

MSc Programs and Courses

Country	University name	MSc			WEBpage	
		name	semesters	courses		lecturers
GB	University of Oxford, Continuing Professional Development Centre (CPD), United Kingdom	Postgraduate certificate of nanotechnology (online) The Postgraduate Certificate in Nanotechnology course exists in order to: introduce the most commonly used and most important analytical, quantitative and experimental methods used in	3 modules, 10 week/module	The wider context of nanotechnology (compulsory) The fundamental science of nanotechnology (compulsory) Fundamental characterization of nanotechnology (compulsory)	Dr. Christiane Norenberg, academic director of nanotechnology branch; christiane.norenberg@conted.ox.ac.uk	http://www.engineers-international.com/Further_education_2.html#Electrical http://cpd.conted.ox.ac.uk/nanotechnology/nano_specification.asp http://cpd.conted.ox.ac.uk/nanotechnology/
	University of Oxford, Faculty of Materials, United Kingdom	Materials Science (M.Eng)	8	Structural and functional nanomaterials (optional)	prof. Chris Grovenor, lecturer and head of Department of Materials; chris.grovenor@materials.ac.uk	http://www.materials.ox.ac.uk/
				Semiconductor device fabrication (optional) Materials for nanoscale information storage (optional)		
GB	Cardiff School of Engineering, Faculty of Electrical Engineering, United Kingdom	Electrical and Electronic Engineering (M.Eng), Mechanical Engineering (M.Eng)	8	Fundamentals of nanomechanics (MEng, optional) (10 ECTS) The fundamental principles of nanomechanics and its application to the solution of advanced engineering problems.	prof. F. Borodich, lecturer of course, Chairman of the Cardiff Nano-Science and Nano-Engineering Group	http://www.cardiff.ac.uk/engin/degreeprogrammes/undergraduate/electrical/electronic/schemestructure/index.html
		Electrical and Electronic Engineering (M.Eng)	8	Fundamentals of micro-and nanotechnology (3th year of BEng, MEng, compulsory)(10 ECTS) Aims: to introduce the principles of micro- and nano-scale fabrication in the context of integrated circuit (IC) technology and micro-mechanical systems (MEMS). Application of basic principles to the design and realisation of IC and MEMS-based problems in current and future systems. To develop an appreciation of the way in which current materials theory and technology is used to solve problems in IC and MEMS systems.	Dr. R. Perks, lecturer of the course and admissions tutor of electrical and electronic engineering studies PerksRM@cardiff.ac.uk	http://www.engin.cf.ac.uk/teaching/structure/module.asp?modno=EN3817;
GB	University of Sussex, Faculty of Materials, United Kingdom	Electrical and Electronic Engineering (M.Eng), Advanced Mechanical Engineering (MSc), Aerospace Technology (MSc), Communications and Space Systems (MSc)	8	Advanced Manufacturing Technology (15 ECTS) (compulsory)	prof. Chris Chatwin, lecturer of course, director of Department of Engineering and Design; C.R.Chatwin@sussex.ac.uk	http://www.sussex.ac.uk/engineering/syllabus/2008/H3501T.html

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GB	Heriott-Watt University, Department of Electrical, electronic and computer engineering, Edinburgh, United Kingdom	Electrical and Electronic Engineering (M.Eng/fast M.Eng)	10 or 8	Electronics and microelectronics manufacturing	prof. Marc Demulliez, head of department, m.demulliez@hw.ac.uk	http://www.undergraduate.hw.ac.uk/eps/eece/courses/
	Heriott-Watt University Department of Chemistry, Edinburgh, United Kingdom	Chemistry with nanotechnology (Mchem) This course is attractive to students with an interest in Chemistry, Physics and Maths and their engineering applications. Chemists have always been 'nanotechnologists' because molecules are about 1 thousandth-millionth of a metre in size. The course combines core chemistry modules with specialist modules in nanochemistry, nanophysics and microengineering.	10	Nanoscience Instrumentation Techniques	prof. Kevin McCulloch, head of Department of Chemistry, K.J.McCulloch@hw.ac.uk	http://www.undergraduate.hw.ac.uk/courses/view/F1F9/ http://www.undergraduate.hw.ac.uk/courses/view/F1F9/
	Heriott-Watt University, Department of Physics, Edinburgh, United Kingdom	Nanoscience (4/5 years M.Phys); Nanoscience is the study of phenomena on a scale ranging from the wavelength of light down to the size of atoms. It is a rapidly developing field continually producing fascinating results in many different fields of study. This course is based on physics but includes content from chemistry and biology to give an important appreciation of how all the sciences have new effects to be observed and new applications to be discovered. (The topics consider behaviour on the nano- scale but with emphasis on the transition from micro-to nano-regimes. The nature and properties of atomic bonding in molecules and of energy bands on a nano-scale. The properties of matter (electrical, optical, thermal) when considered in the nano-scale regime. Phase transitions Quantum Mechanical effects Nano-scale spectroscopic techniques Tolerancing)	8 or 10	Physics I- Mechanics and waves Investigative techniques 1 laboratory EPS maths 1 Principles in chemistry Physics II- fields and forces Investigative techniques 2 laboratory Chemical reactivity Photonics and quantum mechanics EPS maths 3 Circuits and analysis Introductory biology 1 Thermal physics and relativity Experimental lab and communication skills Introductory biology 2 EPS maths 4 Physical mathematics 1 Electromagnetism and optics Dynamics and statistical physics Chemistry of materials Quantum theory and spectroscopy Solid state physics Physical mathematics 2 Quantum theory and solid state physics Nanoscience primer Microstructures and properties of materials	Prof. John Wilson, course director of Physics courses J.I.B.Wilson@hw.ac.uk	http://www.undergraduate.hw.ac.uk/courses/N/

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			Lab project 1 Statistical, nuclear and particle physics Advanced physical instrumentation techniques Numerical modelling and data analysis Lab project 2 Nanophotonics Nano-physics Condensed matter Research project 1 Nanochemistry Functional inorganic materials Materials physics Research project 2 Numerical Techniques		
Heriott-Watt University, Department of Electrical, electronic and computer engineering, Edinburgh, United Kingdom	Microsystems with photonics (Msc/diploma/certificate/part-time Msc) Currently microsystems technology, also known as microengineering or microsystems engineering, is expanding rapidly, as is the demand for qualified engineers with specialist training. To satisfy such a growing industrial demand, the Engineering and Physical Sciences Research Council (EPSRC) in the UK, provided funding to MISEC (Micro Systems Engineering Centre) at Heriot-Watt University in 1992 and again in 1995 to develop the MSc course in Microsystems Engineering, to provide specialist training at Masters level. The course has recently been modified to incorporate new developments in the field and is being offered under the name of MSc in Microsystems with Photonics.	1 year or 9 months or 6 months or 2 years	Manufacturing Processes in MEMS Design, Modelling and Packaging of MEMS Fundamental of Photonics and Micromechanics Research methods critical analysis and project planning RF MEMS Sensors and Actuators Laser Applications and Engineering	prof. Douglas Greenhalgh, head of school, d.a.greenhalgh@hw.ac.uk	http://www.postgraduate.hw.ac.uk/courses/view/310/
Heriott-Watt University, Department of Electrical, electronic and computer engineering, Edinburgh, United Kingdom	Nanotechnology and microsystems (Msc/diploma) The course will produce graduates with up-to-date understanding of the emerging field of nanotechnology as well as an appreciation of the application of such ideas in microsystems. The course is multi-disciplinary and is designed for students with an undergraduate background in physics, chemistry or engineering.	1 year or 9 months	Nanoscience primer Nanophysics Fundamentals of photonics and micromechanics Nanophotonics Nanochemistry Sensors and Actuators	Dr. Richard Warburton, director of programme; R.J.Warburton@hw.ac.uk	http://www.postgraduate.hw.ac.uk/courses/view/239/ http://www.graduateschool.eps.hw.ac.uk/course_nanotechnology2.html seminars: http://www.eps.hw.ac.uk/research/EPS_Seminars.html http://www.eps.hw.ac.uk/research/EPS_Past_Seminars.html

