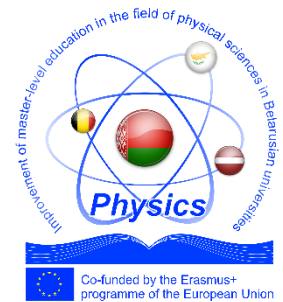




Co-funded by the  
Erasmus+ Programme  
of the European Union



# **Improvement of master level education in the field of physical sciences in Belarusian universities**

**Student's mobility and training event**  
**Riga Technical University 12/1, Azenes Street Riga, Latvia**  
**24th September – 7th October, 2017**



## RTU MAIN BUILDING

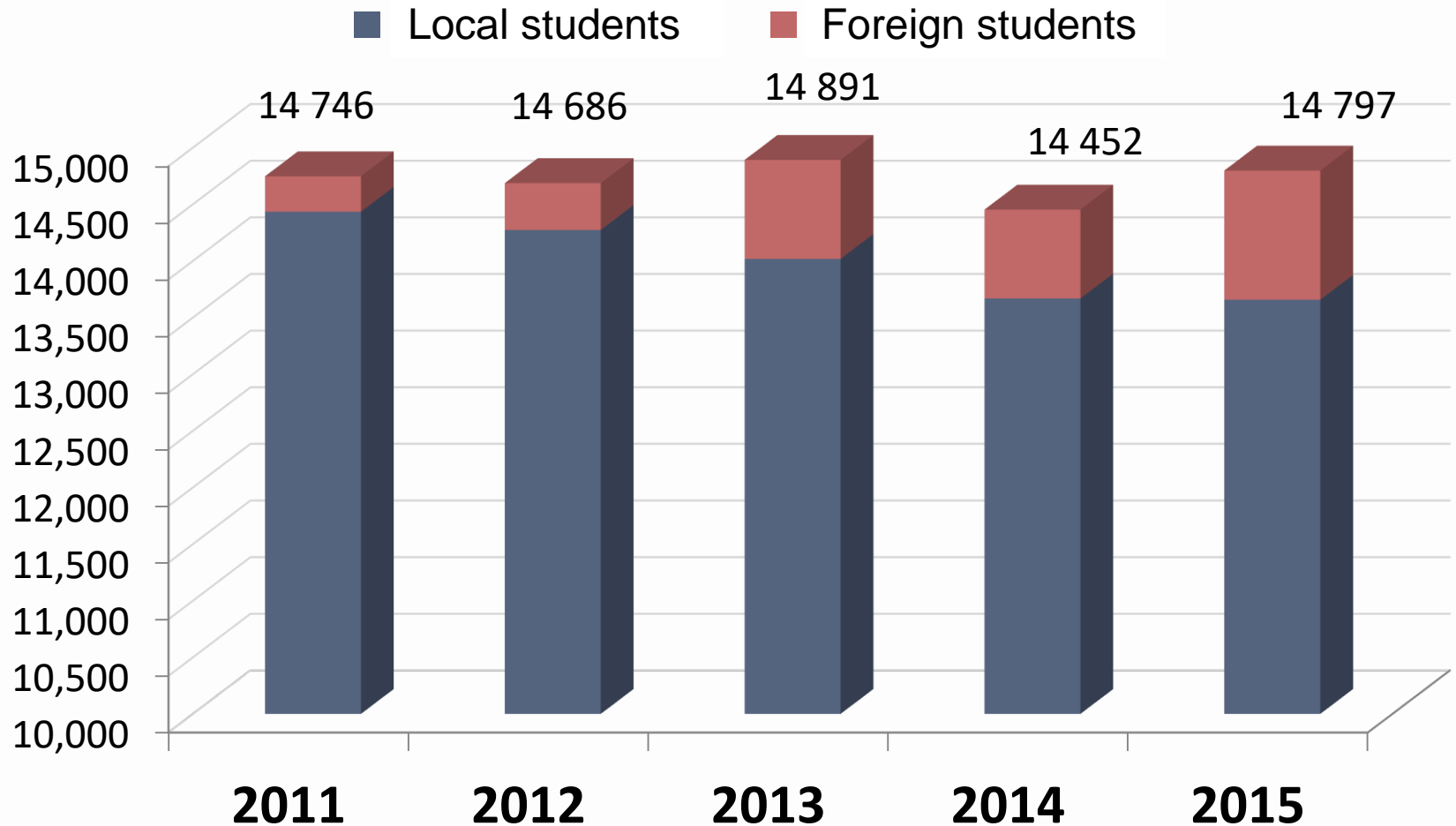
150 years old  
11 faculties and filials

