



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



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

**Seminar for teaching staff**  
**Riga Technical University 12/1, Azenes Street Riga, Latvia**  
**5<sup>th</sup> – 9<sup>th</sup> February, 2018**



## **RTU MAIN BUILDING**

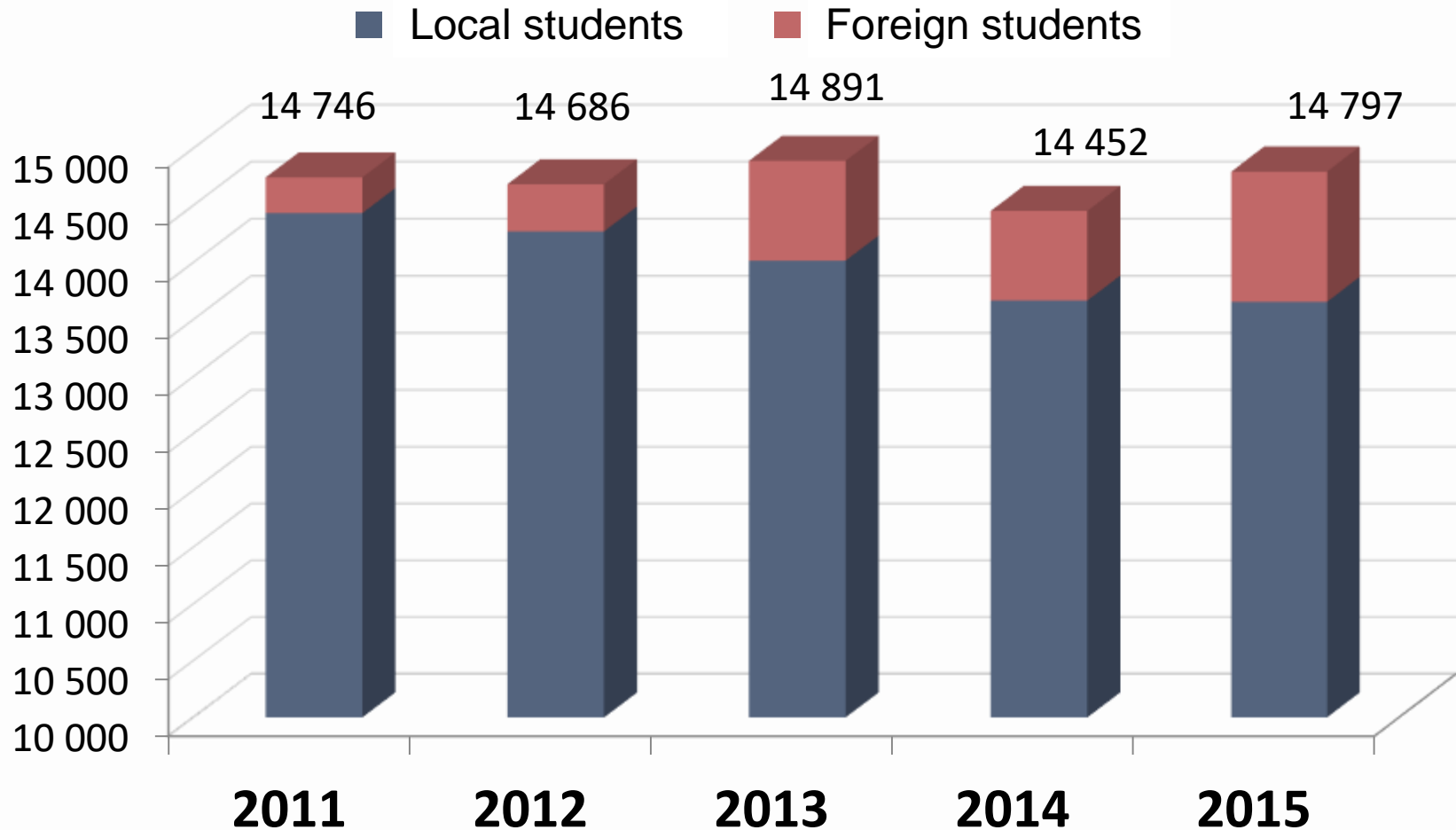
More than 150 years old  
11 faculties and filials