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				Laser applications and engineering		
				Nanolaboratory		
GB	King's College, Faculty of Mechanical engineering, London, United Kingdom	Multi-scale Fluid process engineering (Macro to nano) (Msc) The programme is designed for engineering students with mechanical, chemical or process engineering backgrounds to address industrial needs for improved process design via enhanced understanding and control of the small scale phenomena. The range of scales to be addressed via taught courses and project work will range from coarse-grain molecular modelling, nano particles, up to the larger scales normally addressed in most engineering courses. (they have to choose 4 courses from the optional ones)	2	Heat and mass transfer (comp) Multiscale processes (comp) Computational fluid dynamics (comp) Advanced numerical methods for engineers (comp) Fluid mechanics (optional) Nanotechnology (optional) Special topics in nanotechnology engineering (optional) Dynamical systems and simulations (optional) Project management (optional) Operations management (optional)	prof. Lakmal Seneviratne, head of the division of engineering, lakmal.seneviratne@kcl.ac.uk	http://www.kcl.ac.uk/schools/pse/diveng/pgs/me-msc.html
		Nanotechnology engineering (MSc) Nanotechnology is widely considered a major technology for the 21st century offering great research and commercial opportunities at the interface of engineering, physics and life sciences. Applications of Nanotechnology can already be found in various fields such as coating-technology and high-end lab equipment products. In contrast to the more academically oriented programmes of other universities, our MSc in Nanotechnology Engineering will provide a straight introduction into nanotechnology from the applied point-of-view of an engineer. The students have to choose two courses from optional 1 OR optional 2 group.	2	Nanotechnology (comp) Special topics in nanotechnology engineering (comp) Dynamicsl systems and simulation (comp) Advanced numerical methods for engineers (comp) Project management (comp) Robotic systems (optional 1) Sensors and actuators (optional 1) Real time systems ands control (optional 1) Computer aided design (optional 2) Comptuer aided manufacture (optional 2) Computational fluid dynamics (optional 2)	prof. Lakmal Seneviratne, head of the division of engineering, lakmal.seneviratne@kcl.ac.uk	http://www.kcl.ac.uk/schools/pse/diveng/pgs/me-msc.html http://www.kcl.ac.uk/schools/pse/diveng/pgs/nano
GB	Imperial College, Faculty of Engineering, London, United Kingdom	Optional course for Materials science and Engineering (4year MEng), Aerospace Materials (4 year MEng), Biomaterials and Tissue Engineering (4 year MEng), Materials and Nuclear Engineering (4year MEng)		Polymers, composites and nanocomposites	Dr Stepan Lucyszyn, PhD admissions, Optical and Semiconductor group, s.lucyszyn@imperial.ac.uk . Lecturers of course: R.Hill, A.R.Boccaccini	http://www3.imperial.ac.uk/courses/undergraduatesyllabuses
				Nanomaterials	Dr. M.P.Ryan, dr. J.Riley, prof. M.M. Stevens	http://www3.imperial.ac.uk/opticalandsemidev

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				Nanomaterials II	prof. D. W. McComb, M. Ryan, J. Riley, M. McLachlan	
		Technical module (optional) for Electrical and Electronic Engineering (BEng, MEng)		Advanced electronic devices	Dr.K. Fobelets	http://www3.imperial.ac.uk/courses/undergraduatesyllabuses
		Technical module (optional) for Electrical and Electronic Engineering (BEng, MEng)		MEMS and nanotechnology	dr. Z. Durrani, dr. A. S. Holmes	http://www3.imperial.ac.uk/electricalengineering
S	Chalmers University of Technology, Department of Microtechnology and Nanoscience (MC2), Göteborg, Sweden	<p>Microtechnology (MSc)</p> <p>The program has three major profiles: Packaging, MEMS and Bionano Systems Technology and is characterised by a number of hands-on laboratory work in many courses throughout the program. In this programme students acquire a knowledge foundation that offers the possibility to design and manufacture micro- and nanodevices and micro- and nanosystems in the MC2 clean room facility found at CUT. It is vital to take students from emerging micro/nanodevice fabrication through system level integration all the way to actual products. There are specializations, which are according to the optional courses chosen: microtechnology, electronics design, microwave and photonics, bionanoscience, production management, materials science, applied mechanics. The student has to choose at least one of the optional1 courses.</p>	4	<p>Fundamentals of micro and nanofabrication (comp)</p> <p>Introduction to microsystems packaging (comp)</p> <p>Microsystems technology (comp)</p> <p>Chemistry for engineers (optional)</p> <p>Electrical measurement techniques and wave physics (optional)</p> <p>Liquid crystals physics and applications (optional1)</p> <p>Reliability of microsystems (optional1)</p> <p>Molecular electronics (optional1)</p> <p>Semiconductor materials physics (optional1)</p> <p>Thermal management for microsystems (optional1)</p> <p>Environmentally adapted product development (optional)</p> <p>Composite and nanocomposite materials (optional)</p> <p>Master thesis (comp) 2 semesters</p> <p>Project work in microtechnology (comp)</p> <p>Introduction to microwave and photonic engineering (optional)</p> <p>Semiconductor circuits and devices (optional1)</p> <p>Quantum engineering (optional)</p> <p>Simulation of production systems (optional)</p> <p>Material mechanics (optional)</p> <p>Nanobioscience for information processing (optional)</p> <p>Electronic circuit simulation (optional)</p>	program director: prof. Johan Liu, jliu@chalmers.se	
		Nanoscale science and technology (MSc)- associated with the Physics Centre, Master of Science and Engineering in Engineering Physics	4	<p>Fundamentals of micro- and nanofabrication (7,5 ECTS)</p> <p>Quantum engineering (7,5 ECTS)</p> <p>Nanoscience (7,5 ECTS)</p>	Program director: Göran Johansson, prof. Goran.L.Johansson@chalmers.se	http://www.chalmers.se/en/sections/education/masterprogrammes http://www.chalmers.se/en/sections/education/masterprogrammes/programme-descriptions/nanoscale-science

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<p>nanoscale combined with several possible tracks for a minor subject in adjacent areas giving the possibility of truly multidisciplinary competence in the field of nanoscale science and technology. The students will study and work in the MC2. All of the teachers involved in the core of this programme are simultaneously researchers at the forefront of the nanoscience field both nationally and internationally.</p> <p>Generic competences: broad working knowledge in physics, an insight in available theoretical and experimental techniques, ability to communicate and present technical information, ability to analyse and identify a means to solve a given problem. Unique competences: knowledge of the innovative possibilities of nanotechnology, a solid theoretical background in the physics and technology of nanoscale devices, experience of working in a clean room environment. Thesis work can be 30 or 60 credits.</p>		<p>Modelling and fabrication of nanodevices (7,5 ECTS)</p> <p>Superconductivity and low-temperature physics (7,5 ECTS)</p> <p>Elective (7,5 ECTS)</p> <p>Statistical physics (7,5 ECTS)</p> <p>Elective (7,5 ECTS)</p> <p>Master thesis (7,5 ECTS)</p> <p>Elective (7,5 ECTS)</p> <p>Master thesis (7,5 ECTS)</p> <p>Elective (7,5 ECTS)</p> <p>Master thesis (60 ECTS)</p>		
<p>Materials and nanotechnology (MSc) 120 HEC</p> <p>The purpose of the programme is to offer an engineering education within the materials field where the emphasis is on synthesis, chemical characterisation, physical and chemical properties and applications. Nine alternative-compulsory courses are offered. To graduate, the student must complete a total of six of these courses, equivalent to 45 credits. These courses can be grouped into four main areas (with a substantial overlap): solid state, polymers, surfaces, nano-materials. The remaining 45 credits are used by the student to focus in an area of interest (track). These could be in Polymers, Pharmaceuticals, Catalysts or Advanced materials. Each course is of 7,5 HEC. The student must select at least 6 out of comp1. Thesis work can be 30 or 60 credits.</p>	4	<p>The synthesis, properties and and structure of solid state materials (comp1)</p> <p>Surface chemistry (comp1)</p> <p>Material science, structure and properties (comp1)</p> <p>Solid state chemistry (opt)</p> <p>Polymer chemistry and physics (comp1)</p> <p>Nanomaterials chemistry (comp1)</p> <p>Corrosion (comp1)</p> <p>Surface engineering (comp1)</p> <p>Catalysis (comp1)</p> <p>Polymer technology, advanced course (comp1)</p> <p>Solid state chemistry (opt)</p> <p>Fundamentals of micro and nanotechnology (opt)</p> <p>Nanostructured drug delivery systems (opt)</p> <p>Advanced organic chemistry (opt)</p> <p>Thesis work</p> <p>Natural product chemistry (opt)</p>	<p>Responsible for project: docent Göran Svensson, gorans@chalmers.se</p>	<p>http://www.chalmers.se/en/sections/education/masterprogrammes/programme-descriptions/materials-nanotechnology</p>

