Kaunas University of Technology
Number of students: 9,818
- 7,311 undergraduates
- 2,190 master’s students
- 689 international students
- 317 PhD students

Alumni: ~130,000

Academic Staff: ~1,000
THE UNIVERSITY
KTU COMMUNITY

8 research institutes
2 valleys
4 campuses in 3 cities
9 faculties

Research institutes
• Biomedical Engineering Institute
• Food Institute
• Institute of Architecture and Construction
• Institute of Environmental Engineering
• Institute of Materials Science
• Institute of Mechatronics
• Prof. Kazimieras Baršauskas Ultrasound Research Institute
• Health Telematics Science Institute

Faculties
• Faculty of Chemical Technology
• School of Economics and Business
• Faculty of Electrical and Electronics Engineering
• Faculty of Informatics
• Faculty of Mathematics and Natural Sciences
• Faculty of Mechanical Engineering and Design
• Faculty of Social Sciences, Arts and Humanities
• Faculty of Civil Engineering and Architecture
• Panevezys Faculty of Technologies and Business
• ISM University of Management and Business, Vilnius
KTU WELCOMES STUDENTS

Study in English

- 16 BA programmes
- 25 MA programmes
- 19 PhD programmes
- 1 Integrated programme

47 BA study programmes
58 MA study programmes
19 PhD study programmes
1 Integrated study programme
**KTU PhD Programmes**

19 doctoral (PhD) programmes. Duration – 4 years.

<table>
<thead>
<tr>
<th>TECHNOLOGICAL SCIENCES</th>
<th>PHYSICAL SCIENCES</th>
<th>SOCIAL SCIENCES</th>
<th>HUMANITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical and Electronic Engineering</td>
<td>Chemistry</td>
<td>Political Sciences</td>
<td>History and Theory of Arts</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>Informatics</td>
<td>Management</td>
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</tr>
<tr>
<td>Transport Engineering</td>
<td>Physics</td>
<td>Economics</td>
<td></td>
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<tr>
<td>Environmental Engineering</td>
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<td>Sociology</td>
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<tr>
<td>Chemical Engineering</td>
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<td>Education</td>
<td></td>
</tr>
<tr>
<td>Energetics and Power Engineering</td>
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<tr>
<td>Informatics Engineering</td>
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<tr>
<td>Materials Engineering</td>
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<tr>
<td>Mechanical Engineering</td>
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<tr>
<td>Measurement Engineering</td>
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</tr>
</tbody>
</table>
KTU Joint / Double Degree PhD Programmes

Double degree PhD programmes in:

• **Electrical and Electronic Engineering** with Miguel Hernandez University of Elche, Spain.
• Environmental Engineering with University of Bologna, Italy.
• **Materials Engineering** with partners of Physics and Chemistry of Advanced Materials Network.
• Chemistry with Institute National Polytechnique of Toulouse, France.
• Chemical Engineering with Kosice Technical University, Slovakia.

Joint PhD programme in:

• **Physics** with University of Southern Denmark, Denmark. **Double degree** with Shizuoka University, Japan; Al-Farabi Kazakh National University, Kazakhstan.
• **Measurement Engineering** with National Structural Integrity Research Centre, United Kingdom.
KTU WELCOMES BUSINESS
OPEN TO BUSINESS

Numbers since 2012

- More than 15% international PhD students
- 20+ H2020 projects
- The first H2020 programme Spreading Excellence & Widening Participation Teaming and ERA-Chair projects in Lithuania
- Projects with CERN and ESA (European Space Agency)
- 100+ inventions and technologies
- 70+ international and Lithuanian patent
- 70+ startups
- ISO 5 standard clean room
<table>
<thead>
<tr>
<th>STUDY PROGRAMME COMMITTEE</th>
<th>UNIVERSITY PRIORITY RESEARCH DIRECTIONS</th>
<th>NATIONAL SMART SPECIALISATION</th>
<th>H2020 PRIORITY AREAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informatics Engineering</td>
<td>Automation, control and robotics</td>
<td>Smart transport systems and ICT</td>
<td>Smart systems and components</td>
</tr>
<tr>
<td></td>
<td>Internet-of-Things</td>
<td></td>
<td>Advanced computations and cloud computing (energetically effective computations)</td>
</tr>
<tr>
<td>Information Systems</td>
<td>System Engineering</td>
<td>Advanced e-content, technologies for the development and information exchange</td>
<td>E-content (data technologies)</td>
</tr>
<tr>
<td>Informatics</td>
<td>Multidisciplinary models</td>
<td>ICT infrastructures, cloud computing solutions and services</td>
<td>Advanced computations and cloud computing</td>
</tr>
<tr>
<td></td>
<td>System Engineering</td>
<td></td>
<td>E-content (multimedia)</td>
</tr>
<tr>
<td>Software Systems</td>
<td>Smart Environment and Information Technology</td>
<td></td>
<td>E-content (smart digital content, learning technologies, interfaces, gamification)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advanced e-content, technologies for the development and information exchange</td>
<td>Future internet (software technologies)</td>
</tr>
</tbody>
</table>
• Synthesis and applications of organic semiconductors for the energy generation devices and for the low energy consuming electronic devices, namely, organic and perovskite solar cells, organic light emitting diodes, organic thin-film transistors.

