

TARTU ÜLIKOOL, TALLINNA TEHNIKAÜLIKOOL
University of Tartu, Tallinn University of Technology

Annex to Diploma No MY 000111

This Diploma Supplement follows the model developed by the European Commission, Council of Europe and UNESCO/CEPES. The purpose of the diploma supplement is to provide sufficient independent data to improve the international 'transparency' and fair academic and professional recognition of qualifications. It is designed to provide a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It is free from any value judgments, equivalence statements or suggestions about recognition. Information in all sections should be provided. Where information is not provided, an explanation should give the reason why.

1. INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION

- 1.1. Family name: **TUDENG**
1.2. Given name: **TUULI**
1.3. Data of birth (day/month/year): **01.04.1990**
1.4. Personal identification code: **49004010016**

2. INFORMATION IDENTIFYING THE QUALIFICATION

- 2.1. Name of qualification and (if applicable) title conferred (in original language):
tehnikateaduse magister (tarkvaratehnika)
Master of Science in Engineering (Software Engineering)
- 2.2. Main field(s) of study for the qualification: **Programme: Software Engineering (code 100864)**
The study programme entered into the Estonian Education Information System on 27.01.2010
Main field of study: Software Engineering
- 2.3. Name and status of awarding institutions (in original language):
Tartu Ülikool, public university
Tallinna Tehnikaülikool, public university
- 2.4. Name and status of institution (if different from 2.3.) administering studies (in original language):
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- 2.5. Language(s) of instruction: **English**

3. INFORMATION ON THE LEVEL OF THE QUALIFICATION

- 3.1. Level of qualification: **second cycle higher education,**
Estonian Qualifications Framework Level 7
European Qualifications Framework Level 7
- 3.2. Official length of programme: **2 years**
120 European Credit Transfer and Accumulation System (ECTS) credits
- 3.3. Access requirement(s): **bakalaureusekraad (Bachelor's degree), rakenduskõrgharidusõppe diplom (Diploma of Professional Higher Education) or corresponding qualification**

4. INFORMATION ON THE CONTENTS AND RESULTS GAINED

4.1. Mode of study:

full-time

4.2. Programme requirements:

The curriculum consists of the following components:

- **Core module (24 ECTS)**
- **Specialization module (24 ECTS) to be chosen among two available specializations: (i) Enterprise software engineering - taught at UT and (ii) Embedded real-time software engineering - taught at TTÜ**
- **Elective courses (18 ECTS)**
- **Optional course(s) (6 ECTS)**
- **Practice module (18 ECTS)**
- **Master's thesis (30 ECTS)**

Core module (compulsory)

- **MTAT.03.083 Systems Modelling (6 ECTS)**
- **MTAT.03.244 Software Economics (6 ECTS)**
- **TTÜ: Requirements Engineering (6 ECTS)**
- **TTÜ: Software Quality and Standards (6 ECTS)**

Specialisation module: Enterprise Software Engineering

- **MTAT.03.229 Enterprise System Integration (6 ECTS)**
- **MTAT.03.231 Business Process Management (6 ECTS)**
- **MTAT.03.183 Data Mining (6 ECTS)**
- **MTAT.03.240 Seminar on Enterprise Software (6 ECTS)**

Specialisation module: Embedded Real-Time Software Engineering

- **TTÜ: Foundations of Embedded Real-Time Systems (6 ECTS)**
- **TTÜ: Real-time Operating Systems and Systems Programming (6 ECTS)**
- **TTÜ: Formal Methods in Embedded Real-Time Systems Development (6 ECTS)**
- **TTÜ: Real-Time Software Engineering (6 ECTS)**

Practice Module

The practice module provides an opportunity to apply the acquired knowledge in practice. Normally, the practice module takes the form of an internship of 3 months in a software company or in the IT department of an organization. Alternatively, students may combine a shorter internship (2 months) with a software project or teaching

Learning outcomes:

After passing the curriculum the student

- 1) has an understanding of the main body of knowledge and theories of software engineering;
- 2) can apply essential concepts, principles, and practices of software engineering in the context of well-defined scenarios, showing good judgment in the selection and application of software engineering tools and methods;
- 3) can produce work involving problem identification, analysis, design, and development of a software system, along with appropriate documentation.
- 4) is able to demonstrate the ability to work as an individual under guidance and as a team member.
- 5) appreciates continuing professional development.