## **THE FACULTY OF POWER AND ELECTRICAL ENGINEERING**

Most energy efficient building  
in Riga



# The number of students



# RTU research platforms

I. ENERGY AND ENVIRONMENT

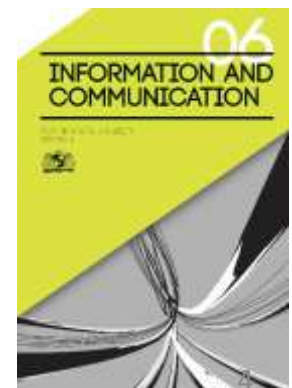
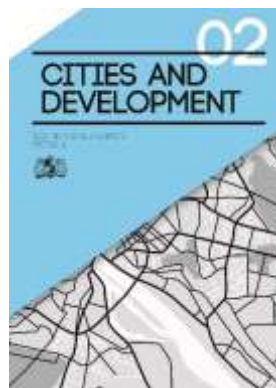
II. CITY AND THEIR DEVELOPMENT

III. INFORMATION AND COMMUNICATION TECHNOLOGIES

IV. TRANSPORTATION

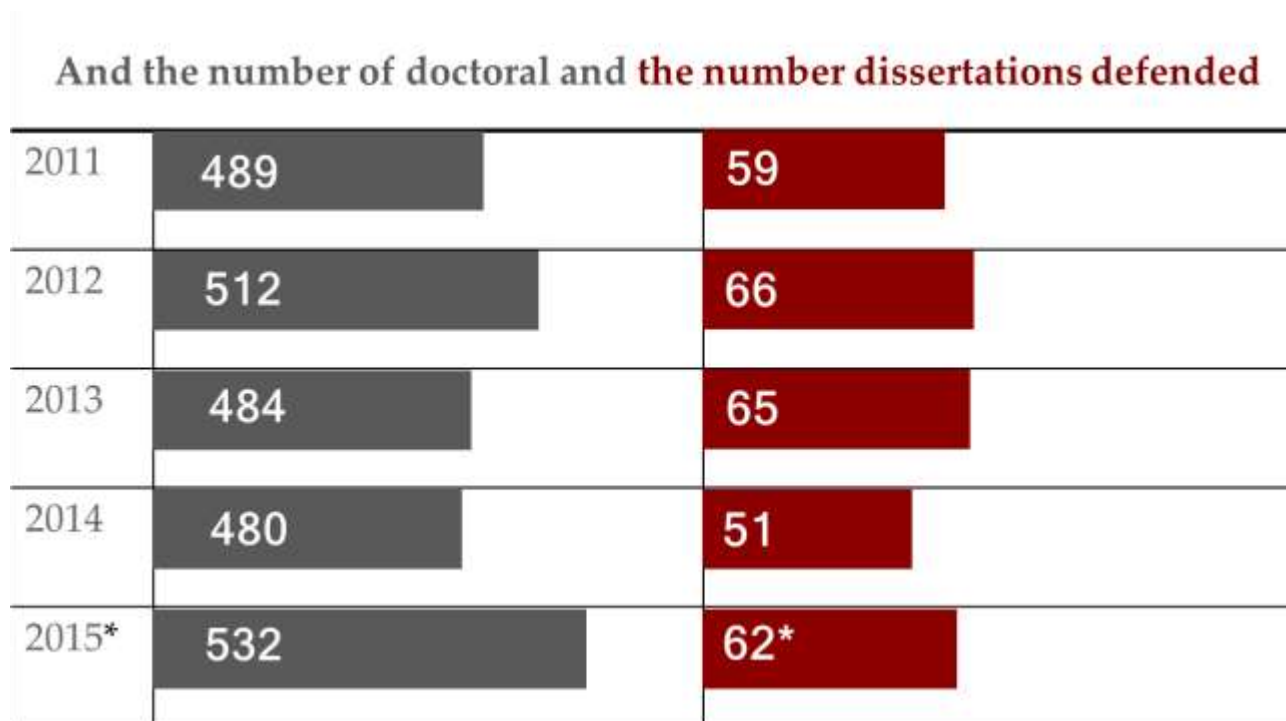
V. MATERIALS, PROCESSES AND TECHNOLOGY

VI. SAFETY AND SECURITY



# PhD

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



\* 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

