

MS in Technical Physics Curriculum 2011-2012

The Master's Degree Programme in Technomathematics and Technical Physics takes two years, corresponds to 120 ECTS credits and leads to the degree of Master of Science in Technology. The language of tuition in the programme is English. The programme has two alternative major subjects: Technomathematics and Technical Physics.

Technical Physics

Programme Coordinator in Technical Physics is professor, Ph.D. Erkki Lähderanta

The student majoring in Technical Physics should have a Bachelor's degree from a related field. Each student will make a personal study plan, the contents of which will depend on the student's previous degree/studies and his field of interest and specialization.

The aim of the major subject in Technical Physics is to prepare the student professionally and academically in physics and other technical science skills in industry and R&D tasks. The most important fields of education and research are material physics, applied optics and microelectronics. The programme also provides the graduate with capabilities for scientific doctoral studies and independent research.

Degree Structure		
General Studies	9	ECTS cr
Major Subject	65-68	ECTS cr
Minor Subject	20	ECTS cr
Elective Studies	23-26	ECTS cr
<i>Total</i>	<i>120 (min.)</i>	<i>ECTS cr</i>

General Studies 9 ECTS cr

<i>Obligatory Studies (9 ECTS cr)</i>	<i>year</i>	<i>per. ECTS cr</i>	
BK10A0300 Introduction to M.Sc. Studies	M.Sc. (Tech.) 1	1	1
FV11A6500 Presenting in English	B.Sc. (Tech.) 2-3 B.Sc. (Econ. & Bus. Adm.) 2-3	1, 3	2, 4
FV11A8900 Academic Writing in English	B.Sc. (Tech.) 3 M.Sc. (Tech.) 1-2 B.Sc. (Econ. & Bus. Adm.) 3 M.Sc. (Econ. & Bus. Adm.) 1-2	1-2, 3	4, 3, 3-4, 5
FV18A9101 Finnish 1		1, 3	2

Major Subject 65-68 ECTS cr

<i>Obligatory Studies (65-68 ECTS cr)</i>	<i>year</i>	<i>per.</i>	<i>ECTS cr</i>
BL50A0600 Electromagnetic Compatibility in Power Electronics	M.Sc. (Tech.) 1	1	2
BM30A0500 Applied Optics	M.Sc. (Tech.) 1	2	6
BM30A0601 Optoelectronics	M.Sc. (Tech.) 1	1	6
BM30A1500 Advanced Topics in Material Science	M.Sc. (Tech.) 2	2	6

BM30A1600	Microelectronics	M.Sc. (Tech.)	1	1	6
BM30A1700	Physics of Semiconductor Devices	M.Sc. (Tech.)	1-1-2	2	3-6
BM30A2200	Semiconductor and Superconductor Physics	M.Sc. (Tech.)	1	1-2	6
BM10A0000	Master's Thesis and Seminar	M.Sc. (Tech.)	2	1-4	30

Minor Subject 20 ECTS cr

The student can choose any minor subject taught at LUT if the required prerequisites are completed. The choice of the minor subject should, however, be discussed with the Programme Coordinator in Technical Physics.

Elective Studies 23-26 ECTS cr

Elective studies can include any courses offered by LUT if the required prerequisites are completed. Studies in other universities may be included upon application. Elective studies may include a maximum of 6 ECTS credits of traineeship improving expertise. The student should discuss the choice of the elective courses with the Programme Coordinator.

Master's Thesis and Seminar 30 ECTS cr

Thesis topics arise from various application areas, research projects and contacts with different universities. Typically, the thesis contains a theoretical study, experimental part and analysis of the experimental results.

The Degree Structure for Double Degree Students

Degree Structure		
General Studies	5	ECTS cr
Major Subject	66	ECTS cr
Credit Transfer	50	ECTS cr
<i>Total</i>	<i>121 (min.)</i>	<i>ECTS cr</i>

General Studies (5 ECTS cr)

<i>Obligatory Studies (5 ECTS cr)</i>	<i>year</i>	<i>per. ECTS cr</i>
BK10A0300 Introduction to M.Sc. Studies	M.Sc. (Tech.) 1	1 1
FV11A8900 Academic Writing in English	B.Sc. (Tech.) 3 M.Sc. (Tech.) 1-2 B.Sc. (Econ. & Bus. Adm.) 3 M.Sc. (Econ. & Bus. Adm.) 1-5 2	1-2, 4 3, 3-4, 2

Major Subject (66 ECTS cr)

<i>Obligatory Studies (66 ECTS cr)</i>	<i>year</i>	<i>per.</i>	<i>ECTS cr</i>
BM30A0500 Applied Optics	M.Sc. (Tech.)	1 2	6
BM30A0601 Optoelectronics	M.Sc. (Tech.)	1 1	6
BM30A1500 Advanced Topics in Material Science	M.Sc. (Tech.)	2 2	6
BM30A1600 Microelectronics	M.Sc. (Tech.)	1 1	6
BM30A1700 Physics of Semiconductor Devices	M.Sc. (Tech.)	1-1-2 2	6
BM30A2200 Semiconductor and Superconductor Physics	M.Sc. (Tech.)	1 1-2	6
BM10A0000 Master's Thesis and Seminar	M.Sc. (Tech.)	2 1-4	30

Double degree students come from the LUT partner universities. The student takes his Master's degree from both partnering universities, and will be awarded the degree certificate of LUT and the diploma of the home university. The maximum credit transfer to be accepted to the LUT degree from the previous studies in the student's home university is 50 ECTS cr.