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				Applied coordination chemistry (opt)		
				Masters thesis (30 HEC)		
		Wireless and Photonics Engineering; Advanced Engineering Materials; Chemistry and Bioscience; integrated Electronic Systems Design; (MSc)	4	related subjects (Fundamentals of Micro- and nanotechnology)		
FIN	Helsinki University of Technology, Department of micro- and nanosciences, Helsinki, Finland	<p>Master of Sciences (Technology) (MSc) in Micro- and nanotechnology. Taught in English. Currently the miniaturization is seen in mechanical, optical and chemical functions among others. Another trend is the continuing miniaturization even further into the nanometer scale. This programme focuses on the technologies involved in the miniaturization of electronic and optical devices. The main emphasis is on current microtechnologies including the design and fabrication of microelectronic circuits, microsystems and optoelectronics. In addition to these topics, students can specialize in nanotechnology and nanosystem design or electronics production technology. The programme offers studies in basic materials and circuit theory, processing, functional devices and characterisation.</p> <p>After common core courses students can choose between five specialisations: Micro- and Nanosystems-1, Optoelectronics-2, Semiconductor Technology-3, Microelectronic Circuit Design-4, Electronics Integration and Reliability-5.</p>	4	<p>Semiconductor technology I (comp) 5 ECTS</p> <p>Basic integrated circuit design (comp) 3 ECTS</p> <p>Materials and microsystem integration (comp) 7 ECTS</p> <p>Optoelectronics (comp) 5 ECTS</p> <p>Mathematics 3 (comp) 10 ECTS</p> <p>Semiconductor technology II (comp) 5 ECTS</p> <p>Analog integrated systems (comp) 5 ECTS</p> <p>Microsystems technology (comp) 5 ECTS</p> <p>Nanotechnology (comp) 5 ECTS</p> <p>1- Semiconductor technology, lab. course 1 ECTS</p> <p>1- Microsystems, laboratory 5 ECTS</p> <p>1- Micro- and nanotechnology, laboratory 4 ECTS</p> <p>1- Special project in measurement technology 7 ECTS</p> <p>1- Microsensing 3 ECTS</p> <p>2- Semiconductor technology, laboratory 1 ECTS</p> <p>2- Microsystems, laboratory 5 ECTS</p> <p>2- Micro- and nanotechnology, laboratory 4 ECTS</p> <p>2- Photonics and integrated optics 5 ECTS</p> <p>2- Semiconductor quantum structures 5 ECTS</p> <p>3- Semiconductor technology, laboratory 1 ECTS</p> <p>3- Microsystems, laboratory 5 ECTS</p> <p>3- Micro- and nanotechnology, laboratory, 4 ECTS</p>	<p>Harri Lipsanen, Vice head of Department of Micro and nanosciences, Harri.Lipsanen@tkk.fi</p>	<p>http://electronics.tkk.fi/en/prospective_students/international_programmes/micro/index.html</p> <p>http://nano.tkk.fi/en/studies/index/index.html</p>

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			3- Reliability of micro- and nanosystems 4 ECTS 3- Project work in microsystems reliability 6 ECTS 4- Electronic sensors 5 ECTS 4- Special project in semiconductor technology 5 ECTS 4- Semiconductor technology, laboratory I 1 ECTS 4- Semiconductor technology, laboratory II 5 ECTS 4- Micro- and nanotechnology, laboratory 4 ECTS 5- Computer aided circuit design 3 ECTS 5- Integrated RF circuits 5 ECTS 5- Electrical design of digital VLSI circuits 5 ECTS 5- Special project in electronic circuit design 6 ECTS 5- Reserach seminar in electronics circuit design 1 ECTS Thesis 30 ECTS		
Helsinki University of Technology	Department of micro- nand nanosciences		many elective courses, more than 20	prof. Heikki Koivo, head of department, heikki.koivo@tkk.fi	http://www.tkk.fi/en/studies/master-s_level_studies_and_courses/courses_in_english/index.html#Department%20of%20Automation%20and%20Systems%20Technology
	Department of Automation and systems technology		Introduction to microsystems 3 ECTS		http://www.tkk.fi/en/studies/master-s_level_studies_and_courses/courses_in_english/index.html#Department%20of%20Automation%20and%20Systems%20Technology
			Micro- and nanorobotics 4 ECTS		
Helsinki University of Technology, Department of engineering physics and mathematics, Helsinki, Finland	Master of Sciences (MSc) in engineering physics The core skills of the Engineering Physics and Mathematics department are based on sound mathematical natural science training and its	4	Semiconductors, polymers Nanophysics and nanomaterials Photonics and nano-optics Molecular materials	Anna Kaarina Hakala, planning officer, tf-kanslia@hut.fi (website is under construction)	http://fysiikka.tkk.fi/en/studies/

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		application to the rapidly changing problems of industrial and economic life. The primary areas of research are material physics at the atomic level, nanophysics and technology, optimization and systems sciences, new energy technologies, biophysics and biomaterials, and numerical analysis and simulation. Here listed only courses which are in the program, but related to nano.		Nanostructures and nanotubes		
FIN	Tampere University of Technology	Microsystem technology MSc The goal of the studies in Micro System Technology is to educate R&D engineers and researchers who know the potential, benefits and limitations of microsystems and are able to apply them in the product development and research in various application areas. The major in Micro System Technology provides a good background for students who are interested in research in Microsystems, while the minor is a suitable supportive package for any student who aims at R&D tasks in industry. The student should choose at least one of the comp1 courses. There are two minors: Microsystems in biotechnology (minor1) and Microfabrication and microrobotics (minor2)	4	<p>Introduction to microsystem technology (comp) 4 ECTS</p> <p>Laboratory course in microsystem technology (comp) 4 ECTS</p> <p>Microsensors (comp) 5 ECTS</p> <p>Microfluidics (comp1) 5 ECTS</p> <p>Microrobotics and microactuators (comp1) 5 ECTS</p> <p>Identification (minor1) 5 ECTS</p> <p>Assignment in microfluidics (minor1) 5 ECTS</p> <p>Measurements of physiological systems (minor1) 4 ECTS</p> <p>Bioelectromagnetism (minor1) 6 ECTS</p> <p>Cell electrophysiology (minor1) 4 ECTS</p> <p>Design of silicon sensors (minor1) 7-8 ECTS</p> <p>Biosensors (minor1) 5 ECTS</p> <p>Introduction to computational systems biology (minor1) 3 ECTS</p> <p>Compulsory courses (minor2) (the names were available only in Finnish)</p> <p>Introduction to robotics and automation (minor2) 5 ECTS</p> <p>Electron microscopy (minor2) 5 ECTS</p> <p>Control in robotics and automation (minor2) 6 ECTS</p> <p>Machine vision in production automation (minor2) 5 ECTS</p>	dr. Pentti Lautala, Head of department, pentti.lautala@tut.fi; lecturer of nano courses, head of Micor-and nanosystems research group: prof. Pasi Kallio, pasi.kallio@tut.fi	http://ae.tut.fi/research/MST/index.html
		International Masters degree (MSc) The students learn common compulsory courses and have to choose a major and a minor specialization. The program is of 120 ECTS. The	4	<p>Biomeasurements Major</p> <p>Microsensors Major</p> <p>Medical instrumentation Major</p> <p>Biotechnology Major</p>	Biomedical engineering: Mr. Juha Nousiainen, juha.nousiainen@tut.fi; Materials science: Ms. Katariina Mikkonen,	http://www.dtu.dk/English/education/MSc_Programs/Materials%20Engineering.aspx

