**Research work**

At the departments of TCM, ISTT, RE of the Institute there is a multifaceted research work, in which the teaching staff and students actively participate. Every year teachers and students participate in scientific conferences and seminars, publish scientific works, prepare reports on research and development, obtain author's certificates and patents, students take part in research and development activities and make reports in the students' scientific and technical committee.

Materials on R&D have been published in the form of monographs, articles in scientific journals of the Kyrgyz Republic, the Republic of Kazakhstan and the Russian Federation, reported at numerous national and international scientific-practical conferences, applications and patents of the Kyrgyz Republic for invention have been executed, completed R&D have been implemented in production.

**1 Research and Development Themes:**

The departments of the institute are actively working with 10 R&D topics including consultancy services, two of which received funding from international organizations:

* “Assessment of the Kyrgyz Republic's Readiness for e-Governance” (funded by UNDP)
* Project “Connecting Schools” (funded by ITU)

**Main scientific directions of the Institute**

* Research and development of the structural-algorithmic organization of the means of communication in the specialized multiprocessor systems; -Manager Candidate of Technical Sciences, Prof. Karimov B.T.;
* Electromagnetic compatibility of radio-electronic means and mobile communication in the frequency range from 450 MHz to 1.5 GHz; - Supervisor Candidate of Technical Sciences, Prof. Zhumabaev M.J.;
* Research and development of design methods of digital television broadcasting networks in mountainous conditions; - Supervisor, Candidate of Technical Sciences, Prof. M.Zhumabaev;
* Wireless technologies and protected multiservice networks; - Head Mr. R.B. Bakytov;
* Analysis and research of methods for optimization of broadband access implementation; - Head - Candidate of Technical Sciences, Associate Professor A.K. Karmyshakov.

**2 International cooperation**

IET actively cooperates with the International Telecommunication Union (ITU). Within the framework of cooperation, a number of projects of special importance not only for the IET but also for the country as a whole have been realized.

According to the two regional initiatives of the International Telecommunication Union 2014, IET has implemented two projects together with ITU:

- As part of the implementation of RI “Ensuring the possibility of access to telecommunication/ICT services for persons with disabilities” with the support of ITU, a training center for people with disabilities “Iygilik” was established in IET, equipped with standard and assistive ICT tools adapted to the needs of different categories of citizens. The goal of the Iygilik Center is to create a favorable environment accessible to telecommunication/ICT for people with disabilities and persons with disabilities: to increase the accessibility of education for all people with disabilities through information technology infrastructure.

- Also in 2014, the ITU Academy selected the Institute along with such universities as the Popov Odessa National Academy of Communications (ONAC) and the Moscow Technical University of Communications and Informatics (MTUCI) as one of the Centers of Professional Excellence for CIS countries on broadband access (BAC) and e-waste. These areas are very relevant at present, and therefore IET specialists are engaged in analytical and research work in the field of broadband access and e-waste.

IET actively cooperates with partner universities from Russia, Kazakhstan, Ukraine and Belarus. Within the framework of the Russian-Kyrgyz consortium of technical universities annually holds scientific and technical conferences in the direction of: “Information technologies and systems, Info-communication communication systems”.

Young scientists, master's students and students of IET participated in the International Student Forum within the framework of RCCTU.

**3. Training of scientific personnel**

IET faculty is involved in the training of young personnel for the telecommunications industry. Every year there is an annual enrollment in the postgraduate program in the following fields: 05.12.04 “Radio engineering, including systems and devices of radio navigation, radiolocation and television” and 05.13.13 “Telecommunication systems and computer networks”, for full-time and part-time education. After graduation they successfully defend their PhD theses. In recent years defended Dzhylyshbaev M.N., Zimin I.V. and Kutsev E.V. For May 2021 in the postgraduate school of IET are 8 people, both full-time and part-time.

Scientific supervisors from the Institute are Candidate of Technical Sciences, Professor KSTU Zhumabaev M.Zh., Doctor of Technical Sciences, Professor Sagynbaev A.A., Candidate of Technical Sciences, Professor KSTU Karimov B.T. and Doctor of Technical Sciences, Professor Alymkulov S.A..

