

Co-Nanomet

Co-ordination of Nanometrology in Europe

European Training Directory:

Nanometrology



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Directory of Current Training Available in Nanometrology Across Europe

Introduction

Funded under the European Commission Framework Programme 7, Co-Nanomet is a programme of work which is *addressing the need within Europe to develop the required measurement framework to successfully support the development and economic exploitation of nanotechnology.*

To bring nanotechnology through to successful business calls for access to not only the relevant metrology tools but also suitably skilled human resources able to implement such tools at the appropriate level. As nanotechnology is a complex technology, residing at the meeting point of multiple specialised fields, training in this area must also reflect this multidisciplinary requirement. An effective training infrastructure is a key pillar to providing continuous training of human resources: to develop and upgrade the knowledge and skills required to support and implement company product development and other dependent strategies.

Training Directory

As part of the Co-Nanomet programme, a review has been completed of the availability and coverage of training courses across Europe in 'nanometrology' offered by universities, public and private training centers. Results from this review are published herein and aim to increase awareness and improve public access to training resources available. The outcome of the review has been divided into three sections:

- Section 1 provides a summary of bachelor, postgraduate, master or doctoral studies available Europe wide which address nanometrology.
- Section 2 lists reference institutions, both public and private, offering workshops, seminars and support to those working in the field with their nanometrology capabilities.
- Section 3 details instrument suppliers (e.g.: AFM, SEM, SPM, TEM's, etc.) that provide training to in the implementation of specific nanometrology systems and associated techniques. This includes: user meetings, workshops, webinars, seminars and 2 or 3 day courses demonstrating their technology.

Details are provided in the directory of training opportunities by country, the training organisation, their status (public or private), course availability and a short summary of the programme (if available)¹. We hope you find this directory of value and welcome any additions to the listing below.

Dr Theresa Burke
CEO euspen Ltd
on behalf of the Co-Nanomet Consortium

¹ Information correct as at Jan 2010.

To submit details of a training service in nanometrology please email: debbie-nyman@euspen.eu

Section 1: Bachelor, Postgraduate, Master or Doctoral Studies Available in Nanometrology

Section 1: Bachelor, postgraduate, master or doctoral studies available Europe wide which address nanometrology.

COUNTRY	ORGANISATION	C. TYPE	TITLE	DURATION	KEYCONTACT			COST €
					WEBSITE	EMAIL	PHONE	
AUSTRIA	University of Applied Sciences Dornbirn	Master	Micro and Nanotechnology	5 semesters	www.en.fhv.at/	rainer.laengle@schlosshofen.at	+43 (0)5574 4930 142	3000
	Graz University of Technology	Master	Nanophysics	4 semesters	TU Graz	info@tugraz.at	+43 (0)316 873/0	1526
		Postgraduate	Nanotechnology and Nanoanalytics	4 semesters	TU Graz	info@tugraz.at	+43 (0)316 873/0	1526
		Master	Advanced Material Science	4 semesters	TU Graz	info@tugraz.at	+43 (0)316 873/0	1526
		Master	Technical Physics	4 semesters	TU Graz	info@tugraz.at	+43 (0)316 873/0	1526
	Technical University of Vienna	Master	Physical Energy and Measurement Engineering	2 years	www.tuwien.ac.at/	webmaster@zv.tuwien.ac.at	43/(0)1/58801-0	
Master		Technical Chemistry - Materials Technology and Materials Analytics	1 year	www.tuwien.ac.at/	webmaster@zv.tuwien.ac.at	43/(0)1/58801-0		
AZERBAIJAN	Baku State University	Bachelor	Physics nanoparticles	3 year	www.bsu.edu.az/	nanomaterials@bsu.az	(99412)4387217	
		Bachelor	Physical chemistry nanoparticles and nanomaterials	3 year	www.bsu.edu.az/	nanomaterials@bsu.az	(99412)4387217	
		Bachelor	Nanobiotechnology	3 year	www.bsu.edu.az/	nanomaterials@bsu.az	(99412)4387217	
BELGIUM	University of Antwerp	Master	Nanophysics	1 year	www.ua.ac.be/	bart.partoens@ua.ac.be	+32 (0)3 265 36 63	
	Hasselt University (Campus Diepenbeek)	Master	Bioelectronics and Nanotechnology	2 years	www.uhasselt.be	patrick.wagner@uhasselt.be	+32 - (0)11 - 26 88 95	3240
	Université Libre de Bruxelles	Master	Nanotechnologie	1 year	www.ulb.ac.be/	inscriptions@admin.ulb.ac.be	+32 2 650 21 11	
	Université de Liège	Master	Nanotechnologie	2 years	www.ulg.ac.be/	Info.Etudes@ulg.ac.be	+32 4 366.36.11	
	University of Leuven	Master	Nano-sciences and Nano-technology	1 year	www.kuleuven.be/	nano@kuleuven.be	+ 32 16 32 40 10	567

