NTNU

INTERNATIONAL MASTER´S PROGRAMMES 2010 - 2011

MASTER OF SCIENCE IN ENGINEERING
MASTER OF SCIENCE IN NATURAL SCIENCES
MASTER OF PHILOSOPHY

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For course descriptions see: http://www.ntnu.no/studies/courses

INTRODUCTION

This is a guide for students who are enrolled in one of the International Master's Degree Programmes at NTNU, and who are in the process of planning or completing their degree.
It contains an updated outline of the programmes for each of the individual International Master's Degrees.

As this catalogue is revised annually, only the latest edition is valid. This edition is valid until the end of the academic year 2010/2011.

Good luck with your studies,

Student and Academic Division

NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY (NTNU)

NTNU consists of 7 faculties. The University has over 20 000 students, and approximately 5 000 employees.

Although the University has a main profile in technological and the natural sciences it also has a full range of degrees in the social sciences, arts, humanities, medicine, and psychology. NTNU has a number of non-degree courses, such as those for practising musicians and teachers, as well as for artists in the visual arts.

NTNU is concerned with creativity and innovation. A University where its students can meet the challenges of a new era. NTNU is concerned with interrelations at the macro- and micro-levels, and contributes to developing society that is in harmony with our natural resources in interplay with traditional and new knowledge.

GUIDE TO THE INTERNATIONAL MASTER´S PROGRAMMES

Tables
The tables show the courses in relation to the overall degree programme. Here is a guide to the specific boxes:

Ex (Course year and time of examination)
This box states which course year and examination period this examination can be taken for the first time.
The examination period is marked “h” for the autumn examination and “v” for the spring examination.

Subject no.
The course code comprises 6 or 7 digits.

Subject title
This box gives the course title in abbreviated form.

Note
This box includes any references to footnotes.

Cr (credits)
The credits give the weighting of each course in the degree programme. Credits are given according to the European Credit Transfer System (ECTS).

FACULTY OF NATURAL SCIENCES AND TECHNOLOGY

MSC-PROGRAMME IN CHEMICAL ENGINEERING
(MSCHEMENG)

Term 1 and 2

Ex	Subject no.	Subject title	Note	Cr	Comp./ Opt.
		Compulsory and optional courses	1		
1h	TKP4140	PROCESS CONTROL		7,5	v1
1h	TKP4155	REACTION KIN/CATALYS		7,5	v1
1h	TKP4160	TRANSPORT PHENOMENA		7,5	v1
1h	TKP4170	PROCESS DESIGN PROJ	2	7,5	v
1v	-	EXP IN TEAM INT PROJ		7,5	o
1v	TKP4115	SURFACE/COLLOID CHEM		7,5	v1
1v	TKP4130	POLYMER CHEMISTRY		7,5	v2
1v	TKP4135	CHEM PROC SYST ENG		7,5	v2
1v	TKP4145	REACTOR TECHNOLOGY		7,5	v2
1v	TKP4150	PETROCH/OIL REFINING		7,5	v2
1v	TKP4171	PROCESS DESIGN PROJ	2	7,5	v
1v	TKP4180	BIOENERG FIBER TECH		7,5	v2
		Supplementary courses	1		
1h	TBT4140	BIOCHEM ENGINEERING		7,5	v
1h	TMA4195	MATHEMATIC MODELLING		7,5	v
1h	TMA4215	NUMERIC MATHEMATICS		7,5	v
1h	TPG4105	PETROLEUM ENG BC		7,5	v
1h	TPG4140	NATURAL GAS		7,5	v
1h	TPK4120	SAFETY/RELIAB ANALYS		7,5	v
1v	KJ2053	CHROMATOGRAPHY		7,5	v
1v	TBT4125	FOOD CHEMISTRY		7,5	v
1v	TBT4130	ENVIRONM BIOTECH		7,5	v
1v	TEP4215	ENERGY AND PROCESS		7,5	v
1v	TEP4250	MULTIPHASE TRANSPORT		7,5	v
1v	TEP4265	FOOD ENGINEERING		7,5	v
1v	TKJ4175	CHEMOMETRICS BC		7,5	v
1v	TKP4185	NUCLEAR POWER INTRO		7,5	v
1v	TKP4190	FABR/APPL NANOMAT		7,5	v
1v	TKT4140	NUM METH COMP LAB		7,5	v
1v	TMM4175	POLYMERS/COMPOSITES		7,5	v
1v	TPG4230	FIELD DEV/OPERATIONS		7,5	v
1v	TTK4135	OPTIMISATION/CONTROL		7,5	v
1V	TVM4145	WATER/WASTEW TREATM		7,5	v

o - compulsory courses
v - optional courses

v1 - at least 3 of these 4 courses must be selected
v2 - at least 1 of these courses must be selected

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring

1) The courses must be selected to obtain a total of 30 credits in each semester. Supplementary courses are not considered when planning the teaching and examination schedules.
2) The course must be chosen either in autumn (TKP4170) or in spring (TKP4171).

FACULTY OF NATURAL SCIENCES AND TECHNOLOGY

MSC-PROGRAMME IN CHEMICAL ENGINEERING
(MSCHEMENG)

Term 3 and 4

Ex	Subject no.	Subject title	Note	Cr
		Specialization courses	1	
2h	TKP4515	CATALYS/PETROCHEM SC		7,5
2h	TKP4525	COLL/POLYMER CHEM SC		7,5
2h	TKP4535	ENVIRONM/REACT TECH SC		7,5
2h	TKP4555	PROCESS SYST ENG SC		7,5
2h	TKP4565	PULP/PAPER BIOREFIN SC		7,5
		Specialization projects	1	
2h	TKP4510	CATALYS/PETROCHEM SP		15,0
2h	TKP4511	CATALYS/PETROCHEM SP		7,5
2h	TKP4520	COLL/POLYMER CHEM SP		15,0
2h	TKP4521	COLL/POLYMER CHEM SP		7,5
2h	TKP4530	ENVIRONM/REACT TECH SP		15,0
2h	TKP4531	ENVIRONM/REACT TECH SP		7,5
2h	TKP4550	PROCESS SYST ENG SP		15,0
2h	TKP4551	PROCESS SYST ENG SP		7,5
2h	TKP4560	PULP/PAPER BIOREFIN SP		15,0
2h	TKP4561	PULP/PAPER BIOREFIN SP		7,5
		Supplementary courses	2	
2h	TBT4140	BIOCHEM ENGINEERING		7,5
2h	TKP4140	PROCESS CONTROL		7,5
2h	TKP4155	REACT KIN/CATALYSIS		7,5
2h	TKP4160	TRANSPORT PHENOMENA		7,5
2h	TMA4195	MATHEMATIC MODELLING		7,5
2h	TMA4215	NUMERIC MATHEMATICS		7,5
2h	TPG4105	PETROLEUM ENG BC		7,5
2h	TPG4140	NATURAL GAS		7,5
2h	TPK4120	SAFETY/RELIAB ANALYS		7,5
2h	TVM4145	WATER/WASTEW TREATM		7,5
		Master Thesis		
2v	TKP4900	CHEM PROCESS TECHN		30,0

Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) One specialization course and one specialization project must be selected. The specializations are within the following five main profiles:
   Catalysis and Petrochemistry
   Colloid and Polymer Chemistry
   Process Systems Engineering
   Environmental Technology and Reactor Technology
   Pulp & Paper and Biorefinery
2) Supplementary courses must be selected to obtain a total of 30 credits per semester. The courses are not considered when planning the teaching and examination schedules.