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		first four majors have few courses related to MST and nano, the others have more, or completely dedicated to this subject. The prerequisites are a BSc degree of chemistry, physics, mathematics or electrical engineering.		Materials research Major Nanotechnology Major Biomeasurements Minor Control Theory and instrumentation Minor Nanotechnology Minor	materials@tut.fi; Science and bioengineering: Ms. Suvi-Paivikki Ikonen, suvi.ikonen@tut.fi, Nano: prof. Pasi Kallio	
DK	Technical University of Denmark, Department of Micro and nanotechnology	Nanotech MSc Electrical Engineering faculty, DTU Nanotech provides a lot of exciting courses on the master level. The courses are organised in three categories, the Micro, LabChip and Nano course of studies. We recommend that you take either Micro-2, Labchip-2 or Nano-2, as part of your master study. These courses really provide you an outstanding knowledge within their fields. There are advanced supplementary courses.	4	Nano-2 Micro-2 LabChip-2 Nano-3 Micro-3 LabChip-3	Acting director: Mogens Rysholt Poulsen, mogens.poulsen@nanotech.dtu.dk	http://www.dtu.dk/English/education/MSc_Programs/Materials%20Engineering.aspx
	Technical University of Denmark, Department of chemical engineering	MSc in Advanced and applied chemistry This understanding, particularly of the interrelationships between the different aspects, is important both at a molecular and nano-scale level. Engineers with this background are also expected to collaborate with those involved in the production of the final products and those designing the necessary processes. This M.Sc. program will make it possible to obtain a broad knowledge of the design of advanced materials. Alternatively, there is a possibility of specialization in three areas of high technological and scientific interest, specifically (i) polymers, (ii) catalysis and nanotechnology and (iii) pharmaceuticals and other complex organic molecules. In addition to the specializations, the program includes education within a variety of disciplines like analytical, bioinorganic and materials chemistry, femto-second and structural chemistry based on advanced spectroscopic and X-ray methods. Here the catalysis and nanotechnology specialization is detailed. Mostly students with BSc on Physics are welcome. They have to choose one from optional1 and at least two from optional2, and 12,5 ECTS from optional3 courses. They also can select from a number of elective courses (here only one is mentioned, related to nano).	4	Chromatography and analysis (10 ECTS) (comp) Chemical and biochemical product design 10 ECTS optional1 Technology, economics, management and organization (10 ECTS) (optional1) The chemistry of metals in biological systems (5 ECTS) (optional2) Physical chemistry3 (5 ECTS) (optional2) Biomolecular chemistry (5 ECTS) (optional2) Organic chemistry 3 (5 ECTS) (optional2) Soft nanotechnology in colloid and surface chemistry (5 ECTS) (optional2) Nano-catalysis (10 ECTS) (comp) Chemical kinetics and catalysis (7,5 ECTS) (comp) Transport processes (10 ECTS) (optional3) Structural and solid state chemistry (10 ECTS) (optional3) Ceramic science and engineering (10 ECTS) (optional3) Soft nanotechnology – colloid and surface chemistry (5 ECTS) (optional3)	Program coordinator: Georgios Kontogeorgis, gk@kt.dtu.dk	http://www.dtu.dk/English/education/MSc_Programs/Materials%20Engineering.aspx

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			<p>Industrial reaction engineering (7,5 ECTS) (optional3)</p> <p>Instrumental analysis (5 ECTS) (optional3)</p> <p>NMR spectroscopy (5 ECTS) (optional3)</p> <p>Industrial inorganic chemistry (5 ECTS) (optional3)</p> <p>Chemistry at the nanoscale (5 ECTS) (elective)</p>		
Technical university of Denmark	MSc in Design and innovation The courses listed here are nano- and MST-related courses from the technological specialization courses (elective)	4	<p>Micromechanical systems design and manufacture (10 ECTS)</p> <p>Micro-2: Microtechnology nanomicrosystems (10 ECTS)</p> <p>Applications of theoretical micro and optofluidics</p>	Program coordinator: Saeema Ahmed, design-ing@ipl.dtu.dk	http://www.dtu.dk/English/education/MSc_Programs/Materials%20Engineering.aspx
Technical University of Denmark, Department of photonics engineering	optional course at the MSc in Telecommunication, Optical communication branch	4	Nano-photonics- physics and devices (5 ECTS)	Program coordinator: Christophe Peucheret, cp@com.dtu.dk	http://www.dtu.dk/English/education/MSc_Programs/Materials%20Engineering.aspx
Technical University of Denmark, Department of Management engineering	MSc in Manufacturing engineering and management The management of production focuses on how the interaction between persons, knowledge and technology can be developed and optimized such that techniques and production will function in practice. It also includes issues of sustainability, environment and working environment. Manufacturing Engineering and Management consists of three disciplines: Industrial engineering and management, Micro/nano production- and process-development, Innovation and sustainability Here listed only the courses of the nano branch. The student has to choose one from optional1, 20 ECTS from optional2, and at least 10 ECTS from optional3 courses.	4	<p>Micromechanical systems and manufacture (10 ECTS)</p> <p>Industrial forming of metals (5 ECTS) (optional1)</p> <p>Metallurgy, design and manufacturing of cast components (5 ECTS) (optional1)</p> <p>Advanced surface technology (5 ECTS) (optional2)</p> <p>Geometrical metrology and machine testing (10 ECTS) (optional2)</p> <p>Manufacturing tribology -modelling and testing (5 ECTS) (optional2)</p> <p>Thermomechanical modelling in casting and welding (10 ECTS) (optional2)</p> <p>Industrial laser technology (5 ECTS) (optional2)</p> <p>Polymer processes (7,5 ECTS) (optional2)</p> <p>Laboratory course in process analysis – advanced course (5 ECTS) (optional2)</p> <p>Mass customization (10 ECTS) (optional2)</p> <p>Applications of theoretical micro and optofluidics (5 ECTS) (optional2)</p>	Prof. Hans Norgaard Hansen, hnh@ipl.dtu.dk	http://www.dtu.dk/English/education/MSc_Programs/Materials%20Engineering.aspx

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			<p>Fabrication of micro and nanostructures (5 ECTS) (optional2)</p> <p>Design of plastic products (5 ECTS) (optional3)</p> <p>Experimental plastics technology (5 ECTS) (optional3)</p> <p>Life cycle assessment of products and systems (10 ECTS) (optional3)</p> <p>FEM-heavy (10 ECTS) (optional3)</p> <p>development projects in companies (7,5 ECTS) (optional3)</p>		
Technical University of Denmark, Faculty of Mechanical engineering, Department of Materials science	MSc in Materials science This MSc program focuses on the use of materials in high-tech industrial areas and products, such as those used in the automotive and aeronautics industries, medical equipment, communication devices, the food industry, energy production, sports equipment, etc. The key to understanding the effective selection and application of materials for high-tech products is to understand the interrelationship between the microstructure of the materials, the fabrication process, geometric shapes and dimensions as well as types of loads and impacts from the operational environment. Only the courses related nano and MST are mentioned here.	4	<p>Materials in advanced applications and products (10 ECTS)</p> <p>Micromechanical systems design and manufacturing (10 ECTS) (optional)</p>	program coordinator: Andy Horsewell, anho@mek.dtu.dk	http://www.dtu.dk/English/education/MSc_Programs/Materials%20Engineering.aspx
Technical University of Denmark, Department of Physics	MSc in physics and nanotechnology The MSc program in Physics and Nanotechnology is offered in collaboration between three DTU departments: Department of Physics, Department of Micro- and Nanotechnology, and Department of Photonics Engineering. The main subject areas are atomic-scale physics: understanding, designing and manipulating atomic-scale systems; Nanosystems engineering: design and fabrication of nano- and microsystems; Optics and photonics: photonic devices and the quantum theory of light-matter interaction; and Biophysics and complex systems: the physics of biological systems from biomolecules to organs. Here are mentioned only the courses of the Nanosystems engineering line. At least 45 ECTS should be chosen from this list.	4	<p>Advanced quantum mechanics (10 ECTS)</p> <p>Statistical physics (5 ECTS)</p> <p>Quantum electronics: physics and devices (10 ECTS)</p> <p>Continuum physics (5 ECTS)</p> <p>Semiconductor technology (5 ECTS)</p> <p>Nano-2: nanosystems engineering (10 ECTS)</p> <p>Nano-3: advanced MEMS (5 ECTS)</p> <p>LabChip -2 (10 ECTS)</p> <p>Micro-2: microtechnology and microsystems (10 ECTS)</p> <p>Sensors and actuators (5 ECTS)</p> <p>Nanolithography (5 ECTS)</p> <p>Nanophotonics: physics and devices (10 ECTS)</p>	programme coordinator: Jakob Schiøtz, kandidatstuderer@fysik.dtu.dk	http://www.fys.dtu.dk/English/Education/Physics_and_Nanotechnology/Master_Programme_in_Physics_and_Nanotechnology.aspx

