Professional Education Competence Centre

Riga Technical College

First Level of Higher Professional Education

ELECTRONICS

Study Programm Self-assessment Statement

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INTRODUCTION

The study program submitted for the assessment is the first level of higher professional education program in Electronics (code- 41 523) with the aquired qualification Electronics specialist.

Study program has been implemented since the year 2002 and reaccredited until 31 December, 2016 (The act of the Accreditation Comission No 3520 of 15 September).

1. Quality

1.1. Study Program Aims and Tasks

Higher professional education studies comprise obtaining professional knowledge and developing skills and abilities required for a creative and consistent professional activity.

The study programm **is aimed at** providing higher professional education and preparing highly-qualified specialists for a successful career in the domain of electronics. Moreover, the study program is to assure:

- the compliance of the obtained theoretical and empirical knowledge, skills, abilities and professional attitude with the requirements of the profession standard and labour market requirements;
- the compliance with the fourth professional qualification level.

Electronics specialists/ engineers may be employed by manufacturing companies, TV and Radio Broadcast Centre, electronic equipment service centres, workshops as well as companies dealing with electronic equipment design and assembling, maintenance and sales. Moreover, they may be recruited by laboratories, communication services and companies dealing with the exploitation, repair and sales of electronics and communication equipment.
The objectives of the study program are the following:

- to provide competitive education to the electronics specialists of the fourth qualification level and facilitate their further professional development in changeable social and economic environment and in the international labour market.
- to encourage knowlege, comprehension skills, abilities and professional attitude development in accordance with profession standard and labour market requirements and create motivation to continue education in the study programs of the 2nd level of higher professional education;
- to facilitate autonomous learning and the development of creative and critical application skills as well as further necessity to reconsider and reevaluate the obtained experience;
- to form the understanding of humanities, social sciences and economics;
- to equip and complement the study process with modern information technologies.

Study program results are the following:

Study program results have been aligned with the knowledge, skills and competences defined in the European Qualification Framework for Lifelong Learning (the Rules of Procedure of the Cabinet of Ministers of the Republic of Latvia No 931 from 5 October 2010).

Upon successful completion of the study program of 100 credit points (150 ECTS) and having passed State qualification exams students obtain electronics specialist's qualification. As a result of the study process, competitive electronics specialists, who will have obtained all necessary knowledge, skills and competences for professional task execution.

Electronics specialist's professional knowledge and skills are the following: to be able to understand and interpret schemes, circuits and technical drawings of electronic equipment, design, assemble, istall and set up electronic equipment, control and check its parameters, repair it, work with technical documentation and standards, be able to apply it for design, assembling, installation, set up, and dismantling and disassembling, do technical adjustment, apply computers for solving technical problems, apply technical electronic principles for solving problems arising, arrange a work place considering ergonomic requirements, plan team work, coordinate and manage a team, participate in team work, plan, implement and manage projects, present reports on professional matters at conferences, seminars, meetings, work independently with professional literature, be able to communicate in English on professional matters, be motivated for systematic and continuous professional qualification development, share knowledge base with colleagues.

Electronics specialist's professional attitude involves the following: result and quality orientation at work, positive attitude towards society and environment, the sense of responsibilty, patience, support, independence, decision making, tolerance, discipline, honesty, reliability, cooperation and communication skills, stress resistance and psychological durability, the awareness of professional ethics, initiative, flexibility, creativity, open-mindedness and curiousity, striving for self-development and perfection, personality development and strengthening, work planning and organisation, precision, determination, self-criticism, logical thinking and good memory, loyalty and discreet.

The estimated result of the the study program is to prepare electronics specialists who are able:

1) to organise the installation and set up of electronic equipment and systems on site;
2) to conduct, monitor and control the measurements of electronic equipment as well as testing and adjustment;

3) to apply latest technologies, devices and sources of information during the design, production and exploitation of radio electronic equipment;

4) maintain automated control systems of radio electronic equipment;

5) apply novel and progressive work experience and cooperation among electronic enterprises within the branch.

The graduates are provided with the possibility to continue their studies at a higher level. The professional education competence centre *Riga Technical College* (hereafter RTC) has signed a cooperation agreement with Riga Technical University for RTC graduated to continue their studies in the professional bachelor program *Electronics*.

The results of the study program *Electronics* characterise the knowledge, skills and attitude acquired during the study process and have been aligned with the study aims set in RTC development strategy for the years 2008 to 2014.[1]

1.2 Study Content and Organisation

The first level of higher professional education study program in *Electronics* (code- 41 523) with the aquired qualification *Electronics specialist*s has been implemented since the year 2002 and reaccredited until 31 December, 2016 (The act of the Accreditation Comission No 3520 of 15 September).

The studies are determined by the regulations of Riga Technical College, study program, study plan, study course programs (curricula) and study process schedule. The study program and the study plan state the acquired study courses, their mode, length, distribution in semesters and sequence. Study process schedule determines the terms of the academic year. Study course programs (syllabi) define the content of studies, practice and internship. The structure of the study program is given in the study plan and a brief abstract is provided in the study course descriptions.

The Division of the Study Program According to Study Course Groups

Study Course Group	Credit points	ECTS
General education compulsory study courses	*20*	*30*
Domain specific study courses	*55*	*82,5*
Practice and internship	*16*	*24*
The design and the defense of the qualification paper	*9*	*13,5*

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[1] http://rtk.lv/docs/pasvertejumi/RTK_strategija_2008_2014.pdf

	Total:	*100*	*150*

Study courses ensure the first level of higher professional education and the study program of each course is an integral part of the overall study program comprising 7 general education study courses, 19 domain specific study courses, practice, internships and the qualification paper. The program involves 9 exams and the design of 3 term papers. Contact hours are managed by a responsible member of academic personnel and constitute not less than 50 percent from the overall amount of the course. Contact hours are realised in the mode of lectures, seminars, laboratory and practical assignments as well as tutorials. During the autonomous learning students acquire the material independently- working with professional literature, searching for the information in databases and the world wide web, designing course reports and term papers. Internship is a study form, which is conducted at a real work place within a company according to the internship program. The design and the defense of the qualification paper assure students' professional qualification.

Study program duration:
- Full-time studies – two and a half years ;
- Part-time studies – three years.

