RIGA TECHNICAL UNIVERSITY

Erasmus+ project “Improvement of master level education in the field of physical sciences in Belarusian universities” – Acronym “Physics”

561525-EPP-1-2015-1-LV-EPPKA2-CBHE-JP – ERASMUS+ CBHE

Teachers training event

Riga Technical University 12/1, Azenes Street Riga, Latvia

February 5th – 9th, 2018

Dr.sc.ing.,Anatolijs Zabasta
Dr.sc.ing., Prof. Nadezhda Kunicina
Riga Technical University
Institute of Industrial Electronics and Electrical Engineering


RTU

History

- The history of **the Institute of Industrial Electronics and Electrical Engineering (IIEEE) dates from 1987.**
- **IIEEE is a part of the European Center for Power Electronics (ECPE),** which unifies Europe's leading manufacturers and scientific institutions in the field of power electronics.
- In the last five years IIEEE participated in several **international projects**, has realized **local and regional projects** and completed more than **40 contract-jobs** for companies.

- Thereby **IIEEE is the leading institute in its field in Latvia, ensuring a world-level research**. Institute collaborates with other scientific institutions within Latvian and EU projects, with leading Latvian enterprises and with universities in Europe, North America, South America, India and China.

IIEEE Structure

Director: Academician, Professor, *Dr. habil. sc. ing.* **Leonīds Ribickis**

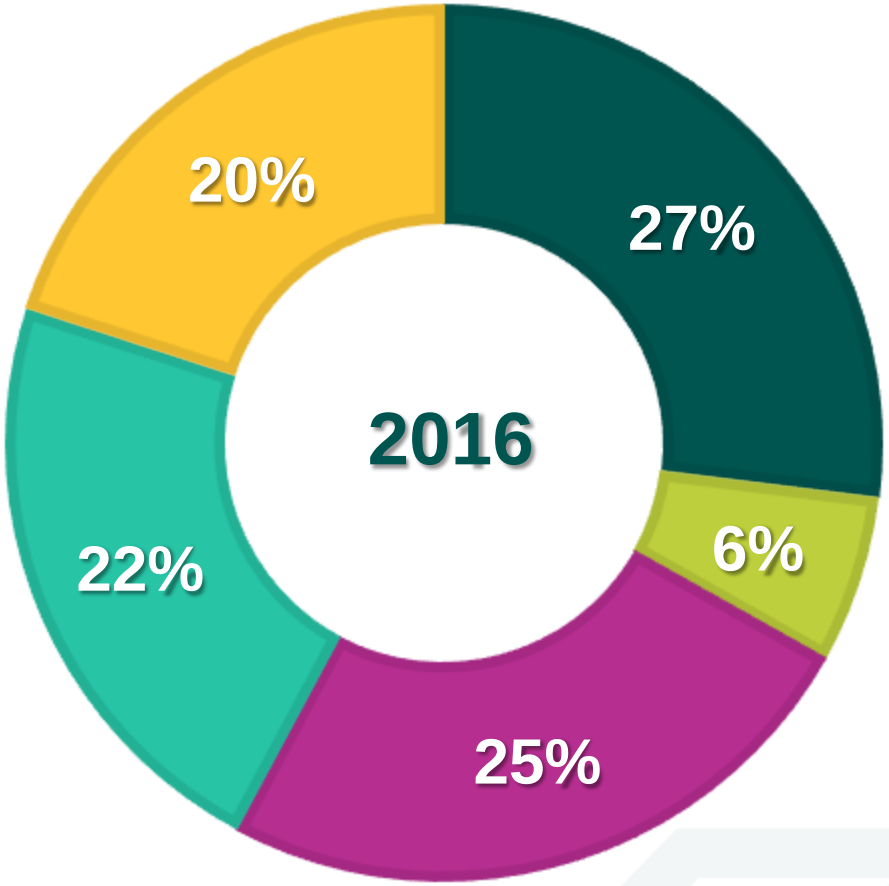
Department of Industrial Electronics and Electrical Technologies
Head: Assist. Prof., *Dr. sc. ing*. **Pēteris Apse-Apsītis**

Scientific Laboratory of Electromechatronics
Head: Academician, Professor, *Dr. habil. sc. ing.* **Leonīds Ribickis**

Department of Electrical Engineering and Electronics
Head: Assoc. Professor, *Dr. sc. ing.* **Andrejs Podgornovs**

Student Creative Laboratory
Head: Ansis Avotiņš

Finances
of IIEEE in 2016



- Grants of Latvian Scientific Council
- Agreements with enterprises
- State research programmes
- INTERREG programme
- IP Horizon 2020 projects

∑= 448 892,43 EUR

Registered National Patents in 2015,2016

1. *Current-fed quasi-z-source inverter.* Authors Andrii Chub; Jānis Zaķis; Dmitri Vinnikov. LV14939

2. *Self-excitation system of synchronous generator with reducing current transducer.* P-13-94, Authors Genadijs Zaļeskis; Ivars Raņķis. LV14951