MSc Programs and Courses

				Modern topics in nanophotonics (5 ECTS)		
				Fabrication of nanophotonics devices (5 ECTS)		
D	Technical University of Dresden, Institut für Halbleiter- und Mikrosystemtechnik Technical University of Dresden, Institut für Halbleiter- und Mikrosystemtechnik	Mikrotechnik (MSc) Mikroelektronik Information only available in German. The students has to choose one from the optional courses, the others are compulsory. For several courses, there are laboratory practices (the list not contains them separately), which are in other semesters.	4	Microsystems for microelectronics (4 ECTS) Materials science II (3 cr) FEM in microelectronics (2 cr) Vacuumtechnik (2 cr) Semiconductor technology I (5 cr) Design and simulation of microsystems (4 cr) Measurement technique for semiconductors and microsystems (5 cr) Materials science III (4 cr) Semiconductor technology II (5 cr) Physical microanalytics (3 cr) Thick films (3 cr) Microelectronics technology (3cr) Solar energy technics (2 cr) Lithography for semiconductor technology (optional) (3 cr) Nanoelectronics research (optional) (3 cr) Microcomputing practice II (optional) (3 cr)	Responsible for this branch: prof. Wolf-Joachim Fischer, wolf-joachim.fischer@tu-dresden.de	http://www.ihm.tu-dresden.de/index.php?id=614
		Mikromechatronik (MSc) Information only available in German. The students has to choose from two modules (optional1 and 2), the other subjects are compulsory. For several courses, there are laboratory practices (the list not contains them separately), which are in other semesters. Optional 1 is Micro-electro-mechanical systems MEMS; optional 2 is Biomedical instrumentation.	4	Materials of MST for mechatronics (optional1) Microsystems for mechatronics (optional1) Electromechanical networks (optional1) Micromechanical laboratory (optional1) Simulations combined with applications (optional1) Biomedical technique (optional2) Technically relevant biological processes and structures (optional2) Therapeutical instrumentation (optional2) Laboratory on therapeutical instrumentation (optional2)	Responsible: prof. Fischer (MEMS branch), wolf-joachim.fischer@tu-dresden.de; prof. Poll (Biomedical branch)	
		Optoelectronic systems (MSc) Information only available in German. Only these courses were listed.	4	Optoelectronic building blocks and systems Technical optics	Responsible: prof. Hubert Lakner, hubert-lakner@tu-dresden.de	

MSc Programs and Courses

CH	University of Neuchatel, Institute of Microtechnology	no dedicated MSc, but optional to do the Masters project in Micro-nano for Masters on Science if the student is registered for the EPFL (Federal Polytechnical University of Lausanne)	4		Director of institute: prof. N. de Rooij, nico.derooij@unine.ch	http://www2.unine.ch/imt/page2949.html
H	Budapest University of Technology and Economics, Department of Microelectronics, Budapest, Hungary	Micro- and nanoelectronics MSc The main topics of these programs comprise electronics, microelectronics, microelectronic design systems, design of analogue and digital ICs, graphical lay-out design, IC testing, simulation of semiconductor structures and processes, photonic devices, integrated microsystems and mechatronics. The elective subjects comprise a wide field, focusing on the bases of image technique, bioelectronics, optoelectronics, quantumelectronics, solar cells and photovoltaics, computer graphics, circuits in memories and microcomputers, microwave semiconductor devices, high power semiconductors, VHDL language and its application, digital circuit realisation by programmable microcircuits and monolithic IC realisation. The students have to choose one from the optional1 courses. The humanities and management compulsory and/or optional courses are not listed.	4	<ul style="list-style-type: none"> VLSI circuits (4 ECTS) System-level design (4 ECTS) IC and MEMS design (4 ECTS) Micro- and nanotechnics (4 ECTS) Nanoelectronics (4 ECTS) Systems design laboratory (4 ECTS) IC and MEMS design laboratory (4 ECTS) Advanced linear algebra (6 ECTS) Mathematical analysis (6 ECTS) Physics 3 (5 ECTS) Quality assurance in microelectronics (4 ECTS) Infocommunication theory (optional1) (4 ECTS) Measurement technics (optional1) (4 ECTS) Software design (optional1) (4 ECTS) Systems with alternating current (optional1) (4 ECTS) 	Responsible for program: Dr. Marta Rencz, head of department of microelectronics, rencz@eet.bme.hu	http://www.eet.bme.hu
	Budapest University of Technology and Economics, Department of Electronics Technology, Budapest, Hungary	Electronics technology and quality assurance MSc The programme provides knowledge about the circuit assembling processes, electrical appliances and quality assurance methods. It emphasizes the innovative knowledge of micro- and nanotechnological processes and their use in the industry. They will know the scientific basics about the fabrication of highly miniaturized circuit modules, appliances, the chip attachment methods. The students have to choose one from the optional1 courses. The humanities and management compulsory and/or optional courses are not listed.	4	<ul style="list-style-type: none"> Physical, chemical and nanotechnologies (4 ECTS) System technology of module ircuits (4 ECTS) Failure analysis in reliability (4 ECTS) Modelling of technological processes (4 ECTS) Highly integrated circuit modules (4 ECTS) Laboratory: physical, chemical and nanotechnologies (4 ECTS) Quality control and assurance laboratory (4 ECTS) Advanced linear algebra (6 ECTS) Stochastics (6 ECTS) Physics 3 (5 ECTS) 	Reponsible for programme: prof. Gabor Harsanyi, head of department of electronics technolgy, harsanyi@ett.bme.hu	http://www.ett.bme.hu

MSc Programs and Courses

				Quality assurance in microelectronics (4 ECTS) Infocommunication theory (optional1) (4 ECTS) Measurement technics (optional1) (4 ECTS) Software design (optional1) (4 ECTS) Systems with alternating current (optional1) (4 ECTS)		
		Optional course for all Electrical Engineering MSc programmes	4	Nanoscience		
D	Hamburg University of Technology, Hamburg-Harburg	Microelectronics and microsystems (MSc) 2 year (both international and german)	4 semesters; select 20 ECTS out of 24.5 ECTS	Electronic devices Submicron devices Circuit design Laboratory: circuit design-analogue Laboratory: circuit design-digital Microelectronic materials 2D microelectronic systems Optoelectronics II	prof. Manfred Casper, professor in Institute of microsystem technology, kasper@tu-harburg.de	http://www.tu-harburg.de/education/master/index.html http://www.tu-harburg.de/mst/deutsch/index.shtml
			Select 13,5 ECTS out of 16,5	Microsystems Engineering Microsystem Design Microsystem Technologies Laboratory: Semiconductor and Microsystem Technologies Laboratory: Microsystem Design		
			Select 7.5 ECTS out of 24	Fibre and integrated optics Optical communications Microwave engineering Digital Filters Mobile communications Communication networks		
			Select 7,5 ECTS out of 19,25	Parallel processing Object-oriented analysis and design 3D computer vision Digital signal processors Digital video signal coding Digital audio signal processing		
		Mechatronics (MSc) 2 year	1 semester, 3 ECTS	Microsystem Engineering (Compulsory)		http://intranet.tu-harburg.de/kvvz/vorlesung_e.php3?sg_s=IMPMECH&id=key100