One credit point (CP) corresponds to 40 hours of studies a week, i.e.
- 20 contact hour and 20 hours of independent studies for full-time students;
- 16 contact hour and 24 hours of independent studies for part-time students;

Both full-time and part-time students have 40 hours of practical assignments a week.

During the study process the students are provided with an individual approach and continuous feedback. The individual approach is achieved by holding tutorials. Academic staff has reception hours for that reason or students may arrange additional appointment during the working hours. Active and regular information exchange channels for successful communication are e-mail and Skype. Study materials involve handouts, visual aids, hard copy materials, electronic version and in the format of presentations. Approaching student individually determines the choice of teaching methods, individual themes and problems for the analysis during the lectures, workshops and seminars. Students' wishes, interests and previous work experience are considered selecting the themes for qualification papers.

Students are offered to choose the themes of course reports and term papers that correspond to the course content, contain topical problems and novelty with further defense in the format of a presentation. Thus, the students are facilitated to learn autonomously the information that is appealing and topical for them as well as present their research activities.

During the problem implementation regular feedback is provided. Students receive the information about the passed tests, exams, term papers, course and internship and presentations. In its turn, upon the completion of the course academic personnel conducts questionnaires about students' satisfaction with the course content, methodology, and mode of delivery, their wishes and suggestions for further improvement.

The following methods are applied during the implementation of the study program: lectures, seminars, workshops, laboratory assignments, brainstrorming, individual and team work. Students who acquire a professional study program are required to combine theoretical and empirical knowledge. **The aim** of practical workshops and internship is to apply, deepen and strengthen the theoretical knowledge, acquire and enhance practical skills completing specific tasks. The study program under consideration includes three types of practice and internship:

- electronic equipment assembling practice (held in the 2nd semester (4CP)
- Production technological internship (within an enterprise) (held in the 4th semester (8CP)
- Qualification internship (within an enterprise) (held in the 5th semester (4CP)

Internship is a study mode run at a work place in accordance to the practice program. Production technological internship is at organised at an enterprise, but in exceptional cases at college. Internship places are provided by both college authorities and students. The department approves the head of the group's practice or internship from the academic personnel. The head of the practice or internship gives individual assignments, provides tutorials and controls the overall process. Every student also has the head of internship from company employees at the workplace. At the end of the internship the student submits a report and a reference from the the head of the internship at the workplace to the department. The execution of the internship program is monitored by the committee appointed by the head of the department. The assessment is *passed* or *failed.*

The didactic conception of the study program has been grounded in the following cyclical activities: discussion with students, academic personnel, study program director during which the quality and content are considered and evaluated. Students fill in questionnaires at the end of the course and the academic year. Discussions about cooperation and the quality enhancement of the study program and the study courses are held.with the academic personnel. Methodological meetings are organised to make decisions

for the enchancement of the study program from the point of view of students and the academic personnel.

The academic personnel is familiarised with the overall aims of the study program, its objectives, implementation opportunities, expected learning outcomes, based on which the quality of the study courses is assured. The results and the study outcomes of the students are analysed and discussed during the Information Technologies and Communication department meetings.

1.3 Studies and Evaluation of Knowledge

RTC provides a possibility to acquire a higher education to any resident of the Republic of Latvia irrespective of his/her age, gender, social and material status, race and national identity, political and religious beliefs. The enrolment is organised considering competition principles in accordance with matriculation regulations, which involve enrolment regulations for Latvian higher education institutions approved by the Ministry of Education and Science and additional RTC requirements approved by RTC board.

In order to pass the courses successfully, especially beginning the studies, students' prior readiness is crucial. Upon commencement of the studies, academic personnel is informed about the knowledge results of the enrolled students in order to observe whether students' selection criteria are sufficient to achieve expected learning outcomes in estimated time and of relevant quality. Having in the basis *RTC matriculation procedure* which was issued in accordance with the Law of Higher Education Institutions clauses 45, 46 and 83, applicants applying to study full-time are enrolled considering competition principle, summing up two centralised state exams (Latvian, Math, Physics or English) with the average mark in the General Certificate of Secondary Education (marks=points). The coefficient of 2011/ 2012 academic year's applicants for the study program in *Electronics* for state budget funding was 2.2.

In the course of the study program implementation, study methods and mode are continuously improved, new teaching ways, which would enable the students to acquire their professional skills and abilities, are searched for. The emphasis is put not only on traditional lectures and seminars, but also on practical and laboratory assignments. The academic personnel choose the methods that encourage students learning and communication , develop teamwork skills as well as the ability to use the acquired knowledge creatively.

The academic personnel design a program and course description which contain course aim, objectives, expected learning outcomes upon the successful course completion as well as course themes and the requirement for obtaining credit points.

In order to ensure the achievement of learning outcomes, the students are familiarised with the study aims, objectives and learning outcomes as well as assessment criteria upon commencement of their studies in the 1st year as well as at the beginning of every course. Students know about their exams, tests and other assessment modes assessment criteria in a timely manner. The obtained information stimulates students, enables self-assessment, and allows academic personnel to evaluate learning outcomes in a group. It is crucial that the requirements of the academic personnel must be clear and understandable.

During the study process the academic personnel widely use modern technologies, e.g. MS Powerpoint presentations, sending the material of lectures to group's e-mail as well as showing various materials in the world wide web. Such study methods help to save up time for presenting the theoretical material allowing to pay more attention to the analysis and discussion.

The assessment of students' knowledge of the study program corresponds to the Rules of Procedure of the Cabinet of Ministers of the Republic of Latvia on the standard of state first level of higher professional education. (No 141 from 20 March, 2001) and the act of the ministry of Education and Science No 208 from 14 April, 1998.

In order to ensure the objectivity of knowledge assessment the following events are conducted:

- ✓ the combination of written and spoken modes of assessment during exams and tests;
- ✓ the assessment of a test with a mark and *passed* or *failed*;
- ✓ the defense of term papers;
- ✓ the involvement of employers' representatives to the board of state qualification exam for assessment.

The students of the study program are required to obtain a positive mark for acquiring the content of the study program (upon successful completion of all tests and exams in accordance with the content of the program). Tests and exams are used for the assessment of the acquisition of the study program. At the end of the study course a student takes a test and an exam. During the assessment the students are encouraged to show their analytical, creative and research skills as well as the skill of scientific recognition and the one to apply the acquired knowledge.