• Development of novel materials and devices based on nanocomposites, metamaterials, plasmonic materials etc. for the increased efficiency of renewable energy devices and power electronics.

• Developing of novel non-destructive analytical and diagnostic techniques for materials used in energy and electronics, including ultrasound, X-ray and optical spectroscopies and concentrating on exploitation conditions including harsh environment and other extreme conditions.
Direct femtosecond laser interference lithography ablation system for the dot-matrix holograms on a nickel foil

The project (a), rendered hologram image (b), camera image (c), dark field optical microscope micrograph with three different pitch grating zones (d) bright field image of a holo-pixel (e)

T. Tamulevičius et al. Submitted to Scientific Reports
Numerical analysis – far field

FDTD - the far field image of the angular reflectance spectra, air $\theta=10^\circ$

**Thermal Nano Imprint Lithography**

- **SiPol** thermoplastic resist (**SiPOL** is a silicon-containing thermal nanoimprint resist with a high oxygen plasma resistance)
- T-NIL HEX03 (Jenoptik)
- **RIE100** (Oxford Instruments) $O_2$ (DLC), $O_2$+Ar (DLC:Ag)

---

**Standard scheme**

1. Thermal Imprint
2. Removal of residual layer
3. Relief Amplification
4. Substrate Etching
5. Resist Removal

**Alternative scheme**

1. **DLC** Deposition
2. Resist Spincoating
3. Thermal Imprint (Incomplete Filling)
4. **DLC** Etching
5. Resist Removal

---

Magnetron sputtering of a-C:H:Cu/Ag nanocomposite thin films

Giant Negative Piezoresistive Effect in DLC and DLC: Ni Films

Diamond like carbon film by reactive magnetron sputtering of Ni target

Clustering of the sp2-bonded carbon and/or formation of areas with the decreased hydrogen content.
The tensile stress-induced rearrangements of these conglomerations have resulted in the increased conductivity paths.

Š.Meškinis et al ACS Appl. Mater. Interfaces 2018, 10, 15778−15785, DOI: 10.1021/acsami.7b17439
Microfluidic Mixer in Alumina employing Femtosecond Laser Ablation

CAPA of fluorescent polystyrene beads on PDMS

Assembly yield vs coordinate

\[
Y(x) = Y_{\text{min}} + \frac{Y_{\text{max}} - Y_{\text{min}}}{1 + e^{-k(x-x_0)}},
\]

Study. Learn. Create.

Dr. Leonas Balasevicius  +370 615 31969  |  leonas.balasevicius@ktu.lt  |  KTU
Doctoral School,
K. Donelaičio St. 73-422, LT-44029 Kaunas, Lithuania
Relevant Master‘s’s studies and research
Business Big Data Analytics
Graduate study programme

Interdisciplinary study programme

A02 Applied Mathematics (main field);
J01 Economics (supplementary field);
B01 Informatics (supplementary field);

Qualification degree:
Master of Mathematical Sciences
Business Big Data Analytics
Graduate study programme

The only one study programme in Lithuania for business big data analysis with strong engagement of industry partners to facilitate growing demand for the specialists in the field.

Practical seminars are conducted by Lithuanian and international experts from leading business companies (*Western Union*, *Adform*, *Barclays*, *Execaster*, etc.).

Case-based teaching and problem-based learning facilitates understanding of ongoing challenges and application of real-life solutions using Spark, Python, Scala, SAS, R software.