4.3. Programme details (e.g. modules or units studied) and the individual grades/marks/credits obtained:

Subject code	Subject	ECTS credits	Date	Result	Teaching staff member
Tallinn University of Technology					
IDY0204	Software Quality and Standards	6.00	06.01.2012	C - Good	Õ. Õppejõud
ITI8500	Foundations of Embedded Real-Time Systems	6.00	13.01.2012	A - Excellent	Õ. Õppejõud
IDY0201	Requirements Engineering	6.00	20.01.2012	A - Excellent	Õ. Õppejõud
IAY0351	Special Course on Digital Technics I	2.00	22.05.2012	Pass	Õ. Õppejõud
ITI0080	Special Seminar for Graduate Students	4.00	24.05.2012	Pass	Õ. Õppejõud
ITI8510	Real-time Operating Systems and Systems Programming	6.00	28.05.2012	D - Satisfactory	Õ. Õppejõud

ITI8540	System reliability and fault-tolerance	5.00	06.06.2012	D - Satisfactory	Õ. Õppejõud
ITI8530	Formal Methods in Embedded Real-Time Systems Development	6.00	08.06.2012	Pass	Õ. Õppejõud
ITI0135	Project on Formal Methods	5.00	06.09.2012	A - Excellent	Õ. Õppejõud
ITI8520	Real-Time Software Engineering	6.00	11.01.2013	B - Very good	Õ. Õppejõud

University of Tartu

MTAT.03.244	Software Economics	6.00	13.12.2011	A - Excellent	Õ. Õppejõud, Õ. Õppejõud
FLKE.02.140	French for Beginners I, Level 0 > A1.1	6.00	16.12.2011	Pass	Õ. Õppejõud
MTAT.03.083	Systems Modelling	6.00	23.01.2012	A - Excellent	Õ. Õppejõud, Ä. Õppejõud
MTAT.03.262	Mobile Application Development	3.00	27.01.2012	C - Good	Õ. Õppejõud
MTAT.03.206	Practical Training in Information Technology	12.00	31.05.2013	Pass	Õ. Õppejõud
MTAT.03.237	Practical Training in Informatics	6.00	31.05.2013	Pass	Õ. Õppejõud

Tallinn University of Technology

ITI70LT	Final thesis: Mobile Application Development	30.00	24.01.2014	B - Very good	Õ. Õppejõud
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Total workload 121.00

Weighted average grade 3.98

4.4. Grading scheme(s):

Grading scheme since August 30, 1999

Grade	Description
A	Excellent
B	Very good
C	Good
D	Satisfactory
E	Sufficient
F	Insufficient

The examination or preliminary examination is considered passed upon its grading in the range from "E" to "A". In calculating the average grade the following correspondences are applied: A = 5, B = 4, C = 3, D = 2, E = 1, F = 0. Non-differentiated assessment of academic results is conducted using a system whereby the positive result is defined as "Pass" and the negative result as "Fail".

5. INFORMATION OF THE FUNCTION OF THE QUALIFICATION

- 5.1. Access to further study: **Doctoral studies**
- 5.2. Professional status: **Qualified to work as a professional specialist in positions, where master level degree is required**

6. ADDITIONAL INFORMATION

- 6.1. Additional information: **The joint study programme is included in the study programme group of "Informatics and information technology" and the studies may be conducted according to Government of the Republic Regulation No. 178 of 18.12.2008 "Standard of Higher Education".**
The consortium agreement of the joint study programme in Software Engineering has been signed 03.06.2009 by Tartu Ülikool and Tallinna Tehnikaülikool.

6.2. Further information sources:

Institution:	University of Tartu Faculty of Mathematics and Computer Science	Estonian ENIC/NARIC Academic Recognition Information Centre Archimedes Foundation
Address:	J. Liivi 2, 50409, Tartu	L. Koidula 13A, 10125, Tallinn, ESTONIA
www-page:	www.ut.ee	www.archimedes.ee/enic
Tel:	(+372) 737 5860, (+372) 737 5862	(+ 372) 697 9215
Fax:		(+ 372) 697 9226
E-mail:	math@ut.ee	enic-naric@archimedes.ee

