UNIVERSITY OF TARTU
1632

- *Unique program in Europe*
- *Scholarships and stipends*
- *Internships*

Master of Science in Engineering

APPLIED MEASUREMENT SCIENCE

In 2008 "Chemistry Euromaster" quality label was awarded to the international consortium "Measurement Science in Chemistry", uniting nine European universities, and coordinated by the University of Tartu.

This Master's degree program has been selected by the Estonian Ministry of Education and Research as one of the winners of the 2007 national competition of the most attractive international Master's programs in Estonia.

Learn from the leading Estonian and European experts:

- **Physical and chemical measurements**
- **Quality systems**
- **Economic and legal aspects**
- **Internship**
- **Instruction in English**
- **International teaching staff**
- **Program duration – 2 years**
- **Possibility of credit transfer**

Excellent international career prospects:

- **R&D departments of major companies**
- **Chemical industry labs**
- **Pharmaceutical industry labs**
- **Health and environmental protection agencies**
- **Food processing and manufacturing quality assurance labs**
- **Certification, standardization and accreditation authorities**
- **National Centers and Institutes of Metrology**
- **Academic career and PhD studies**

http://www.ut.ee/ams

Measurement Science

What is measurement science?

Measurements must be considered in the broadest sense and have very many applications:

- toxic metals in drinking water;
- cholesterol level in blood;
- strength of construction materials;
- protein content in wheat;
- octane number of gasoline.

Why is measurement science important?

Importance of measurements is enormous for economy, society, medical sciences and much more:

- 40% of the EU directives involve measurements
- Critical economical, social, medical decisions are based on results of measurements
- Estimated direct annual spending on measurements is 80 billion EUR or 1% of the GDP in Europe

Incorrect measurements may result in direct loss of profit, death of patient, failure of equipment, etc. Wrong measurements can also cause incorrect environment protection measures, inefficient business plans, and other indirect losses.

Practical application example:
BSE (mad cow disease)

- Constant monitoring is necessary: it is critical to test and isolate BSE-positive animals
- 170 000 BSE tests per week were done around Europe for monitoring the disease during the peak of the BSE crisis in 2001

The key to business success, healthier foods, cleaner and better environment, more reliable medicines is in having educated workers and managers in laboratories. This is exactly what this Master's program provides.

Professor Ivo Leito, PhD, program director
University of Tartu Professor of Analytical Chemistry, Estonian Representative in EUROMET- MetChem

The importance of measurements and analyses is constantly increasing. More and more legal acts are issued that require measurement and testing. Fully functional quality systems accredited according to international standards like ISO/IEC 17025:2005 or GLP is now a must in most industries.

Merit Huopolainen
MSc student at UT
Institute of Chemistry

The high quality of education at the University of Tartu and practical experience I gained through internship have enabled me to get a job already in the second year of my master studies here. I now work for the Food Monitoring Laboratory of Estonian Health Protection Inspectorate.

Erko Jakobson
PhD student at UT
Institute of Physics

UT Testing Centre provides calibration and measurement services to industry enterprises and has regular contacts with laboratories around Europe. I believe I get first-class hands-on education here and have great career prospects and job opportunities.

MEASUREMENT SCIENCE IN CHEMISTRY

International Consortium "Measurement Science in Chemistry"

The consortium unites nine European universities teaching programs in Measurement Science in Chemistry. Participants of the Master's program at the University of Tartu have an opportunity to study for one semester at one of the partner universities:

University of Tartu (Estonia) - coordinating member
University of Warsaw (Poland)
Adam Mickiewicz University (Poland)
Maria Curie-Skłodowska University (Poland)
Université de Lyon (France)
University of Lisbon (Portugal)
University of Bucharest (Romania)
South-West University "Neofit Rilski" (Bulgaria)
University of Maribor (Slovenia)

Mentor-organization:
EC JRC Institute for Reference Materials and Measurements

Additional information:

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Telephone +(372) 737 6109
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studyinfo@ut.ee

PROGRAM DESCRIPTION

Curriculum structure:

Compulsory courses	45 ECTS
Elective courses	30 ECTS
Optional subjects	6 ECTS
Internship	9 ECTS
Master's thesis	30 ECTS
TOTAL	**120 ECTS**