MSc Programs and Courses

		Medical Engineering (MSc) 2 year	1 semester, 4 ECTS	Microsystem Engineering (compulsory in certain module)		http://www.tu-harburg.de/studium/programme/master/med.html
		Product development, Materials and Production (MSc), 2 year	1 semester, 4 ECTS	Microsystemtechnology (compulsory in certain module)		http://www.tu-harburg.de/studium/programme/master/pep.html
Portugal, Denmark, Germany	Universidade Aveiro, Hamburg University of Technology, Aalborg University (ECIU= European Consortium of Innovative Universities)	Joint European Masters Programme in Materials Science, EMMS (MSc) EMMS is a two-year European Master Programme in Materials Science/Engineering and related areas, e.g. Physics or Chemistry. The Master programme is offered as a joint cooperation between Hamburg University, Germany and the Universities of Aveiro, Portugal and Aalborg University, Denmark. The programme provides specialist training in the science and technology of conventional and modern materials, such as metals, intermetallics, polymers, ceramics, glasses and nanomaterials. Special attention is given to the application of structural and functional materials in general mechanical engineering, microelectronics and microsystems technology. The programme consists of 120 ECTS.	4	Research topics: Polymer nanocomposites, Metallic materials, Biomaterials, Advanced ceramics, Materials for optoelectronics, Multiscaling modelling	Coordinator of programme: Victor Amaral, vamaral@ua.pt; from Harburg: Hans Wittich, wittich@tuhh.de; from Aalborg: Lars Jenssen, lrj@ime.aau.dk	http://emms.web.ua.pt

MSc Programs and Courses

Sweden, The Netherlands, Germany, Belgium	Chalmers University of Technology, Technical university Delft and Leiden, Technical University of Dresden, Catholic University Leuven	<p>Erasmus Mundus Master Nanoscience and nanotechnology Four leading research and educational institutions in Europe propose a joint Erasmus Mundus Master Course entitled "Nanoscience and nanotechnology". The programme offered is a truly integrated program, with a strong research backbone and a very important international outreach. The course provides top quality multidisciplinary education in nanoscience and nanotechnology.</p> <p>The participating partners are: Chalmers Tekniska Högskola (Chalmers), Sweden; Technische Universiteit Delft (TUD) & Universiteit Leiden (UL), The Netherlands; Technische Universität Dresden (TU Dresden), Germany; Katholieke Universiteit Leuven (K.U.Leuven), Belgium.</p> <p>The strong link between education and research is a guarantee for keeping the education relevant and state of the art. The program consists of 120 ECTS.</p>	4			http://www.emm-nano.org
NL	University of Twente, Faculty of Science and technology, Enschede	<p>Nanotechnology MSc Language: English. The programme is administered by the faculty of Science and Technology. Participating groups conduct their research in the MESA+ Institute for Nanotechnology and form part of the Electrical Engineering, Mathematics & Computer Science and Science and Technology faculties. The duration of the program is two years. During the first 2 semesters you will follow seven core modules in Nanotechnology. One module is reserved for homologation and the subject will depend on your BSc-background. There are practical trainings, including a cleanroom course, and non-technical courses. In the second year the student has to do an industrial training at a company involved in nanotechnology. The last 7-8 months are for Master research project in one of the research groups. During this project you will learn to set-up, plan, manage and perform a larger research project. 120 ECTS</p>	4	<p>Fabrication of nanostructures (5 ECTS)</p> <p>Characterization of nanostructures (5 ECTS)</p> <p>Nanoscience: fundamentals and applications (5 ECTS)</p> <p>Nano-optics (5 ECTS)</p> <p>Homologation (5 ECTS)</p> <p>Nanoelectronics (5 ECTS)</p> <p>Laboratory course (5 ECTS)</p> <p>Cleanroom course (2 ECTS)</p> <p>Bionanotechnology (5 ECTS)</p> <p>Paper and presentation (3 ECTS)</p> <p>Nanofluidics (5 ECTS)</p> <p>Societal embedding of nanotechnology (2,5 ECTS)</p> <p>Technology venturing (2,5 ECTS)</p>	<p>prof.dr.ir. J. Huskens</p> <p>prof.dr. G. J. Vancso</p> <p>prof.dr.ir. H. J. W. Zandvliet</p> <p>prof.dr. M. Pollnau</p> <p>dr.ir. W. G. van der Wiel</p> <p>dr. ir. M. L. Bennink (programme coordinator)</p> <p>G. P.M. Roelofs</p> <p>dr. ir. M. L. Bennink</p> <p>Mw. Dr. ir. J. G. M. Becht</p> <p>prof. Dr. F. G. Mugele</p> <p>prof. A. Rip</p> <p>prof. Dr. A. J. Groen c. s.</p>	<p>http://www.utwente.nl/en/education/2009/master/;</p> <p>http://www.graduate.utwente.nl/nt/programinfo/Program/; Programme coordinator: Dr. Martin Bennink, m.l.bennink@utwente.nl</p>

MSc Programs and Courses

		Elective (5 ECTS)			
		Internship OR Research project (min. 15 ECTS)			
		Master project (max. 45 ECTS)			
University of Twente, Faculty of Electrical Engineering, Mathematics and Computer Science, Enschede	Microsystems and microelectronics (a specialization in Electrical Engineering) MSc The programme is taught in English. The "Microsystems and Microelectronics" track covers the wide field of micro-technology and engineering, including microelectronics, microelectrical/mechanical/optical/magnetic systems, micro chemical systems and the supporting material science fundamentals. The track benefits from close ties with the Faculty of Science and Technology and the MESA+ research institute. "Microsystems and Microelectronics" graduates have a wide range of employability. In microelectronics in particular, there is an enormous shortage of personnel around the world. 120 ECTS	4	no list of courses	Programme coordinator: Drs. R.W. Brink, r.w.brink@ewi.utwente.nl	http://www.graduate.utwente.nl/choose/%5Egeneratemasters.whlink/tracks.shtml program coordinator: Drs. R.W. Brink, r.w.brink@ewi.utwente.nl
University of Twente, Faculty of Science and Technology, Enschede	Materials Physics (a specialization in Applied Physics) MSc The programme is taught in English. The "Materials Physics" track looks at the physics of superconducting materials, very thin layers (nanometer scale) and the interaction between electrons and atoms. Research Groups: Low Temperatures group (physical processes active at temperatures near absolute zero, superconducting materials, sensitive detectors).The Solid State Physics group (physical properties of very thin layers and small clusters/chains of material). "Very thin" is only a few nanometres. Computational Materials Science group develops computer simulations to solve materials science problems by calculating the interaction between electrons and atomic nuclei. 120 ECTS	4	no list of courses	Programme coordinator: B. M. Tel, b.m.tel@tnw.utwente.nl	http://www.graduate.utwente.nl/aph/

MSc Programs and Courses

	University of Twente, Faculty of Science and Technology, Enschede	Chemistry and Technology of Materials (specialization in Chemical Engineering) MSc Research in organic materials (polymers) in nanometer range, (controlled fabrication of complex polymeric architectures: molecular motors, sensors, and actuators). Biocompatible and biodegradable polymers (tissue engineering	4	no list of courses	programme coordinator: dr. R. J. Vermeij, r.j.vermeij@utwente.nl	http://mnf.tnw.utwente.nl/ ; http://www.graduate.utwente.nl/che/tracks/ctm/
D	University of Ilmenau	Micro- and nanoelectronic systems Major MSc (Mikro- und nanoelektronische svsteme) info onlv	4	Moderne aufbau und verbindunastechnik (Modern Bauelemente simulation und modelling (Simulation and modelling Analoge CMOS-Schaltungstechnik (Analogue CMOS...) Compulsorv	Information: Dipl. Ing. Claudia Lutz. referat-ei@tu-ilmenau.de:	http://www.tu-ilmenau.de/uni/6180+M54099f70862
S	Chalmers University of Technology, Department of Microtechnology and Nanoscience (MC2), Göteborg, Sweden	Microtechnology (MSc) The program has three major profiles: Packaging, MEMS and Bionano Systems Technology and is characterised by a number of hands-on laboratory work in many courses throughout the program. In this programme students acquire a knowledge foundation that offers the possibility to design and manufacture micro- and nanodevices and micro- and nanosystems in the MC2 clean room facility found at CUT. It is vital to take students from emerging micro/nanodevice fabrication through system level integration all the way to actual products. There are specializations, which are according to the optioanl courses chosen: microtechnology, electronics design, microwave and photonics, bionanoscience, production management, materials science, applied mechanics. The student has to choose at least one of the optional1 courses.	4	Fundamentals of micro and nanofabrication (comp) Introduction to microsystems packaging (comp) Microsystems technology (comp) Chemistry for engineers (optional) Electrical measurement techniques and wave physics (optional) Liquid crystals physics and applications (optional1) Reliability of microsystems (optional1) Molecular electronics (optional1) Semiconductor materials physics (optional1) Thermal management for microsystems (optional1) Environmentally adapted product development (optional) Composite and nanocomposite materials (optional) Master thesis (comp) 2 semesters Project work in microtechnology (comp) Introduction to microwave and photonic engineering (optional)	program director: prof. Johan Liu, jliu@chalmers.se	http://www.chalmers.se/en/sections/education/masterprogrammes