COUNTRY	ORGANISATION	C. TYPE	TITLE	DURATION	KEYCONTACT			COST €
					WEBSITE	EMAIL	PHONE	
BULGARIA	University of Sofia	Master	Laser Physics and Optics	1 year	www.uni-sofia.bg/	nano@kuleuven.be	(+359 2) 9308 200	3300
		Master	Nanotechnology of Quantum Structures for Optoelectronics	1 year	www.uni-sofia.bg/	info@admin.uni-sofia.bg	(+359 2) 9308 200	3300
		Master	Optics and Spectroscopy	1 year	www.uni-sofia.bg/	info@admin.uni-sofia.bg	(+359 2) 9308 200	3300
CROATIA	University of Zagreb	Doctoral study	Engineering Chemistry	2 year	www.fkit.hr/	office@fkit.hr	+385 (0) 1 4597 281	5880
DENMARK	Technical University of Denmark	Bachelor	Physics and Nanotechnology	3 year	www.dtu.dk/	dtu@adm.dtu.dk	+45 45 25 25 25	
		Master	Physics and Nanotechnology	2 year	www.dtu.dk/	dtu@adm.dtu.dk	+45 45 25 25 25	
		Doctoral study	Several branches	2 year	www.dtu.dk/	dtu@adm.dtu.dk	+45 45 25 25 25	
	University of Copenhagen	Bachelor	Nanoscience	3 year	www.ku.dk/	sa-info@adm.ku.dk	+45 33 14 15 36	
		Master	Nanoscience	2 year	www.ku.dk/	sa-info@adm.ku.dk	+45 33 14 15 36	
ESTONIA	University of Tartu	Master	Applied Measurement Science	2 year	www.ut.ee/	studyinfo@ut.ee	+372 737 6109	4430
FINLAND	University of Jyväskylä	Master	Nanoscience	2 year	www.jyu.fi/	tiedotus@jyu.fi	(014) 260 1211	free
	Helsinki University of Technology	Master	Micro and Nanotechnology	2 year	www.tkk.fi/	kirjaamo@tkk.fi	+358 9 470 23121	free
	Tampere University of Technology	Master	Science and Bioengineering	2 year	www.tut.fi/	tiina.niemi@tut.fi	+358 (0)3 3115 11	free
FRANCE	University Paul Sabatier (Toulouse)	Master	Nanoscience, nanocomposites and nanometrology	1 year	www.ups-tlse.fr/	fillon@cemes.fr	+33 05.62.25.79.73	
		Master	Chimie Analytique et Instrumentation	1 year	www.ups-tlse.fr/	apca31@adm.ups-tlse.fr	+33 05 61 55 82 81	
	University Joseph Fourier	Master	Nanoscience, Nanotechnology (nanochimie et nano-objects)	1 year	www.ujf-grenoble.fr/	bva@ujf-grenoble.fr	+33 (0)4 76 88 74 99	
		Master	Nanoscience, Nanotechnology (nanobiologie et nanobiotechnologies)	1 year	www.ujf-grenoble.fr/	bva@ujf-grenoble.fr	+33 (0)4 76 88 74 99	
Master	Nanoscience, Nanotechnology (nanophysique et nanostructures)	1 year	www.ujf-grenoble.fr/	bva@ujf-grenoble.fr	+33 (0)4 76 88 74 99			

COUNTRY	ORGANISATION	C. TYPE	TITLE	DURATION	KEYCONTACT			COST €
					WEBSITE	EMAIL	PHONE	
GERMANY	Technische Universität Dresden	Dipl. Ing.	Mechanical engineering (major field of study: surface- and nanotechnology)	3 year	www.tu-dresden.de/		+49 (0) 351 4633-8101	free
		Master	Nanobiophysics (BIOTEC)	2 years	www.tu-dresden.de/	anne.chesneau@biotec.tu-dresden.de	+49 (0) 351 463 400 33	
	Universität Julius Maximilian Würzburg	Bachelor	Nanostrukturtechnik	3 year	www.uni-wuerzburg.de/	info@klinik.uni-wuerzburg.de	+49 (0) 931 31 - 85720	
		Master	Nanostrukturtechnik	2 year	www.uni-wuerzburg.de/	info@klinik.uni-wuerzburg.de	+49 (0) 931 31 - 85720	
	University of Kaiserslautern	Distance Study	Nanobiotechnology.	2 semesters	www.uni-kl.de/	cz@physik.uni-kl.de	+ 49-631-205-2855	1500
	South Westphalia University of Applied Sciences	Bachelor	Bio and Nanotechnology	3 year	www.fh-swf.de/	pressestelle@fh-swf.de	(02371) 566-100/101	
	Fiedrich-Alexander	Bachelor	Molecular Science	3 year	www.uni-erlangen.org/	ibz@zuv.uni-erlangen.de		
	University Erlangen-Nuremberg	Master	Advanced materials and processes	5 semesters	www.uni-erlangen.org/	ibz@zuv.uni-erlangen.de		1000
		Master	Advanced Optical Technologies	5 semesters	www.uni-erlangen.org/	ibz@zuv.uni-erlangen.de		1000
		Master	Chemical and Bioengineering	5 semesters	www.uni-erlangen.org/	ibz@zuv.uni-erlangen.de		1000
		Master	Nanotechnology	5 semesters	www.uni-erlangen.org/	Info.Nano @ ww.uni-erlangen.de		1000
	Technical University of Berlin	Bachelor	Biotechnology	3 year	www.tu-berlin.de	studienberatung@tu-berlin.de	030/3140	
	University of Kassel	Bachelor	Nanostrukturwissenschaft	3 year	www.uni-kassel.de/	studieren@uni-kassel.de	0561/8040	
	University of Hamburg	Bachelor	Nanoscience and Nanotechnology	3 year	www.uni-hamburg.de/	studienberatung@uni-hamburg.de		2250
International University Bremen	Master	Nanomolecular Science	2 year	www.jacobs-university.de/	counseling@jacobs-university.de	0421/20040	2000	
Technical University of Chemnitz	Master	Micro and Nano Systems	2 year	www.tu-chemnitz.de	studienberatung@tu-chemnitz.de	0371/5310		
Technical University Ilmenau	Master	Micro and Nanotechnology	2 year	www.tu-ilmenau.de	studienberatung@tu-ilmenau.de	03677/690		