Duration: 2 (3) years, 120 ECTS
Place: Kaunas, Vilnius
## Business Big Data Analytics Programme structure

<table>
<thead>
<tr>
<th>Semester I</th>
<th>Semester II</th>
<th>Semester III</th>
<th>Semester IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Data Mining Methods 9 ECTS</td>
<td>Multivariate Statistical Analysis Models</td>
<td>Information Systems Requirements Analysis and Specification</td>
<td>Final Degree Project 30 ECTS</td>
</tr>
<tr>
<td>Strategic Business Analysis 9 ECTS</td>
<td>Project of Business Internal Data Analytics</td>
<td>Project of Business External Data Analytics 6 ECTS</td>
<td></td>
</tr>
<tr>
<td>Seminar on Big Data Analysis and Application 6 ECTS</td>
<td>Optimization and Decision Making 6 ECTS</td>
<td>Business Risk and Uncertainty Analytics 6 ECTS</td>
<td></td>
</tr>
<tr>
<td>Matrix Analysis 6 ECTS</td>
<td>Electives I 9 ECTS</td>
<td>Electives II 6 ECTS</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electives III 6 ECTS</td>
<td></td>
</tr>
</tbody>
</table>

**ECTS**

- Big Data Mining Methods: 9 ECTS
- Multivariate Statistical Analysis Models: 9 ECTS
- Information Systems Requirements Analysis and Specification: 6 ECTS
- Project of Business Internal Data Analytics: 6 ECTS
- Optimization and Decision Making: 6 ECTS
- Electives I: 9 ECTS
- Electives II: 6 ECTS
- Electives III: 6 ECTS
- Final Degree Project: 30 ECTS
Business Big Data Analytics Programme structure

**Electives I**
Analytics of Finance and Accounting Data
Business Logistics Analytics
Marketing Decisions Modeling

**Electives II**
Time Series Analysis
Financial Markets Models

**Electives III**
- Big Data Analytic Tools
- Financial Management Decisions
- Business Process Modelling
- Consumer Analytics
- Tax System Simulation
- Metadata Analysis and Information Portals
- Business Information Technology
Business Big Data Analytics
Graduate study programme

Teaching staff:

8 Professors, 13 Associate professors, 5 lecturers with PhD degree.
+
International teaching staff:

Dr. D. Hulme, ULC University, UK,
Prof. dr. M. A. F. Sanjuán, University Rey Juan Carlos (URJC), Spain
R. Siaurusevičiūtė, American Express, USA
Dr. A. Burauskaitė-Harju, FM Försäkringsmatematik, Sweden
Dr. K. Bloutsos, Ernst and Young, Greece
Business Big Data Analytics
Graduate study programme

Teaching staff – experts from business

E. Ramanauskienė (Inspection Department Director, State Tax Inspectorate).
D. Aliulis (Data Scientist & Engineer, DATA DOG).
A. Mikšys (Chief analyst at Bank of Lithuania).

D. Butrimas (CEO, UAB „S2P“ Solutions to Perform).
A. Galinskis (Data Analytics Manager, WU).
G. Paškevičius (Head of CVM Data and System Development Department Swedbank Baltic Banking).
Š. Chomentauskas (CEO, Exacaster).
R. Balukonis (IT System Engineer, Adform).
V. Indilas (Senior Data Scientist, Adform).
Business Big Data Analytics
Graduate study programme

Posdoctoral fellow

Dr. Tomas lešmantas (2016-2018).
Work subject is related to these important research fields:
1. Advanced medical engineering for early diagnostics and treatment;
2. Smart systems diagnostic, monitoring, metering and management of complex systems;
Business Big Data Analytics
Graduate study programme

Teachers training

Annual International Winter School on Big Data/ Rovira i Virgili University, Spain 2016 – Dr. M. Kavaliauskas (MGMF)
Annual International Winter School on Big Data/ University of Bari "Aldo Moro", Italy 2017 – Dr. M. Kavaliauskas (MGMF), Dr. A. Kabašinskas (MGMF), Dr. L. Girdauskienė (EVF)
Business Big Data Analytics
Graduate study programme

Events

- 61st Meeting of EURO Working Group for Commodities and Financial Modelling, 16-18 MAY 2018, Kaunas, Lithuania.