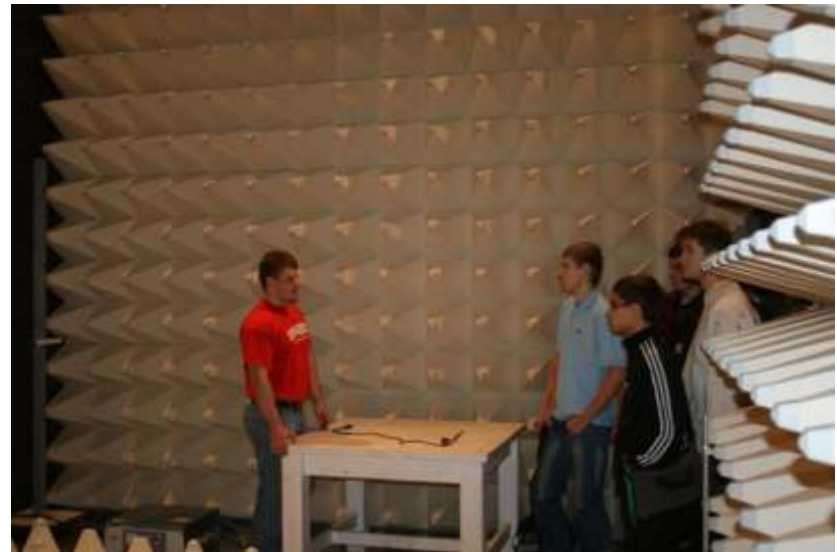


# **RTU graduates in politics after independence**

- 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



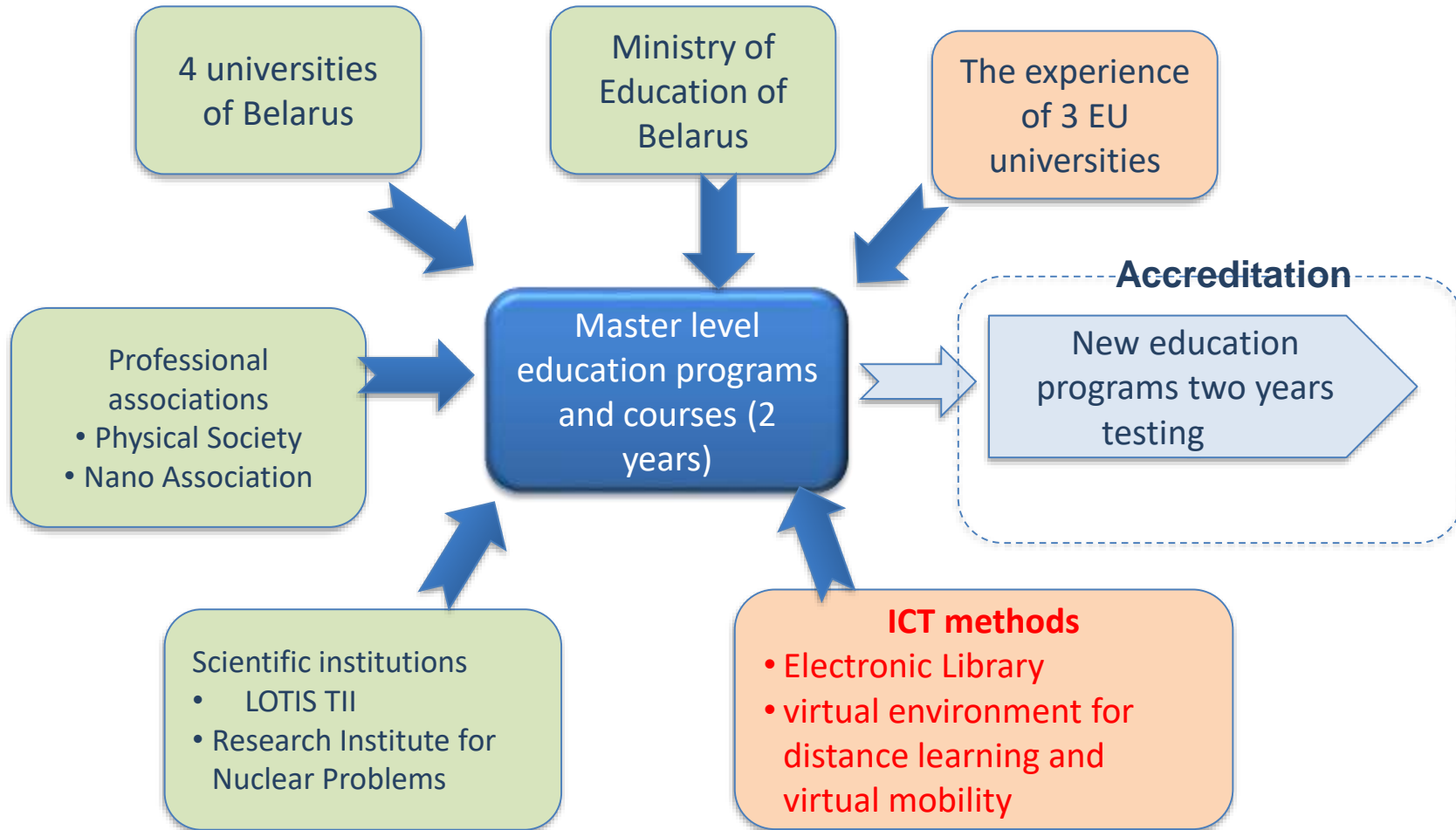
Electromagnetic Compatibility  
and Electric Security Research  
Centre