COUNTRY	ORGANISATION	C. TYPE	TITLE	DURATION	KEYCONTACT			COST €
					WEBSITE	EMAIL	PHONE	
GERMANY	University of Saarland	Bachelor	Micro and Nanostructure	3 year	www.uni-saarland.de	studienberatung@mx.uni-saarland.de	0681/3020	3000
		Master	Micro and Nanostructure	2 year	www.uni-saarland.de	studienberatung@mx.uni-saarland.de	0681/3020	2000
	Universität Bielefeld	Bachelor	Science in Biophysik oder Nanowissenschaften	3 year	www.uni-bielefeld.de/	zsb@uni-bielefeld.de	0521/10600	
		Master	Nanoscience	2 year	www.uni-bielefeld.de/	zsb@uni-bielefeld.de	0521/10600	1400
	University of Hannover	Bachelor	Nanotechnology	3 year	www.uni-hannover.de/	studienberatung@uni-hannover.de	0511/7620	3000
		Master	Nanochemist	2 year	www.uni-hannover.de/	studienberatung@uni-hannover.de	0511/7620	2000
	Ludwig-Maximilians-University (LMU) Munich	Master	Advanced Materials Science	18 months	www.uni-muenchen.de/	ams.office@lrz.tum.de	+49 (0) 89 2180 77808	1500
	University of Duisburg-Essen	Bachelor	Enginnering Nano	3 year	www.uni-due.de/	studienberatung@uni-due.de	0201/1831	3000
		Master	Nanoengineering	24 months	www.uni-due.de/	scies@uni-due.de	+49 (0)203 379 3776	2000
	University of Ulm	Master	Advanced Materials Science	24 months	www.uni-ulm.de/	adv-mat@uni-ulm.de	+ 49 (0)731/50 23010	2400
GREECE	National Technical University of Athens	Master	Microsystems and Nanodevices	2 year	www.ntua.gr/		+30 210 7723034	
	Aristotle University of Thessaloniki	Master	Nanosciences & Nanotechnologies	2 year	www.auth.gr/	info@physics.auth.gr	+30 2310 998140	
ITALY	INRIM (Istituto Nazionale di Ricerca Metrologica):	Master	Precision Engineering: Nanometrology.	12 months	www.inrim.it/	inrim@inrim.it	+39 011 3919.1	
	Universities of Padua, Venice and Verona:	Master	Nanotechnologies	12 months	www.univiu.org/	placement@unive.it	041 2347951	7000
LUXEMBOURG	European PhD School (CRP - Gabriel Lippmann)	Teaching weeks	Nanoanalysis using focussed ion and electron beams	12 months	www.nanobeams.org/phd-school.html	contact@lippmann.lu	(+352) 47 02 61 - 1	
THE NETHERLANDS	University of Groningen (Zernike Institute for Advance Materials)	Master	Nanoscience	2 year	www.rug.nl/	n.i.i.mars@rug.nl	+31 50 363 4843	3240
		Doctoral study	Nanoscience	2 year	www.rug.nl/	n.i.i.mars@rug.nl	+31 50 363 4843	
	University of Twente	Master	Nanotechnology	2 year	www.universiteittwente.nl/	info@utwente.nl	+ 31 (0)53 489 9111	3240
		Doctoral study	Nanotechnology including Nanometrology	2 year	www.universiteittwente.nl/	info@utwente.nl	+ 31 (0)53 489 9111	
	Delft University of Technology	Master	Nanoscience	2 year	www.tudelft.nl/	info@tudelft.nl	+31 (0)15 27 89111	3240
		Master	Applied Physics	2 year	www.tudelft.nl/	info@tudelft.nl	+31 (0)15 27 89111	3240

COUNTRY	ORGANISATION	C. TYPE	TITLE	DURATION	KEYCONTACT			COST €
					WEBSITE	EMAIL	PHONE	
NORWAY	Norwegian University Of Science And Technology	Master	Condensed Matter Physics	2 year	www.ntnu.no/english	studentservice@adm.ntnu.no	+47 73 59 50 00	
POLAND	Wroclaw University of Technology:	Master	Scanning Probe microscopy, nanostructures and nanometrology	2 year	www.uni.wroc.pl/	international@uni.wroc.pl	+ 48 71 320 26 00	
PORTUGAL	University of Aveiro	Doctoral study	Nanosciences and Nanotechnologies	2 year	www.cv.ua.pt/	ceramica@ua.pt	+ 351 234 370354	
REPUBLIC OF IRELAND	University College Dublin	Master	NanoBioScience	2 year	www.ucd.ie/	brian.vohnsen@ucd.ie	+ 353 1 716 2217	
RUSSIA	North Caucasus State Technical University (NCSTU)	Postgraduate	Chemical technology of monocrystals, materials and articles of electronic technology	2 year	www.ncstu.info/	Elmel@stv.runnet.ru	+7 (8652) 94-40-09	
		Postgraduate	Nanotechnology in electronics	2 year	www.ncstu.info/	Elmel@stv.runnet.ru	+7 (8652) 94-40-09	
	Far Eastern National Uni., Vladivostok	Master	Nanoelectronics	1 year	www.fenu.ru/?a=page&id=276	office@dip.dvgu.ru	+7 (4232) 433280	
	Novosibirsk State University (SB RAS)	Postgraduate	Physical Aspects of the Nanotechnology	1 year	www.phys.nsu.ru/k04/	terek@thermo.isp.nsc.ru	+7 (383) 335-62-33	
	Tech. Design Institute of Sci.Instrument Engineering (SB RAS)	Bachelor	Nanotechnology in Electronics	3 year	www.nanotube.ru/klass.html	vk@nanotube.ru	+7 (499) 720-89-22	
	Moscow State Uni. (Scientific Educational Center in Nanotechnology)	Master	Composites Nanomaterials	2 year	www.nano.msu.ru/en/education/	chertov@polly.phys.msu.ru	+7 (495) -939-35-92	3720
		Postgraduate	Nnanosystems and Nanodevices	2 year	www.nano.msu.ru/en/education/	chertov@polly.phys.msu.ru	+7 (495) -939-35-92	
		Postgraduate	Functional nanomaterials	2 year	www.nano.msu.ru/en/education/	chertov@polly.phys.msu.ru	+7 (495) -939-35-92	
		Postgraduate	Nanobiomaterials and nanobiotechnology	2 year	www.nano.msu.ru/en/education/	chertov@polly.phys.msu.ru	+7 (495) -939-35-92	
	Russian Academy of Sciences (*)	Postgraduate	Physics of Microstructures Institute (1)	1 year	www.ipm.sci-nnov.ru/	svg@ipm.sci-nnov.ru	+7 (8314) 38-51-20	
		Postgraduate	Solid State Physics Institute(2)	1 year	www.issp.ac.ru/	kveder@issp.ac.ru	+7 (495) 962-80-54	
		Postgraduate	Institute of Spectroscopy (3)	1 year	www.isan.troitsk.ru/	evinogr@isan.troitsk.ru	+7 (496) 751-05-79	
Postgraduate		Institute of Physics. HI Amirkhanova Dagestan Scientific Center (4)	1 year	www.dagphys.ru/	kamilov_i@iwt.ru	+7 (8722) 62-89-60		