3. *Inductor electric machine with decreased starting torque and electromagnetic regulation of air gap.* 14994, authors Aleksandrs Gasparjans; Anastasija Žiravecka; Aleksandrs Terebkovs; Marija Hramcova. LV14994

4. *Interface for transmission of information via closed loop using modulation both of inductive reactance and amplitude.* 15027, authors Iļja Galkins, Maksims Vorobjovs, Andrejs Stepanovs. LV15027

5. *Train smooth and precise automatic braking system.* 14917, autori Andrejs Potapovs, Anatolijs Ļevčenkovs, Mihails Gorobecs, Sergejs Holodovs, Igors Birjulins. LV14917

6. *Consumers supply voltage normalization system.* 14950, authors Dmitrijs Širkins, Ivars Raņķis. LV14950

7. *Direct voltage converter.* 14493, author Alvis Sokolovs. LV14493

8. *Contactless direct-driven wind generator.* 14525, authors Alvis Sokolovs, Nikolajs Levins, Aleksandrs Serebrjakovs. LV14525

Registered National Patents in 2015,2016

9. *Wind-driven electric plant.* 14388, authors Leonīds Ribickis, Nikolajs Levins, Vladislavs Pugačevs, Guntis Diļevs. LV14388

10. *Mosfet driver.* P-13-140,authors Ingars Steiks, Ivars Raņķis, Oskars Krievs, Aleksandrs Andreičiks.
LV14768

11. *Autonomous energetic system provided with wind turbine and hydrogen fuel cell.* 14766, authors Aivars Pumpurs, Ivars Raņķis. LV14766

12. *Method and system for data transmission in a closed power circuit.* 14861, autori Andrejs Stepanovs, Iļja Galkins, Maksims Vorobjovs. LV14861

13. *Transceiver for data transmission and reception in a closed power circuit.* 14860, autori Iļja Galkins, Maksims Vorobjovs, Andrejs Stepanovs. LV14860

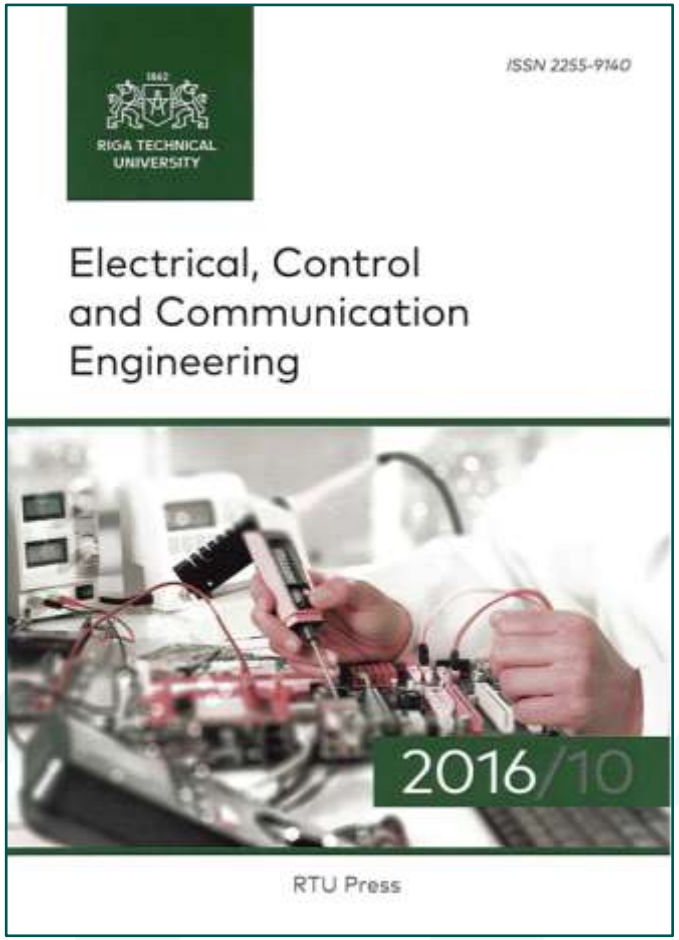
14. *Assemblage method of permanent magnet synchronous generator rotor.* 14800, autori Alvis Sokolovs. LV14800