Upon successful completion of the theoretical and practical studies as well as practice and internship assignments, the student is required to defend the qualification paper, which is assessed considering 10 points system by the board of state qualification exam, including RTC academic personnel, the representatives of social partners and employers. The participants of the state qualification exam board are approved approved by RTC board. In accordance with the Rules of Procedure Cabinet of Ministers of the Republic of Latvia No 347 of 24 May, 2007 The students are required to pass their qualification exam with the grade not lower than 4 (almost average).

The assessment mark for term papers, practice, internship and the qualification paper is granted after their defense.

The successful organisation of the study process and study course acquisition are closely connected with students' autonomous learning during the semester.

The amount of midterm tests is dependent on the amount of the study course credit points. Unsatisfactory results of midterm tests may lead to the instance when a student is not admitted to take the examination.

In order to assess students' progress the academic staff applies B. Bloom's taxonomy according to which:

1. Knowledge – remember, recognise, define
2. Comprehension – explain, interrelate
3. Application – generalise, organise,
4. Analysis – compare, differentiate, classify,
5. Synthesis – compose, construct, produce,
6. Evaluation – judge, weight, summarise.

Every member of the academic personnel has a compulsory tutorial once a week. They have been approved with the decision taken during the department meeting and are accessible to students electronically at RTC webpage and on the notice board next to the schedule. The students can obtain individual tutorials on the phone or by e-mail. In order to ensure the achievement of results of the study program and motivate students to study, the knowledge of the students is regularly assessed with the help of tests, practical and individual assignments and discussions. The learning outcomes are discussed with the students during the lectures as well as during the department meeting once a week where other members of academic personnel are familiarised with the progress of the students.

1.4 Study Provision and Management

Studies are provided in accordance with college regulations, which have been devised in accordance with the legislative and normative acts of the Republic of Latvia. RTC regulations and structure determine the operation of RTC board, involving students' representatives delegated by RTC Students' board. Therefore, the students are included not only in the decision making concerning specific study programs, but also with regards to the decision making process at college on the whole.

An essential aspect of program implementation is annual students and graduates questionnaires, the results of which are included into annual self- assessment statements accessible at college webpage www.rtk.lv. The results of the questionnaires are analysed during the department meeting at the end of the academic year. Respondents' negative feedback is closely paid attention to, however, it is worth mentioning that students are mostly satisfied with the study program. In order to enhance the organisation of the study process and improve quality, students' and graduates' comments, suggestions, recommendations and proposals are considered and implemented.

One of the pre-requisites for striving for perfection, establishing traditions and college development is the introduction of the code of ethics, which has been designed by lecturer Evija Tože in 2011. It is available for all students, academic personnel and college employees at the library, from the group's monitor (from academic personnel) and study program director.

In order to avoid conflict situations, students are able to obtain support from the group's monitor, who is the first instance to approach if problems arise. In case they cannot be solved with the help of the group's monitor, study program director, the head of the department and study department are involved. Since academic personnel is very competent possessing pedagogical education the conflicts occur rarely.

1.5 Academic Personnel and Students Research (Creative) Activities

Academic personnel scientific research activities are connected with their participation in scientific and research conferences and seminars, publication in scientific conference proceedings, journals and periodicals. Academic staff participates in the design of the study programs, draw up and implement course programs (syllabi) prepare methodological materials.

The academic personnel are highly qualified and competent in order to ensure not only the acquisition of knowledge and skills, but also the required research skills. In this connection the study program involves laboratory assignments upon the completion of which the students write reports.

To encourage study process novelty, continuity and quality academic personnel and students take part in scientific conferences and creative activities.

The most prominent results of the scientific activity of academic personnel in the academic year 2010/2011 were the following:

- Assistant professor Z.Bunžs presented the results of his scientific work at 9th RTC scientific-practical conference in the report *Electronic Equipment Operational Safety and Increasing Its Efficiency*.

- Z.Bunžs un A.Veide obtained certificates about attending *JTAG Boundry Scan* technology training program at Ventspils University College from 27 August, 2010.

- All academic personnel attended the exhibition *Tech Industry 2010*.

- K.Rūtiņa attended Riga *Technical University Innovations and Modern Technologies Conference* on 16 March, 2011.

- K.Rūtiņa participated in a seminar held by Latvian Investment and Development Agency regarding *What should entrepreneurs know about ES standardisation and CE marking* on 23 March, 2011.

- A.Boguts, A.Veide, Z.Bunžs, A.Krūmiņš, A.Saulgozis participated in the seminars held by *JSC SAF Tehnika* and *Hanzas Elektronika Ltd* and learned about electronic equipment production modern technologies applied by these companies.

- A.Saulgozis, A.Krūmiņš un A.Boguts participated in the training regarding PC-A-610E-2010 standard application organized from 16 to 19 august, 2011.

Students' research activity is an integral part of every higher education institution work. Its aim is students' scientific justification, further development and solving parctical problems applying research methods.

Students may do their research in labs as well designing term papers and qualification papers.

In accordance with the study program plan, students are required to design three term papers individually in the following courses:

- Receivers and Transmitters (3 sem.);
- Entrepreneurial Economics (4 sem.);

- Design and Technology (5 sem.).

A term paper ensures the facilitation of students' research skills and well as a deeper acquisition of the study course in accordance with the study program.

The theme, aim and objectives of the term paper are discussed and approved by the academic personnel of each study course. The term paper is written according to *Methodological Guidelines and Conventions for Qualification Paper Design at Riga Technical College*.

RTC students are able to do research in foreign enterprises. In the spring of 2011 two second year students Dāvis Bērziņš and Artūrs Lācis went on an internship to Eddibon company in Spain for 8 weeks within the framework of ERASMUS program. The company specialises in the design and production of technical training equipment. As assurance both students received EUROPASS

1.6 Quality Assurance and Guaranties

Quality management system comprising all operational aspects of education institution and accounting for quality environment has been implemented In the Professional Education Competence Centre Riga Technical College. Quality management system changes in accordance with the changes in the environment.

Quality management system ensures process planning, organisation, control and correction.