COUNTRY	ORGANISATION	COURSE TYPE	TITLE	DURATION	KEYCONTACT			COST €
					WEBSITE	EMAIL	PHONE	
RUSSIA	Russian Academy of Sciences	Postgraduate	Institute of Microelectronics Technology (5)	1 year	www.ipmt-hpm.ac.ru/	tulin@ipmt-hpm.ac.ru	+7 (495) 962-80-74	
		Postgraduate	Institute of engineering and technological Informatics (6)	1 year	www.lkti.org.ru/	admgroup@ikti.org.ru	+7 (499) 978-49-02	
		Postgraduate	Physics and Technology Institute (7)	1 year	www.ftian.ru/	orlikovsky@ftian.oivta.ru	+7 (495) 129-50-04	
		Postgraduate	Scientific-Technological Center of Unique Instrumentation (8)	1 year	www.ntcup.ru/	np@ckbup.dol.ru	+7 (495) 333-61-02	
		Postgraduate	Institute of Physical Chemistry and Electrochemistrythem. AN Frumkin (9)	1 year	www.phyche.ac.ru/	tsiv@phyche.ac.ru	+7 (495) 955-46-30	
		Postgraduate	Photochemistry Center (10)	1 year	www.photonics.ru/	alfimov@photonics.ru	+7 (495) 936-77-53	
		Postgraduate	Institute of Organic and Physical Chemistry, them. AE Arbuzov, Kazan Scientific Center (11)	1 year	www.iopc.knc.ru/	arbuzov@iopc.knc.ru	+7 (843) 273-93-65	
		Postgraduate	Institute of Metallurgy and Materials, them. AA Baikov (12)	1 year	www.imet.ac.ru/	kolmakov@imet.ac.ru	+7 (499) 135-20-60	
		Postgraduate	Institute of Strength Physics and Materials (13)	1 year	www.ispms.ru/	root@ispms.tomsk.ru	+7 (3822) 49-18-81	
SLOVENIA	University of Ljubljana	Master	Nanoscience and Nanotechnology	2 year	www.uni-lj.si/	rektorat@uni-lj.si	+386 1 241 85 00	
SPAIN	University Autònoma Barcelona	Master	Nanotechnology	1 year	www.uab.cat/	informacio@uab.es	+ 34 93 581 11 11	1800
	University of Barcelona, Rovira & Virgili University	Master	Nanoscience and Nanotechnology	1 year	www.urv.es/	contacteu@urv.cat	+ 34 902 337 878	1800
	Universidad Politécnica Catalunya	Master	Nanociencia y Nanotecnología	1 year	www.upc.edu/	masters.etseibupc.edu	+34 93 401 62 00	1800
	University of Valencia	Master	Molecular Nanoscience and Nanotechnology	2 year	www.uv.es/postgrau/	postgrado@uv.es	+34 963 983 229	
	Universidad del País Vasco	Master	Nanoscience	2 year	www.ehu.es/	info@mscnano.eu	+ 34 943 01 82 03	3600
	Universidad Autónoma de Madrid	Master	Física de la Materia Condensada y Nanotecnología	1 year	www.uam.es/	miguel.ramos@uam.es	+ 34 91 497 5551	1800
		Master	Theoretical Chemistry & Computational Modelling	2 year	www.emtccm.org/	emtccm@uam.es	+ 34 91 497 5551	2000
Universidad de Zaragoza	Master	Nanostructured Materials for Nanotechnology Applications	1 year	www.unizar.es/	seccepsz@unizar.es	+ (34) 976-761001	1800	

COUNTRY	ORGANISATION	C. TYPE	TITLE	DURATION	KEYCONTACT			COST €
					WEBSITE	EMAIL	PHONE	
SWEDEN	Chalmers University of Technology	Master	Materials and Nanotechnology	2 year	www.chalmers.se/	admission@lists.chalmers.se	+46-(0)31 772 10 00	free
		Master	Nanoscale Science and Technology	2 year	www.chalmers.se/mc2/EN/	Goran.L.Johansson@chalmers.se	+46-(0)31 772 10 00	free
	Linköping University	Master	Material Physics and Nanotechnology	2 year	www.liu.se/en/education/master/programmes/	lij@ifm.liu.se	+46 13 28 12 62	free
	Karlstad University	Master	Nanomaterials	2 year	www.basil.web.kau.se/physicsmaster/E/master_ex.html/	master.nanophys@kau.se	+46 54-700 10 00	free
	Lund University	Master	Nanoscience	2 year	www.lth.se/english/education/master/nanoscience/	nano@master.lth.se	+46-46 2229746	
	KTH Royal Institute of Technology	Master	Nanotechnology	2 year	www.kth.se/studies/master/programmes/physics/	nano@master.lth.se	+46 8 790 60 00	free
SWITZERLAND	Ecole Polytechnique Federale de Lausanne	Master	Nanotechnology	3 semester	www.epfl.ch/	smx@epfl.ch	+41(0)21 693 6801	
	Universität Basel	Bachelor	Nanowissenschaften	3 year	www.unibas.ch/	marianne.hess@unibas.ch	+41 (0)61 267 30 53	
		Master	Nanowissenschaften	2 year	www.unibas.ch/	marianne.hess@unibas.ch	+41 (0)61 267 30 53	
		Doctoral study	Nanowissenschaften	2 year	www.unibas.ch/	marianne.hess@unibas.ch	+41 (0)61 267 30 53	
	Swiss Federal Institute of Technology Zürich	Master	Science in Micro and Nanosystems	2 year	www.micronano.ethz.ch/education/master/	infomaster@micronano.ethz.ch	+41 44 633 63 69	1800
Master		Materials Science	18 months	www.mat.ethz.ch/education/master_degree/	andrea.schrott@mat.ethz.ch	+41 (0) 44 633 47 90	1135	
TURKEY	Middle East Technical University	Master	Micro and Nanotechnology	1 year	www.mnt.metu.edu.tr/	turanr@metu.edu.tr	(+90)-312-210 2292	
		Doctoral study	Micro and Nanotechnology	2 year	www.mnt.metu.edu.tr/	turanr@metu.edu.tr	(+90)-312-210 2292	
	Bilkent University	Bachelor	Material Science and Nanotechnology	3 year	www.nano.org.tr/msn.html/			
		Master	Material Science and Nanotechnology	1 year	www.nano.org.tr/msn.html/	ciraci@fen.bilkent.edu.tr	+90 312 290 2513	
		Doctoral study	Material Science and Nanotechnology	2 year	www.nano.org.tr/msn.html/			