This conference #ewgcfm2018 brings together scientific experts on financial modelling, statistics and economics, decision-making analysis and methods, FinTech and Blockchain, LittleData to BigData in finance and investment, game theory and mathematical economics, banking, insurance, pension planning, pricing and hedging of derivatives, credit and systemic risk, application of OR methods in finance etc.
The conference was organized by the Faculty of Mathematics and Natural Sciences, Kaunas University of Technology together with EURO Working Group for Commodities and Financial Modelling (EWGCFM).
Business Big Data Analytics
Graduate study programme

Upcoming event

• KTU Big Data School 2018 / September 26-28, 2018, Kaunas

KTU Big Data School is an international event focused on the development of knowledge and skills in the field of big data of scientists and experts from business. The event brings together the best specialists from all over Europe to share their experience with Lithuanian students and professionals.
Informatics

Master’s Study programme: Informatics (in English)

Main programme topics:

**Algorithms:** Algorithms and Data Structures in Computational Systems, Modells and Algorithms of Physically Based Behavior;

**ML:** Computational Intelligence and Decision Making, Cryptographic Systems;

**HPC:** Cloud Computing Services.

**Data analytics:** Data mining, Approximation and Visualization of Objects, Optimization Techniques and Algorithms.

*Informatics could cover a 2 semester span of joint Master study programme.*

*Topics may also cover Ph.D. topics and internships.*
Materials Science

- Develops research skills, deep theoretical and experimental knowledge of material composition and improvement of their characteristics, knowledge of methodology and technique for technological measurements of materials, processing and analysis of experimental results, knowledge of application of high technologies (micro- and nanotechnologies) in materials science.

- The programme combines fundamental and engineering studies, and enables the graduates to create and apply functional materials and technologies of their production.

- KTU research in materials science is recognised internationally, and the research outcomes are applied in industry, e.g. to create scales for precision laser measurement systems.

- KTU cooperates with leading international organisations: Inter-Academia, Federation of European Materials Society, Physics and Chemistry of Advanced Materials, etc.
Materials Science Subjects

**Materials technologies** – surface engineering, micro- and nanotechnologies, physical-plasma technologies;

**Objects** – nano-derivatives and micro-derivatives, biomaterials, nanostructures, films;

**Groups of materials** – semiconductors, ceramics, polymers, metals, composites;

**Materials** – composition, characteristics, change of composition, processes, creation, application.
Medical Physics at KTU

MSc study program „Medical Physics“

• program related to particle physics, nuclear physics and accelerator applications;
• implemented in collaboration with Lithuanian University of Health Sciences and University Hospital Kauno klinikos).

Research group „Radiation and medical physics“

• development of detector materials, detection methods and detectors for registration of ionizing radiation (medical applications);
• dosimetry issues in accelerator therapy, brachytherapy, PET

Responsible person: prof. Diana Adlienė
<table>
<thead>
<tr>
<th>Code</th>
<th>Course</th>
<th>Cr.</th>
<th>Contact hrs</th>
<th>Semester</th>
<th>Coordinating Lecturer</th>
<th>REMARKS</th>
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</thead>
<tbody>
<tr>
<td>B140M006</td>
<td>Radiation Protection and Safety</td>
<td>6</td>
<td>64</td>
<td>x</td>
<td>Prof. D. Adlienė</td>
<td>PP, NP</td>
</tr>
<tr>
<td>B145M002</td>
<td>Radiobiology and Mathematical Modelling</td>
<td>6</td>
<td>64</td>
<td>x</td>
<td>Prof. D. Adlienė, Assoc. Prof. K. Sutienė</td>
<td>PP, NP</td>
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<tr>
<td>B470M001</td>
<td>Fundamentals of Human Anatomy and Physiology</td>
<td>6</td>
<td>64</td>
<td>x</td>
<td>Assoc. prof. A. Dabužinskienė</td>
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<tr>
<td>P220M001</td>
<td>Radiation interaction with matter</td>
<td>6</td>
<td>64</td>
<td>x</td>
<td>Prof. L. Marcinauskas</td>
<td>PP, NP</td>
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<tr>
<td>B140M001</td>
<td>Medical Imaging</td>
<td>6</td>
<td>48</td>
<td>x</td>
<td>Assoc. Prof. D. Jegelevičius</td>
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<tr>
<td>T111M165</td>
<td>Image Analysis and Recognition</td>
<td>6</td>
<td>64</td>
<td>x</td>
<td>Prof. A. Dosinas</td>
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<tr>
<td>T160M004</td>
<td>Radiation Detectors and Measurements</td>
<td>6</td>
<td>64</td>
<td>x</td>
<td>Prof. D. Adlienė</td>
<td>Medical detectors for registration of ionizing radiation</td>
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<tr>
<td>B140M100</td>
<td>Applied Physics of Non-Ionizing Radiation</td>
<td>6</td>
<td>64</td>
<td>x</td>
<td>Assoc. Prof. V. Minialga</td>
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<tr>
<td>B140M003</td>
<td>Diagnostic Radiation Physics</td>
<td>6</td>
<td>64</td>
<td>x</td>
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<tr>
<td>B140M004</td>
<td>Radiation Therapy Physics</td>
<td>9</td>
<td>112</td>
<td>x</td>
<td>Dr. J. Laurikaitienė, prof.D. Adlienė</td>
<td>AT, NP</td>
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<tr>
<td>B145M010</td>
<td>Applied Radionuclide Physics</td>
<td>3</td>
<td>32</td>
<td>x</td>
<td>Assoc. Prof. J. Puišo</td>
<td></td>
</tr>
</tbody>
</table>