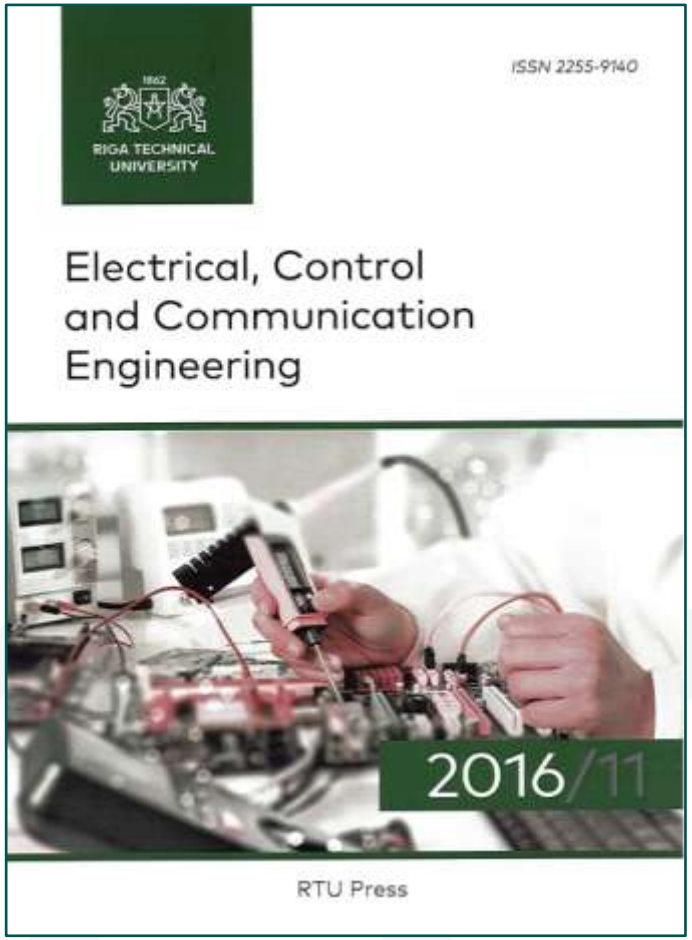
15. *Adjustable electronic current source with doubled current stabilization*. 14796, autori Iļja Galkins, Oļegs Tetervenoks. LV14796

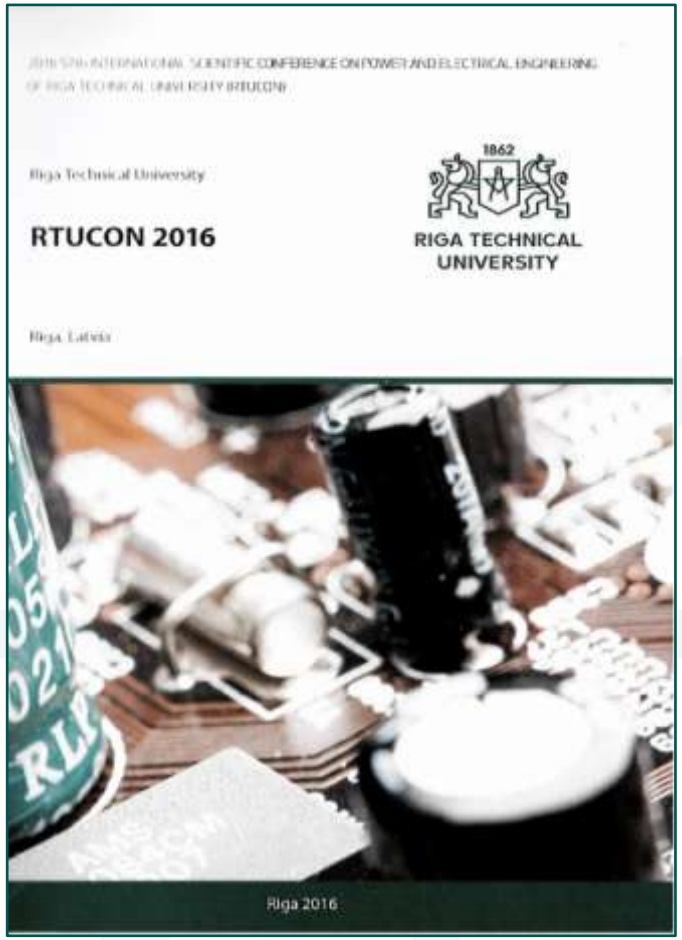
16. Participation in the development of patent:
Electrical Network Protection Device and Method.
Authors Antans Sauhats, Māris Kuņickis, Dmitrijs Antonvs, Nauris Jankovskis. LV15156