COUNTRY	ORGANISATION	C. TYPE	TITLE	DURATION	KEYCONTACT			COST
					WEBSITE	EMAIL	PHONE	
UK	University of Oxford	Postgraduate Certificate	Nanotechnology (Fundamental Characterisation for Nanotechnology)	1 year	www.ox.ac.uk/	nano@conted.ox.ac.uk	+44 (0) 1865 286951	6100
	Cranfield University	Master	Microsystems & Nanotechnology	1 year	www.cranfield.ac.uk/	appliedsciences@cranfield.ac.uk	+44 (0)1234 754086	5000
	University of York	Bachelor	Electronic Engineering with Nanotechnology	3 year	www.york.ac.uk/	ugrad@elec.york.ac.uk	(+44) 01904 432365	
		Master	Electronic Engineering with Nanotechnology	1 year	www.york.ac.uk/	ugrad@elec.york.ac.uk	(+44) 01904 432365	
	Bangor University	Master	Nanotechnology and Microfabrication	1 year	www.bangor.ac.uk/	eng-pg-admissions@bangor.ac.uk	+ 44 (0) 1248 382683	5000
	University of Nottingham	Master	Nanoscience (Characterisation)	1 year	www.nottingham.ac.uk/	wendy.kirkup@nottingham.ac.uk	+44 (0)115 951 3481	4000
	University of Cambridge (Nanoscience Centre)	Bachelor	Nanoscience	3 year	www.nanoscience.cam.ac.uk	admissions@nanoscience.cam.ac.uk	+44 (0)1223 760304	
		Master	Micro and NanoTechnology	10 month	www.nanoscience.cam.ac.uk	rvk10@cam.ac.uk	+44-(0)1223-334327	
	University of Manchester & Lancaster (EPSRC) NOWNANO: A North West Nanoscience Doctoral Training Centre	Master	Nanoelectronics	1 year	www.manchester.ac.uk/	pgt-eee@manchester.ac.uk	+44 (0)161 306 4766	5000
		Doctoral study	From nanoscience through electronics to information technology	3 year	www.chemistry.manchester.ac.uk/postgraduate/nownano/	nownanodtc@manchester.ac.uk	+44 (0)161 275 1887	
	University of Bristol (EPSRC):	Integrated Doctoral study	Functional Nanomaterials	4 year	www.bristol.ac.uk/	helen.bainbridge@bristol.ac.uk	+44 (0) 117 3940018	
	Heriot-Watt University (Edinburgh)	Master	Nanotechnology and Microsystems Engineering	1 year	www.hw.ac.uk/	pgt@eps.hw.ac.uk	+44 (0)131 451 3023	
University of Liverpool	Master	Micro and Nano Technology	1 year	www.liv.ac.uk/	PGRengEEE@liv.ac.uk	+44 (0) 1517944545	5000	
Queen Mary, University of London	Master	Advanced Microscopy (subject to approval)	1 year	www.qmul.ac.uk/courses/pg.php		+44 (0)20 7882 5555	5000	

COUNTRY	ORGANISATION	C. TYPE	TITLE	DURATION	KEYCONTACT			COST €
					WEBSITE	EMAIL	PHONE	
UK	University of Leeds	Master	Nanoelectronics and nanomechanics	1 year	www.leeds.ac.uk	c.a.walder@leeds.ac.uk	+44 (0) 113 343 2087	
		Master	Nanoscale Science and Technology	1 year	www.leeds.ac.uk	c.a.walder@leeds.ac.uk	+44 (0) 113 343 2087	
		Master	Nanomaterials for Nanoengineering	1 year	www.leeds.ac.uk	c.a.walder@leeds.ac.uk	+44 (0) 113 343 2087	
		Master	Bionanotechnology	1 year	www.leeds.ac.uk	c.a.walder@leeds.ac.uk	+44 (0) 113 343 2087	
		Master	Nanotechnology and Advanced Electronic Devices	1 year	www.leeds.ac.uk	electronics@leeds.ac.uk	+44 (0) 113 343 2087	
	University of Sheffield	Master	Biotechnology	1 year	www.shef.ac.uk/	j.milner@shef.ac.uk	+44 (0)114 222 3514	4000
		Master	NanoMaterials for NanoEngineering - MSc	1 year	www.shef.ac.uk/	j.milner@shef.ac.uk	+44 (0)114 222 3514	
		Master	Nanoelectronics and Nanomechanics - MSc	1 year	www.shef.ac.uk/	mark.geoghegan@sheffield.ac.uk	+44 (0)114 222 3544	
		Master	Nanoscale Science and Technology - MSc	1 year	www.shef.ac.uk/	mark.geoghegan@sheffield.ac.uk	+44 (0)114 222 3544	
		Master	Nano-scale Semiconductor and Photonic Engineering	1 year	www.shef.ac.uk/	infoeee@sheffield.ac.uk	+44 (0)114 222 5355	
	University of Teesside (Middlesbrough)	Master	Nanotechnology and Microsystems	1 year	www.tees.ac.uk/	sse-admissions@tees.ac.uk	+44 (0)164 234 2499	4554
	Newcastle University	Doctoral study	Nanoscale Science and Technology	1 year	www.ncl.ac.uk/postgraduate/		+44 191 222 6000	4900
	De Montfort University (Leicester)	Master	Micro-electronics and Nano-Technologies	1 year	www.dmu.ac.uk/Subjects/Db/	spaul@dmu.ac.uk	+44 (0) 116 207 8548	3765
	University of Surrey	Master	Nanotechnology and Nanoelectronic Devices	1 year	www.surrey.ac.uk	pg-enquiries@surrey.ac.uk	+44 (0)1483 681681	
University of Wales Swansea	Master	Nanoscience to Nanotechnology	1 year	www.swan.ac.uk/postgraduate	engineering@swansea.ac.uk	+44 (0)1792 292982	5000	
Renishaw (WMMMC)/Coventry University/NPL	Foundation Degree	Metrology	2 year	www.renishaw.com	uk@renishaw.com	+44 (0)1453 524901		
EUROPE	Leuven, Delft, Chalmers, Dresden	Master	Nanoscience and Nanotechnology	24 months	www.emm-nano.org/	nano@kuleuven.be	+32 16 281 747	1080
	Grenoble Institute of Technology	Master	Functionalised Advanced Materials and Engineering	24 months	www.grenoble-inp.fr/	laurent.montes@phelma.grenoble-inp.fr , ././asanchez/Misdocumentos/PROYECTOS/CONANOMET/R eports/www.grenoble-inp.fr	+33 (0)4 56 52 91 00	1000