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| --- | --- | --- | --- | --- |
| № | Full name of the graduate student | Full name of the supervisor | Specialty | Course |
|  | Toybayeva Zhazgul | Sagynbaev A.A., Doctor of Technical Sciences, prof. | 05.13.13 -Telecommunication systems and computer networks | 1 |
|  | Kondubaev Maksat | Sagynbaev A.A., Doctor of Technical Sciences, prof. | 05.13.13 -Telecommunication systems and computer networks | 1 |
|  | Akbarova Adilya | Sagynbaev A.A., Doctor of Technical Sciences, prof. | 05.13.13 -Telecommunication systems and computer networks | 2 |
|  | Aitbekova Aida Aitbekovna | Alymkulov S.A., Doctor of Technical Sciences, prof. | 05.13.13-Telecommunication systems and computer networks | 3 |
|  | Kurmanbekova Kyial | Zhumabaev M.J. Candidate of Technical Sciences, Associate Professor. | 05.13.13 -Telecommunication systems and computer networks | 2 |
|  | Amantayev Aliaskar | Zhumabaev M.J. Candidate of Technical Sciences, Associate Professor. | 05.13.13 -Telecommunication systems and computer networks | 2 |
|  | Keldibekova Aliya | M.J. Zhumabaev, Candidate of Technical Sciences, Associate Professor. | 05.13.13 -Telecommunication systems and computer networks | 3 |
|  | Akieva Aisuluu Toktosunovna | Karimov B.T. | 05.12.04 - Radio engineering including systems and devices of radio navigation, radiolocation and television | 1 |

**4 Scientific articles, reports, monographs and certificates of authorship**

Every year, teachers and students publish scientific papers, obtain certificates of authorship and patents. In recent years the following patents have been obtained:

* Akkozov A.Y., Zimin I.V., "Simulation model for traffic management in telecommunication networks and WSC".
* Aliev I.K., Aliev E.I., "Esepke okutuu systemasy".
* Karimova G.T., Barakova J.T., Sarybaeva A.A., Kozhoshova A.Y. "Interactive electronic textbook 'Fundamentals of Informatics'".

Research materials are published in the form of monographs, articles in scientific journals indexed in RSCI and SCOPUS.

Work on the creation of interactive electronic textbooks is also underway. At present, four interactive electronic textbooks on information technologies in Russian and Kyrgyz languages have been created, which are very popular.

**5. Student research**

Students of the Institute are actively involved in research work. Every year, the topics of the research work are approved at the meetings of the departments and touch on the current problems of the telecommunications industry. The most interesting student reports are published in research journals. It should be noted that the number of published articles by students increases every year and in 2021 it amounted to 17 articles.

It is also worth noting that every year IET students are involved in the research work of other sections: philosophy and social sciences, physics, computer science, etc. The most interesting student papers are published in research journals.

|  |  |
| --- | --- |
| Year | Number of published papers |
| 2016 | 11 |
| 2017 | 17 |
| 2018 | 18 |
| 2019 | 14 |
| 2020 | 15 |
| 2021 | 17 |

Students of the Institute of Electronics and Telecommunications have opportunities to participate in international exhibitions, conferences, forums, participate in joint scientific projects, with full or partial funding from ITU. Thus, in spring 2014 IET students took part in the World Youth Forum on Info-communication Technologies in Moscow and visited the scientific exhibition.

In recent years IET students have participated in:

**6. Research and development of students:**

During the last 2 years, 12 layouts were developed by students, master students, postgraduates and faculty members of IET, the main purpose of the developments is to improve the laboratory facilities of IET

|  |  |  |
| --- | --- | --- |
| ***№*** | ***Layout title*** | ***Authors*** |
| 1 | Laboratory installation on the course “UGFS” | Bayakeeva A.E., Belyalov Sh.A., |
| 2 | AIS of ISTT department | Venger S.K., Karimova G.T. |
| 3 | Laboratory stand “Programmable Arduino circuitry” | Baichaeva A.D., Razabaev U.J., Karimov B.T. |
| 4 | Laboratory stand on electroacoustics and sound broadcasting | Zaichenko D.A., Shadymbekov N.Sh., Karimov B.T. |
| 5 | Laboratory stand on “Radio circuits and signals” discipline | Bragina K.S., L.M.N., Belyalov S.A. |
| 6 | Laboratory stand for studying microcontrollers | Yakimov I.V., Bayakeeva A.E., Belyalov Sh.A. |
| 7 | Laboratory complex on “Video Surveillance Systems” and “Security Alarm Systems”. | Aitymbetova A.T., Kubanychbekova E., Saparbekova A.R., Tokonov A.T. |
| 8 | Radio-controlled quadrocopter based on Arduino | Spiridonov V.P., Belyalov Sh.A., |
| 9 | Laboratory complex on computer communication networks | Atabekov O.K., Tokonov A.T. |
| 10 | Mobile application “Kyrgyz Family Tree” for ANDROID platform | Nurdoolot Tagaev, Duishokov K.D. |
| 11 | Information portal of IET KSTU named after I. Razzakov. | Pak D.L., Bakytov R.B., |
| 12 | “Spatial Data Infrastructure of Bishkek”. | Kulikov M.S., Karimova G.T. |