Published Journals and Proceedings

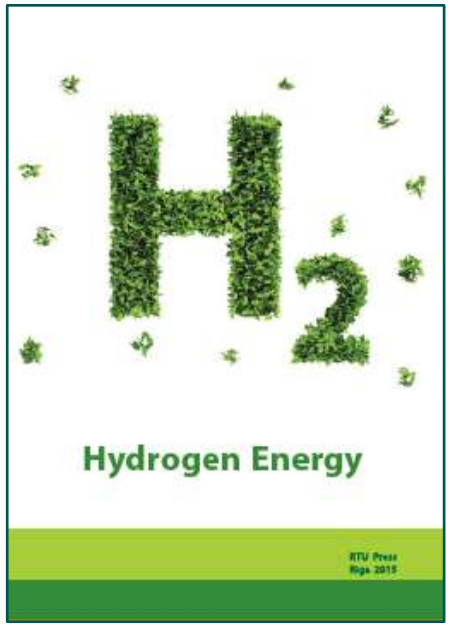
in 2016

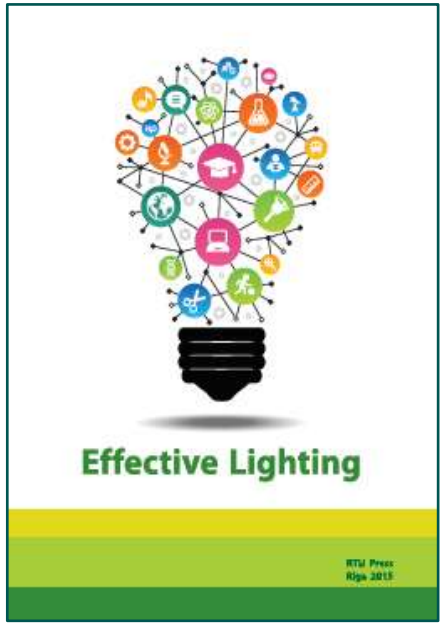


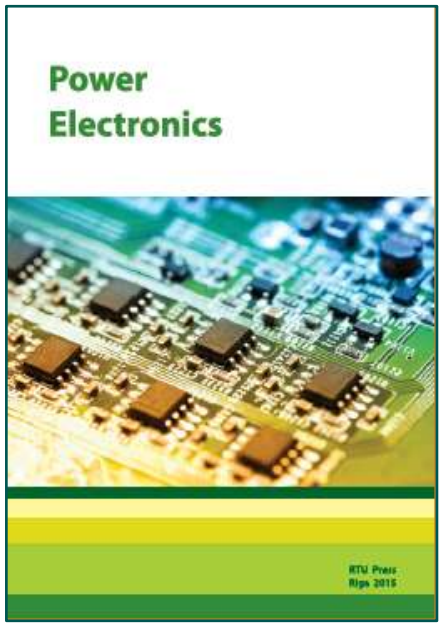


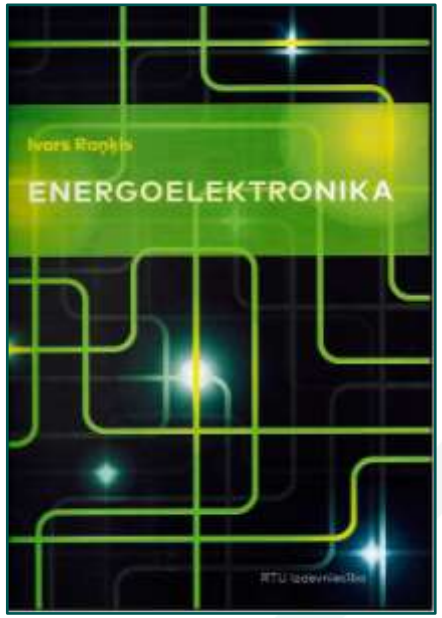


Published Books in 2015, 2016 and 2017

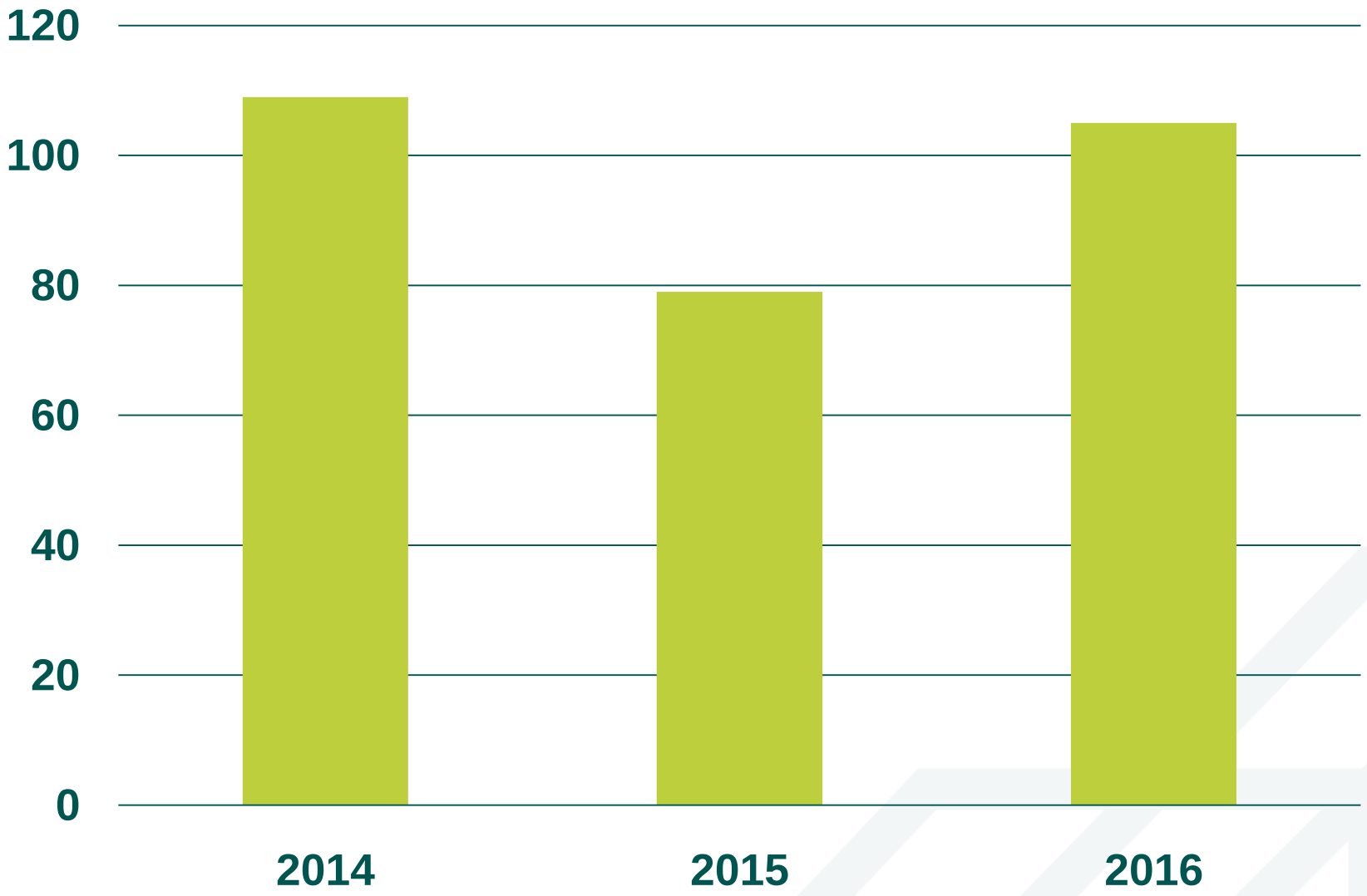




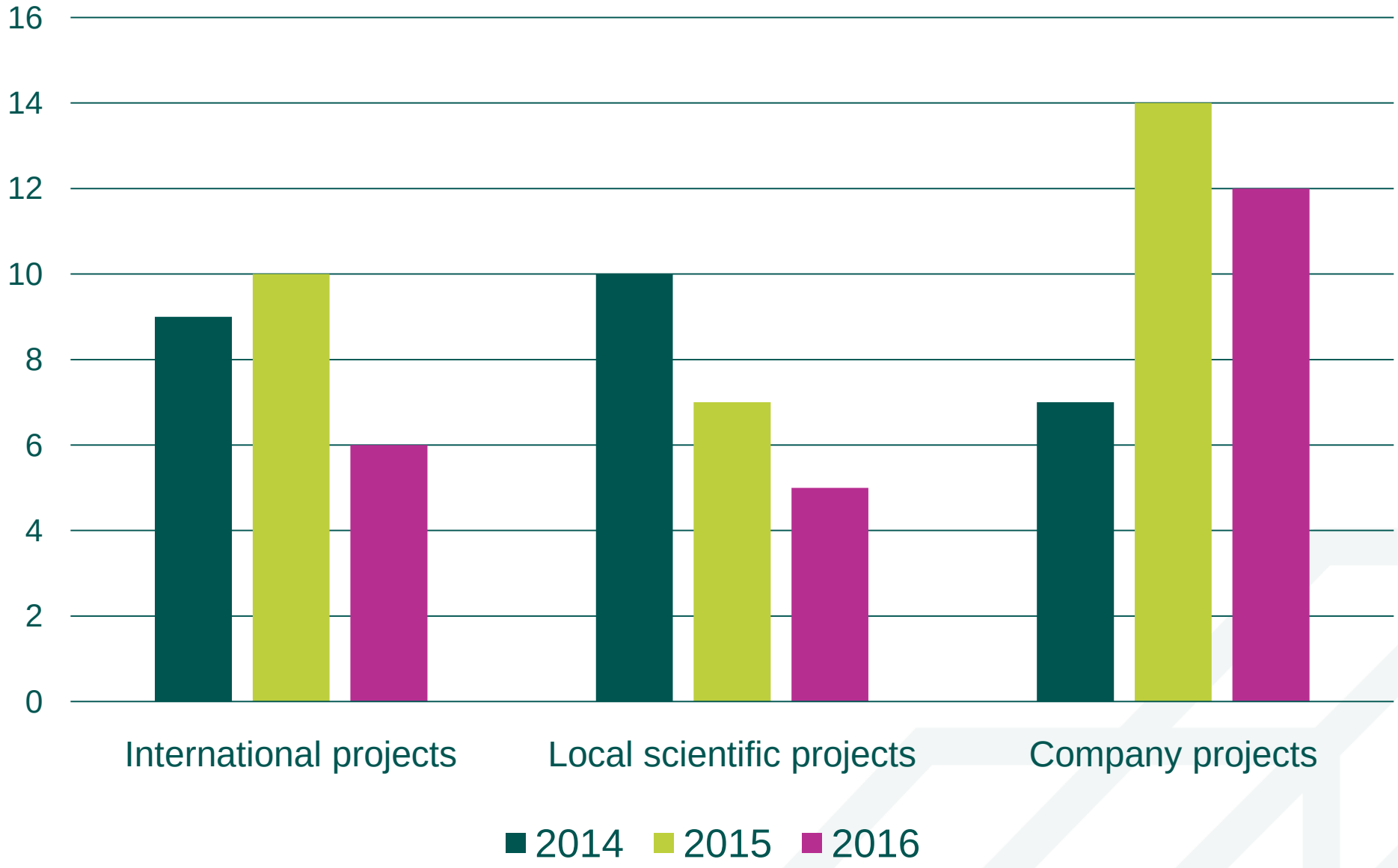




Scientific Publications



Research Projects



Organized Scientific Events

International Doctoral School

- May 26-27, 2017, for the 6th time IIEEE organized annual **International doctoral school in Electrical Engineering and Power Electronics** at RTU sports campus "Ronīši" close to the sea.
- The duration of the school is usually 2-3 days giving the post-graduate students an opportunity of listening to **Latvian and world-known leading professionals lectures**, as well as informing about their own research and results.
- The intention is to provide **an opportunity for doctoral students to learn** about scientific innovation, share the scientific experience with leading scientists, discuss their own recent achievements.

Organized Scientific Events

RTU Annual International Scientific Conferences

Section of Power and Electrical Engineering, 2016

- Each year from April to October RTU organizes International scientific conference with work of more than 15 sections covering all the areas of the university research.
- Technical support – RTU and IEEE Latvia.
- IIEEE is represented in the **section "Power and Electrical Engineering"** with the participants from all over the world to discuss development and achievements in the area.

Organized Scientific Events