(*) Postgraduate courses offered by the Russian Academy of Sciences are detailed below:

(1) Physics of Microstructures Institute

- a. Solid-State Nanostructures.
- b. High-temperature superconductivity.
- c. Optics soft X-ray range.

(2) Solid State Physics Institute

- a. Condensed matter physics and materials science.
- b. Electronic, magnetic, electromagnetic, optical and mechanical properties of the skie crystalline and amorphous materials and nano-and meso-structures based on them.
- c. Spectroscopy of solids and solid-state structures.
- d. The structure of condensed matter physics of defects, crystal growth, transport phenomena in crystalline and amorphous materials and structures – pax.
- e. Phase equilibria, phase transitions.
- f. Low-dimensional structures, nano-and mesoscopic structures and systems – themes, atomic and molecular clusters.
- g. New materials and structures.
- h. Quantum and the macro-quantum methods of telecommunication.
- i. New experimental methods for the study and diagnosis of solids and solid-state nano-and meso-structures.
- j. New technologies of solid materials and structures.

(3) Institute of Spectroscopy

- a. Spectroscopy of atoms, ions, molecules, clusters, bulk and surface of condensed matter, the development of new methods of spectroscopy.

- b. Laser spectroscopy with the active influence of light on the substance and its use for isotope separation, control the motion of atoms in nanophotonics, femtooptike, photochemistry, photobiology, analytical chemistry – Mii, nanotechnology, information and other technologies.
- c. Analytical spectroscopy and its application for process control, for diagnostic purposes, environmental monitoring, to oh – wounds on human health, to study natural and technological disasters, etc.
- d. Development and creation of unique devices, spectral Ancillaries tours, optical and analytical instruments, recording systems, methods and measurements necessary for fundamental research and practical applications.

(4) Institute of Physics. HI Amirkhanova Dagestan Scientific Center

- a. Condensed matter physics, including the physics of nanostructures, spintronics, superconductivity, equilibrium and nonequilibrium phase transitions, nonlinear, quantum, critical and resonant phenomena in magnets, ferroelectrics, semiconductors, liquids and their mixtures.
- b. Physical materials: new materials and structures, including fullerenes, nanotubes and other nanomaterials.
- c. Optics and laser physics, including optical precision of measurements, the interaction of radiation with matter.
- d. Physico-technical and environmental problems of energy: heat and mass transfer, thermal, electrical and physico-chemical properties of substances and low-temperature plasma technologies based on them.
- e. Create advanced structures, materials and technologies, of the receipt of new alloys and protective coatings for multi – values.

(5) Institute of Microelectronics Technology

- a. Physico-chemical basis of promising technologies for creating the element base of nanoelectronics and microelectronics, as well as nanosistemnoy and microsystems technology.
- b. Physical basis of promising diagnostic structures nanoelectronics and microelectronics, the development of diagnostic devices.
- c. Physical principles of X-ray optics and X-ray methods of management, development of methods of X-ray and electron lithography and microscopy.
- d. Investigation of electrical, magnetic and optical properties of nanometer and quantum-well structures in order to search for new physical principles of the elemental base of microelectronics and nanoelectronics, as well as nanosistemnoy and microsystems technology.

- e. Research and development of physical and chemical methods of obtaining and analyzing high-functional materials and nano-electronics and microelectronics.

(6) Institute of engineering and technological Informatics

- a. Automation Systems, CALS-technology, mathematical models and methods for the study of complex control systems and processes, fundamental problems Sociodynamics complex high-tech industries.
- b. Global and integrated information and communications systems and networks, information technology, basic and applied problems of creating distributed information and computing environment of complex high-tech industries.
- c. Fundamental problems of cognitive-oriented technologies for representation and processing of design and technological knowledge, mathematical modeling and information processes in manufacturing and process systems engineering.
- d. Mathematical and physical modeling of advanced structures, materials and technologies in engineering and instrument making, theoretical foundations and basic principles of nanometrology in technical systems –, foundations obtain nanocomposite materials, nano-structured multi-layered-composite coatings.

(7) Physics and Technology Institute

- a. Quantum information processing techniques and architecture of high performance computing, physics of elemental base of quantum computers.
- b. Physics and technology of the element base of micro-and nano-electronics, micro-and nanosistemnoy technology.
- c. X-ray methods for analysis of multilayer nanosystems.
- d. Mathematical modeling of devices and technological processes of micro-and nanoelectronics.
- e. Development of low-temperature plasma sources, ion beams and ionoplazmennyh technologies.
- f. Development of methods for process monitoring and diagnosis of micro-and nanostructures, physics nanomagnetik

(8) Scientific-Technological Center of Unique Instrumentation

- a. Optical, acousto-optic and acoustoelectronic information technology and systems.
- b. The theory of algorithms, unique devices and information processing systems.