MSC-PROGRAMME IN COASTAL AND MARINE CIVIL ENGINEERING

This Master of Science degree programme in Coastal and Marine Civil Engineering is an integrated, two year study programme for Norwegian and foreign students. Thus the programme is designed according to the current framework for engineering graduate studies at NTNU.

The first year of the study consists of basic compulsory and optional courses on graduate level. The second year provides a specialization in Marine Civil Engineering through a specialization project and subject. In addition one supplementary subject must be chosen. The specialization is supplemented by a non-technical course.

Norwegian students can enrol in the full M.Sc programme, or select individual courses from the programme in their study curriculum.

Foreign students could be admitted through the Quota Programme, with participants from developing countries and from Central and Eastern Europe. Students with other sources of financing might also be admitted to the full M.Sc programme.

Foreign exchange students could select individual courses from the programme, provided they have the necessary qualifications for the course.

Students aiming a specialization in Arctic Marine Civil Engineering may in agreement with professor in charge replace compulsory or other subjects with subjects in Arctic technology given at UNIS, Svalbard or elsewhere. The specialization semester and/or the master thesis may be taken at UNIS.

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN COASTAL AND MARINE CIVIL ENGINEERING (MSCOASTMAR)

Term 1, 2, 3 and 4

Ex	Subject no	Subject title	Note	Cr
		Compulsory courses		
1h	TBA4145	PORT/COAST FACILITI		7,5
1h	TBA4265	MARINE PHYS ENV		7,5
1v	-	EXP IN TEAM INT PROJ		7,5
1v	TBA4270	COASTAL ENGINEERING		7,5
		Optional courses	1	
1h	TBA4275	DYNAMIC RESPONSE		7,5
1h	TBA4325	SPREAD OF POLLUTION		7,5
1h	TBA5100	THEORETICAL SOIL MEC		7,5
1h	TKT4220	CONCRETE STRUC 2 AC		7,5
1h	TPK4120	SAFETY/RELIAB ANALYS		7,5
1h	AT327	ARCTIC OFFSHORE	2	10,0
1v	TBA5155	FOUNDATIONS/SLOPES		7,5
1v	TKT4135	MEC OF MATERIALS		7,5
1v	TKT4201	STRUCTURAL DYNAMICS		7,5
1v	TKT4215	CONCRETE TECHNOLOGY		7,5
1v	TMR4225	MARINE OPERATIONS		7,5
1v	AT205	FROZEN GROUND ENG	3	15,0
1v	AT208	THERM MECH PROP MAT	3	15,0
		Specialization	4	
2h	TBA4510	GEOTECHN ENG SP	5	7,5
2h	TBA4516	GEOTECHN ENG SC	5	7,5
2h	TBA4550	MARINE CIV ENG SP		7,5
2h	TBA4551	MARINE CIV ENG SP	6	15,0
2h	TBA4556	MARINE CIV ENG SC		7,5
		Supplementary courses	7	
2h	TBA4110	GEOTECH FIELD/LAB IN		7,5
2h	TBA4116	GEOTECH ENG AC		7,5
2h	TBA4292	MARINE CIV ENG AC		7,5
2h	TKT4108	DYNAMICS AC		7,5
2h	TMR4130	RISK SAFETY MAR TRAN		7,5
2h	AT301	INFRA CHANGING CLIM	3	10,0
2h	AT323	THERM MECH ICE SNOW	3	10,0
2h	AT327	ARCTIC OFFSHORE	2	10,0
	-	**Non-technical courses**	8	7,5
		Master Thesis	9	
2v	TBA4900	GEOTECH ENGINEERING	5	30,0
2v	TBA4920	COAST MAR CIV ENG		30,0

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Select two of the courses each term.
2) Two-week intensive course at UNIS, Svalbard. In agreement with the supervising professor. Check date of exam. Number of participants might be restricted.
3) These subjects requires that the student is at UNIS the whole semester. Special agreement with professor in charge is required.
4) A specialization course with the associated specialization project must be chosen. Generally specialization Marine Civil Engineering should be selected.
5) Specialization Geotechnics is an option for those who aim to specialize in Marine Geotechnics.

cont.

6) Specialization project of 15 credits is a special need for studentes aiming at a specialization in Arctic Marine Engineering in cooperation with UNIS and who are not at NTNU during the specialization semester.
7) One supplementary course must be chosen so that the total load for the semester is at least 30 credits. It shall be chosen from the list or among the optional courses listed for term 1 (1h). Check dates of exam. The courses are not considered when planning the teaching and examination schedules.
8) A non-technical course shall be chosen. Check language of teaching and date of exam.
9) Master thesis must be chosen. Students aiming a specialization in Arctic Marine Civil Engineering might in agreement with the supervising professor take the Master thesis at UNIS, Svalbard. Parts of the studies can be taken at UNIS, Svalbard. Check supplementary regulations. Studies at UNIS must be approved by the faculty.

FACULTY OF INFORMATION TECHNOLOGY, MATHEMATICS AND ELECTRICAL ENGINEERING

MSC-PROGRAMME IN ELECTRIC POWER ENGINEERING (MSELPOWER)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr	Comp/ Opt.
		Compulsory and optional courses	1		
1h	TET4115	POWER SYST ANALYSIS		7,5	o
1h	TET4160	INSULATING MATERIALS		7,5	o
1h	TET4190	POWER ELECTRONICS RE		7,5	o
1h	TET5100	POWER ENG UPDATES		7,5	o
1v	-	EXP IN TEAM INT PROJ		7,5	o
1v	TEP4220	ENERGY/ENV CONSEQUEN	2	7,5	v
1v	TET4120	ELECTR DRIVES		7,5	v1
1v	TET4135	ENERGY PLANNING		7,5	v1
1v	TET4170	EL INSTALLATIONS		7,5	v1
1v	TET4180	EL POW SYST STAB		7,5	v1
1v	TET4185	POWER MARKETS		7,5	v1
1v	TET4195	HIGH VOLTAGE EQUIPM		7,5	v1
1v	TET4200	MAR OFFSH POW SYST		7,5	v1
2h	TET5500	EL POWER ENG SP		15,0	o
2h	TET5505	EL POWER ENG SC		7,5	o
2h	TET4165	LIGHT AND LIGHTING		7,5	v
2h	TPK4120	SAFETY/REL ANALYSIS		7,5	v
2h	TPK5100	PROJ PLAN/CONTR		7,5	v
		Master Thesis			
2v	TET4910	ELEC POW ENG		30,0	o

o - compulsory courses
v - optional courses

v1 - at least two of these courses must be chosen

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

10) The courses must each semester be selected so that the total weighting amounts to 30 credits (Cr).
11) The course is not considered when planning the teaching and examination schedules.