7. CERTIFICATION OF THE SUPPLEMENT

7.1. Date: **21.06.2014**

7.2. Signatures 7.3. Names 7.4. Capacity 7.5. Official stamp or seal

Õnne Õppejõud
Dean
Faculty of Mathematics and Computer Science
Tartu Ülikool

Tõnu Tallinn
Dean
Faculty of Information Technology
Tallinna Tehnikaülikool

Õie Õppejõud
Academic Affairs Specialist
Faculty of Mathematics and Computer Science
Tartu Ülikool

Tiiu Tallinn
Student Counsellor
Faculty of Information Technology
Tallinna Tehnikaülikool

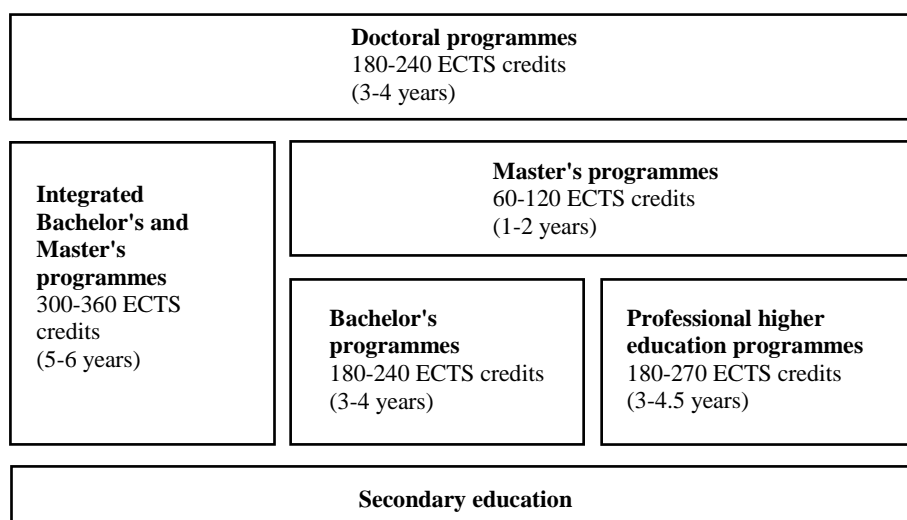
Registration No 12

8. INFORMATION ON THE HIGHER EDUCATION SYSTEM OF ESTONIA

OVERALL ORGANISATION

Higher education in Estonia is regulated by the following legislation: the Republic of Estonia Education Act, the Universities Act, the Private Schools Act, the Institutions of Professional Higher Education Act, the Vocational Education Institutions Act, and the Standard of Higher Education.

As of academic year 2002/2003, the higher education system comprises three cycles, following the Bachelor-Master-PhD model of the European Higher Education Area



Universities provide professional higher education, bachelor's, master's and doctoral programmes. Professional higher education institutions and some vocational education institutions provide professional higher education. A professional higher education institution may also provide master's programmes. In terms of ownership, institutions are divided into state, public and private institutions.

RECOGNITION OF QUALIFICATIONS

As of 1 January 2012, higher education programmes may be provided only if the quality of the respective study programme group has been assessed and the Government of the Republic has granted a license to provide instruction in the respective group. Annex 3 to Regulation no. 178 of the Government of the Republic of 18 December 2008 "Standard of Higher Education" sets out the study programme groups and cycles of higher education where educational institutions have the right to provide instruction. The right to provide instruction involves the right to issue national diplomas.

QUALITY ASSESSMENT

Since 2009, higher education quality has been assessed by *Eesti Kõrghariduse Kvaliteediagentuur* (Estonian Higher Education Quality Agency), an independent agency.

Quality assessment of study programme groups

Since 2010, the quality of study programme groups has been assessed instead of the former assessment of study programmes. Quality assessment involves assessment of the compliance of study programmes, teaching and study-related development efforts based thereon with legislation, national and international standards and developments the study programme, study programme development, availability of resources, the study process, teaching staff and students are assessed).

Quality assessment takes place once every seven years, unless the Agency has established a term of up to three years based on the results of quality assessment. The result of quality assessment is a decision made by the Assessment Council of the Agency.

Institutional accreditation

Institutional accreditation focuses on the internal quality assurance system of the educational institution and the functionality thereof, incl. the fulfilment of the tasks, duties and functions of the educational institution, the compliance of the management system with the goals and development plan of the higher education institution.