## THE FACULTY OF POWER AND ELECTRICAL ENGINEERING

Most energy efficient building  
in Riga



# The number of students



# RTU research platforms

I. ENERGY AND ENVIRONMENT

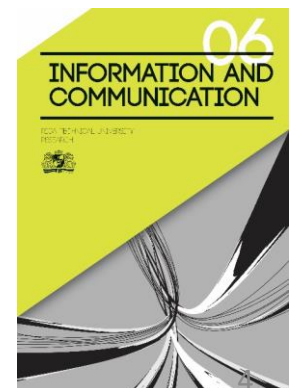
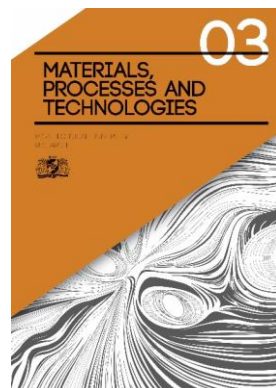
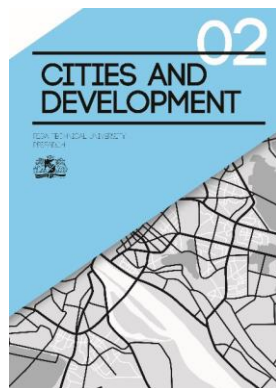
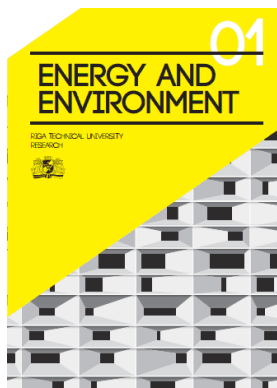
II. CITY AND THEIR DEVELOPMENT

III. INFORMATION AND COMMUNICATION TECHNOLOGIES

IV. TRANSPORTATION

V. MATERIALS, PROCESSES AND TECHNOLOGY

VI. SAFETY AND SECURITY



# PhD

RTU offers 21 doctoral programs in engineering, natural sciences, architecture, social sciences and services.