# **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

# Project “Physics” Approach



# “Physics” objectives

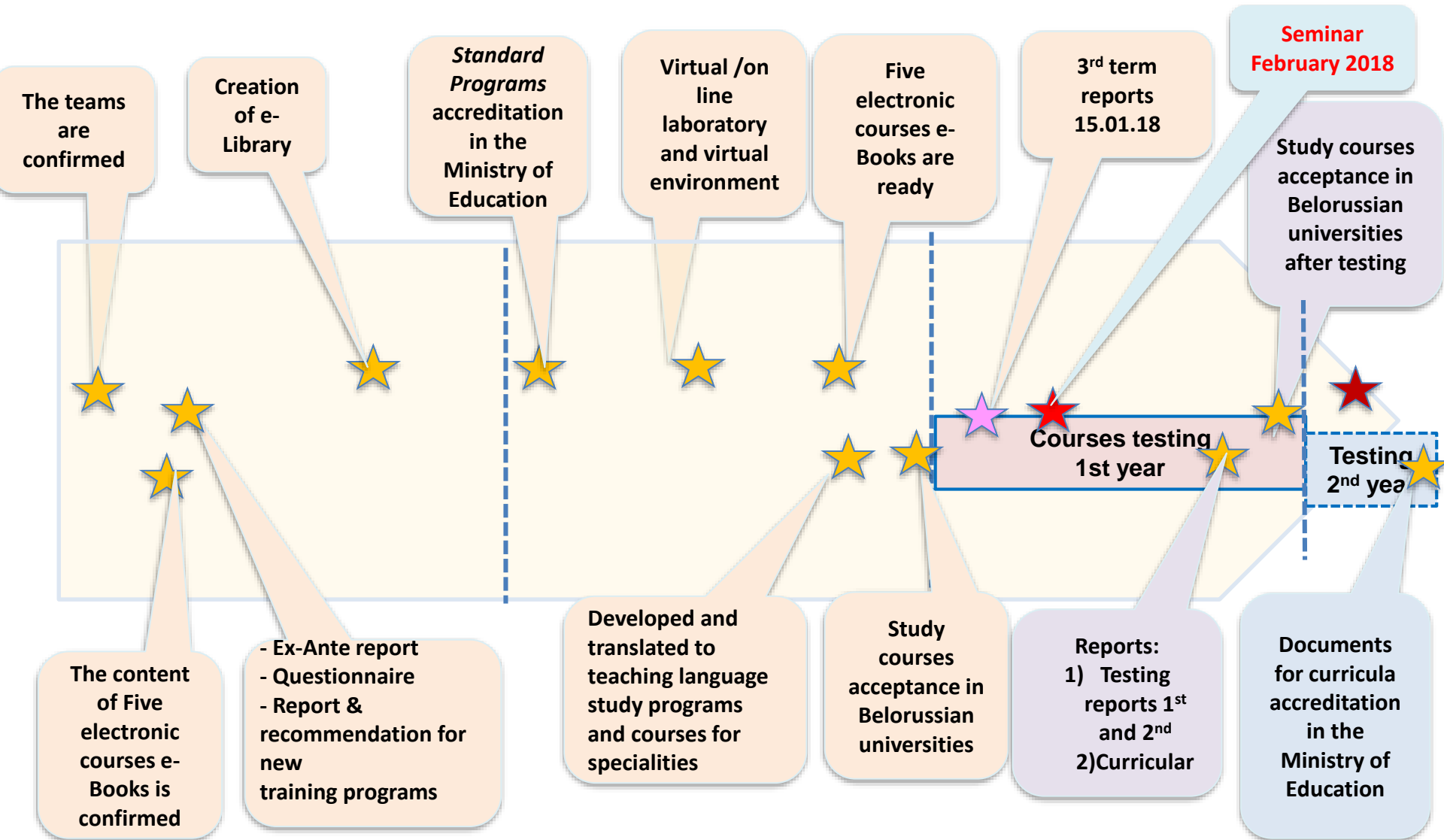
- To develop *modern master-level programs* in the field of functional nanomaterials, photonics and applied physics, and to implement it at four Belorussian universities;
- To develop and update courses and teaching materials for two *master-level model educational programs* *Functional nanomaterials 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)

# Deliverables schedule



# English language courses for teachers, June 2017





# Courses for students Oct 2017



# Courses for students Oct 2017



# Courses for students Oct 2017





# E-environment

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

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[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

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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

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Repositories

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FULL COURSE "APPLIED PHYSICS"

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Chapter 3: The use of a Faraday cage

Chapter 4: Radiated emission measurem

Chapter 5: Reliability and functional safe

Chapter 6: System theory

Chapter 7: State Space Analysis

Chapter 8: System Theory: DSP: Analog

filters

Chapter 9: EMC filters

Chapter 10: EMC/EMI demonstration bo

ACTIVITIES

Assignments

Forums

Questionnaires

Quizzes

Resources

# Meetings and trainings

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 2 weeks
Minsk	GoSU/BSU	WS7: WP2: Workshops for curricula development and testing.	April 12-13 <sup>th</sup> 2018
		MC6 meeting	
Nicosia	UCY	WS9: WP2: Workshops for curricula development. <i>First testing results, acceptance.</i>	June 27 - 28 <sup>th</sup> 2018
Minsk	BSTU	Final conference	September 12 <sup>th</sup> 2018

