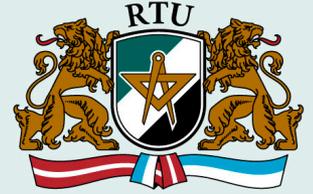


# Capacity building in the field of GNSS at the Riga Technical University

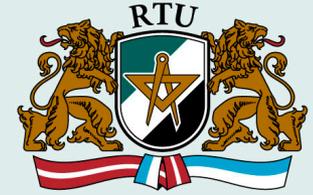
Janis Zvirgzds  
Riga Technical University  
Spatial and Regional research center

# Outline



- Riga Tehnical University from 1862
- Faculty of Civil Engineering
- Institute of Transport structures
- Geomatics division
- GNSS related programmms
- International cooperation
- Conclusions

# Riga Technical University



1862–1918 Riga Polytechnical Institute,



1919-1958 Part faculties joined University of Latvia

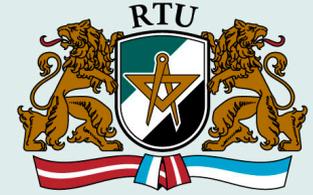


1958–present Riga Technical University,



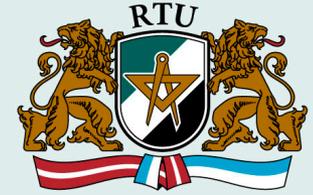
- Faculty of Architecture and Urban planning
- Faculty of **Building and Civil engineering**
- Faculty of Computer Science and Information Technology
- Faculty of Electronics and Telecommunications
- Faculty of Engineering economics
- Faculty of Materials Science and Applied Chemistry
- Faculty of Power and Electrical engineering
- Faculty of Transport and Mechanical engineering

# Faculty of Civil Engineering



- Heat, Gas, and Water Technology Institute;
- Institute of Building Production;
- Institute of Materials and Structures;
- Institute of Building and Reconstruction;
- **Institute of Transport Structures**

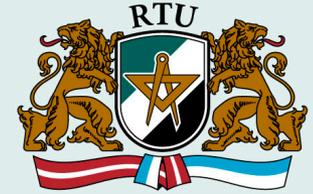
# Institute of Transport Structures



## Programmes:

- Civil Engineering
- **Geomatics**
- Heat, gas and water technology
- Transportation Engineering

# Geomatics



Dr. sc. ing.  
8 semesters



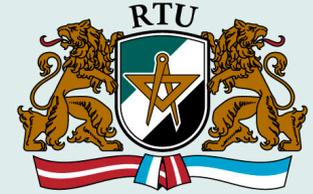
MEng  
3 semesters



BEng  
6 semesters



# Geomatics

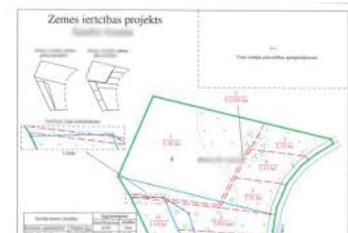


**Cartography**  
Cartography  
Geographical Information  
Systems  
Photogrammetry  
Remote Sensing  
Digital Mapping

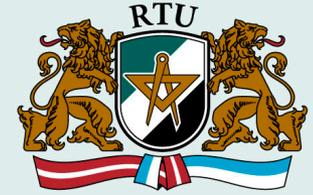
**GEOMATICS**

**Geodesy**  
Control Surveying  
Geodesy  
Land surveying  
Hydrography  
etc.

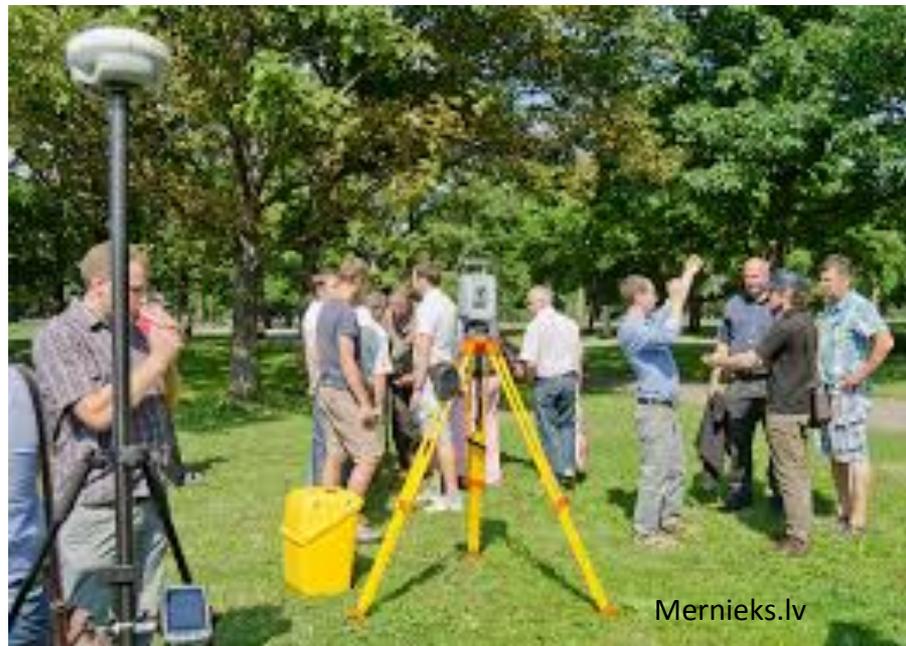
**Land management**  
Real Estate Valuation  
Land Law  
Territorial Planning  
Real Estate Cadastre  
etc.