2015 IEEE 5th International Conference on Power Engineering, Energy and Electrical Drives

- In May 2015 RTU EEF was a venue of “POWERENG’2015”, which gathered more than 100 scientists, engineers and businessmen representing 67 universities of 33 countries.
- During the conference, the participants were informed of some 120 studies related to power engineering, electrical engineering and electric drives. The participants introduced their research results and the latest trends in the following areas:

energy production; power electronics systems and their application; smart grid technology; electrical machinery and adjustable drive; renewable energy sources and technologies; education in the field of energy and electrical engineering.

- The conference main partner – AS “Latvenergo”, the main sponsor – “ABB”.

Scientific Projects

AREUS
Automation and Robotics for EUropean Sustainable manufacturing

Contract No. 609391
Project: FP7-NMP
Project name: Automation and Robotics for European Sustainable manufacturing
Project budget: 6 003 008 EUR
RTU budget: 601 732 EUR
Duration of the Project: 1 September 2013 – 31 August 2016

The scientists of IIEEE within the frames of AREUS project developed **a unique DC power supply system for robotic factories**. It is energy-efficient, and the production companies potentially save up to 25% of electric energy.

That system is designed and approbated in cooperation with the German automobile company "Daimler AG" for the use at "Mercedes-Benz" automobile factory.

Tempus Project

Project title: Development of Training Network for Improving Education in Energy Efficiency

Project budget: 1 440 000 EUR