MSc Programs and Courses

		Semiconductor circuits and devices (optional1) Quantum engineering (optional) Simulation of production systems (optional) Material mechanics (optional) Nanobioscience for information processing (optional) Electronic circuit simulation (optional)		
<p>Nanoscale science and technology (MSc)- associated with the Physics Centre, Master of Science and Engineering in Engineering Physics</p> <p>The programme is based firmly on physics of the nanoscale combined with several possible tracks for a minor subject in adjacent areas giving the possibility of truly multidisciplinary competence in the field of nanoscale science and technology.</p> <p>The students will study and work in the MC2. All of the teachers involved in the core of this programme are simultaneously researchers at the forefront of the nanoscience field both nationally and internationally. Generic competences: broad working knowledge in physics, an insight in available theoretical and experimental techniques, ability to communicate and present technical information, ability to analyse and identify a means to solve a given problem. Unique competences: knowledge of the innovative possibilities of nanotechnology, a solid theoretical background in the physics and technology of nanoscale devices, experience of working in a clean room environment. Thesis work can be 30 or 60 credits.</p>	4	Fundamentals of micro- and nano-fabrication (7,5 ECTS) Quantum engineering (7,5 ECTS) Nanoscience (7,5 ECTS) Modelling and fabrication of nanodevices (7,5 ECTS) Superconductivity and low-temperature physics (7,5 ECTS) Elective (7,5 ECTS) Statistical physics (7,5 ECTS) Elective (7,5 ECTS) Master thesis (7,5 ECTS) Elective (7,5 ECTS) Master thesis (7,5 ECTS) Elective (7,5 ECTS) Master thesis (60 ECTS)	Program director: Göran Johansson, prof. Goran.L.Johansson@chalmers.se	http://www.chalmers.se/en/sections/education/masterprogrammes/programme-descriptions/nanoscale-science
<p>Materials and nanotechnology (MSc) 120 HEC</p> <p>The purpose of the programme is to offer an engineering education within the materials field where the emphasis is on synthesis, chemical characterisation, physical and chemical properties and applications. Nine alternative-</p>	4	The synthesis, properties and structure of solid state materials Surface chemistry (comp1) Material science, structure and properties (comp1)	Responsible for project: docent Göran Svensson, gorans@chalmers.se	http://www.chalmers.se/en/sections/education/masterprogrammes/programme-descriptions/materials-nanotechnology

MSc Programs and Courses

		<p>compulsory courses are offered. To graduate, the student must complete a total of six of these courses, equivalent to 45 credits. These courses can be grouped into four main areas (with a substantial overlap): solid state, polymers, surfaces, nano-materials. The remaining 45 credits are used by the student to focus in an area of interest (track). These could be in Polymers, Pharmaceuticals, Catalysts or Advanced materials. Each course is of 7,5 HEC. The student must select at least 6 out of comp1. Thesis work can be 30 or 60 credits.</p>		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">Solid state chemistry (opt)</td></tr> <tr><td style="padding: 2px;">Polymer chemistry and physics (comp1)</td></tr> <tr><td style="padding: 2px;">Nanomaterials chemistry (comp1)</td></tr> <tr><td style="padding: 2px;">Corrosion (comp1)</td></tr> <tr><td style="padding: 2px;">Surface engineering (comp1)</td></tr> <tr><td style="padding: 2px;">Catalysis (comp1)</td></tr> <tr><td style="padding: 2px;">Polymer technology, advanced course (comp1)</td></tr> <tr><td style="padding: 2px;">Solid state chemistry (opt)</td></tr> <tr><td style="padding: 2px;">Fundamentals of micro and nanotechnology (opt)</td></tr> <tr><td style="padding: 2px;">Nanostructured drug delivery systems (opt)</td></tr> <tr><td style="padding: 2px;">Advanced organic chemistry (opt)</td></tr> <tr><td style="padding: 2px;">Thesis work</td></tr> <tr><td style="padding: 2px;">Natural product chemistry (opt)</td></tr> <tr><td style="padding: 2px;">Applied coordination chemistry (opt)</td></tr> <tr><td style="padding: 2px;">Masters thesis (30 HEC)</td></tr> </table>	Solid state chemistry (opt)	Polymer chemistry and physics (comp1)	Nanomaterials chemistry (comp1)	Corrosion (comp1)	Surface engineering (comp1)	Catalysis (comp1)	Polymer technology, advanced course (comp1)	Solid state chemistry (opt)	Fundamentals of micro and nanotechnology (opt)	Nanostructured drug delivery systems (opt)	Advanced organic chemistry (opt)	Thesis work	Natural product chemistry (opt)	Applied coordination chemistry (opt)	Masters thesis (30 HEC)		
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		<p>Wireless and Photonics Engineering; Advanced Engineering Materials; Chemistry and Bioscience; integrated Electronic Systems Design; (MSc)</p>	4	<p>related subjects (Fundamentals of Micro- and nanotechnology)</p>																	

MSc Programs and Courses

CH	École Polytechnique Fédérale de Lausanne, Section of Chemistry and Chemical Engineering	<p>Master in Molecular & Biological Chemistry (MSc) The Masters program in molecular and biological chemistry offers a wide range of specialization in modern chemistry. Each semester the student will complete a project within a research laboratory. In addition to this lab work, he will select 6 credit's modules from five of the following areas:</p> <ul style="list-style-type: none"> - analytical chemistry and sensors, - cheminformatics - biological chemistry and biophysics - supramolecular chemistry, clusters and cages - Target synthesis, reactivity and physical organic chemistry - Photochemistry and electronics of solids - Lasers in chemistry - Environmental and food chemistry - Engineering (other EPFL sections) 	4	<p>Nanomaterials (2 ECTS) (opt. module 1) In this course we will develop the concept of nanomaterials and its role in nature as well as its integration in today's technology. We will explore the unique characteristics of these special materials in particular with the properties related to the grain size, the high surface area as well as interatomic interactions leading to split in electronic energy. We will elaborate and discuss these special properties related to the microstructure of these materials.</p>	<p>Section director, (study advisory): prof. Kay Severin, kay.severin@epfl.ch Alke Fink: alke.fink@epfl.ch, Heinrich Hofmann professor: heinrich.hofmann@epfl.ch</p>	<p>http://scgc.epfl.ch/index-e.html; http://scgc.ch/master-study-plan_molecular_biological_chemistry.htm</p>
				<p>F elements (2 ECTS) (opt. advanced module 1)</p>	<p>Jean-Claude Bünzli</p>	
				<p>Supramolecular chemistry (2 ECTS) (opt. advanced module 1)</p>	<p>Kay Severin</p>	
				<p>Nanobiotechnology and biophysics (2 ECTS) (MSc biological chemistry and bioph., MSc chemical and biochemical eng.) This course concerns modern biophysical and bioanalytical techniques to investigate the structure and function of biopolymers both in isolated and reconstituted systems and in live biological cells including recent micro- and nanotechnological approaches to detect and manipulate single molecules.</p>	<p>Horst Vogel, professor: horst.vogel@epfl.ch</p>	