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN GEOTECHNICS AND GEOHAZARDS (MSGEOTECH)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr
		Compulsory courses		
1h	TBA4110	GEOTECH FIELD/LAB IN		7,5
1h	TBA4231	APPLIED GEOMATICS		7,5
1h	TBA5100	THEORETICAL SOIL MEC		7,5
1h	TBA5150	GEOHAZARDS/RISK AN		7,5
1v	-	EXP IN TEAM INT PROJ		7,5
1v	TBA5155	FOUNDATIONS/SLOPES		7,5
1v	TGB5110	GEOLOGY TUNNELL BC		7,5
1v	TKT4135	MECH OF MATERIALS		7,5
2h	TBA4510	GEOTECH ENG SP	1	7,5
2h	TBA4516	GEOTECH ENG SC		7,5
2h	TGB5100	ROCK ENGINEERING AC		7,5
2h	-	ELECTIVE COURSE	2	7,5
		Master Thesis		
2v	TBA4900	GEOTECH ENGINEERING		30,0

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) The primary choice is the combination TBA4510 (7,5 cr) together with an elective course (7,5 cr). In some case, when an appropriate elective course is hard to find, the combination may be exchanged with the 15 cr course TBA4511 Geotechnical Engineering, Specialization Project. This must be done in agreement with the project supervisor.
2) A technical or project-related course must be chosen.

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN HYDROPOWER DEVELOPMENT
(MSB1)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr
		Compulsory courses		
1h	TVM4105	HYDROLOGY		7,5
1h	TVM5115	DAM ENGINEERING		7,5
1h	TVM5125	HYDRAULIC DESIGN		7,5
1h	TVM5135	PLANNING HYDROPOWER		7,5
1v	-	EXP IN TEAM INT PROJ		7,5
1v	TGB5110	GEOLOGY TUNNELL BC		7,5
1v	TVM5132	PREF STUDY HYDRO DEV		7,5
1v	TVM5140	ECON ASSESM HYDROPOW		7,5
2h	TGB5100	ROCK ENGINEERING AC		7,5
2h	TVM4106	HYDRO MODELLING		7,5
2h	TVM5160	HEADWORKS/SEDIMENT		7,5
2h	TVM5171	ENV IMP HYDROPOWER		7,5
		Master Thesis	1	
2v	TBA4910	PROJ MANAGEMENT		30,0
2v	TGB4910	ROCK ENGINEERING		30,0
2v	TVM4915	HYDROPOWER PLANNING		30,0
2v	TVM4920	HYDROPOWER HYDROLOGY		30,0
2v	TVM4925	HYDROPOWER HYDRAULIC		30,0

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Choose one of the thesis.

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN INDUSTRIAL ECOLOGY (MSINDECOL)

Term 1, 2, 3 and 4

Ex	Subject no	Subject title	Note	Cr	Specialization 1	Specialization 2
		Compulsory and optional courses	1			
1h	TEP4223	LIFE CYCLE ASSESS		7,5	o	o
1h	TFY4300	ENERGY ENVIR PHYSICS		7,5	v	v
1h	TIØ4195	ENV MAN CORP SOC RES	2	7,5	o	o
1h	TVM4162	INDUSTRIAL ECOLOGY		7,5	o	o
1h	SOS1002	RESEARCH METHODS	3	15,0	v	v
1v	-	EXP IN TEAM INT PROJ		7,5	o	o
1v	TEP4220	ENERGY/ENV CONSEQUEN		7,5	v	v
1v	TPD5100	SUS PROD DES AC		7,5	v	v
1v	TVM4160	MATERIAL FLOW ANALYS		7,5	o	v
1v	POL1003	POLITICS ENVIRONMENT		7,5	v	o
1v	POL3004	RESEARCH DESIGN	4,5	7,5	v	v
1v	PSY3590	SAFET AND SECURITY	6	7,5	v	v
1v	SØK1101	ENVIRONM RESOURCE		7,5	v	v
		Supplementary courses	1,7			
1h	TIØ4300	ENV SC ECOSYS SUST		7,5	v	v
1h	TPD4505	DESIGN THEORY SC		7,5	v	v
1h	KULT3304	STUD TECHN/SCIENCE II	8	15,0	v	v
1h	SOS3508	INST/INST DESIGN	9	15,0	v	v
		Compulsory and optional courses	1			
2h	TEP4222	INPUT-OUTPUT ANALYS		7,5	o	v
2h	TIØ4525	SAFE HEALTH/ENV SC	10	7,5	v	v
2h	TPK4160	VALUE CHAIN CONTR		7,5	v	v
2h	POL3507	POLICY ANALYSIS	8,9	15,0	v	v
2h	PSY3090	RISK PSYCHOLOGY ENV	5	15,0	v	v
		Supplementary courses	1,7			
2h	TIØ4300	ENV SC ECOSYS SUST		7,5	v	v
2h	TPD4505	DESIGN THEORY SC		7,5	v	v
2h	KULT3304	STUD TECHN/SCIENCE II	8	15,0	v	v
2h	SOS3508	INST/INST DESIGN	9	15,0	v	v
		Project and thesis preparation course	11			
2h	TEP5100	INDECOL PROJECT		15,0	v	-
2h	TIØ5235	INDECOL PROJECT	10	15,0	-	v
2h	TPD4190	DESIGN PROJECT	12	15,0	v	-
2h	TVM5175	INDECOL PROJECT		15,0	v	-
2h	POL3520	INDECOL PROJECT	4	15,0	-	v
		Master Thesis	11			
2v	TEP4930	INDUSTRIAL ECOLOGY		30,0	v	-
2v	TIØ4955	INDUSTRIAL ECOLOGY	10	30,0	-	v
2v	TPD4910	INDUSTRIAL ECOLOGY		30,0	v	-
2v	TVM4900	INDUSTRIAL ECOLOGY		30,0	v	-
2v	POL3920	INDUSTRIAL ECOLOGY	4	30,0	-	v

o = Compulsory courses
v = Optional courses

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Other optional/supplementary courses may be chosen from the NTNU course catalogue. The combination of optional/supplementary courses must be approved by the programme. The courses are selected so that the total weighting each term amounts to 30 credits (Cr).
2) May be taken in the second autumn semester, 2h.
3) If a student in Specialization 2, with a supervisor from the Dep. of Sociology and Political Science, does not already have this course in his bachelor degree, he must take it during the first semester. Exemptions may be granted when the student has a similar course from another institution.
4) This course is compulsory for students in Specialization 2 who want to write a project and a thesis with a supervisor from the Dep. of Sociology and Political Science.
5) This course is compulsory for students in Specialization 2 who want to write a project and a thesis with a supervisor from the Dep. of Psychology.
6) Recommended for students in Specialization 2 with a supervisor from the Dep. of Pshychology.
7) The courses are not considered when planning the teaching and examination schedules.
8) Course given in Norwegian only.
9) The course is taught upon availability.
10) This course is compulsory for students in Specialization 2 who want to write a project and a thesis with a supervisor from the Dep. of Industrial Economics and Technology Management.
11) Students in Specialization 1 choose one of the options depending on which department their supervisor belongs to.
12) Can also be taken in the spring semester, 1v.

Specialization:
1 Environmental Systems Analysis
2 Environmental Politics and Management

For Specialization 2, in the second or third semester students must choose different compulsory courses depending on from which department they want to have a supervisor; from the Dep. of Industrial Economics and Technology Management, the Dep. of Psychology or the Dep. of Sociology and Political Science. In order to have a supervisor from the Dep. of Sociology and Political Science the student must have at least 60 ECTS credits of Political Science courses in his bachelor degree.