Duration of the Project: 15 October 2012 – 14 October 2015

Erasmus plus project

Project title: “Improvement of master-level education in the field of physical sciences in Belarusian universities”

Project acronym: Physics

Project number: ERASMUS+ project “Physics” 561525-EPP-1-2015-1-LV-EPPKA2-CBHE-JP – ERASMUS+ CBHE

Time: 15th October 2015 – 14th October 2018

Budget: The project total budget: EU Grant 660 576 euro

Scientific Research Programme

Program: National Research Program
Project name: Latenergi / "Energy efficient and low-carbon solutions for a secure, sustainable and climate variability reducing energy supply" (No. 2014.10-4/VPP-1/277)
Project budget: 2 250 000 EUR
Duration of the Project: November 2014 – December 2017

Defended PhD Thesis in 2015, 2016, 2017

Author	Title	Scientific Supervisor
Oļegs Tetervenoks	Direct Current Control and Compensation of Non-Linearity for the Improvement of Quality Parameters of the LED Lamp	Prof. Iļja Galkins
Jūlija Maksimkina	Investigation of Dynamic Modes of High Power Induction Motors with Consideration of Skin Effect	Prof. Ivars Raņķis
Uģis Sirmelis	Urban Electric Transport System Modelling for the Selection of Optimal Energy Storage Parameters	Jānis Zaķis
Atis Hermanis	Shape Sensing Based on Embedded Sensors for Mobile Cyber-Physical Systems	Modris Greitāns Prof. Oskars Krievs
Leslie Robert Adrian	Research and Development of Obstacle Avoidance Systems for Mobile Robotics	Prof. Leonīds Ribickis
Genādijs Zaļeskis	Research of the Automation Tasks of the Wind Generators in the Low-power Microgrids	Prof.Ivars Raņķis

I invite all of you to participate in **EPE'18 ECCE EUROPE** in Riga!