# Seminar schedule

Schedule		Activity	Responsible contact
<b>Monday</b> February 5 <sup>th</sup> 9.00 – 12.00	Āz. 12/1 - 319	Overview schedule + main goals of mobility program. Innovation Management Visit to RTU laboratories	Dr. A.Zabasta, Prof. N.Kunicina, Prof. A.Žiravecka, Doc. I.Buņina. Chief Lab. A.Avotiņš
Monday February 5 <sup>th</sup> 13.00 – 16.00, off.	Āz. 12/1 - 521	Dizaina Fabrika	N.Kunicina /A.Zabasta
<b>Tuesday,</b> February 6 <sup>th</sup> 9.00 – 12.00	Āz. 12/1 – 319	Active use of a digital learning environment: <ul style="list-style-type: none"> <li>a general explanation concerning electronic learning</li> <li>an explanation on Blackboard and Moodle</li> </ul>	Prof. Ioan Peuteman N.Kunicina
Tuesday, February 6 <sup>th</sup> 13.00 – 16.00	12:30 – 14:30 Āz. 12/1 – 522 14:30 – 16:30: Āz. 12/1 - 314	Active use of a digital learning environment: <ul style="list-style-type: none"> <li>the course on 'applied physics' as an example</li> <li>a hands-on part where the participants make their own course (with non-technical staff)</li> </ul>	Prof. Ioan Peuteman N.Kunicina



Schedule		Activity	Responsible contact
<b>Wednesday</b> February 7th 9.00 – 12.00,	Cesis campus	Visit to renewables laboratory, which is allocated in RTU filial in Cesis campus.	A.Žiravecka,
Wednesday February 7 <sup>th</sup> 13.00 – 16.00,	Cesis campus	Visit to renewables laboratory, which is allocated in RTU filial in Cesis campus.	A.Žiravecka,
<b>Thursday</b> February 8th 9.00 – 12.00,	Āz. 12/1 – 319 I.Buņina.	Гранулярные нано-композиты металл-полупроводник-диэлектрик  Магнетизм нано-структурированных композитов и многослойных материалов	Федотов А.К., БГУ.  Касюк Ю.В., Федотова Ю.А. НИИ ядерных проблем БГУ (эксперты РАНИ).
Thursday February 8th 13.00 – 16.00,	Āz. 12/1 – 319 I.Buņina.	Динамическая голография и ее применения  РАНИ: Современное состояние дел в области нано-технологий в Республике Беларусь»  Научные исследования и подготовка специалистов в области нано-технологий и нано-материалов в Белорусском государственном университете информатики и радиоэлектроники	Толстик А.Л., БГУ.  Труханов А.В. Республиканская ассоциация нано-индустрии (исполнительный директор РАНИ)  Борисенко В.Е., Белорусский государственный университет информатики и радиоэлектроники (эксперт РАНИ)

# Seminar schedule

Schedule		Activity	Responsible contact
<b>Friday</b> February 9th 9.00 – 12.00,	Āz. 12/1 – 319 A.Zabasta	Основы нано-фотоники Технологии формирования нано- композиционных покрытий Применение функциональных нано- материалов в полимерных композициях	Стрекаль Н.Д., Гродненский государственный университет. Купо А.Н., Гомельский государственный университет. Белорусский государственный технологический университет.
Friday February 9 <sup>th</sup> 13.00 – 16.00	Āz. 12/1 – 319 A.Zabasta	Round table	BSU, RANI, RTU

# Logistics

- **Laptops are necessary!**
- **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:**
  - **Coffee breaks** in the seminar rooms
  - **A student canteen** is allocated at the 1<sup>st</sup> floor of the Faculty of Power and Electrical Engineering. Working time 8.00 – 17.30. Complex lunch: 2.80 and 3.00 euro.
  - **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,**  
Professor, Dr.sc.ing., leading  
researcher  
[Nadezda.Kunicina@rtu.lv](mailto:Nadezda.Kunicina@rtu.lv)



**Ansis Avotiņš,** Chief of  
laboratories  
[Ansis.avotins@rtu.lv](mailto:Ansis.avotins@rtu.lv)



**Anatolijs Zabashta,** Dr.sc.ing.,  
MBA, leading researcher,  
“Physics” coordinator  
[Anatolijs.Zabasta@rtu.lv](mailto:Anatolijs.Zabasta@rtu.lv)



**Inna Bunina,** Docent, Dr.sc.ing.,  
[Inna.Bunina@rtu.lv](mailto:Inna.Bunina@rtu.lv)



**Anastasija Žiravecka,**  
Professor, Dr.sc.ing., leading  
researcher  
[Anastasija.Ziravecka@rtu.lv](mailto:Anastasija.Ziravecka@rtu.lv)