The internal quality system of the higher professional education study program *Elecronics* has been established basing on study quality monitoring and control systems.

The college study quality system has been divided into seven fundamental criteria:

- Study process compliance with college development strategy
- Academic personnel work quality;
- Study program quality;
- The quality of cooperation with applicants and graduates;
- Study process quality;
- The quality of infrastructure, material and technical support
- Finance and business activity quality.

Withing the above mentioned framework, study program and study process quality are the most crucial factors for the internal quaity system of the study program *Electronics*.

RTC study program quality is assessed according to the following criteria:

- The compliance of the study program to college development strategy
- The compliance of the study program to education and profession stadards and other normative and legislative acts of the Republic of Lavtvia;
- Considering democracy principles in mutual relations of academic personnel and students as well as when managing the study program;
- Study program methodological, informative, material and technical support;
- annual study program self-assessment **.**

Study program quality assurance system assesses:

- innovative study process methods, the computer, multimedia, Internet application;
- study motivation;
- the objectivity of the assessment of knowledge and skills and the application of these results for the improvement of the study process; zināšanu un prasmju novērtēšanas objektivitāte un šo rezultātu izmantošana studiju procesa pilnveidošanai;
- the involvement of the students into research activities;
- study load, autonomous learning organisation, tutorial accessibility, information availability, the content of subjects, study subject allocation and continuity;
- students' feelings and awareness at college.

The study program director is responsible for the implementation of the study program. The changes and amendments may be encouraged by the study program director', academic personnel', and students' suggestions. They have to be approved by the college board.The study pocess during the study program implementation is discussed during the department meeting. Program director observes some lectures and seminars at random and analyses it with the responsible academic personnel involved. The questionnaires about the study process are conducted and administered at the end of the academic year, the results of which are discussed during the department meeting.

The internal assessment of the education institution is a consistent possibility to evaluate its activity and results. The assessment enables to show the preferable ways of development of the education institution (students', academic personnel's, employee's, material, technical and methodological base) which have been grounded in internal reserves and needs.

In accordance with National Development Plan, Latvija has to develop the branches with high added value, among which is electronics and electrical equipment production. The factor that significantly influences the development of this branch is the shortage   of

qualified work force. Research shows that the suply of the electronic engineers covers only 30 per cent of the demand of the employees in Latvian enterprises.

The currently increasing demand of students is not satisfied. According to E&E branch survey data[2], the demand for electronic engineers in future will exceed the demand for telecommunication engineers by 3 to 4 times (refer to figure 1). In order to satisfy the current demand it is essential to increase the number of students in the study program *Electronics* considerably.
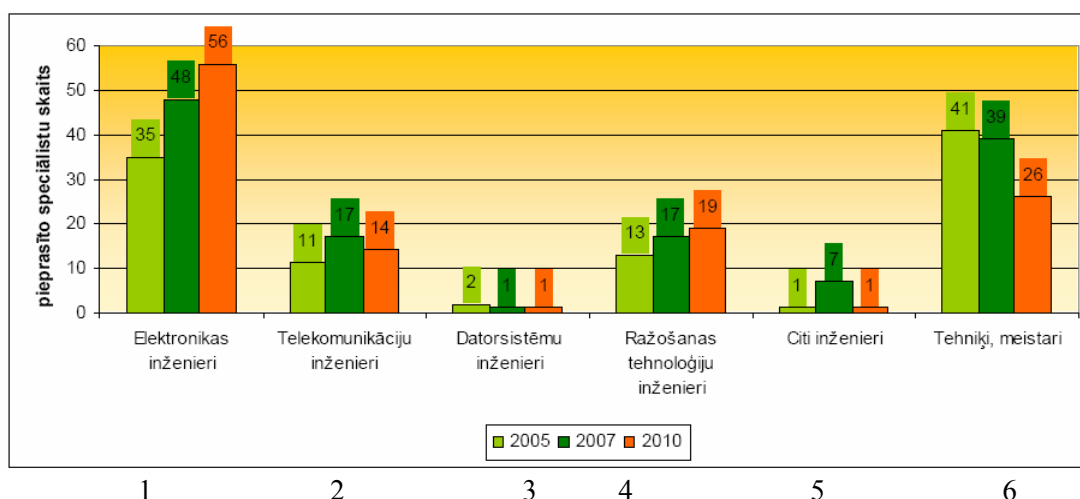

Figure 1. Electronics and other specialists expected demand in the labour market.
1. Electronics Engineers
2. Telecommnication Engineers
3. Computer Systems Engineers
4. Production Technology Engineers
5. Other Engineers
6. Technicians, Foremen

The leading specialists in a variety of Lavian electronic enterprises and organisations are the graduates of Riga Technical College, in the preparation of whose RTC possesses a vast experience. The most prominent employers are *Arcus Elektronika Ltd, Hanzas Elektronika Ltd, PRO-1 Ltd, Kompānija NA Ltd, Baltcom TV Ltd, Audio AE Ltd, EET sistēmas Ltd, Televideotīkli Ltd* a.o. (*Baltic Instruments Ltd, Tevalo Latvia Ltd – electronic components catalogue ELFA), JSC SAF Tehnika, ServiceNet Ltd* a.o.

A wide range of companies determines a necessity to prepare a narrow qualification specialists, which is achieved by correct and successful internship planning. The aim of the internship is to ensure a link between theoretical knowledge and real work environment,

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[2] ESF project No VPD1/ESF/NVA/04/APK/3.1.5.2./0009/1 „Recommendation and Action Plan to Prevent the Shortage of Human Resource in Electronics and Electrical Equipment Branch in Latvia"

which enables the students to obtain practical skills. All internship places can be considered as potential national economy work places.

2 Resources

2.1 Study Program Aims and Tasks

In order to ensure the study program quality and compliance with the requirements of the modern labour market all stakeholders (employers, graduates, students) are regularly surveyed. The results of the survey are administered and analysed in annual study program self-assessment statements.

The students' survey is conducted once a year asnd its results reflect students' evaluation of the study process, its methodological, material and technical support as the academic personnel. On the whole, the students are satisfied with the study program implementation.