CONFERENCE ORGANIZING COMMITTEE

Conference Chairperson	**Leonīds Ribickis, Riga Technical University, Latvia**
Programme Chairperson	**Philippe Lataire, Vrije Universiteit Brussel, Belgium (EPE)**
Joint Conference Chairperson	Rik W. De Doncker, RWTH Aachen University, Germany
Joint Conference Chairperson	Frede Blaabjerg, University of Aalborg, Denmark
Joint Conference Chairperson	Hans–Peter Nee, KTH Royal Institute of Technology, Sweden
Joint Conference Chairperson	Tore Marvin Undeland, Norwegian University of Science and Technology, Norway
Joint Conference Chairperson	Oskars Krievs, Riga Technical University, Latvia
Joint Conference Chairperson	Tõnu Lehtla, Tallinn University of Technology, Estonia
Joint Conference Chairperson	Šarūnas Paulikas, Vilnius Gediminas Technical University, Lithuania
Joint Conference Chairperson	Jero Ahola, Lappeenranta University of Technology, Finland

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RIGA – AN ARCHITECTURAL PEARL

RIGA – CAPITAL OF GASTRONOMY


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Accreditation procedures for new programmes in EU countries

License - the right (matriculation) to matriculate and train students.
Accreditation - a state guarantee for the quality of studies (the right to issue state-recognized diplomas).
Internal quality assurance
• Organized by the higher education institution itself.
• Higher education institutions, study program management, students are evaluating universities / study programs.

External quality assessment
• Organized by the Academic Information Center (AIC). Higher Education Quality Agency (AIKA).

• Higher education institutions / study courses (study program group) are evaluated by experts and observers "from the outside".

The external quality assessment is carried out as follows:
• Evaluation of higher education institutions;
• Evaluation of study directions.

In order to obtain a state-recognized diploma, both the university / college and the study area must be accredited.
The .xls format table with accredited study courses at higher education institutions can be found at http://www.aic.lv/portal/aikna/akreditetie-studiju-virzieni-un-programs.

Accreditation procedures for new programmes in EU countries

Academic Information Centre (AIC) is a non-profit institution, foundation established in 1994 by the Ministry of Education and Science and University of Latvia, Institute of Mathematics and Computer Science.

AIC implements the following functions:

- Latvian representative to the European diploma recognition networks ENIC/NARIC
- Information institution on recognition of professional qualifications in regulated professions
- Member of vocational education information network ReferNet established by Cedefop
- National Europass centre
- Latvian coordination point for referencing national qualifications framework to the EQF
- Institution taking the decision about referencing higher education qualifications obtained earlier in Latvia according to the Cabinet of Ministers Regulations No.142 (2012)

Accreditation procedure in Latvia

Since 2013, the study programs have been accredited at higher education institutions or by study program groups based on a special classification. This means that when completing the study area accreditation, all programs in this direction are accredited. Accreditation direction is given for 6 years. If deficiencies are detected in the direction, then it can be accredited for 2 years. The programs included in the study field are detailed and described in the appendix to the study area issued to the higher education institution in the accreditation sheet.

Refusal of study direction accreditation

If a university is denied the study direction accreditation, it can prepare additional documentation within 6 months and submit to the accreditation the study direction repeatedly or to close the programs implemented in the study field. If the program is closed, the university must provide students with the opportunity to continue their education in another study program in their or another higher education institution in accordance with the agreement stipulated by the documentation to be submitted for licensing the program or cover losses if the student does not wish to continue studies in another study program.

Credit system

- In Latvia, credits are used in higher education, which are equated with credit points of the European Credit Transfer System (ECTS). The credit point (CP) in Latvia is defined as the amount of one-week full-time study work. When converting ECTS, the number of Latvian credits should be multiplied by 1.5.
- The amount for one study year in full-time studies is 40 credit points (60 ECTS).
- For all study cource sertain ammount of credit poits are assigned.

International organisations

European Association for Quality Assurance in Higher Education

AFFILIATE OF ENQA

International Network for Quality Assurance Agencies in Higher Education

INQAAHE
INTERNATIONAL NETWORK FOR QUALITY ASSURANCE AGENCIES IN HIGHER EDUCATION

Central and Eastern European Network of Quality Assurance Agencies in Higher Education

Standards and Guidelines for Quality Assurance in European Higher Education Area (ESG 2015) and their application in evaluation process

Development of the European Standards and Guidelines (Version 1 –2005)

Recommendation of the Berlin Communiqué of Ministers(September 2003)

„an agreed set of standards, procedures and guidelines on quality assurance" and „to explore ways of ensuring an adequate peer review system for quality assurance and/or accreditation agencies"

ESG 2015 and their application in evaluation process

Development of the European Standards and Guidelines (Version 1 –2005)
In 2005 (in Bergen, Norway) ENQA reported back with a recommendation for the Ministers to adopt:

- European standards for internal and external quality assurance and for external quality assurance agencies
- European QA agencies will be expected to submit themselves to a cyclical review within 5 years
- A European register of quality assurance agencies will be produced
- A European Consultative Forum for Quality Assurance in Higher Education will be established (EQAF)

European Standards and Guidelines (ESG):

A key element of ESG 2005 was the 3 Part Structure of QA:

Part 1. ESG for Internal QA within Higher Education Institutions (7 standards) -the corner stone of QA in HE
Part 2. ESG for External QA of Higher Education (8 standards) -a condition of the credibility of the results of the internal evaluation
Part 3. ESG for External QA Agencies (8 standards) -External evaluators (QA agencies) are accountable for the quality of their activities