And the number of doctoral and **the number dissertations defended**

2011	489	59
2012	512	66
2013	484	65
2014	480	51
2015*	532	62*

\* Prognoze

No 01.01.2015. līdz šim aizstāvēti jau 54 promocijas darbi



# RTU infrastructure development in Kipsala







**New Scientific library building**

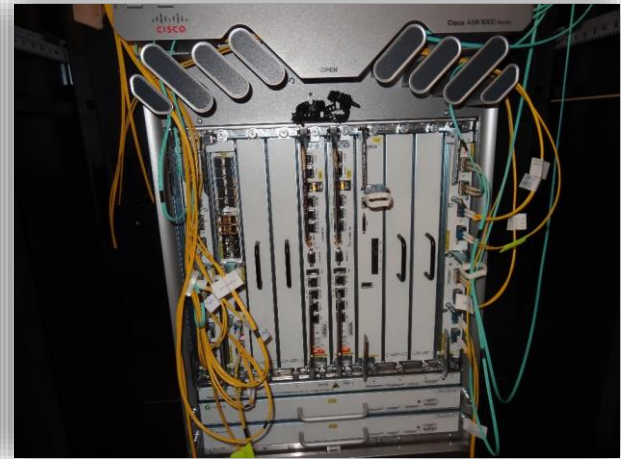


**Laboratory building**



**RTU Kipsala swimming pool**

# Academic Network of HPC (high-performance computer infrastructure) center





# RTU women's choir «DELTA» Concert noted the 55-year anniversary

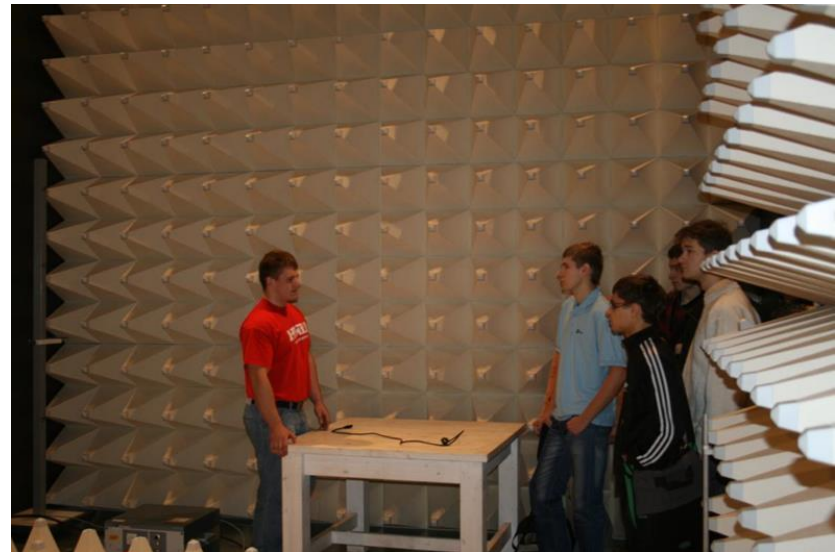


# **RTU graduates in politics after independence**

- Latvian President of the Republic - 1
- The Prime Ministers - 3
- Ministers - 19
- European Commission Vice-President - 1
- European Union members of parliament - 2
- Parliament members - 11



# Faculty of Power and Electrical Engineering



Electromagnetic Compatibility  
and Electric Security Research  
Centre



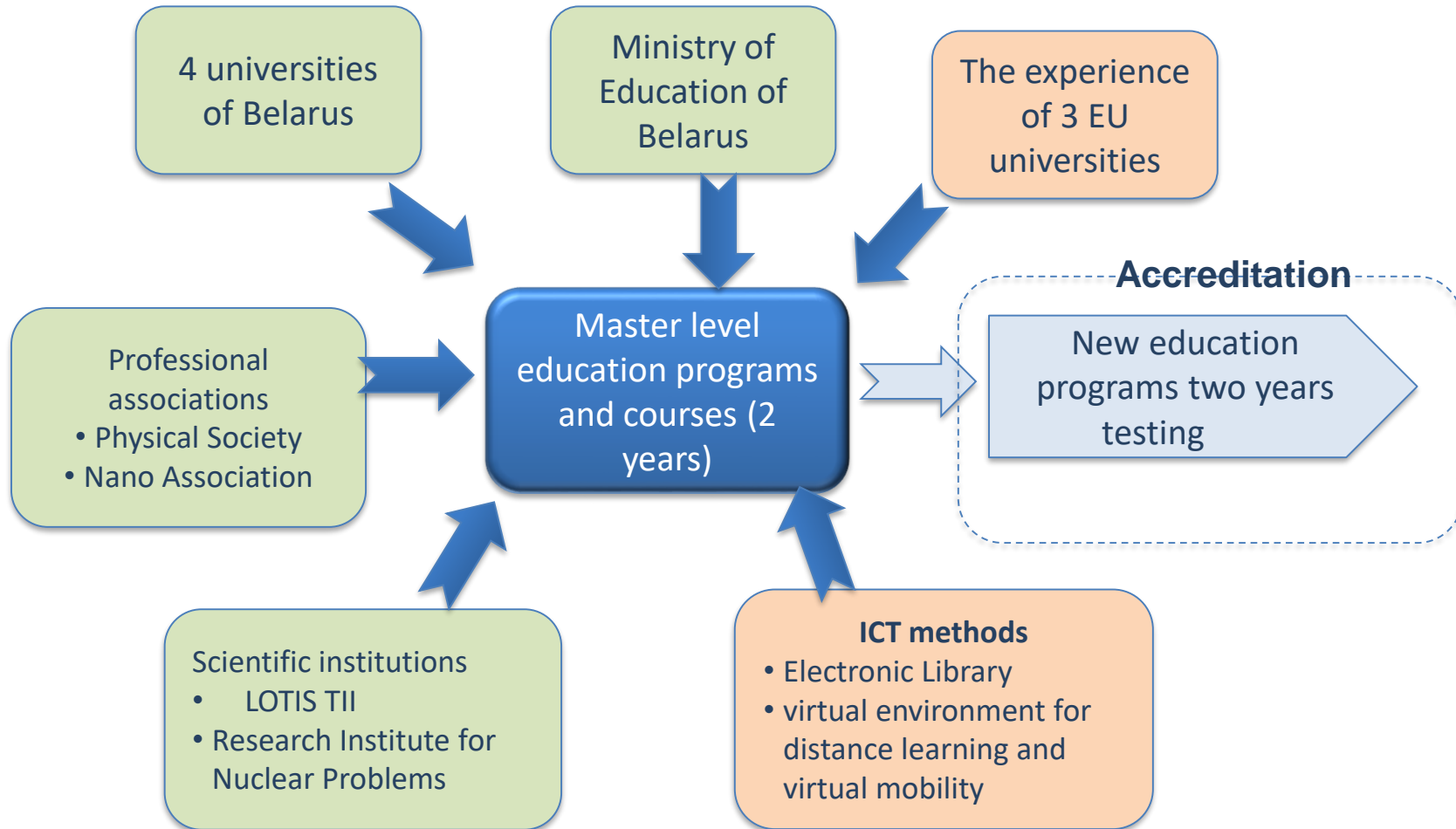
# **Institute of Industrial Electronics and Electrical Engineering main topics of research**