FACULTY OF INFORMATION TECHNOLOGY, MATHEMATICS AND ELECTRICAL ENGINEERING

MSC-PROGRAMME IN INFORMATION SYSTEMS
(MSINFOSYST)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr	Specialization 1	Specialization 2
		Compulosory and optional courses	1			
1h	TDT4235	SOFTWARE QUALITY		7,5	v	v
1h	TDT4237	SOFTWARE SECURITY		7,5	v	-
1h	TDT4245	COOPERATION TECHN		7,5	v	v
1h	TDT4250	MODEL-DRIVEN DEV IS		7,5	o	o
1h	TDT4290	CUSTOMER DRIVEN PROJ		15,0	o	o
1h	TPK5100	PROJ PLAN/CONTR		7,5	v	v
1v	-	EXP IN TEAM INT PROJ		7,5	o	o
1v	TDT4215	WEB INTELLIGENCE		7,5	o	o
1v	TDT4240	SOFTWARE ARCHITECT		7,5	v	v
1v	TDT4242	REQUIREMENT TEST		7,5	v	v
1v	TDT4252	MOD INFOSYST AC		7,5	v	o
1v	TTM4115	ENG DIST REAL SYST		7,5	v	-
2h	TDT4520	PROGR INFO SYST SP		15,0	o	o
2h	TDT4525	PROGR INFO SYST SC		7,5	o	o
2h	TBA5200	PROJ PLAN/ANALYSIS		7,5	v	v
2h	TDT4210	HEALTHCARE INFORM		7,5	v	v
2h	TIØ4180	INNOV MANAGEM		7,5	v	-
2h	IT3010	RESEARCH METHODOLOGY		7,5	v	-
2h	IT3604	ORGANIZATION/ICT		7,5	v	v
		Master Thesis				
2v	TDT4900	COMPU INFO SCIENCE		30,0	o	o

o - compulsory courses
v - optional courses

1) Optional courses must be selected to obtain a total of 30 credits in each semester.

Specialization:
1 Information Systems
2 Information Systems Engineering*

*Possible for students accepted for this specialization to have the 3rd semester at one of the order EUROMISE universities (NTNU, KTH, UPValencia, Politechnico Milano, UnivDelft, Twente, Sorbonne, Tech Univ Catalonia).

FACULTY OF NATURAL SCIENCES AND TECHNOLOGY

MSC-PROGRAMME IN LIGHT METALS PRODUCTION
(MSLIMETAL)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr
		Compulsory courses		
1h	TMT4145	CERAMIC ENGINEERING		7,5
1h	TMT4155	HETEROGEN EQUILIBRIA		7,5
1h	TMT4253	ELECTROCHEM/ENERGY		7,5
1h	TMT5105	ELECTR LIGHT MET 1		7,5
1v	TMT4166	EXP MATR/ELECTR CHEM		7,5
1v	TMT4850	EXP IN TEAM INT PROJ		7,5
1v	TMT5100	ELECTR LIGHT MET 2		7,5
		Optional courses	1	
1v	TMT4208	FLUID/HEAT TRANSF AC		7,5
1v	MT8301	CARBON MAT TECHN		7,5
		Compulsory courses		
2h	TMT4325	REFIN/RECYL METALS		7,5
2h	TMT5500	PROC MET ELECTR SP		15,0
2h	TMT5505	PROC MET ELECTR SC		7,5
		Master Thesis	2	
2v	TMT4900	MAT CHEM ENER TECHN		30,0
2v	TMT4905	MATR TECHN		30,0

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Select one of the courses.
2) Select one of the thesis.

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN MARINE TECHNOLOGY (MSN1)

Term 1, 2, 3 and 4

MARINE STRUCTURES

Ex	Subject no.	Subject title	Note	Cr	Specialization 1	2	3
		Compulsory and optional courses					
1h	TMR4115	DESIGN METHODS		7,5	v	v	-
1h	TMR4125	BUILD SHIPS/PLATF		7,5	v	v	-
1h	TMR4130	RISK ANALYSIS		7,5	v	-	-
1h	TMR4170	MARINE STRUCTURES BC	1	7,5	o	o	o
1h	TMR4190	FINITE ELEM METH		7,5	o	o	-
1h	TMR4200	FATIGUE/FRACTURE	2	7,5	v	v	-
1h	TMR4215	SEA LOADS		7,5	o	o	o
1h	TMR4235	STOCH THEORY SEALOAD		7,5	v	v	-
1h	TMR4275	MOD/SIM/AN DYN SYS		7,5	-	v	o
1h	TMR4290	MAR ELECTR PROP SYST		7,5	-	-	v
1h	TTK4115	LINEAR SYST THEORY		7,5	-	-	v
1h	TTK4150	NONLINEAR CONTR SYST		7,5	-	-	v
1v	TKT4145	FIN ELEM METH		7,5	v	v	v
1v	TMR4140	DES MAR PROD PLANTS		7,5	v	-	-
1v	TMR4182	MARINE DYNAMICS	1	7,5	o	o	o
1v	TMR4195	DESIGN OFFSHOR STRUC	3	7,5	o	v	v
1v	TMR4205	BUCKLING/COLLAPS STR	2	7,5	v	-	-
1v	TMR4217	HYDRO HIGH-SPEED VEH	3	7,5	v	v	v
1v	TMR4220	NAVAL HYDRODYNAMICS	3	7,5	v	v	-
1v	TMR4225	MARINE OPERATIONS	3	7,5	v	v	v
1v	TMR4240	MARINE CONTROL SYST		7,5	-	-	o
1v	TTK4135	OPTIMISATION/CONTROL		7,5	-	-	v
1v	TTK4190	GUIDANCE/CONTROL		7,5	-	-	v
		Supplementary courses	4				
1h	TMR4135	FISH VESSEL/WORK DES		7,5	v	v	-
1v	TMR4220	NAVAL HYDRODYNAMICS		7,5	-	-	v
1v	TMR4230	OCEANOGRAPHY		7,5	v	v	v
		Specialization courses					
2h	TMR4505	MARINE STRUCTURE SC		7,5	o	-	-
2h	TMR4515	MAR CONTR SYST SC		7,5	-	-	o
2h	TMR4525	MARINE HYDRODYN SC		7,5	-	o	-
		Specialization projects					
2h	TMR4500	MARINE STRUCTURE SP		7,5	o	-	-
2h	TMR4510	MAR CONTR SYST SP		7,5	-	-	o
2h	TMR4520	MARINE HYDRODYN SP		7,5	-	o	-
		Supplementary courses	5				
2h	TMA4145	LINEAR METHODS		7,5	-	-	v
2h	TMR4115	DESIGN METHODS		7,5	v	v	-
2h	TMR4130	RISK ANALYSIS		7,5	v	-	-
2h	TMR4135	FISH VESSEL/WORK DES		7,5	v	-	-
2h	TMR4200	FATIGUE/FRACTURE		7,5	v	v	-
2h	TMR4235	STOCH THEORY SEALOAD		7,5	v	v	-
2h	TMR4275	MOD/SIM/AN DYN SYS		7,5	-	v	-
2h	TMR4290	MAR ELECTR PROP SYST		7,5	-	-	v
2h	TMR4300	EXP/NUM HYDRODYN		7,5	-	v	-
2h	TMR4305	ADV ANALY MAR STRUCT		7,5	v	-	-
2h	TTK4115	LINEAR SYST THEORY		7,5	-	-	v
2h	TTK4150	NONLINEAR CONTR SYST		7,5	-	-	v
		Master Thesis					
2v	TMR4900	MARINE STRUCTURES		30,0	o	o	o

o = compulsory course
v = optional course

cont.

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Compulsory course for students without the equivalent background.
2) Select at least one subject for the specialization Marine structures.
3) Select at least two subjects for the specialization Marine hydrodynamics.
4) Supplementary courses are not considered when planning the teaching and examination schedules.
5) Select two supplementary courses. Courses are not considered when planning the teaching and examination schedules.