Graduates highlight the professionalism of the academic personnel and good rapport in their questionnaires as well as claim that the content of the program is relevant and understandable. The provision with literature and methodological materials and study facilities, such as classrooms, academic personnel offices, technical equipment and access to literature are also estimated as good.

Employers are regularly invited to evaluate the content of the study program and the learning outcomes (knowledge, skills and competences) The analysis of survey data ensures that the students' competences are relevant to the study program results.

2.2 Study Content and Organisation

Academic personnel is a significant factor working with the students. Their work essentially influences study quality. The involved academic personnel is required to have skills and experience in order to trasfer their skills and knowledge to the students in all study courses. All academic personnel are encouraged to extend and develop their knowledge in various professional development training courses, doing Master's and Doctoral research.

The professionalism of the academic personnel implementing the study program complies with the content of the study program. In total, 18 academic personnel are involved and their academic positions degrees and qualifications have been summarised in Table 1.

Table 1.

No	Name, surname	Academic position	Degree	Study Course	Amount of Credit Points
1.	Vija Grava	lecturer	Master's	Higher Mathematics	6
2.	Inta Klotiņa	assist. professor	Doctoral	Physics	3
3.	Jana Kuzmina	guest assist. professor	Master's, 3rd Year Doctoral Student	English	3
4.	Kristīne Rūtiņa	assistant	Bachelor	Entrepreneurial Economics Latvia and Europe	3 1
5.	Lilita Jonāne	assist. professor	Master's	Corporate Psychology	2
6.	Oļģerts Dreimanis	assistant	Higher professional	Labour, Environment, and Civil Protection	1
7.	Sandra Stūrīte	assistant	Master's	Labour, Environment, and Civil Protection	1
8.	Ziedonis Bunžs	assist. professor	Doctoral	Electronics and Microelectronics Impulse Equipment Microcontrollers Energy Electronics Technical Documentation	4 4 4 1 2
9.	Rasma Baļule	lecturer	Master's	Theoretical Basics of Electrical Equipment	3
10.	Veronika Iesmiņa	assistant	Master's	Engineering Graphics	2
11.	Andrejs Veide	lecturer	Master's	Computer Studies Theoretical Basics of Radio Equipment Receivers and Transmitters Electronic Equipment Assembling Practice	1 3 3 1
12.	Arta Petaja	lecturer	Master's	Computer Studies	2
13.	Juris Silarājs	assist. professor	Master's	Industrial Electronic Appliances	2
14.	Imants Trauliņš	lecturer	Master's	Mobile Communication Systems	2

15.	Arnis Boguts	assistant	Master's	Materials Studies	2
				Radio Technical Measurements	2
				Design and Technology	6
				Electronic Equipment Assembling Practice	1
16.	Andrejs Krūmiņš	assistant	Master's	Electronics and Microelectronics	1
				Power Sources	2
				Amplifiers	2
				Energy Electronics	2
				Radio Waves	2
				Frequency and Antennas	
				Audio/Video Appliances	3
				Electronic Equipment Assembling Practice	1
17.	Andris Saulgozis	assistant	Master's	Electronic Equipment Assembling Practice	1
18.	Jānis Kalniņš	lecturer	Master's	Sport	0

Enterprise internship is organised in accordance with the aims and objectives of the study program and complies with the qualification of Electronics specialist. Refer to clause 1.2 of the present statement.

One month prior to the commencement of the internship an informative meeting is held to make the students acquainted with internship documentation, program and assessment criteria. Internship program contains a clearly defined aim and tasks to be completed as well as requirement for a successful course pass. Internship methodological documents are available at the Information and Communication Department and in the library.

The proportion of workshops (practical assignment), laboratory assignments and seminars corresponds to the aims of the study program comprising 33 percent of theory, 27 percent of workshops (practical assignments), 25 percent of internship and 15 percent of the design of the qualification paper from the total amount (2420 h.) of contact hours.

2.3 Studies and Evaluation of Knowledge

The facilities to ensure efficient study process are classrooms, labs, and computer study rooms, which are equipped with all necessary equipment.

Students, academic personnel and other employees create the psychological environment at college, which is open, favourable, democratic, relevant since the academic personnel is accessible, provide the required psychological and methodological support for the students. As a result, the students feel comfortable and free to express their opinion.

As a significant achievent, material and technical base improvement activities in study facilities, i.e. classrooms and laboratory premises are worth mentioning. As a result, the facilities have been supplemented with computerised study places (personal computers, laptops to improve the work of academic personnel and study process quality, data and OHP installation). A project for scientific work has been implemented, thus, academic personnel can apply modern measurement equipment, whic is required for a more consistent study program acquisition.

The following projects have contributed considerably to the enhancement of the study program:

1)   ESF co-financed project *The Improvement of the Study Process in Electronics at Riga Technical College* (26.10.2006. -20.08.2007.)

2)   ESF co-financed project *The Improvement of the Educational Process in Electronics at Riga Technical College Secondary School* (07.09.2006. - 20.08.2008.)

3)   bilateral project „Swedish- Latvian bilateral project „Computer room" (2003- 2009) as a result of which experience, relevant information and ideas for organising and installing electronic laboratory as well as material- technical resources for classroom and laboratory facility (personal computers, laptops and two testers) were obtained.

Academic personnel may apply modern oscillographs, testers, signal generators, measurement equipment a.o. for further improvement of theoretical and empirical work.

Study facilities are modern, involving computers, multi-media and the Internet. The study process has been considerably improved as a result of the installation of personal computers with the Internet connection, data-OHP, scanner, printers as well as 15 computerised study places for students' needs with the installed electronic equipment technical design software.

The facilities for the implementation of the study are being consistently and continuously improved. For instance, in February 2011, one of the most modern soldering workshop in the Baltics was opened at Riga Technical College. It contains 26 workstations or 48 work places. Each workstation is equipped with a multimeter, 2 power supplies, 2

soldering stations, generator, oscilloscope, as well as tools and wire sets. Two workstations are additionally equipped with a microscope, infrared soldering station and wide warm-up device.

2.4 Study Provision and Management

Administrative and technical staff are sufficient in order to ensure the achievement of the learning outcomes. Modern technologies are used throughout the study process (i.e. document portfolios, computers multimedia, the Internet, in the computer labs as well as study and methodological materials are available electronically on CDs.).