- ✓ Energy Saving
- ✓ Electric Drives, DC Traction Drives
- ✓ Converters, Power Electronics
- ✓ Hydrogen Power Electronic Converters
- ✓ Control and Regulation
- ✓ Signal transmitting
- ✓ Energy storages
- ✓ Electric transport
- ✓ Non-Destructive Testing using Capacitance Method
- ✓ Analysis and optimization of public transport

# European High Education Area

Goals Declaration	Objectives Measurable	Tools
Social Dimension  Citizen of Europe  Employability  Lifelong Learning	3 cycle  Learner centered Academic Recognition  Quality Assurance and Enhancement	<ul style="list-style-type: none"> <li>- Qualifications Framework</li> <li>- Learning Outcomes Levels</li> <li>- ECTS - European Credit Transfer and Accumulation System</li> <li>- Diploma Supplement</li> <li>- Credits and Grades</li> <li>- Common structure</li> <li>- Standards and Guidelines / Register</li> </ul>

# Project “Physics” Approach





# “Physics” objectives




- To develop *modern master-level programs* in the field of functional nanomaterials, photonics and applied physics, and to implement it at four Belorussian universities;
- To develop and update courses and teaching materials for two *master-level model educational programs* *Functional nanomaterials and Photonics*;
- To improve teachers’ qualifications and skills;
- To improve Belarusian academic staff competences for teaching of developed courses in English;
- To implement *modern technical infrastructure* for teaching and learning.
- To develop *innovative ICT based teaching and learning* environment;
- To bring the Higher Education Institutions of Belarusian *closer to the Labour Market needs*.



# Course books

1. Applied Physics (curator – KU Leuven)
2. Functional nanomaterials (curator – BSU)
3. Photonics (curator – BSU)
4. Applied Informatics (curator – RTU, *Nadezhda Kunicina*)
5. Research towards master thesis/ scientific project management (curator – The University of Cyprus)

# E-environment

<https://dl.bsu.by/?lang=en>

 Home  Dashboard  My Courses

 Hide blocks  Full screen

## My courses

### Research towards master thesis/ ...

This course is part of ERASMUS + project  
""Improvement of master-le...

 Galkina Alina

Course >

### Applied Informatics


This course is part of ERASMUS + project  
""Improvement of master-le...

 Galkina Alina

Course >

### Photonics


This course is part of ERASMUS + project  
""Improvement of master-le...

 Strekal Natallia

Course >

### Functional nanomaterials

This course is part of ERASMUS + project  
""Improvement of master-le...

 Fedotova Julia

Course >

### Applied Physics Chapters 1-3

This course is part of ERASMUS + project  
""Improvement of master-le...