Specialization:
1 Marine structures
2 Marine hydrodynamics
3 Marine cybernetics

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN MARINE TECHNOLOGY (MSN1)

Term 1 and 2

MARINE SYSTEMS ENGINEERING

Ex	Subject no.	Subject title	Note	Cr	Specialization	
					1	4
		Compulsory and optional courses				
1h	TMR4115	DESIGN METHODS		7,5	-	v
1h	TMR4125	BUILD SHIPS/PLATF		7,5	-	v
1h	TMR4130	RISK ANALYSIS		7,5	o	v
1h	TMR4135	FISH VESSEL WORK DES		7,5	-	o
1h	TMR4137	SUST UTIL MAR RES		7,5	-	o
1h	TMR4223	MARINE MACHINERY	1	7,5	o	v
1h	TMR4253	MARINE SYST DESIGN	1	7,5	o	o
1h	TMR4290	MAR ELECTR PROP SYST		7,5	-	v
1h	TMR4295	DES OF MECH SYST		7,5	o	-
1v	TMR4120	UNDERWATER ENG BC		7,5	v	v
1v	TMR4140	DES MAR PROD PLANTS		7,5	-	o
1v	TMR4182	MARINE DYNAMICS		7,5	v	v
1v	TMR4265	OPERATION TECHN BC		7,5	o	v
1v	TMR4280	INTERNAL COMB ENGINE		7,5	v	v
		Supplementary courses	2			
1h	BI3061	BIOL OCEAN		7,5	-	v
1h	TIØ4120	OP RESEARCH INTRO		7,5	-	v
1h	TMR4215	SEA LOADS		7,5	-	v
1h	TMR4275	MOD/SIM/AN DYN SYST		7,5	-	v
1h	TMR4295	DES OF MECH SYST		7,5	-	v
1h	TPK4160	VALUE CHAIN CONTROL		7,5	-	v
1h	TPK5100	PROJ PLAN/CONTR		7,5	-	v
1h	TTT4175	MARINE ACOUSTICS		7,5	-	v
1h	TVM4162	INDUSTRIAL ECOLOGY		7,5	-	v

o = compulsory course
v = optional course

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring

According to their specialization the students will be assigned to an academic supervisor in the first or beginning of the second semester. The combination of courses must be approved by the programme. The courses are selected so that the total weighting each term amounts to 30 credits (Cr).

1) Compulsory for students without the equivalent background.
2) Courses are not considered when planning the teaching and examination schedules.

Specialization:
1 Technical Operation of Marine Systems
4 Fisheries and Marine Resources

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN MARINE TECHNOLOGY (MSN1)

Term 1 and 2

MARINE SYSTEMS ENGINEERING - for students to TU Delft*

Ex	Subject no.	Subject title	Note	Cr	Specialization 2	3
		Compulsory and optional courses				
1h	TMR4115	DESIGN METHODS		7,5	-	o
1h	TMR4135	FISH VESSEL WORK DES		7,5	-	v
1h	TMR4137	SUST UTIL MAR RES		7,5	-	v
1h	TMR4170	MARINE STRUCTURES BC		7,5	-	v
1h	TMR4223	MARINE MACHINERY	1	7,5	o	v
1h	TMR4253	MARINE SYST DESIGN	1	7,5	-	o
1h	TMR4275	MOD/SIM/AN DYN SYST		7,5	o	v
1h	TMR4290	MAR ELECTR PROP SYST		7,5	o	v
1h	TMR4295	DES OF MECH SYST		7,5	o	-
		Supplementary courses	2			
1h	TIØ4120	OP RESEARCH INTRO		7,5	-	v
1h	TMR4125	BUILD SHIPS/PLATF		7,5	-	v
1h	TMR4130	RISK ANALYSIS		7,5	-	v
1h	TMR4215	SEA LOADS		7,5	-	v
1h	TPK4160	VALUE CHAIN CONTROL		7,5	-	v
		Compulsory courses at Delft	3			
1v	MT044	NAVAL SHIP DESIGN		3,0	-	o
1v	MT113	DESIGN ADV VEHICLES		3,0	v	o
1v	MT218	MECHATRONIC MAR TECH		5,0	o	v
1v	MT525	MARINE PROP SYSTEMS		2,0	o	v
1v	MT713	MARINE ENGINEERING C		2,0	o	o
1v	WB4408A	DIESEL ENGINES A		4,0	o	-
1v	WB4408B	DIESEL ENGINES B		4,0	o	-
		Optional courses at Delft	3			

o = compulsory course
v = optional course

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring

According to their specialization the students will be assigned to an academic supervisor in the first or beginning of the second semester. The combination of courses must be approved by the programme. The courses are selected so that the total weighting each term amounts to 30 credits (Cr). The Department will give a list of optional subjects.

1) Compulsory for students without the equivalent background.
2) Courses are not considered when planning the teaching and examination schedules.
3) Information on the subjects, see http://blackboard.tudelft.nl. Altogether 30 ECTS pr. semester.

Specialization:
2 Marine Engineering
3 Marine Systems Design and Logistics

*For students who choose the option Marine Systems Engineering and the main profiles Marine Engineering or Marine Systems Design and Logistics, there is an obligatory 6-months stay at TU Delft in the Netherlands in the second semester of the first year.

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN MARINE TECHNOLOGY (MSN1)

Term 3 and 4

MARINE SYSTEMS ENGINEERING

Ex	Subject no.	Subject title	Note	Cr	Specialization			
					1	2	3	4
		Specialization courses						
2h	TMR4535	MARINE MACHINERY SC		7,5	-	o	-	-
2h	TMR4555	OPER TECHN SC		7,5	o	-	-	-
2h	TMR4565	MAR SYST DESIGN SC		7,5	-	-	o	-
2h	TMR4575	FISH/MAR RES SC		7,5	-	-	-	o
		Specialization projects						
2h	TMR4530	MARINE MACHINERY SP		7,5	-	o	-	-
2h	TMR4550	OPER TECHN SP		7,5	o	-	-	-
2h	TMR4560	MAR SYST DESIGN SP		7,5	-	-	o	-
2h	TMR4570	FISH/MAR RES SP		7,5	-	-	-	o
		Supplementary courses	1					
2h	TBA4305	FREIGHT TRANSP SYST		7,5	-	-	v	-
2h	TEP4212	GAS CLEAN/EMISS CONT		7,5	-	v	-	-
2h	TIØ4120	OP RESEARCH INTRO		7,5	v	-	-	v
2h	TIØ4130	OPT METHODS		7,5	-	-	v	-
2h	TMM4135	ANALYS/ASSESMENT		7,5	-	v	-	-
2h	TMM4220	INNOV-WITHOUT LIMITS		7,5	v	-	-	-
2h	TMR4115	DESIGN METHODS		7,5	v	v	-	v
2h	TMR4125	BUILD SHIPS/PLATF		7,5	v	v	v	v
2h	TMR4130	RISK ANALYSIS		7,5	-	-	v	-
2h	TMR4135	FISH VESSEL WORK DES		7,5	v	-	-	-
2h	TMR4137	SUST UTIL MAR RES		7,5	v	-	v	-
2h	TMR4190	FINITE ELEM METH		7,5	v	-	v	v
2h	TMR4200	FATIGUE/FRACTURE		7,5	v	-	v	-
2h	TMR4215	SEA LOADS		7,5	-	v	v	v
2h	TMR4275	MOD/SIM/AN DYN SYST		7,5	-	v	v	v
2h	TMR4290	MAR ELECTR PROP SYST		7,5	-	v	v	v
2h	TPK4160	VALUE CHAIN CONTROL		7,5	-	-	v	v
2h	TPK5100	PROJ PLAN/CONTR		7,5	v	-	v	v
2h	TTK4115	LIN SYST THEORY		7,5	-	v	-	-
2h	TTT4175	MARINE ACOUSTICS		7,5	-	-	-	v
2h	TVM4162	INDUSTRIAL ECOLOGY		7,5	-	-	-	v
		Master Thesis						
2v	TMR4905	MARINE SYST		30,0	o	o	o	o

o = compulsory course
v = optional course

Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

According to their specialization the students will be assigned to an academic supervisor in the first or beginning of the second semester. The combination of courses must be approved by the programme. The courses are selected so that the total weighting each term amounts to 30 credits (Cr).