The following **Riga Technical College structural units** are involved in the implementation of the study program *Electronics*::

- *Information Technologies and Communication Department* (with the access to electronics and microelectronics laboratory, measurement and adjustment laboratory, radio and antennae laboratory, amplifiers and receivers laboratory, computer classrooms and experimental study LAN);
- *Energetics* (electrical equipment laboratory and labour protection classroom);
- *General Studies, Entrepreneurship and Management Department* (Math classroom with an interactive whiteboard, Physics, English, Economics and Corporate Psychology classrooms);
- *Transport and Metalwork Department Metalwork Unit (Engineering Graphics classroom).*

All the abovementioned departments participate in the implemetation of the study program, delivering the relevant study courses theoretical and practical parts.

To realise empirical studies and internship Riga Technical College **Study Practice and Production Department** is involved**.**

The following assisting personnel is facilitates the implementation of the study program:

- Study Department
- Study Practice and Production Department
- Research and Methodological Development Department
- IT Support Department
- Study Process Development and Business Activity Department
- Library

- Study Information Centre
- Administrative office
- Accounting Department
- Dorms

All the abovementioned structural units participate in the implementation of the study program , ensuring a consistent theoretical and empirical study process and well as everyday routine.

Research and Methodological Development Department establishes the study program methodological work, comprising methodological material design, multiplying and spreading among students for their study purposes.

The library plays a significant role in the provision of the study process at Riga technical College. It operates in accordance with the internal normative acts and performs the fuctions of cultural and information centre, ensuring literature and information access, providing, library, bibliographical services, consulting students and academic personnel.

The main objective of the college library is to provide the study process with the required information resources and services in accordance with the study program requirements. The library employees regulary perform the inventory and sistematisation of the resources, the informative and bibliographical services for students, academic personnel and employees.

The library contributes to the technical education process and scientific work of the students and academic staff.

There are 27 study places, 5 computers and a photocopier in the reading room (97 m^2). The computers are connected to the Internet through the local area network. In addition, the students can access the computers with the internet connection in classrooms and dorms.

The library provides a free access to reference literature, latest publications in various branches and fiction. The library has a subscription to 28 hard copy press and media materials.

It consists of 2 books storage rooms (193 m^2) for reference literature, fiction, periodicals archive and study books and methodological materials for full-time and part-time students in technical branches, i.e. energetics, electronics, telecommunications, metalwork, information technologies, including 8000 lecture methodological notes, which were designed and published within the framework of EU projects using its funding and Latvian standards.

RTC library supplements necessary scientific literature, study books, and methodological materials for the support of the study program cooperating with study program directors and heads of departments. In 2011 there have been 35 705 units in the library, including 25 537 books, 22 032 of them being study books. Audio visual aids constitute 22, DVD 12 items respectively. The library utilises alphabetical and systematic catalogues.The library employees use the common state catalogue of 9 libraries as well as Latvian National Library and Riga Technical University subscription for the academic personnel.

Since 2009, ordering and receiving books are possble electronically applying Latvian National Library inter-library subscription.

2.5 Academic Personnel and Students Research (Creative) Activities

It is possible to use the following resources for the scientific and creative work of the academic personnel and students:

- State significance commno library electronic catalogue http://www.lnb.lv/lv/lasitajiem/katalogi-datubazes-kartotekas/valsts-nozimes-biblioteku-elektroniskais-kopkatalogs;
- International project OAPEN (Open Access Publishing in European Networks) database *OAPEN Online Library containing e-books selections online covering various branches in scientific and popular scientific literature http://www.oapen.org/home*
- *Digital Book Index* provides access to more than 165 000 e-books from more than 1800 publishers. More than 140 000 of the books, texts and documentation are available for free.
- http://www.digitalbookindex.org/about.htm
- *Wikibooks* provides study books or modulesfor different branches and differnt eductaion level students. (open-content), un tās jebkurš var rediģēt un papildināt. http://en.wikibooks.org/wiki/Main_PageE-books are open-content sources.

Various other materials are available in the Internet, encyclopaedias, search engines, e.g. **GoogleScholar**, (http://scholar.google.lv/) searching for scientific publications online; social networks, e.g. **ResearchGate** (http://www.researchgate.net/), being the largest free social network of scientists and researchers.

2.6 Quality Assurance and Guaranties

The funds to implement the study program are sufficient (which is seen in R.2.1., R.2.2., R.2.3.) and their use is strictly controlled.

3   Sustainability

3.1 Study Program Aims and Tasks

The study program *Electronics* corresponds to the mission, vision, aims and objectives of the planned cycle of RigaTechnical College development strategy (2008-2014) .

RigaTechnical College mission is:

to be an education centre providing a good knowledge base and an ability of autonomous learning;

to provide support to technical specialists choosing or reconsidering their career;

to be a disciplinary and interdisciplinary cross-point and facilitator.

RigaTechnical College vision is:

to become a technical education, culture, and cooperation centre for specialists, enterprises, other stakeholders and different branches in 7 years.

The necessity of the implementation of the study program has been grounded in Riga Technical College strategy, which aim is the preparation of technical specialists in electronics since it is one of the main prospective branches in the further development of Latvian economy.

The study courses acquired in electronics specialty are compliant with latest modern technologies. A high level of professional education ensures the demand in the labour market.

Having an extensive experience in preparing well-qualified specialists, the graduates of Riga Technical College are employed by various electronic enterprises and organizations, namely *Arcus Elektronika Ltd, Hanzas Elektronika Ltd, PRO-1 Ltd, Kompānija NA Ltd, Baltcom TV Ltd, Audio AE Ltd, EET sistēmas Ltd, Televideotīkli Ltd a.o. (Baltic Instruments Ltd, Tevalo Latvia Ltd, -electronic components catalogue ELFA), JSC SAF Tehnika, ServiceNet a.o.*

 A wide range of companies determines a necessity to prepare a narrow qualification specialists, which is achieved by correct and successful internship planning. The aim of the internship is to ensure a link between theoretical knowledge and real work environment,

which enables the students to obtain practical skills. All internship places can be considered as potential national economy work places.

Study program Electronics is open-minded and flexible, considering higher education aims and objectives as well as regional development and state interests, which are conected with the students' and emplyers' need.

