

REPUBLIC OF UZBEKISTAN
MINISTRY OF HIGHER EDUCATION, SCIENCE AND INNOVATIONS
FERGANA STATE TECHNICAL UNIVERSITY

Electrical engineering

MODULE HANDBOOK

Field of knowledge:	700000	- Engineering, Manufacturing, and Construction
Field of Education:	730 000	- Civil Engineering
Educational Program:	60730300	- Civil Engineering

Module title	<i>Electrical engineering</i>
Code (if available)	<i>ElectrM36</i>
Semester(s) of module teaching	<i>6</i>
Responsible for the module	<i>Mamadaliyev Muslimkul Imamali ogli,, Department of Electrical Engineering, Assistant Numonjonov Shahzod Nomonjon ogli, Department of Electrical Engineering, Senior Teacher</i>
Language of instruction	<i>Uzbek, Russian, English</i>
Connection to the curriculum	<i>compulsory</i>
Teaching methods	<i>lecture, practical training, laboratory training, independent study.</i>
Study load (including classroom and independent study hours)	<i>Total hours: 180 hours Auditorium hours: 72 hours lecture – 30 hours, practical training – 24 hours, laboratory training-18 hours, independent work-108 hours.</i>
Credit units	<i>6</i>
Required and recommended prior knowledge for studying the module	<i>Physics, Higher mathematics</i>
Module objectives/intended learning outcome	<i>The purpose of the module:</i> to teach students basic concepts of electrical engineering, laws on the distribution of current, voltage and power in electrical circuits, as well as electrical calculations in technical structures and systems (power transmission networks, electrical equipment, lighting systems, household and industrial power supply, control systems, automation devices)and to formulate skills for their application in practice. To achieve the above goal, the science performs the tasks of forming a methodological approach to evaluating students in theoretical knowledge, practical skills, electrical processes, as well as a scientific worldview. The knowledge, skills and qualifications of students in the subject are subject to requirements. Student: • situations of energy carriers in equilibrium and movement, laws of electrical circuits and methods of their application in solving technical issues; basic physical magnitudes such as electricity, voltage, power and their application in practice; electrical equipment and their interaction; environmental issues of electrical engineering, electrical supply systems, lighting, automation and control systems, getting an idea of electrical processes in the fields of industrial and domestic electrical • the effect of electric current and voltage, the distribution of current and voltage in electrical circuits, the types of electric current (constant and alternating current), the main elements of electrical circuits (resistor, inductance, capacitance), the energy flow according to the direction of the electric current, the active and reactive resistance of electrical circuits, their knowledge of methods of calculation and • it should have the skills to determine current and voltage calculation methods in simple and complex electrical circuits, electrical equipment and elements, electromotive force and electrical loads affecting electrical circuits, perform calculations of power supply systems, carry out electrical calculations of

	<i>industrial and domestic electrical networks and control systems, design and calculation of power supply systems based on modern methods.</i>
Content	<i>Module 1. Introduction and fundamentals of electrical circuits</i> <i>Introduction. Basic concepts of electric and magnetic fields</i> <i>Physical properties of electric current (charge, current, voltage, resistance) Ohm's law and its application to the network chain</i> <i>Kirchhoff's laws and their role in calculating complex chains The law of conservation of energy in electrical circuits.</i> <i>Module 2. Operation and analysis of electrical circuits</i> <i>The main types of electrical circuits: sequential and parallel connection</i> <i>Average and effective values of electric current, voltage and power</i> <i>Properties of reactive, inductive and capacitive elements</i> <i>Electrical calculation in constant current chains</i> <i>Module 3. Electrical resistors and energy losses</i> <i>Types of electrical resistors: active, inductive and capacitive resistors</i> <i>Voltage and power losses by chains</i> <i>Loss and compensation of electricity</i> <i>Improving energy efficiency in electrical networks Heat losses in electrical appliances depending on the current</i> <i>Module 4. Distribution of electrical equipment and electricity</i> <i>Source-to-consumer movement of electricity</i> <i>Automatic relays and relay protection systems</i> <i>Module 5. Transmission lines of electricity</i> <i>Properties and principle of operation of high-voltage lines</i> <i>Cable lines, overhead lines and their comparative analysis.</i> <i>Power factor, its calculation and increase</i>
Forms of assessment	<i>oral, presentation, written work, practical assignments, laboratory work, and final exams.</i>
Requirements for study and assessment	<i>In order to successfully complete the module, the student must participate in classes, accumulate the minimum points established from the current, intermediate and final assessments.</i>
Bibliography	1. Yusupov D.T., Yusupova F.T. "Electrical Engineering and Electronics" A textbook for higher educational institutions – Fergana, 2021. 2. Kulikova L. V., Drobyazko O. N. "GENERAL ENERGY" A textbook on the discipline "General Energy" for students majoring in "Electric Power Engineering and Electrical Engineering." Moscow, Berlin, 2020. 3. Arthouros Zervos., Rana Adib., National Technical University of Athens (NTUA) REPORT CITATION REN21. 2020. Renewables 2020 Global Status Report (Paris: REN21 Secretariat). ISBN 978-3-948393-00-7. 4. Zlobin V.G. Steam Turbine Installations of Thermal and Nuclear Power Plants. St. Petersburg, 2020. 5. Subhas K. Department of Electrical and Electronics Engineering, Electrical Drives Lecture Notes, B.Tech (IV Year – I Semester) (2021-22). 6. Maxmudov M. I., Qo'ziyev Z. E. "Electrical Engineering and Electronics" Textbook, Bukhara, 2020.

	7. <i>HimaBindu V. V., Madhuri Chandrashekar V.S. D Basic Electrical Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, 2020, p. 103.</i> 8. <i>Fundamentals of Electrical Engineering and Electronics. Practical Training: Educational and Methodological Guide / compiled by A.P. Mirilenko [et al.]. – Minsk: O-75 BGATU, 2020. – 84 pages.</i>
Reviewers	<i>T.T.K.Jabborov – Phd, Associate Professor, Department of "Energy Engineering", FDTU</i> <i>Q.X.Akhunov - PhD, Associate Professor, Department of Electrical Engineeng, FDTU</i>