MSc Programs and Courses

CH	École Polytechnique Fédérale de Lausanne, Section of Physics	MSc in Physics We offer you an education in modern physics, with an initiation into research in the institutes of physics at EPFL: theoretical physics, condensed matter physics, plasma physics and nanostructures, biophysics, astrophysics, etc.	4	Frontiers in nanoscience I (4 ECTS) (opt.) and Frontiers in nanoscience II (4 ECTS) (opt.) Nanoscale science and technology is a young and prospering field at the interface between science and engineering. The course provides a comprehensive introduction to the rapidly developing field and its physical foundations. The relevant experimental and theoretical tools and concepts will be introduced, moving from basic concepts like quantum size effects to "hot fields" such as spin transport for data storage applications (spintronics), carbon electronics, nanocatalysis or biomolecular machines. It is a modular course that emphasizes cooperative learning approaches involving strong student participation and laboratory visits.	Director of Physics section: prof. Jean-Philippe Ansermet, jean-pierre.ansermet@epfl.ch Lecturers of course: Klaus Kern professor: klaus.kern@epfl.ch, Stefano Rusponi stefano.rusponi@epfl.ch Lecturers: Klaus Kern, Wolfgang Harbich, wolfgang.harbich@epfl.ch	http://sph.epfl.ch/page53732.html
CH	École Polytechnique Fédérale de Lausanne, School of Engineering	MSc in Microengineering Cooperative course with University of Neuchatel Starting a master in Microengineering at EPFL is choosing to discover the world of microrobotics, nanosystems and photonics. This also juggling with electronics, mechanics, material sciences, chemistry, informatics and optics to imagine, conceive and design new devices and new micro/nano products. Five orientations: Applied photonics, Micro- and nanosystems, Robotics and autonomous systems, Production techniques, Biomedical microengineering. This syllabus is of the Micro- and nanosystems orientation. There are several among the optional courses which are also for the Biomedical microengineering orientation.	3	<p>Microelectronics (2 ECTS) (comp.)</p> <p>Microelectronics and Microsystems Laboratory I and II (4 ECTS each) (comp.)</p> <p>Microstructure fabrication technologies II (3 ECTS) (comp.)</p> <p>Scaling in MEMS (2 ECTS) (comp.)</p> <p>Microengineering project I and II (12 ECTS each) (comp.)</p> <p>Project of Human and social sciences I and II (3 ECTS each)(comp.)</p> <p>Analogue circuits design I and II (2 ECTS each) (opt.)</p>	Education advisor: prof. Radivoje Popovic, radivoje.popvic@epfl.ch Micro- and nanosystems orientation responsible: prof. Philippe Renaud, philippe.renaud@epfl.ch	http://sti.epfl.ch/page74605.html ; http://sti.epfl.ch/page74572.html

MSc Programs and Courses

				Biological and artificial intelligent systems (3 ECTS) (opt.) BioMEMS (2 ECTS) (opt.) Biomicroscopy I and II (3 ECTS each) (opt.) Conceptual design of products and systems (2 ECTS) (opt.) Devices and basic analogue structures (2 ECTS) (opt.) Image processing I and II (3 ECTS each) (opt.) Integrated digital circuits (2 ECTS) (opt.) Laser micro-machining training course (2 ECTS) (opt.) Nanobiotechnology and biophysics (2 ECTS) (opt.) Nanotechnology I and II (4 ECTS each) Optical radiation detection methods (3 ECTS) (opt.) Optical whole.field methods of measurement (3 ECTS) (opt.) Quantum mechanics in view of applications I and II (3 ECTS) (opt.) Reliability of MEMS (2 ECTS) (opt.) Space technology and operations (2 ECTS) (opt.) Sensors in medical instrumentation (2 ECTS) (opt.) Technologies of miniaturized sensors and actuators (2 ECTS) The engineer in the industrial R&D (2 ECTS) (opt.)		
Cooperative	Politecnico di Torino, EPFL Lausanne, University de Grenoble	INP Grenoble (INPG), Turin Polytechnique (PoliTo) and École Polytechnique Fédéral de Lausanne (EPFL) are setting up a joint masters degree in micro- and nanotechnology for integrated systems "Master's Degree in Micro-	4	Conception of microsystems (CAD Desgin of microsystems) (5 ECTS) Characterization of technological process (4 ECTS)	Paolo Civera, PoliTo P. Giorgis, PoliTo	http://www.master-nanotech.com/ ; The training, Contents of the degree Contact people: Laurent Montes: Laurent.Montes@inpg.fr; montes@epfl.ch; 00 (0)4 50 50

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Integrated systems Master's Degree in Micro- and Nanotechnology for Integrated Systems". Microelectronic products, omnipresent in our daily lives, can still undergo even more sophisticated miniaturisation. This miniaturisation is carried out using expertise in micrometric and nanometric technology ; the objective of this degree course is to produce engineers with a wide range of knowledge in this discipline, which is overflowing with applications in practically all sectors of the world economy. It is a versatile degree course, given primarily in English and dedicated to micro and nanotechnology, such that subsequent integration into the world of industry will be facilitated, at national or international level. It relies on the complementary skills of three leading European universities, in training and research in the sphere of micro and nanotechnology. In the 2nd and 3rd semester, the student has to choose optional courses for 4 ECTS. They also have to choose one block in the 3rd semester.

Informatics (Computer sciences) (2 ECTS)	Paolo Caminati, PoliTo
Physics of technological processes and microsystems (5 ECTS)	Matteo Cocuzza, PoliTo
Semiconductor devices (4 ECTS)	Federica Cappelluti, PoliTo
Solid state physics (3 ECTS)	Paolo Allia, PoliTo
Telecommunications introduction (2 ECTS)	G. Bosco, PoliTo
Entrepreneurship (3 ECTS)	
French/Italian (2 ECTS)	in 2 semesters
CAD for microsystems (1,5 ECTS)	Skandar Basruour, INPG
From Micro to Nano electronics (1,5 ECTS)	Raphael Cleric, INPG
Microsystems basics II (2 ECTS)	Matteo Cocuzza, PoliTo
Next generation lithography (1 ECTS)	Stefan Landis, INPG
Analogue circuits design I (2 ECTS)	Maher Kayal, EPFL
Integrated digital circuits (2 ECTS)	Lorena Anghel, INPG
Micro- and nanosystems practical work (3,5 ECTS)	Emmanuel Broquin, INPG
Advanced microscopy (2 ECTS)	Hervé Courtois, Joel Chevrier, INPG
Nanostructures - Physics and transport (2,5 ECTS)	Thierry Ouisse, INPG
Nanostructures for optical and magnetic applications (2 ECTS)	Laurent Montes, Liliana Prejbeanu, INPG
Group project - social sciences (4 ECTS)	INPG
Biochip labs (1 ECTS) (opt.)	Franz Brucker, INPG
Bioelectronics (biosensors, biochips, biomedical electrodes) : interfacing biology and electronics (2 ECTS) (opt.)	

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			Magnetic microsystems applications (1 ECTS) (opt.)	Orphee Cugat, INPG
			Microfluidics systems physics (1 ECTS) (opt.)	Philippe Marmottant, INPG
			Molecular biology (2 ECTS) (opt.)	Franz Brucker, INPG
			Optical integrated circuits (1 ECTS) (opt.)	Emmanuel Broquin, INPG
			Optional courses (4 ECTS)	
			Analogue circuits design II (2 ECTS) (opt. block1)	Maher Kayal, EPFL
			Digital systems modeling (2 ECTS) (opt. block1)	
			HF and VHF circuits and techniques (3 ECTS) (opt. Block1)	
			VLSI design (2 ECTS) (opt. Block1)	
			Design for testability (2 ECTS) (opt. Block2)	
			Nanoelectronics (2 ECTS) (opt. block2)	Adrian Ionescu, EPFL
			Optoelectronics (2 ECTS) (opt. block2)	Emmanuel Broquin, INPG
			Physical models for micro and nano systems (2 ECTS) (opt. Block2)	
			EDA based design (5 ECTS) (opt. Block3)	
			Entrepreneurship (4 ECTS) (opt. Block3)	
			Mi-term evaluation (6 ECTS)	
			Final evaluation (24 ECTS)	