Digital Telecommunication Technologies

Bachelor's Educational Programme | 240 credits | Georgian Technical University

Programme admission prerequisite

The right to study on the bachelor's educational programme "Digital Telecommunication Technologies" is granted only to a holder of a state certificate confirming complete general education, or of a document equivalent to it, who is enrolled in accordance with the procedure established by the legislation of Georgia.

Programme objectives

- To prepare qualified personnel for the free labour market in the field of modern digital telecommunications, possessing broad knowledge of the existing modern technological systems and technical means, of the theory of construction of electronic devices and components, of design, of the principles of functioning and of the rules of operation;
- To develop in the bachelor the skills for the rational operation, development, monitoring and maintenance of existing telecommunication systems and networks, as well as the skills for using those new technologies and types of services that are determined by global trends in the development of telecommunications;
- To provide graduates with professional and general (transferable) competences, which determine not only their employment prospects with the qualification of Bachelor of Engineering in Telecommunications, but also create motivation for them to continue their studies and to deepen their professional competence.

Learning outcomes / competences (general and professional)

1. Describes the theories and principles applied in the field of telecommunications and interprets them critically;
2. Analyses complex issues of telecommunication theory and technology, as well as issues determined by the main development trends of the field;
3. Carries out circuit-engineering design, and the calculation and construction of switching nodes, using the relevant documentary material;
4. Operates and monitors the power supply devices of telecommunication equipment in accordance with the operating rules and recommendations for these devices;
5. In a complex, unpredictable environment, carries out professional activity in an organised manner in accordance with the assignment and in compliance with ethical norms; observes the requirements, applicable norms, rules and standards established for the operation of telecommunication facilities;
6. Carries out measurements of the characteristics of telecommunication devices, channels and paths and analyses the results;
7. Uses computer programmes at the various stages of design, installation, adjustment and commissioning, and operation of individual nodes, systems and networks of telecommunication equipment;
8. Becomes familiar with the possibilities of new telecommunication methods, systems, networks and services;
9. Independently and conscientiously draws up a programme for his/her further professional growth and development.

Concentration 1

- Describes modern digital telecommunication technologies theoretically and demonstrates broad knowledge of cellular mobile communication networks, Internet of Things networks, sensors and control units;

- Builds a cellular mobile communication network, assembles an Internet of Things network, sensors and control units, and connects the network components to one another;
- In accordance with predetermined instructions, creates a cellular network project of a research and/or practical nature and optimises the network parameters;
- Uses cognitive radio technologies and integrates them into the network;
- Serves cellular mobile communication systems with responsibility and in full compliance with ethical norms.

Concentration 2

- Describes the systems of modern digital telecommunication technologies and demonstrates broad knowledge of signals, source coding, processing and methods of applying efficient coding;
- In accordance with predetermined instructions, uses, transmits, receives and processes audio information, and creates a project of a research and/or practical nature on the basis of modern technologies of universal infocommunication infrastructure and optimises its parameters;
- Serves multiservice and infocommunication networks;
- In accordance with instructions, develops signal-code structures and feedback schemes for telecommunication systems;
- Serves the systems and networks of telecommunication technologies with responsibility and in full compliance with ethical norms.

Concentration 3

- Describes the systems of modern digital telecommunication technologies and demonstrates broad knowledge of the methods of applying optical transport systems;
- Transmits, receives and processes information over an optical network;
- In accordance with predetermined instructions, creates a project of cable systems and networks of a research and/or practical nature, optimises parameters and models optical systems;
- Builds and services a DWDM network;
- Serves optical transport systems with responsibility and in full compliance with ethical norms.

Concentration 4

- Describes modern telecommunication systems of radio communication, terrestrial and satellite types;
- Demonstrates broad knowledge of radar and radio navigation systems;
- In accordance with predetermined instructions, carries out computer modelling of antennas of a research and/or practical nature;
- Builds radio-frequency circuits and works with signal processors;
- Serves ultra-high frequency devices with responsibility and in full compliance with ethical norms.

Student knowledge assessment system

Assessment is carried out on a 100-point scale.

Positive grades:

- A. Excellent — 91–100 points;
- B. Very good — 81–90 points;
- C. Good — 71–80 points;
- D. Satisfactory — 61–70 points;
- E. Sufficient — 51–60 points.

Negative grades:

- (FX) Did not pass — 41–50 points, which means that the student needs to do more work in order to pass and is granted the right to sit an additional examination once on the basis of independent work;
- F. Failed — 40 points or fewer, which means that the work carried out by the student is not sufficient and he/she must study the subject anew.

In the case of an FX, an additional examination is scheduled no earlier than 5 days after the announcement of the results. The grade obtained at the additional examination is not added to the grade obtained in the final assessment.