1) Select two supplementary courses. Courses are not considered when planning the teaching and examination schedules.

Specialization:
1 Technical Operation of Marine Systems
2 Marine Engineering
3 Marine Systems Design and Logistics
4 Fisheries and Marine Resources

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN MARINE TECHNOLOGY (MSN1)

Term 1, 2, 3 and 4

NAUTICAL SCIENCE

Ex	Subject no.	Subject title	Note	Cr
		Compulsory courses		
1h	TMA4120	CALCULUS 4K	1	7,5
1h	TMR4215	SEA LOADS		7,5
1h	TMR5230	NAUTICAL SCIENCE BC		7,5
1h	TTT4175	MAR ACOUSTICS		7,5
1v	TMR4182	MARINE DYNAMICS	1	7,5
1v	TTT4150	NAVIGATION SYSTEMS		7,5
		Optional courses		
1v	TMR4217	HYDRO HIGH-SPEED VEH	2	7,5
1v	TMR4220	NAVAL HYDRODYNAMICS		7,5
1v	TMR4225	MARINE OPERATIONS		7,5
1v	TMR4230	OCEANOGRAPHY		7,5
1v	TMR4240	MARINE CONTROL SYST	3	7,5
1v	TTK4105	CONTROL SYSTEMS	4	7,5
1v	TTK4190	GUIDANCE AND CONTROL		7,5
		Compulsory courses		
2h	TMR5240	NAUTICAL SCIENCE AC		7,5
2h	TMR5250	NAUTICAL SCIENCE PRO		7,5
2h	TMR5260	NAUTICAL SCIENCE SC		7,5
		Optional courses		
2h	TMR4130	RISK ANALYSIS		7,5
2h	TMR4235	STOCH THEORY SEALOAD		7,5
		Master Thesis		
2v	TMR4925	NAUTICAL SCIENCE		30,0

o = Compulsory course
v = Optional course

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Compulsory course for students without the equivalent background.
2) The course is not considered when planning the teaching and examination schedules.
3) TTK4105 or equivalent is necessary background for TMR4240.
4) It is recommended to study this course in parallel to TMR4240.

FACULTY OF NATURAL SCIENCES AND TECHNOLOGY

MSC-PROGRAMME IN MEDICAL TECHNOLOGY (MSMEDTEK)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr	Specialization				
					1	2	3	4	5*
		Compulsory and optional courses							
1h	BI3013	EXP CELL BIOLOGY		7,5	-	-	-	-	v
1h	FY2302	BIOPHYSICS I		7,5	-	-	-	v	-
1h	IT3604	ORGANIZATION/ICT		7,5	-	v	-	-	-
1h	MFEL1010	MED FOR NON MED STUD	1	7,5	o	o	o	o	-
1h	MOL3000	INTRO MOL MEDICINE		7,5	-	-	-	-	o
1h	MOL3005	IMMUNOLOGY		7,5	-	-	-	-	o
1h	MOL3014	NANOMED 1		7,5	-	-	-	-	v
1h	TBT4135	BIOPOLYMERS		7,5	-	-	-	-	v
1h	TBT4145	MOL GENETICS		7,5	-	-	-	-	o
1h	TDT4117	INFO RETRIEVAL		7,5	-	-	v	-	-
1h	TDT4136	LOGIC/REASONING SYST		7,5	-	v	v	-	-
1h	TDT4210	HEALTHCARE INFORM		7,5	-	o	v	-	-
1h	TDT4245	COOPERATION TECHN		7,5	-	v	-	-	-
1h	TDT4250	MODEL DRIVEN DEV IS		7,5	-	v	-	-	-
1h	TFY4225	NUCLEAR/RAD PHYS		7,5	-	-	-	o	-
1h	TFY4265	BIOPHYSICAL MICROMET		7,5	-	-	-	v	-
1h	TFY4310	MOLECULAR BIOPHYSICS		7,5	-	-	-	v	-
1h	TTK4160	MEDICAL IMAGING		7,5	-	-	v	-	-
1h	TTT4125	INFO THEORY COD/COMP		7,5	o	-	-	-	-
1h	TTT4145	RADIO COMMUNICATIONS		7,5	v	-	-	-	-
1h	TTT4155	REMOTE SENSING		7,5	v	-	-	-	-
1h	TTT4175	MARINE ACOUSTICS		7,5	v	-	-	-	-
1v	-	EXP IN TEAM INT PROJ		7,5	o	o	o	o	o
1v	BI2012	CELL BIOLOGY		7,5	-	-	-	-	v
1v	BI3018	PAT/COMMERCIALIZAT		7,5	-	-	-	-	v
1v	BI3073	GENETIC TOXICOLOGY		7,5	-	-	-	-	v
1v	DT8112	RES TOP HEALTH INFO	2	7,5	-	v	-	-	-
1v	MOL3007	FUNCTIONAL GENOMICS		7,5	-	-	-	-	v
1v	MOL3015	NANOMED II THERAPY		7,5	-	-	-	-	v
1v	MOL4010	MOL BIOL FOR TECH	3	7,5	-	-	o	-	-
1v	MTEK3001	APPL BIOINFORMATICS		7,5	-	-	o	-	-
1v	TDT4213	CLINICAL INFO SYSTEM		7,5	-	o	-	-	-
1v	TDT4215	WEB INTELLIGENCE		7,5	-	v	-	-	-
1v	TDT4240	SOFTWARE ARCHITECT		7,5	-	v	-	-	-
1v	TFY4315	BIOPHYS IONIZ RADIAT		7,5	-	-	-	o	-
1v	TFY4320	MEDICAL PHYSICS		7,5	v	-	-	o	-
1v	TKT4150	BIOMECHANICS		7,5	-	-	-	v	-
1v	TMA4300	COMP STAT METHODS		7,5	-	-	o	-	-
1v	TTK4165	SIGNAL PROC MED IMAG		7,5	o	-	-	-	-
1v	TTK4170	MOD/IDENT BIOL SYS		7,5	-	-	-	v	-
1v	TTT4136	SOUND/IMAGE PROCESS		7,5	o	-	-	-	-
1v	TTT4240	STAT SIGNAL THEORY		7,5	v	-	-	-	-
1v	TTT4245	MARINE ACOUSTICS II		7,5	v	-	-	-	-

cont.