Compulsory courses:

Fundamentals of Metrology
Metrology in Chemistry
Measuring and Instrumentation
Measurement Data Processing
Practical Chemical Analysis
Quality Systems
Practical Works on Physical Measurement and Calibration
Practical Works in Chemical Analysis and Metrology
Master Seminar in Measurement Science

Elective courses:

Materials Characterization and Testing Methods
Structural Analysis I
Measurements in Biochemistry
Measurements and the Law
Economic Aspects of Measurements
Environment and Measurements
Electrochemical Methods for Quantitative Analysis
Signal Processing
Chemometrics

Language of instruction: English

Program duration: 2 years

- possibility of credit transfer is available to graduates with a 4-year Bachelor`s diploma or equivalent;
- recognition of prior work experience is available to applicants with substantial work experience in the field.

Internship:

During the program students will be placed in companies and laboratories like Metrosert AS, Estiko AS, Mayeri Industries AS, Laboratories of the Estonian Health Protection Inspectorate, Estonian Veterinary and Food Laboratories, State Agency of Medicines, Estonian Accreditation Centre. Internships last 4-6 weeks and are intended for participants to gain practical experience.

Tuition fees and scholarships:

Regular program fee is 4430 EUR/year and covers tuition, teaching materials, supervision and advising of thesis preparation.
Program offers a number of scholarships that cover full tuition fee for two years of the program (8860 EUR). These scholarships will be awarded to academically best applicants based on results of their Bachelor studies. In addition a monthly stipend (255 EUR/month during Sept-May) will be granted to students with the best current academic standing.

Teaching staff:

Lectures and courses in the program are delivered by some of the leading Estonian and European experts: prof. Ivo Leito, Estonian national representative at EUROMET-MetChem; prof. Paul De Bièvre, Editor-in-chief *of Accreditation and Quality Assurance* journal; prof. Nineta Majcen, Director of the Slovenian National Metrology Institute; prof. Philip Taylor, Head of the Isotope Measurements Unit of the IRMM.

APPLICATION INFORMATION

Who should apply to the program:

- Graduates with Bachelor's degrees in physics, chemistry, materials science, natural sciences, engineering, technology or medicine.
- Practitioners in analysis and measurement laboratories who are facing the fast development of analytical methods and new regulations (Quality systems, ISO 17025 accreditation).
- Personnel of laboratories, accreditation, certification and inspection agencies.
- Quality managers in various industries.

General admission requirements:

- Bachelor's degree (or equivalent) in the field of exact or natural sciences, technology, engineering or medicine.
- Applicants must have completed 18 ECTS in physics or chemistry in prior learning periods (minimum eligibility requirement for application is 60% of the maximum grade available).
- English language requirement: international applicants for whom English is not a native language need to provide proof of English language proficiency. One of the following is accepted: TOEFL 550 or higher (computer based–213, internet based-79/80); IELTS 6.5; Cambridge Certificate of Proficiency in English – C; Cambridge Certificate in Advanced English – B.

Application deadline:

EU applicants - June 1
non-EU applicants - please consult the website

NB! Applicants graduating in 2009 with diplomas issued later than the set deadlines (e.g. in July), please send the application form and the most recent Transcript of Records by the required deadline. Indicate to the International Student Service when your diploma will be issued. For further information contact the International Student Service directly.

Application process:

1. Download the appropriate application forms from **www.ut.ee/64491** or request them from **studyinfo@ut.ee**
2. Mail the application with all the necessary documents by indicated deadline to: International Student Service, University of Tartu, Ülikooli 18, Tartu 50090, ESTONIA