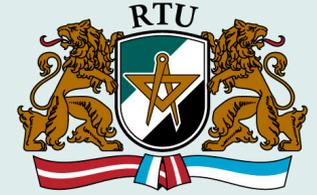
# GNSS programmms



- Global Positioning System Basics
- Global Positioning Systems
- Height determination with GPS



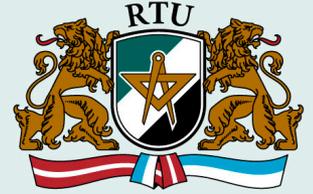
# Global Positioning System Basics



- Introduction. Control questions for point (on-site) survey methods.
- Insights Positioning System in the structure
- System of historical development and future trends
- Earth observation satellites (satellites), their orbits visibility
- Global positioning and navigational instruments and measurement techniques
- Global Positioning methods and geodetic networks
- Positioning methods in geodetic measurements
- Positioning methods in construction
- Legal documents and standards
- Practical work and tasks independently



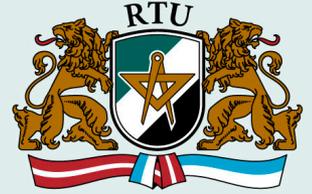
# Global Positioning Systems



- Introduction. Control questions for global positioning methods.
- Insights Positioning System structure.
- System user segment and future trends.
- Earth observation satellites (satellites), their orbits visibility.
- Global positioning and navigational instruments and measurement techniques.
- Global positioning system coordinates and time.
- Multiphase generators and signal access.
- Earth's atmospheric effects.
- Constructing mathematical models and analysis.
- Practical work and tasks independently.



# Height determination with GPS



- Introduction. Control questions for height reference surfaces.
- Preview of the height of the systems and their determination.
- Height conversions between systems.
- Quasigeoid model development and analysis.
- The High Court and Reduced global positioning measurements.
- Global positioning height detection comparison with instrumental methods.
- Altimetry calibration site.
- Latvian and international experience in the height determination with GPS.
- The height of the transfer (leveling) perspective with GPS.
- Practical work and tasks independently.



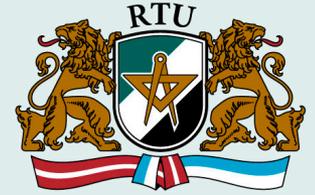
# Graduate papers of students



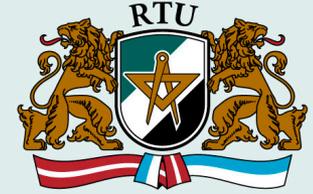
- April 2014. doctoral thesis «Determination methods of High-precision Latvian geoid model»
- Mg: The height model testing and evaluation
- Mg: GNSS support systems evaluation
- Bc: Troposphere and its effects on GNSS observations
- Mg: GNSS in marine navigation and shipping logistics problems
- Mg: Earth tides and their effect on the DGNSS positioning results
- Mg: Multiple radio signal reflection effect on measurements DGNSS
- Mg: Quasigeoid acquisition in Latvian southeastern part, varying with geodetic data



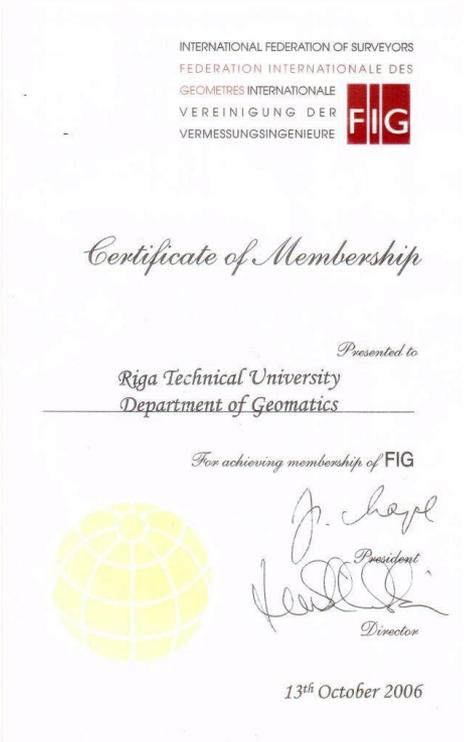
# International students



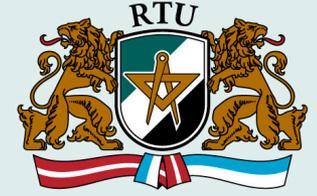
# International cooperation



- Member of FIG
- EUREF
- EUPOS



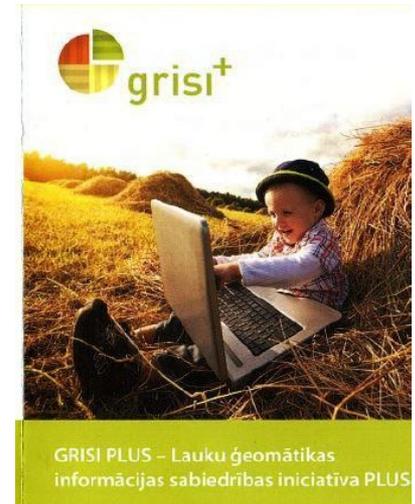
# Cooperation in projects



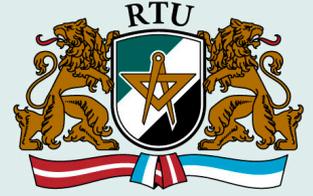
- grisi+ (GIS for countryside)
- Cooperation with Hochschule
- Karlsruhe (GNSS)
- Nord Plus project
- NGK summer schools



Hochschule Karlsruhe  
Technik und Wirtschaft  
UNIVERSITY OF APPLIED SCIENCES



# Conclusions



- Basics of systems
- Understanding how it works
- Expand international cooperation
- 15 students annually
- Special courses for surveyors  
(renew knowledge)



# Thank You for attention!

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