 De Craemer Renaat

Course >

### Applied Physics Chapters 4-5

This course is part of ERASMUS + project  
""Improvement of master-le...

 De Craemer Renaat

Course >

### Documentation

This course is part of ERASMUS + project  
""Improvement of master-le...

 Galkina Alina

Course >

All courses



# E-environment

<https://dl.bsu.by/?lang=en>

dl.bsu.by

English (en)

My courses

Theme colours

This course

Competencies

Grades

FULL COURSE "APPLIED PHYSICS"

Chapter 1: Introduction to EMC

Chapter 2: Conducted emission measurements

Chapter 3: The use of a Faraday cage

Chapter 4: Radiated emission measurements

Chapter 5: Reliability and functional safety

Chapter 6: System theory

Chapter 7: State Space Analysis

Chapter 8: System Theory: DSP: Analog and digital

...

Chapter 9: EMC filters

Chapter 10: EMC/EMI demonstration box

Home

Dashboard

Calendar

Private files

My courses

Applied Informatics

Applied Physics ch.1-3

Applied Physics ch.4-5

FULL COURSE "APPLIED PHYSICS"

The full course on "applied physics" can be downloaded as a word document and as a pdf document.  
The document is the final draft version finalised end August 2017. The course needs to be evaluated and tested during academic year 2017-2018.  
The course material on "scanning electron microscopy" has been added as a separate document.

The full course on "Applied Physics": final draft (August 2017)

The full course on "Applied Physics": final draft (August 2017)

Section 4.7 "Scanning electron microscopy": final draft (Sept 2017)

Section 4.7 "Scanning electron microscopy": final draft (Sept 2017)

Chapter 1: Introduction to EMC

This folder contains the course documents (including some tests and multimedia materials) which provide the student an introduction to EMC.

ROADMAP

LEARNING OUTCOMES

PRE-REQUISITES

THEORETICAL LECTURE

OPEN-ENDED CHECK QUESTIONS

CLOSE-ENDED CHECK QUESTIONS

LEARNING TASKS

MOVIE

TROUBLE SHOOTING

Read carefully the document and try to understand the theoretical lecture "Introduction on EMC".

Have a look at the avi-file "Radiated immunity test".  
A thorough understanding of the topics visualised in the movie will be given in next chapters. The movie gives an idea of HALT and EMC measurements in the laboratory.

In this forum you can post your own questions concerning chapter 1 "Introduction to EMC".

Turn editing on

Users

Filters

Reports

Gradebook setup

Outcomes

Backup

Restore

Import

Reset

Question bank

Repositories

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FULL COURSE "APPLIED PHYSICS"

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Chapter 3: The use of a Faraday cage

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Chapter 4: Radiated emission measurem

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Chapter 5: Reliability and functional safe

6

Chapter 6: System theory

7

Chapter 7: State Space Analysis

8

Chapter 8: System Theory: DSP: Analog

9

Chapter 9: EMC filters

10

Chapter 10: EMC/EMI demonstration bo

ACTIVITIES

Assignments

Forums

Questionnaires

Quizzes

Resources

# Meetings and trainings

Place	Responsible	Meeting topics and responsible for the topics	Date
Minsk	Belarusian State University and Ministry of Education	WP5: Information sessions with stakeholders	September 20 <sup>th</sup> 2017
Riga	RTU	Students training in RTU (2 weeks)	September 24 <sup>th</sup> – October 7 <sup>th</sup> 2017
Riga	RTU	WS6: Workshops for curricula development. Courses acceptance and testing is started. MC5 meeting	November 30 <sup>th</sup> – December 1 <sup>st</sup> 2017
Riga	RTU	Teachers training in RTU (1 week)	February 5-9 <sup>th</sup> 2018
Nicosia	UCY	Students training in UCY (2 weeks)	February 2018
Minsk	GoSU/ BSU	WS7: WP2: Workshops for curricula development and testing MC6 meeting	April 12-13 <sup>th</sup> 2018
Nicosia	UCY	WS9: WP2: Workshops for curricula development. First testing results, acceptance.	June 27 - 28 <sup>th</sup>
Minsk	BSTU	Final conference	September 2018