FACULTY OF NATURAL SCIENCES AND TECHNOLOGY

MSC-PROGRAMME IN MEDICAL TECHNOLOGY (MSMEDTEK)

Ex	Subject no.	Subject title	Note	Cr	Specialization				
					1	2	3	4	5*
2h	BI3016	MOLECULAR CELL BIOL		7,5	-	-	-	-	o
2h	TDT4138	KNOWLEDGE REPR MOD		7,5	-	o	-	-	-
2h	TDT4287	ALGORITHMS BIOINFO		7,5	-	-	o	-	-
2h	TTK4160	MEDICAL IMAGING		7,5	o	-	-	o	-
		Specialization courses							
2h	TBT4505	BIOTECHNOLOGY SC		7,5	-	-	-	-	o
2h	TDT4535	BIOINFORMATICS SC		7,5	-	-	o	-	-
2h	TDT4545	HEALTHCARE INFO SC		7,5	-	o	-	-	-
2h	TFY4505	BIOPHYSICS SC		7,5	-	-	-	o	-
2h	TTK4555	ENG CYBERNETICS SC	4	7,5	v	-	-	-	-
2h	TTT4525	SIGNAL PROC SC	4	7,5	v	-	-	-	-
		Specialization projects							
2h	TBT4500	BIOTECHNOLOGY SP		15,0	-	-	-	-	o
2h	TDT4530	BIOINFORMATICS SP		15,0	-	-	o	-	-
2h	TDT4540	HEALTHCARE INFO SP		15,0	-	o	-	-	-
2h	TFY4500	BIOPHYSICS SP		15,0	-	-	-	o	-
2h	TTK4550	ENG CYBERNETICS SP	4	15,0	v	-	-	-	-
2h	TTT4520	SIGNAL PROC SP	4	15,0	v	-	-	-	-
		Master Thesis							
2v	TBT4900	BIOTECHNOLOGY		30,0	-	-	-	-	o
2v	TDT4900	COMP INFORM SCIENCE		30,0	-	o	o	-	-
2v	TFY4900	PHYSICS		30,0	-	-	-	o	-
2v	TTK4900	ENGINEERING CYBERN	5	30,0	v	-	-	-	-
2v	TTT4900	ACOUST SIGN PROC/COM	5	30,0	v	-	-	-	-

* Follows the Examination regulations for the Natural Sciences studies.

o = compulsory courses
v - optional courses

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

Specialization:
1 Medical Signal Processing and Imaging
2 Healthcare Informatics
3 Bioinformatics
4 Biophysics and Medical Physics
5 Medical Biotechnology

1) Lectures are held in Norwegian, but all lectures are available in English as films through It's learning. In addition all presentations are available as pdf-files at the same site.
2) The course will not be taught in 2010/11.
3) Lectures are held in Norwegian, but PBL exercises and presentations are given in English.
4) Students at specialization Medical Signal Processing and Imaging should choose one of the combinations TTK4550/ TTK4555 or TTT4520/TTT4525.
5) Students at specialization Medical Signal Processing and Imaging should choose either TTT4900 or TTK4900.

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN NATURAL GAS TECHNOLOGY (MSGASTECH)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr
		Compulsory courses		
1h	TEP4185	IND PROC/ENERGY TECHN		7,5
1h	TPG4140	NATURAL GAS		7,5
1v	-	EXP IN TEAM INT PROJ		7,5
		Optional courses	1	
1h	TEP4135	ENG FLUID MECH 1		7,5
1h	TEP4156	VISC FLOW/BOUND LAYER		7,5
1h	TEP4165	COMP HEAT/FLUID FLOW		7,5
1h	TEP4180	EXP METH PROC ENG	2	7,5
1h	TEP4240	SYSTEM SIMULATION	2	7,5
1h	TKP4170	PROCESS DESIGN PROJ		7,5
1h	TPK4120	SAFETY/RELIABILITY	3	7,5
1v	TEP4150	ENERGY MANAGEM/TECH	3	7,5
1v	TEP4170	HEAT/COMBUST TECH		7,5
1v	TEP4195	TURBO MACHINERY		7,5
1v	TEP4215	ENERG UTIL/PROC INT		7,5
1v	TEP4250	MULTIPHASE TRANSPORT		7,5
1v	TEP4255	HEAT PUMP PROC SYST	3	7,5
1v	TKP4150	PETROCH/OIL REFINING		7,5
1v	TMT4285	HYDROGEN TECHN		7,5
1v	TPG4135	PROC OF PETR		7,5
1v	TPG5110	PETROLEUM ECONOMICS	3	7,5
		Specialization courses	4	
2h	TEP4515	THERMAL ENERGY SC		7,5
2h	TEP4525	INDUS PROC TECHN SC		7,5
2h	TEP4545	ENG FLUID MECH SC		7,5
		Specialization projects	5	
2h	TEP4510	THERMAL ENERGY SP		15,0
2h	TEP4520	INDUS PROC TECHN SP		15,0
2h	TEP4540	ENG FLUID MECH SP		15,0
		Supplementary courses	6	
2h	TEP4135	ENG FLUID MECH		7,5
2h	TEP4165	COMP HEAT/FLUID FLOW		7,5
2h	TEP4180	EXP METH PROC ENG	7	7,5
2h	TEP4240	SYSTEM SIMULATION	7	7,5
2h	TKP4170	PROCESS DESIGN PROJ		7,5
2h	TPK4120	SAFETY RELIABILITY		7,5
		Master Thesis	8	
2v	TEP4905	INDUS PROC TECHN		30,0
2v	TEP4915	THERMAL ENERGY		30,0
2v	TEP4925	ENG FLUID MECH		30,0

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring

1) Optional courses must be selected to obtain a total of 30 credits in each semester.
2) The course will not be taught in 2010/11.
3) The course is not considered when planning the teaching and examination schedules.
4) One specialization course must be chosen.
5) One specialization project must be chosen according to the selected specialization course.
6) Supplementary courses must be selected to obtain a total of 30 credits per semester. The courses are not considered when planning the teaching and examination schedules.
7) The course will not be taught in 2010/11.
8) The master thesis must be chosen according to the selected specialization.

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN PETROLEUM ENGINEERING (MSG1)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr	Specialization 1	2	3
		Compulsory and optional courses	1				
1h	TPG4117	UNCONVENT RESERVOIRS		7,5	v	-	-
1h	TPG4145	RESERVOIR FLUIDS		7,5	o	v	o
1h	TPG4150	RESERVOIR REC TECHN		7,5	o	o	o
1h	TPG4155	APPL COMPUTER METHOD		7,5	o	o	o
1h	TPG4162	3D VISUAL PETR DATA	2	7,5	v	v	v
1h	TPG4175	PETROPHYSICS FUND		7,5	v	v	v
1h	TPG4177	CARB RESERVOIR CHAR		7,5	v	v	v
1h	TPG4215	HIGH DEV DRILLING		7,5	v	o	v
1h	TPG4235	WELL TESTING AC		7,5	v	v	v
1h	TPG5140	SPEC SUB SURF MAN	2	7,5	v	v	v
1v	-	EXP IN TEAM INT PROJ		7,5	o	o	o
1v	TPG4115	RES PROP DETERMIN		7,5	v	-	-
1v	TPG4160	RESERVOIR SIMULATION		7,5	o	v	v
1v	TPG4180	PETR PHYS INTERPR AC		7,5	v	v	v
1v	TPG4205	DRILL TECH PR CONTR		7,5	v	v	v
1v	TPG4220	DRILLING FLUID		7,5	v	o	v
1v	TPG4225	FRACTURED RESERVOIRS	2	7,5	v	-	-
1v	TPG4230	FIELD DEVELOPMENT		7,5	v	v	o
1v	TPG5110	PETROLEUM ECONOMICS		7,5	v	v	v
2h	TPG4185	FORMATION MECHANICS		7,5	v	v	v
2h	TPG4235	WELL TESTING AC		7,5	v	v	v
		Specialization courses					
2h	TPG4515	PETR PROD SC		7,5	-	-	o
2h	TPG4525	DRILLING ENG SC		7,5	-	o	-
2h	TPG4535	RESERVOIR ENG SC		7,5	o	-	-
		Specialization project					
2h	TPG4510	PETR PROD SP		15,0	-	-	o
2h	TPG4520	DRILLING ENG SP		15,0	-	o	-
2h	TPG4530	RESERVOIR ENG SP		15,0	o	-	-
		Master Thesis					
2v	TPG4920	PETROL ENGINEERING		30,0	o	o	o