3.2 Study Content and Organisation

The content of the study program and its implemntation ensure its continuous development, which is based on cooperation and responsible action involving students, academic personnel and employers. A stimulating progress of a personality development and a democratic society's scientific developmet objective are realised in the course of the study process, based on the consideration of labour market needs.

The academic personnel involved in the implementation of the study program regularly participate in professional development trainings. RTC academic personnel attend international exhibitions, one of the most recent being Productonica, held in Munich during November 15 to November 18, 2011 as well as employers' and branch speciic seminars and conferences about latest novelties and trends in electronics. RTC academig personnel is entitled to develop teir qualification participating in ERASMUS mobility project.

RTC top management closely works on the planning policy of personnel development and its implementation, involving new academic personnel and regularly informing everybody about their qualification improvement possibilities in both pedagogy and domain specific study courses. Covering financial expenses, the academic personnel are encouraged to participate in international conferences, where they submit materials for scientific publications, courses and seminars in order to enchance their scientific and didactic compatences. The academic personnel is interested to improve their competence since it influences study quality and college prestige.

RTC has concluded a cooperation agreement with Riga Technical University Electronics and Telecommunication Department Electronics Institute, entitling electronics specialists to continue their studies in this faculty to acquite the second level of higher professional education.

In 2001 Riga Technical College signed a mutual cooperation agreement with Lapland Technical College (Finland). In accordance with it, students' academic personnel's and technical staff's exhange is organased annually.

RTC is a member of Latvian Electrical Equipment and Electronic Production Association, which aim is to facilitate the development of the branch and mutual cooperation as well as branch specialists professional development.

3.3 Studies and Evaluation of Knowledge

Knowledge, skills and competences have been clearly defined in both the study programa on the whole and each course separately for the students to acquire. They, in its turn, are connected with the Electronic specialist standard definite requirements determined by the labour market ket demand since making changes ensure study program continuity.

3.4 Study Provision and Management

Quality assurance and the assessment system reflect the assessment of the study organisation and knowledge. Quality assurance is achieved at two levels, i.e. RTC and Information Technologies and Communication Department.

It is possible to single out academic personnel quality assessment, and study course quality assessment in quality management assurance. It possesses three aims, namely, a college strategic aim as well as the aim of the study program and study courses . All aims contain objectives . Both of them are connected with the capacity of the academic personnel and facilities, highlighting future prospects in accordance with labour market needs. In the course of the study program implementation the feedback regarding quality from employers, students and graduates is provided. Study quality is assessed on the basis the data collected from students' questionnaires , assessment in tests and exams, peer evaluation and methodological work. The survey and questionnaires are conducted upon the completion of the course. The results of the questionnaires are discussed during the Information Technologies and Communication Department meetings.

One of the set of documents characterising quality management is the individual portfolio of the academic staff. The document are arranged considering the following criteria: publications, conference reports, participation in exhibitions, scientific work, designed and defended qualification papers under the supervision of particular academic personnel, the results of the students' questionnaires regarding academic personnel work, administrative responsibilities at RTC and outside it a.o. type of scientific, educative and creative activity. Indvidual set of documments is closely evaluated electing academic personnel.

Study program self- assessment is a continuous process, but a summative meeting is held once a year with the participants being employers, graduates, academic staff and students. In the meantime consultations and discussions are held with the stakeholders interested in the study program quality. The improvements of the study program are made considering the suggestions of the students, employers and study program director analysisng the situation in the potential work places. On the basis of the suggestions of students, employers, graduates and academic personnel the changes in the study program plan are discussed in the Information Technologies and Communication Department meetings and the proposals are submitted to RTC board for approval.

Overall studies monitoring and control including the activity of State qualification exam committee are conducted by Study department and RTC deputy director of study and research activity.

One of the main control system component is a self- assessment statement, analysisng the implementation of the study with the designed development plan for the next academic year, considering the results of self- assessment.

3.5 Academic Personnel and Students Research (Creative) Activities

Academic personnel is involved into scientific research activities, with the themes being novel and topical, connected with regional interests, study program content and future development. The results of the research are published in international and referred sources. Pētniecības darba rezultātus publicē starptautiski pieejamos un recenzējamos izdevumos.

An actual theme for the study program, i.e. *Electronic Equipment Operational Safety and Efficiency Increase*, was investigated by assist. professor Ziedonis Bunžs and published in RTC scientific conference proceedings in 2011. Lecturer Andrejs Veide had a publication regarding *The Design of the Calculation Method for the Parameters and Construction of a Logoperiodical Antenna* in the same source in 2010.

The results of scientific research and creative activities are applied empirically fostering innovations. Students' qualification papers are topical and exploit recent electronic components. For instance, State qualification exam committee claimed the following qualification papers to be excellent and highly valuable:
- Mārcis Tabūns's qualification paper on *A Power Supply with TOP Switch*
- Renārs Zāģers's qualification paper on *Light Diod Lamp* .

Academic personnel's and students' research work and publications are reflected in annual self- assessment statements.

3.6 Quality Assurance and Guaranties

In order to ensure modern and continuous studies compliant with the requirements of labour market, at the end of each academic year the study program director conducts a survey of students and academic personnel as well as organises discussions with employers about the quality of the study program. The obtained results are evaluated and analysed at the Information Technologies and Communication Department meetings. The achievements are reported during RTC board meetings. The dynamics of the students' and graduates' the development trends, graduates' employment, academic personnel qualification and age, finance and research results are regularly discussed at the Information Technologies and Communication Department meetings. According to the enrolment recent results, the study program has been fully completed considering competition principle. It justifies the study program necessity and quality.

To provide the continuity of the study program at the second level of higher professional education a cooperation agreement between RTC and Riga Technical University has been signed. In case of study program liquidation, restructurisation or other changes, students are entitled to continue their studies at Riga Technical University or International Communication Institute.

To attract potential students, RTC academic personnel and students participate in the international exhibition *School* . Every year the college organises open door days, when all interested may get familiarised with the facilities, study program, academic personnel and have a discussion with current RTC students. The news about the study process and about extracurricular activities, i.e. competitions, conferences, projects a.o. is regularly located at RTC webpage.