**Core and Compulsory Subjects**

- Integrated clinical/practical semester: Lectures and practical work are performed in clinical environment.
- Detection and treatment of lesions (especially cancer) using ionizing radiation (particles and photons). Technologies: linear accelerators, nuclear medicine, PET (Cyclotron in the nearest future)
- **SUBJECT FOR COLLABORATION WITH CERN (practical semester at CERN integrated into program curriculum)**

**Total of Credits:** 66 24 18 24

<table>
<thead>
<tr>
<th>Code</th>
<th>Research Project 1</th>
<th>6</th>
<th>x</th>
<th>Prof. D. Adlienė</th>
<th>PP, NP, AT</th>
<th>Research work is related to clinical environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>B000M002</td>
<td>Research Project 2</td>
<td>6</td>
<td>x</td>
<td>Prof. D. Adlienė</td>
<td></td>
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<tr>
<td>B000M003</td>
<td>Research Project 3</td>
<td>6</td>
<td>x</td>
<td>Prof. D. Adlienė</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Research Project and Optional Subjects**

**Total of Credits:** 24 6 12 6

| Code         | Final Degree Project                             | 30  | x        | Prof. D. Adlienė, prof. D. Adlienė     | PP, NP, AT | MSc thesis is focused on clinical applications    |

**Final Degree Project**

**Total of Credits:** 30

**Total of Credits**

| Per Study Programme and per Semester | 120 | 30 | 30 | 30 | 30 |

**PP** - Particle physics; **NP** - Nuclear physics; **AT** – Accelerator technologies
KTU Biomedical Engineering Institute

- **Mission** - to create technology based solutions to health care challenges in the face of rapidly ageing society.

- **Statistics:**
  - 15 team members
  - 33 EU/LT projects
  - >50 publications in IF journals

- **Director:**
  - Vaidotas Marozas, PhD
  - Email: vaidotas.marozas@ktu.lt
  - Google Scholar: https://scholar.google.lt/citations?user=yQcWpoIAAAAJ&hl=lt&oi=ao
Relevant expertise

- Deep knowledge of physiological signals and sensors
  - ECG, EMG, PPG, IPG, GSR, ACC, ...
- Signal acquisition systems
  - unobtrusive, wearable, wireless
- Long-term physiological signals ("big data")
  - > 1 month
- Signal processing algorithms & signal based biomarkers, e.g.:
  - life-long atrial fibrillation episode pattern characterization
  - physical activity pattern characterization for motivation of lifestyle changes
Focus – applications of electronics engineering and IT to:
- biomedical sensing and sensors
- processing of biomedical signals and images
- personal health devices

Statistics:
- Alumni (from 2005) – 122
  - PhD’s and PhD candidates - 24
KTU WELCOMES STUDENTS
GRADUATE PROGRAMMES

MA+ Competences

Unique in Lithuania, the MA+ model allows students either to master the chosen discipline by choosing the Field Expert track or to strengthen interdisciplinary skills.
Dr. Jurgita Vizgirdaitė
Director, Department of Study Quality Assurance and Development
Kaunas University of Technology
K. Donelaičio St. 73 - 412, LT-44029, Kaunas, Lithuania
+370 620 76 841  I jurgita.vizgirdaite@ktu.lt