performances by them, and having the audience sing sample songs from various musical genres.

0105102 Music-II (1+1) 0

The course will cover the definition of music, its importance in social life, the formation and history of music, orchestral instruments, genres of Western music, Western music composers and performances by them, and having the audience sing sample songs from various musical genres.