ESG 2015 and their application in evaluation process

European Standards and Guidelines

- ESG 2.1: External QA procedures should take into account the effectiveness of the internal QA processes described in Part 1 of the ESG

ESG 2015 – PURPOSES

- They set a common framework for quality assurance systems for learning and teaching at European, national and institutional level
- They enable the assurance and improvement of quality of higher education in the European Higher Education Area
- They support mutual trust, thus facilitating recognition and mobility within and across national borders
- They provide information on quality assurance in the EHEA

ESG 2015 – PRINCIPLES

- HEIs have primary responsibility for the quality of their provision and its assurance
- QA responds to the diversity of higher education systems, institutions, programmes and students
- QA supports the development of a quality culture
- QA takes into account the needs and expectations of students, all other stakeholders and society

ESG 2015 and their application in evaluation process

What do we mean with quality assurance?

Internal and external process and criteria to:

–Ensure minimum standards (accountability)

–Support quality enhancement

–Provide reliable and transparent information to users and stakeholders (consumer protection)

–Create trust in the HE system and its components

–Ensure, fundamentally, that students (can) reach the intended learning outcomes

ESG 2015 and their application in evaluation process

ESG Part I: Standards for IQA
1.1 Policy for quality assurance
1.2 Design and approval of programmes
1.3 Student-centred learning, teaching and assessment
1.4 Student admission, progression, recognition and certification
1.5 Teaching staff
1.6 Learning resources and students support
1.7 Information management
1.8 Public information
1.9 On-going monitoring and periodic review of programmes
1.10 Cyclical external quality assurance

ESG 2015 and their application in evaluation process

ESG 2015 part 1 : IQA
ESG 2015 part 2 : EQA

Standard 2.1 : Consideration of IQA

“External quality assurance should address the effectiveness of the internal quality
assurance processes described in Part 1.”

WHY IS INTERNAL AND EXTERNAL QA IMPORTANT FOR THE CONTEMPORARY HIGHER EDUCATION INSTITUTION?

Importance of QA

•QA is an instrument to foster creative instability, shake up the institution, if needed:
–internal review
–external review
•Reflect the expectations of:
–Government –safeguard consumer, value for money, relevance
–Employers –labour mobility and competencies
–Users of research and R&D
–External examiners
–Students –consumers, partners in learning experience (current, alumni, future)
–Graduates of secondary schools

Importance of QA

Quality Assurance:

- what are you trying to do?
- how are you trying to do it?
- how do you know it works?
- what do you need to change in order to improve?

Importance of QA for Leadership

- A means of getting HEI and departments to think critically about academic performance and improvement and development
- To get external views on the quality of programmes
- To receive informed advice on how to improve : “Best Practice”
- To provide an independent catalyst for internal change and innovation
- To provide an external legitimisation /recognition

Importance of QA for Leadership

ESG Standard 1.2.
Design and Approval of Programmes
“(…) The programmes should be designed so that they meet the objectives set for them, including the intended learning outcomes. (…)
Guideline1.3 :
Student-centred learning, teaching and assessment *“(…) The assessment allows students to demonstrate the extent to which the intended learning outcomes have been achieved. (…)”*

Importance of QA for Leadership

Intended Learning outcomes = need of common language, need of common understanding

ILO = what a learner is supposed to know & be able to do after a successful study

Competence= ability to integrate knowledge, skills & attitude to be successful in a certain context

The ILO should become **LIVING** things that are formulated by the stakeholders concerned, shared by the whole team and shaping the teaching, learning and assessment practices & formats accordingly !

Importance of QA for Leadership

New competences needed:

- Communication, problem-solving, creativity, team-work
- Research skills, both academic as well as ‘applied and mixtures
- Inter-disciplinary but with skill and attitude to go deep in to a particular discipline
- Willingness to change, risk-taking, entrepreneurial
- ‘Global competences’ (e.g. computer skills)
- Visionary & inspirational leadership

Importance of QA for Leadership

ESG STANDARD 1.3.
Student-centred Learning, Teaching and Assessment
“Institutions should ensure that the programmes are delivered in a way that encourages
students to take an active role in creating the learning process, and that the assessment
of students reflects this approach.”

Importance of QA for Leadership

ESG STANDARD 1.3.
Student-centred Learning, Teaching and Assessment
The implementation of student-centred learning and teaching
-respects and attends to the diversity of students and their needs, enabling flexible learning paths;
-considers and uses different modes of delivery, where appropriate;
-flexibly uses a variety of pedagogical methods;
-encourages a sense of autonomy in the learning, while ensuring adequate guidance and support from the teacher; (…)

New definition of quality

• Quality, as defined by its stakeholders (= international minimal standards), is the added
value between input and output.
•Quality is the added value between the ILOs of the incoming student and those achieved by the outgoing student in relation to what all stakeholders want and need.

Thank you for attention!

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Institute of Industrial Electronics and Electrical Engineering