# English language courses for teachers, June 2017





# Course program 1<sup>st</sup> week

Schedule	Activity	Responsible contact
Monday 25 <sup>th</sup> of September 9.00 – 12.00	Overview schedule + main goals of mobility program Scientific projects management	Dr. A.Zabasta Prof. N.Kunicina
Monday September 25 <sup>th</sup> 13.00 – 16.00	Short campus tour. Laboratory demonstrations: solar energy, wind energy, fuel cells A walk around Old Riga	Head of laboratories A. Avotins Prof. N.Kunicina, A.Zabašta
Tuesday, September 26 <sup>th</sup> 9.00 – 16.00	Prototype development	Prof. I. Galkins
Wednesday September 27 <sup>th</sup> 9.00 – 16.00	Prototype development	Prof. I. Galkins
Thursday September 28 <sup>th</sup> 9.00 – 16.00	Prototype development -EMC laboratory	Senior researcher G.Asmanis
Friday September 29 <sup>th</sup> 9.00 – 16.00	Prototype development -EMC laboratory	Senior researcher G.Asmanis

# Course program 2<sup>nd</sup> week

Schedule	Activity	Responsible contact
<b>Monday October 2<sup>nd</sup></b> <b>11.15 – 14.00</b>	Scientific – visit To Riga co - generation station Getlini	Project manager Arta Legzdina, Dr. A.Zabasta, Prof. N.Kunicina
<b>Tuesday October 3<sup>rd</sup></b> <b>9.00 – 16.00</b>	Lecture: the elements of automation theory	Prof. A. Ziravecka Prof. N.Kunicina
<b>Wednesday October 4<sup>th</sup></b> <b>9.00 – 12.00</b>	RTU common project with CERN Introduction to applied physics disciplines photonics and nanomaterials	Prof. P. Apse-Apsitis Belarusian State University and Belarusian Physics Society
<b>Wednesday October 4<sup>th</sup></b> <b>13.00 – 16.00</b>	New product development Prototype production	Prof. Elīna Gaile-Sarkane Prof. N.Kunicina, Prof. A. Ziravecka, Dr. A.Zabasta
<b>Thursday October 5<sup>th</sup></b> <b>9.00 – 12.00</b>	Introduction to applied physics disciplines photonics and nanomaterials	Belarusian State University and Belarusian Physics Society
<b>Thursday October 5<sup>th</sup></b> <b>13.00 – 16.00</b>	Prototype presentation preparation	Prof. N.Kunicina, Prof. A. Ziravecka, Dr. A.Zabasta
<b>Friday October 6<sup>th</sup></b> <b>9.00 – 16.00</b>	Presentation of prototype The end of the seminar	Prof. N.Kunicina Prof. A. Ziravecka, Dr. A.Zabasta

# Logistics

- **Access to Wi-Fi network:**

Username: viesis.viesis

Login: Viesis2017

- **Dropbox:** “Physics Students training in RTU September 2017”

- **WEB resources:** <http://physics.rtu.lv/documentation/> ;  
<https://dl.bsu.by/course/>

- **Food**

- A student canteen is allocated at the 1<sup>st</sup> floor of the Faculty of Power and Electrical Engineering, Azenes str. 12/1. Working time 8.00 – 17.00. Complex lunch: 2.80 and 3.00 euro per person.
- Shopping centre Olimpia across the street, where you can find a lot of café at the 2<sup>nd</sup> floor.

# RTU Team



**Nadezhda Kunicina,**  
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researcher  
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**Anatolijs Zabashta,** Dr.sc.ing.,  
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“Physics” coordinator  
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**Gundars Ashmanis,** Dr.sc.ing.,  
leading researcher



**Anastasija Žiravecka,**  
Professor, Dr.sc.ing., leading  
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**Elina Gaile-Sarkane,**  
Professor, Dr.sc.ing., Head  
of Senate of RTU



# RTU Team



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**Pēteris Apse Apsītis**, Associated  
Professor, Dr.sc.ing., leading  
researcher, Head of department



**Ilja Galkins**, Professor, Dr.sc.ing.,  
leading researcher