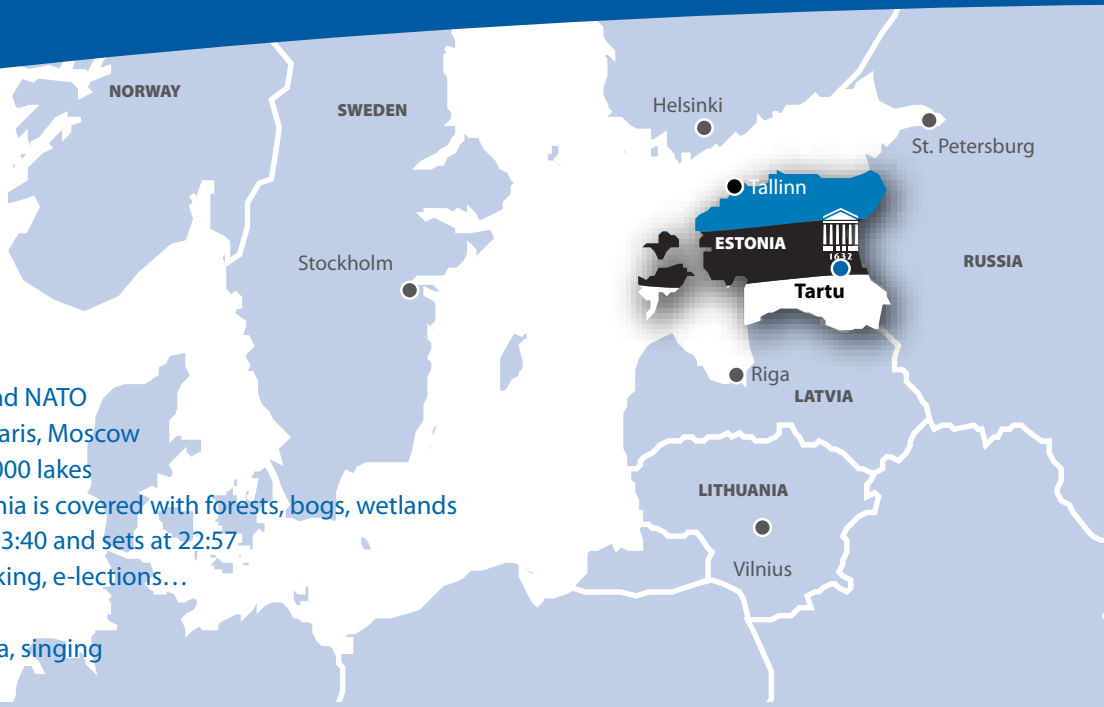
Documents to be submitted:

- application form for Master`s studies;
- application form for assessing prior learning;
- copy of the Bachelor`s diploma (or highest preceding study level) and diploma supplement (transcript/mark sheet) in the original language (a copy certified by the educational institution issuing the document or a notarised copy);
- official translation of the diploma and diploma supplement (transcript/mark sheet) into English, translation certified;
- certified copy of the upper secondary school certificate and a list with grades (non-EU applicants only);
- official translation of the upper secondary school certificate and a list with grades into English, translation certified (non-EU applicants only);
- official test results of English language proficiency;
- copy of the valid identification document;
- CV (for applicants requesting recognition of prior work experience).

All applicants will receive a confirmation upon receipt of their application and its status. Complete applications will be considered by the Admission Commission and students accepted to the program will be notified of their admission soon after.

Measurement Science

UNIVERSITY OF TARTU



Estonia

Population: 1.3 million
Capital: Tallinn
Official language: Estonian
Area: 45 227 km²

- Member of European Union and NATO
- Just a short flight to London, Paris, Moscow
- Country of 1500 islands and 1000 lakes
- Abundant nature: 50% of Estonia is covered with forests, bogs, wetlands
- In midsummer the sun rises at 3:40 and sets at 22:57
- E-stonia: e-government, e-parking, e-lections…
- Birthplace of Skype
- Favorite pastimes: skiing, sauna, singing

Tartu

Population: 100 000
City rights: since 1224
Home of the University of Tartu
Estonia's second largest city

- First mentioned in historic records in 1030
- Intellectual capital of Estonia
- Picturesque green city center on the banks of the River Emajõgi
- Over one fifth of population are students in higher education
- "Child Friendly City" title awarded by UNICEF in 2004
- 22 museums, 17 galleries, 10 concert venues
- English and Russian are spoken widely

University

Founded: 1632
10 faculties, 5 colleges
Students: 17 000
International students: 600

- 15 international Master's degree programs
- 100 doctoral degrees awarded annually
- In world's top 1% citations in Environment/Ecology, Clinical Medicine, Plant and Animal Science
- Some of the most accurate physico-chemical measurements are performed at the University of Tartu
- Home of Lotman School of Cultural Semiotics
- Public university accredited by Estonian Ministry of Education and Research

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