Higher education institutions are required to undergo institutional accreditation once every seven years, but if the Agency has detected any defects in the previous accreditation, it may grant a term of up to three years and during the term the educational institution must undergo the institutional accreditation again. The decision on institutional accreditation will be made by the Assessment Council of the Agency.

ADMISSION REQUIREMENTS

The requirement for access to higher education is secondary education, certified by *Gümnaasiumi lõputunnistus* (Upper Secondary School Leaving Certificate), *Lõputunnistus kutsekeskhariduse omandamise kohta* (Certificate of Vocational Secondary Education) the corresponding qualifications of earlier education systems, and foreign qualifications giving access to higher education. The *Gümnaasiumi lõputunnistus* is issued after 12 years of schooling (9 years of basic education and 3 years of general upper secondary education). In order to complete general upper secondary education it is necessary to take national examinations certified with the national examination certificate.

A higher education institution may introduce further admission requirements, such as entrance examinations, minimum scores of national examinations, interviews, etc.

CREDIT SYSTEM

Student workload is measured in credits. As of academic year 2009/2010, the European Credit Transfer and Accumulation System (ECTS) has officially been in use. One ECTS credit corresponds to 26 hours of work by a student. The workload of one academic year is 1560 hours, which corresponds to 60 ECTS credits.

HIGHER EDUCATION PROGRAMMES AND QUALIFICATIONS

Professional Higher Education Programmes

Professional higher education is higher education of the first cycle, the purpose of which is to acquire the competencies necessary for working in a certain profession or for continuing studies at the master's level. The nominal duration of programmes is 3 to 4 years (180-240 ECTS credits). Midwifery studies and specialised nursing studies last 4.5 years (270 ECTS credits). The qualification awarded upon completion of the programme is *rakenduskõrghariduse diplom* (Diploma of Professional Higher Education) (a grayish-blue diploma form marked E). The qualification gives access to master's programmes.

Bachelor's Programmes

Bachelor's programmes are first-cycle higher education programmes. The purpose of bachelor studies is to broaden the scope of general education, to develop the basic knowledge and skills required for a certain field of study necessary for continuing at the master's level or for access to the labour market. The nominal duration of the programmes is generally 3 years (180 ECTS credits). As an exception, it may be up to 4 years (240 ECTS credits). The qualification awarded upon completion of the programme is *bakalaureus* (bachelor's degree) (a greenish-yellow diploma form marked L). The qualification gives access to master's programmes.

Master's Programmes

Master's programmes are second-cycle higher education programmes. The purpose of master's level studies is to develop the knowledge and skills required for a certain field of study and to acquire the necessary competences in order to enter the labour market or to continue studies at the doctoral level. The access requirement is a first-cycle higher education qualification. The nominal duration of the programmes is 1 to 2 years (60-120 ECTS credits), but with the first-cycle studies it is at least five years (300 ECTS credits). The qualification awarded upon completion of a master's degree programme is *magister* (master's degree) (a silvery diploma form marked M). The qualification gives access to doctoral programmes.

Integrated Bachelor's and Master's Programmes

Integrated bachelor's and master's programmes comprise both basic and specialised studies. Such long-cycle programmes are offered in the fields of medicine, veterinary medicine, pharmacy, dentistry, architecture, civil engineering, and class-teacher training. The nominal duration of programmes in medicine and veterinary medicine is 6 years (360 ECTS credits). The nominal duration of other programmes is 5 years (300 ECTS credits).

The graduates receive a qualification (a silvery diploma form marked M) certifying the completion of the integrated study programme. The graduates of a pharmacy, architecture, civil engineering and class teacher training programme are awarded a degree of *magister* (master's degree). The graduates of a medicine, dentistry and veterinary medicine programme are awarded *arstikraad* (Degree in Medicine), *hambaarstikraad* (Degree in Dentistry) or *loomaarstikraad* (Degree in Veterinary Medicine). The qualifications give access to doctoral programmes.

Doctoral Programmes

Doctoral programmes represent the third cycle of higher education, the purpose of which is to acquire knowledge and skills necessary for independent research, development or professional creative work. The access requirement for doctoral studies is a degree of *magister* (master's degree) or corresponding qualifications. The nominal duration of programme is 3 to 4 years (180-240 ECTS credits). The qualification awarded upon completion of doctoral studies is *doktor* (doctorate degree) (a golden diploma form marked O). A doctorate degree is a research degree obtained after the completion and public defence of a dissertation based on independent scientific research or creative work.