A student who does not agree with the assessment of the learning outcomes is entitled, within five working days of being informed of the assessment result, to apply to the dean with a reasoned complaint and to request a review of the results, link: https://www.gtu.edu.ge/uploads/2026/03/appeal-restore.pdf

Detailed information about the assessment system is provided in the Instruction for the Management of the Learning Process at Georgian Technical University, link: https://www.gtu.edu.ge/students/stsavleba-da-mkhardachera/sastsavlo-protsesi/sauniversito-maregulirebeli-dokumentebi/

Practice is assessed in accordance with the GTU Rule for Conducting and Assessing Student Practice and in accordance with the procedure and criteria described in the relevant syllabus, link: https://www.gtu.edu.ge/students/stsavleba-da-mkhardachera/sastsavlo-protsesi/pormebi-instruqtsiebi/

The defence of the bachelor's project is assessed in accordance with the Rule for Carrying Out a Bachelor's Research Project/Thesis, link: https://www.gtu.edu.ge/uploads/2026/03/sabakalavro-kvlevithi-proeqtisnashromis-shesrulebis-tsesi.pdf

Curriculum

Where several subjects are listed in one row, they form an elective group sharing the same credit value.

Subject	Credits
Engineering Mathematics 1	5
General Physics A	4
Fundamentals of Programming (based on the C++ language)	5
Introduction to the Speciality	5
Computer Architecture and Organisation	3
English Language 1	5
Free Component	3
Engineering Mathematics 2	5
General Physics B	4
English Language 2	5
Analysis of Electrical Circuits 1	5
Computer Operating Systems	3
Network Technology and Communication	3
Special Course in the State Language (Georgian Language)	5
Engineering Mathematics 3	5
English Language 3	5
Probability Theory and Mathematical Statistics	4
Analysis of Electrical Circuits 2	3
Fundamentals of Radioelectronics	3
Fundamentals of Digital	3

Technology	
Telecommunication Technologies	4
Fundamentals of Management	3
English Language 4	5
Signal Theory and Reception Methods	5
[Note carried over from the source document: “the title was changed, the topics were revised, the literature was updated”]	4
Fundamentals of Information and Coding Theory	5
Software Tools for Modelling Telecommunication Systems	4
Fundamentals of the Construction of Telecommunication Networks	4
Fundamentals of Occupational Safety in Power Engineering and Telecommunications	3
Electrodynamics	5
Teletraffic Theory	5
Switching in Modern Telecommunication Networks	5
Telecommunication Cable Lines	5
Fundamentals of the Construction of Telecommunication Systems	5
Basic Principles of Management of Telecommunication Companies Engineering Management	5
Telecommunication Systems	5
Digital Telecommunication Networks	5
Digital Telecommunication	5
Measurements in Telecommunication Engineering	5
Radio Wave Propagation and Antennas Models of Radio Communication Channels	5
Telecommunications Economics Mathematical Foundations of Financial	5

Management Quality Management of Telecommunication Companies	
Digital Fibre-Optic Transmission Systems and Technologies	5
Fundamentals of the Construction of Cellular Mobile Communication Networks	5
Project Management Economic Analysis of Company Activities	5
Information Transmission Technologies over Internet Protocol IP Technology and NGN Networks	5
Computer Engineering of Digital Telecommunication Systems Fundamentals of Software and Management of Infocommunication Networks	5
Fundamentals of Information Protection and Security in Telecommunications Reference Models and Addressing in Networks Mobile Communication Analogue and Digital Television Sound and Television Broadcasting Video Technology	5
Fundamentals of Electromagnetic Compatibility and Ecology	5
Bachelor’s Thesis	5

Concentration 1

Subject	Credits
New Technologies of Cellular Mobile Communication	5
Internet of Things (IoT), Wireless Sensor Networks and Smart Systems	3
Fundamentals of the Design of Cellular Mobile Communication Networks	3
Software Radio Technologies in Wireless Communication Networks	3
Radio-Relay and Satellite Transmission Systems	3
Fundamentals of the	3

Management and Regulation of the Telecommunication Frequency Spectrum Management and Monitoring of the Telecommunication Frequency Spectrum Intelligent and Cognitive Systems of Telecommunications	

Concentration 2

Subject	Credits
Principles of Source Coding of Signals Components of Fibre-Optic Systems and Their Modelling Electrical and Optical Components of Telecommunication Systems	5
Signal-Code Systems	3
Technologies of Sound Signal Transmission	3
Universal Infocommunication Infrastructure Based on Modern Technologies Formation of Digital Streams	3
Infotelecommunication and Multiservice Networks Telecommunication Networks, Architecture and Technologies Modern Networks of Electrical Communication Optical Transport Systems (DWDM) Modulation-Coding and Feedback Data Transmission Systems	3
Efficient Coding of Telecommunication Signals Design of Telecommunication Cable Systems and Networks	3

Concentration 3

Subject	Credits
Synchronisation in Fibre-Optic Telecommunication Systems	3
Formation of Digital Streams	3
Optical Transport Systems (DWDM)	3
Design of Telecommunication Cable Systems and Networks	3
Optical Transport	3

Networks	
Components of Fibre-Optic Systems and Their Modelling Electrical and Optical Components of Telecommunication Systems	5

Concentration 4

Subject	Credits
Radar and Radio Navigation	3
Radio-Frequency Circuits	5
Signal Processors	3
Ultra-High Frequency Devices	3
Computer Modelling of Antennas	3
Space and Terrestrial Radio Communication	3
TOTAL	**240**