- c. Adaptive information systems.
- d. Pattern recognition system.
- e. Automation Systems scientific experiment.
- f. Database properties of substances and materials.
- g. Information and telecommunication systems and networks.
- h. Lasers and laser systems for scientific research, technology and telecommunications.
- i. Nanotechnology and nanomaterials in acousto-electronics and acousto-optics.
- j. Optical spectroscopy of nanostructures and nanoelectronic materials.
- k. Development and creation of unique scientific equipment and information systems.

(9) Institute of Physical Chemistry and Electrochemistrythem. AN Frumkin

- a. Supramolecular and self-assembling nanoscale systems for use in modern high technology.
- b. Surface phenomena in colloid-disperse systems, adsorption, physical-chemical mechanics.
- c. Synthesis and study of new materials, development of materials and nanomaterials with desired properties and functions (polymers and polymer materials, sorbents, composites, alloys, ceramics, biological products and medical devices, optical and superconducting materials).
- d. Chemical resistance of materials, protection of metals and other materials from corrosion and oxidation.
- e. Chemistry and technology of radioactive elements, the development of effective cleaner and maximum process safety management reprocessing of irradiated nuclear fuel, radioactive waste and materials, Radioecology, Radiation-chemical stability of materials, issues of biosafety.
- f. Kinetics and mechanisms of electrochemical reactions, electrocatalysis, new chemical batteries, fuel cells, electrochemical information systems, computer modeling of processes in electrochemical systems, bioelektrohimiya membranes.

(10) Photochemistry Center

- a. Synthesis, investigation and modeling of spectral and photochemical properties of molecules, complexes and aggregates based on them.

- b. To receive, study and modeling of the structure and optical properties of micro-and nanoparticles and ordered ensembles on their basis.
- c. Design, simulation and study of nanostructured materials and devices for photonics (hemochipov, LEDs, photonic crystals, etc.).

(11) Institute of Organic and Physical Chemistry, them. AE Arbuzov, Kazan Scientific Center

- a. Chemistry of elemental phosphorus, its organic and organometallic compounds as the basis for the creation of new substances, materials and environmentally sound alternative technologies.
- b. Chemistry of hetero-and macrocyclic compounds, carbon and organometallic nanoclusters - new molecular platforms and building blocks for constructing supramolecular structures and nano-materials. Physico-chemical study of the structure and properties of molecular and supramolecular systems in the solid and liquid phases, as well as dynamic processes of self-organization in solution.
- c. Creation of biologically active drugs, including those based on biopolymers and low molecular weight natural compounds for medicine, food industry and agriculture. Technological process of renewable raw materials, including receipt of biofuels.
- d. Chemistry, geochemistry of oil. Scientific basis of optimizing the processes of extraction and processing of hydrocarbons, the complex of deposits of viscous oil and natural bitumen with the requirements of ecology.
- e. Stereochemistry and crystal chemistry of molecular, supramolecular and nanoscale systems. Getting neratsemicheskikh substances.
- f. Diagnosis of nanoparticles and functional materials, including nanomaterials. Development of methodology of instrumental control and monitoring nanotoksikantov and ecotoxicants

(12) Institute of Metallurgy and Materials, them. AA Baikov

- a. Development of physical-chemical basis of a metal, ceramic and composite nanomaterials and nanotechnology, surface phenomena, and colloidal nanoparticles; physico-chemical mechanics.
- b. Physical chemistry and technology of energy saving and environmentally friendly processes for ferrous, nonferrous and rare metals and alloys.
- c. The development of physical and chemical bases of creation of new metal, ceramic and composite materials, including structural and functional materials, crystals and intermetallic materials with amorphous and nanocrystalline materials based on refractory non-metallic compounds, ceramic biomaterials.

- d. The theory of strength, plasticity and morphogenesis, the development of physical-chemical bases shaping processes and plastic forming, high-temperature processes in chemistry and materials science, including at high pressures, the development of methods for studying the structure and properties of materials.
- e. Directed synthesis and separation of chemical compounds with unique properties and special purpose materials; Creation of highly effective and selective catalysts and catalytic systems.

(13) Institute of Strength Physics and Materials

- a. Physical Mesomechanics materials.
- b. Physical mesomechanics of heterogeneous environments.
- c. Nanostructured bulk and nanosized materials.
- d. Nanostructured surface layers, thin films and coatings.
- e. Materials based on metals, ceramics and polymers.
- f. Computer design of new materials and technologies of their production.
- g. Scientific basis of technology of hardening and surface treatment of materials.
- h. Non-destructive testing

Section 2: Reference Institutions

Section 2: Reference institutions, both public and private, offering universities and companies workshops, seminars and support with their nanometrology capabilities.

BIPM – International Bureau of Weights and Measures	www.bipm.org	France
Czech Metrology Institute	www.cmi.cz	Czech Republic
DFM – Dansk Fundamental Metrologi	www.dfm.dtu.dk/	Denmark
Estonian Nanotechnology Competence Center (ENCC)	www.encc.ee	Estonia
Centre for Metrology and Accreditation	www.mikes.fi/	Finland
CEMES - Centre National de la Recherche Scientifique	www.cemes.fr/	France
CNRS - Centre d'Elaboration de Materiaux et d'Etudes Structurales	www.cnrs.fr/	France
Institut National des Sciences Appliquées de Toulouse (INSA)	www.insa-toulouse.fr/	France
LNE – Laboratoire National de Metrologie et d'Essais	www.lne.eu/	France
CEA - Commissariat à l'Énergie Atomique	www.cea.fr/	France
PTB – Physikalisch-Technische Bundesanstalt	www.ptb.de/	Germany
BAM - Federal Institute for Materials Research and Testing	www.bam.de/	Germany
Norwegian Metrology Service	www.justervesenet.no/	Norway
D.I. Mendeleev Scientific and Research Institute for Metrology (VNIIM)	www.vniim.ru/	Russia
State Scientific Centre of the Russian Federation	www.mrs.org/	Russia
Universitary Probe Microscopy y Nanotechnology Centre (NT-MDT)	www.ntmdt.com/	Russia
Russian Academy of Sciences	www.ras.ru/	Russia
Slovak Institute of Metrology	www.smu.sk/	Slovakia