Minor in Technical Physics 20-26 ECTS cr

Minor in Technical Physics can be studied by students of other Master's degree programmes.

Minimum 20 ECTS credits should be selected.

<i>Minor Studies min. 20 ECTS cr</i>	<i>per.</i>	<i>ECTS cr</i>
BM30A0500 ^(*) Applied Optics	2	6
BM30A1500 ^(*) Advanced Topics in Material Science	2	6
BM30A1600 ^(*) Microelectronics	1	6
BM30A2100 Microelectronics Processing Technology	1-2	2
BM30A2200 Semiconductor and Superconductor Physics	1-2	6

^{*)} Choose a min. of two courses.

Additional Information

Personal Study Plan

The personal study plan (PSP) is the student's own plan how s/he is going to complete the Master's degree. The degree structure of the Master's programme determines the frame of the studies. At the Master's level, the student makes the PSP by the end of 1st period, and submits it to International Study Coordinator for comments. The electronic personal study plan (ePSP, in Finnish eHOPS) is a tool for drawing the plan up. The students of the Faculty of Technology are recommended to compile the PSP in an electronic form by using the ePSP tool at WebOodi.

Credit Transfer

ECTS credits can be transferred from the student's previous university level studies or higher university degrees from Finnish or foreign universities. More information on credit transfer is available from International Study Coordinator.

Complementary Studies

The student with a Finnish degree from the University of Applied Sciences or equivalent may have to study complementary studies. The extent of these studies depends on the content of the previous degree. More information is available from International Study Coordinator.

Traineeship

A traineeship in the Master's degree can be worth 6 ECTS credits. A two-week full traineeship is worth one ECTS credit. Employment prior to the studies at LUT can be accepted, if it has not been included in any previous degrees. Acceptable practical work may include computational tasks, measurements and instrumentation, work with experiments, data analysis or tasks which improve the student's understanding of science based methods and technology. The traineeship is approved by traineeship coordinators.

Mathematics: Professor Matti Heiliö Physics: Lecturer Jari Soinen

Maturity Test

The student must take a maturity test to show how well s/he knows the topic of the Master's thesis. The test evaluates the student's familiarity with the theories and problems of the thesis. The student is asked to contact the supervising professor to agree how the maturity test is taken, that is, as a seminar presentation or as a written test. The maturity test is evaluated on a scale of passed/failed by the supervising professor of the thesis.

The Courses Offered in English

	<i>ECTS cr</i>
BM10A0000 Master's Thesis and Seminar	30
BM20A1300 Complex Analysis	3
BM20A1900 Statistics II	3
BM20A2000 Simulation	4
BM20A2102 Differential Equations	6
BM20A2201 Logic and Discrete Methods	4
BM20A2500 Linear Algebra and Normed Spaces	3
BM20A2600 Integral Transforms	3
BM20A2701 Numerical Methods II	3
BM20A2800 Nonlinear Optimization	4
BM20A2901 Discrete Optimization	5
BM20A3001 Statistical Analysis in Modelling	5
BM20A3101 Fuzzy Sets and Fuzzy Logic	6
BM20A3202 Fuzzy Engineering	6
BM20A3301 Stochastic Theory and Models	3 - 5
BM20A3401 Design of Experiments	4
BM20A3602 Fuzzy Data Analysis	6
BM20A3801 Advanced Mathematical Methods	3 - 6
BM20A3900 Modelling Methodology in Process Engineering	6
BM20A4000 Case Study Seminar	5
BM20A4201 Applied Functional Analysis	4 - 6
BM20A4500 Evolutionary Computation	5
BM20A4800 Project Work in Applied Mathematics	10 - 30
BM20A5000 Principles of Technical Computing and Scientific Publishing	4
BM20A5100 Scientific Computing and Numerics for PDEs	6
BM30A0500 Applied Optics	6
BM30A0601 Optoelectronics	6
BM30A1500 Advanced Topics in Material Science	6
BM30A1600 Microelectronics	6
BM30A1700 Physics of Semiconductor Devices	3 - 6
BM30A2100 Microelectronics Processing Technology	2
BM30A2200 Semiconductor and Superconductor Physics	6
BM30A2300 Project Work in Technical Physics	10 - 30

Technomathematics (See Separate Chapter in Study Guide)

Programme Coordinator in Technomathematics is professor, Ph.D. Matti Heiliö.

Further Information

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