4 Cooperation and Overlapping

4.1 Study Program Aims and Tasks

Riga Technical College is the only educational institution implementing the study program of the 4th level of higher professional education in electronics with the qualification *Electronics specialist*. The studies covering the 5th level of higher professional education are implemented at Riga Technical University, International Communication Institute and Ventspils University College.

The study program has been designed in cooperation with the colleagues from Riga Technical University Electronics and Telecommunication Faculty. Its aim and learning outcomes differ from RTU study program, since educational levels and length differ. The

aim of the study program is to educate electronics specialists in two and a half years emphasising the professional preparedness. .

4.2 Study Content and Organisation

Having in the basis clause 47 ofthe Law of Higher Education Institutions, when transferred from a different institution all relevant study courses credit points and the assessment obtained in other Latvian higher education institutions study programs are considered.

Clause 59 entitles the students to acquire separate modules, subjects and or have practice or internship (partly or fully) in other Latvian higher education institutions study programs upon completion of which obtaining a certificate , which contains the information about the student, the name of the educational institution, study course or module, the data about the academic staff, the amount in credit points, the amount of work completed and the assessment result.

RTC has signed a cooperation agreement with Lapland technical College (Finland) and Copenhagen Technical Education Centre (Teknisk Erhvervssskole Center - TEC), therefore the students can acquire some domain specific courses there.

Within the framework of the study program students" and academic personnel's mobility project ERASMUS is implemented. In 2010/2011ac. year two students had internship in the company Eddibon in Spain. Two more students will have internship abroad this academic year.

 To facilitate the mobility, life-long learning and language skills of the academic personnel in the long- term perspective of education development, as well as contribute the college prestige and its awareness as an internationally recognised educational institution an English language course is provided free of charge this academic year.

The academic personnel with temporary labour contracts from institutions and enterprises, who participate in methodological and scientific work, are Romualds Smiļģis (Baltic Instruments Ltd), Imants Vilks (Artificial Intellect Fund), Jānis Smilga (J.Smilga's Technological Bureau), kas piedalās metodiskajā un zinātniskajā darbā. They mainly provide references of the qualification papers.

4.3 Studies and Evaluation of Knowledge

The academic personnel of other educational institutions and the employees of the Ministry of Education and Science participate in the assessment of results of the study

program. During the accreditation of the study program the member of the accreditation committee was   Jānis Rudzītis (RTU professor, the directore of Machine Building Technology Institute).

4.4 Study Provision and Management

The partnership with   J.Smilga's Technological Bureau has had an invaluable contribution to students' mobility. J.Smilga helped to find a mobility company in Spain as well as was actively involved in the process of the preparation of the students to the trip.

Internship and research for qualification papers are always supported by cooperation partners- *JSC SAF tehnika, Arcus elektronika Ltd, Hanzas Elektronika Ltd, elevideotīkls Ltd, Audio AE Ltd* a.o.

As a result, theoretical and empirical reserach focuses on the solution the the problems topical for partnership organisations.

There is huge response and assistance from partners' side during the scientific advising and providing references for qualification papers. The members of State qualification commetteeare branch specialists, who participate in the assessment of qualification papers and the analysis of results. The following employers were the members State qualification exam committee Edvīns Laucis, vice president of the Confederation of Small and Medium Enterprises, Andrejs Grišāns, a shareholder of *JSC SAF Tehnika*, Juris Majors, a supervisor of *State Employment Service*, Vitālijs Aišpurs, the director of *Arcus Elektronika Ltd*.

Employers sometimes ask the department to provide them with young specialists from the graduates of the study program *Electronics*. The employers consider RTC refernces about potential candidates, would like to obtain information about the results of the term papers and the qualification paper, personality features, cooperation and other soft skills. The examples of such cooperation are the relations with JSC SAF tehnika, Arcus Elektronika Ltd, National Military Force a.o.

Some academic peronnel, for instance, assistant A. Boguts in cooperation with the enterprises JSC SAF tehnika, J.Smilga's Technological Bureau a.o. organised several study excursions to electronic equipment production and maintenance companies during the electronic equipment assembling practice for the first year students in 2010/2011 ac. year.

Some academic personnel from Information Technologies and Communication Department help other educational institutions   (for instance to Ogre State Vocational School, Latvian University Electronics and Computer Studies Institute, Latvenergo Training

Centre a.o.) conducting some theoretical lectures and monitoring electronic practical assignments. Ogre State Vocational School Students have an opportunity to use the laboratory facilities of Information Technologies and Communication Department and the knowledge of the academic personnel to realise practical studies. Thus othe vocational and higher education institutions are supported to provide additional training and professional development of potential employees in the industry.

College methodological, informative and technical facilities have been highly evaluated by both employers and a branch association. In August 2011 an international training for electronics and automation technology academic personnel on *IPC-A-610E-2010 Standard Certification* was conducted by PIEK International Education Centre (the Netherlands) trainers in a new electronics laboratory. In October 2011, Festo Didactic in cooperation with the Finnish company and the German company EPLAN seminar and workshop were organised in the soldering and testing laboratory. It was attended not only by the academic personnel , but also the representatives of the companies from different branches.

4.5   Academic Personnel and Students Research (Creative) Activities

Owing to various Leonardo Da Vinci projects, the academic personnel of the study program may conduct research (creative) work with other Latvian and foreign higher education institutions study program students and academic personnel. As an example, Z.Bunžs un A.Veide participation in the Leonardo da Vinci Innovation tranfer project Education Program of JTAG Boundary-scan Technology for Vocational Educational Schools (EDUBOSTIVE may be mentioned). The project was implemented from 01.10.2009 to 31.03.2011 cooperating with 6 partners from 4 countries: EDUBOSTVE project coordinator was Latvian Electrical Engineering Business Innovation Centre, Dutch company training technology adjustment was run by Ventspils University College. Three more enterprises from Latvia, Estonia and Lithuania participated in the project and organised cooperation with their state professional education institutions. Within the framework of the project the personnel tested JTAG Boundary-scan technology and evaluated its training program reporting about testing results.

4.6   Quality Assurance and Guaranties

So far the academic personnel have not participated in other study program and higher education institution evaluation and improvement (as experts or guest professors). Though, the academic personnel is open for cooperation with other institutions for assessment.