Slovenian Institute of Quality and Metrology	www.siq.si/	Slovenia
CIN2 – Centro de Investigación en Nanociencia y Nanotecnología	www.cin2.es/	Spain
CEM – Centro Español de Metrología	www.cem.es/	Spain
SP - Technical Research Institute of Sweden	www.sp.se/	Sweden
CMMX Competence Centre for materials science and Technology	www.ccmx.ch/	Switzerland
Swiss Federal Office of Metrology (METAS)	www.ejpd.admin.ch/	Switzerland
Holland Metrology Group (VSL, NMI, Verispect)	www.hollandmetrology.nl/	The Netherlands
NPL - National Physical Laboratory	www.npl.co.uk/	UK
Quantum and Nano Technology Group University of Oxford	www.qunat.org/	UK

Section 3: Instrument Suppliers

Section 3: Instrument Suppliers (e.g.: AFM, SEM, SPM, TEM's, etc.) that provide training in related to specific nanometrology systems and associated techniques. This includes: user meetings, workshops, webinars, seminars and 2 or 3 day courses demonstrating their technology. The following is a list of companies and their instrument focus ():**

Company	Website	Instrument Expertise
Asylum Research	www.asylumresearch.com	AFM, SPM, Nanoindenting
Bruker	www.bruker.com/	Spectroscopy Raman, XRF, X-ray Microanalysis, XRD, X-ray Crystallography, AFM/SPM
Nanonics Imaging	www.nanonics.co.il/	SPM, NSOM, Optical
Nanosurf Mobile	www.nanosurf.com/	SPM, STM, AFM
NT-MDT	www.ntmdt.com/	SPM, UHV SPM, AFM, STM, SNOM
Park Systems	www.parkafm.com/	AFM
Taylor Hobson	www.taylor-hobson.com/	3D Optical profilers, roundness and cylindricity, surface form, texture and contour in both 2D and 3D, non-contact profilers: surface roughness, step-heights, form, shape, angular and critical dimensions
Veeco	www.veeco.com/	AFM, AFP, Optical Interferometric Profilers, Confocal Microscopies
WITec	www.witec.de/	SNOM, RAMAN, AFM, SPM Control unit
JPK Instruments	www.jpk.com/	AFM, AFS, Optical Tweezers
KRÜSS	www.kruss.de/	Tensiometer, Contact angle
TSI	www.tsi.com/	DMA, SMPS
Ocean Optics	www.oceanoptics.com/	Plasma monitoring, thin film reflectory, ellipsometers
Nanosight	www.nanosight.com/	NTA
Izon	www.izon.com/	SIOS

Grimm	www.grimm-aerosol.com/	Optical particle counters (EDM), Condensation Particle Counters (CPC), DMA, SMPS
Prior Scientific	www.prioruk.com/	Microscope Automation Controller
PI (Physik Instrumente)	www.physikinstrumente.com/	Nanopositioning and scanning systems
Mad City Labs	www.madcitylabs.com/	Nanopositioning systems, microscopy, active optics and UHV applications
SOPRALAB	www.sopra-sa.com/	Spectroscopic Ellipsometer (SE), Photovoltaic Metrology Systems (PV), Porosimeter Ellipsometer (EP)
Woollam	www.jawoollam.com/	Spectroscopic Ellipsometers
SENTECH	www.sentech.de/	Ellipsometers, Reflectometers, plasma deposition and etching
Angstrom Advanced	www.angstromadvanced.com/	Spectroscopic Reflectometer, Discrete Wavelength Ellipsometer, Spectroscopic Ellipsometers
Rigaku	www.rigaku.com/	X-ray spectrometry, X-ray diffraction, X-ray optics, small molecule and protein crystallography
Aspex	www.aspexcorp.com/	SEM
Lambda Photometrics	www.lambdaphoto.co.uk/	SEM, SPM, optical profilers, Fizeau interferometers, prism couplers, displacement measuring interferometer systems, non-contact optical metrology systems
Phenom-World	www.phenom-world.com/	SEM
Metricon	www.metricon.com/	Prism coupler
zygo	www.zygo.com/	Displacement Measuring Interferometers

(**) Acronym Summary:

AFM	Atomic Force Microscopy	SIOS	Scanning ion Occlusion Spectroscopy
AFP	Atomic Force Profiler	SMPS	Scanning Mobility Particle Sizer
AFS	Automated Force Spectroscopy	SPM/UHV	Scanning Probe Microscopes
CPC	Condensation Particle Counter	STM	Scanning Tunneling Microscope
DMA	Differential Mobility Analyser	XRD	X-Ray Diffractometers
SNOM	Scanning Near-Field Optical Microscopes	XRF	X-Ray Fluorescence Analyzers

NTA

Nanoparticle Tracking Analysis

UHV

Ultra High Vacuum

Section 4: Useful Sites

The following sites joining entities related to nanotechnology and nanometrology were used in the preparation of this document and may be a value to the reader:

www.ec.europa.eu

www.cordis.europa.eu

www.nanoeducation.org

www.nanostrand.eu

www.nanoindent.eu

www.nanoforum.org

www.emrponline.eu

www.cem.es

www.smu.gov.sk

www.mikes.fi

www.nanospain.org

www.euramet.eu

www.bimp.org

www.nanoned.nd

www.emrs.com

www.nanoscale.de

www.bsi-global.com

www.nanoeducation.org

www.cmi.cz

www.justervesenet.no

www.mnt.globalwatchonline.com

www.mastersportal.eu

www.nanometer.ru

www.infobub.arbeitsagentur.de/kurs

www.investinginrussia.ru/ppp/rosnanotekh

www.nsc.ru/sbras

www.research.webometrics.info/RAS

www.qunat.org

www.siq.si

www.nano.org.uk