o - compulsory courses
v - optional courses

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Totally four subjects must be chosen each semester. In addition to the subjects listed 2h students can choose from 1h Petroleum Engineering, 1h Petroleum Geosciences and PhD-courses if taught in English.
2) The course is not considered when planning the teaching and examination schedules.

Specialization:
1 Reservoir Engineering
2 Drilling Engineering
3 Petroleum Production

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN PETROLEUM GEOSCIENCES (MSG2)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr	Specialization 1	Specialization 2
		Compulsory and optional courses	1			
1h	TGB4160	PETROLEUM GEOLOGY		7,5	v	o
1h	TGB4265	STRUCT GEOLOGY AC	2	7,5	v	v
1h	TPG4120	ENG/ENVIRONM GEOPHYS	2	7,5	v	v
1h	TPG4125	SEISMIC WAVE PROP		7,5	o	o
1h	TPG4150	RESERVOIR REC TECHN		7,5	v	v
1h	TPG4155	APPL COMPUTER METHODS		7,5	o	o
1h	TPG4162	3D VISUAL PETR DATA	2	7,5	v	v
1h	TPG4175	PETROPHYSICS BC		7,5	v	v
1h	TPG4177	CARB RESERVOIR CHAR		7,5	v	v
1h	TPG4185	FORMATION MECHANICS		7,5	v	v
1h	TPG4195	GRAVIMETR MAGNETOMET		7,5	v	v
1h	TPG5130	SEISMIC PROCESSING	2	7,5	v	v
1v	-	EXP IN TEAM INT PROJ		7,5	o	o
1v	TGB4135	BASIN ANALYSIS		7,5	v	v
1v	TGB4170	DIAGENESIS/RES QUAL		7,5	v	v
1v	TPG4130	SEISMIC INTERPRET		7,5	o	o
1v	TPG4170	RESERVOIR SEISMICS		7,5	v	v
1v	TPG4180	PETR PHYS INTERPR AC		7,5	v	v
1v	TPG5110	PETROLEUM ECONOMICS		7,5	v	v
2h	TPG4190	SEISMIC DATA		7,5	o	v
		Specialization courses				
2h	TGB4565	PETR GEOLOGY SC		7,5	-	o
2h	TPG4545	PETR GEOPHYS SC		7,5	o	-
		Specialization project				
2h	TGB4560	PETR GEOLOGY SP		15,0	-	o
2h	TPG4540	PETR GEOPHYS SP		15,0	o	-
		Master Thesis				
2v	TGB4915	PETROLEUM GEOSCIENCE		30,0	-	o
2v	TPG4925	PETROLEUM GEOSCIENCE		30,0	o	-

o - compulsory courses
v - optional courses

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Totally four subjects must be chosen each semester. In addition to the subject listed 2h (TPG4190) students in specialization 2 can choose from 1h Petroleum Engineering, 1h Petroleum Geosciences and PhD-courses if taught in English.
2) The course is not considered when planning the teaching and examination schedules.

Specialization:
1 Petroleum Geophysics
2 Petroleum Geology

FACULTY OF SOCIAL SCIENCES AND TECHNOLOGY MANAGEMENT

MSC-PROGRAMME IN PROJECT MANAGEMENT (MSPROMAN)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr	Comp/ Opt.
		Compulsory and optional courses	1		
1h	TBA5200	PROJ PLAN/ANALYSIS		7,5	o
1h	TIØ4265	STRATEGIC MANAGEMENT		7,5	v
1h	TIØ5200	PROJ ORG		7,5	o
1h	TPK5100	PROJ PLAN/CONTR		7,5	o
1v	-	EXP IN TEAM INT PROJ		7,5	o
1v	TIØ4140	PROJECT EVALUATION		7,5	v
1v	TIØ4175	PURCHASING LOG MGMT		7,5	v
1v	TIØ4235	INT BUS DEV		7,5	v
1v	TIØ5210	PROGRAM MGMT		7,5	o
1v	TIØ5215	SHE/PURCHASING		7,5	o
		Supplementary courses	1		
1h	TBA5150	GEOHAZ/RISK ANALYSIS		7,5	v
1h	TIØ4345	MAN BUS RELAT/NETW		7,5	v
1h	TPK4140	MAINTEN MANAGEMENT		7,5	v
1h	TPK4160	VALUE CHAIN CONTR		7,5	v
1h	TPK5160	RISK ANALYSIS		7,5	v
1v	TGB5110	GEOLOGY/TUNNEL BC		7,5	v
1v	TPK4110	QUAL/PERFORMANCE		7,5	v
1v	TPK4135	LOG/PROD MANAGEMENT		7,5	v
1v	TPK4185	IND SYST ENG		7,5	v
1v	TPK5165	RAMS ENG/MANAGEMENT		7,5	v
		Specialization courses	2		
2h	TBA4536	PRO MAN SC		7,5	v
2h	TIØ5225	PRO MAN SC		7,5	v
2h	TPK4505	PRO MAN SC		7,5	v
		Specialization projects	3		
2h	TBA4530	PRO MAN SP		15,0	v
2h	TIØ5230	PRO MAN SP		15,0	v
2h	TPK4500	PRO MAN SP		15,0	v
2h	TBA5200	PROJ PLAN/ANALYSIS	4	7,5	o
2h	TPK5115	RISK MANAGEM PROJ	5	7,5	o
		Master Thesis	6		
2v	TBA4910	PROJ MANAGEMENT		30,0	v
2v	TIØ4920	PROJ MANAGEMENT		30,0	v
2v	TPK4905	PROJ MANAGEMENT		30,0	v

o - compulsory courses
v - optional courses

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Optional/supplementary courses must be selected to obtain a total of 30 credits per semester. The supplementary courses are not considered when planning the teaching and examination schedules.
2) One specialization course must be chosen.
3) One specialization project must be chosen corresponding to elected specialization course.
4) Only valid for the academic year 2010/11.
5) From the academic year 2011/12.
6) Students will normally take their Master thesis in the 4th semester at the same department as their chosen specialization.

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN RELIABILITY, AVAILABILITY, MAINTAINABILITY AND SAFETY (MSRAMS)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr
		Compulsory courses		
1h	TIØ4205	SHE-METH/TOOLS SHE		7,5
1h	TPK4120	SAFETY/RELIABILITY		7,5
1h	TPK4140	MAIN MANAGEMENT		7,5
1h	TPK5160	RISK ANALYSIS		7,5
1v	-	EXP IN TEAM INT PROJ		7,5
1v	TIØ4200	SAFETY MANAGEMENT	1	7,5
1v	TMA4255	APPLIED STATISTICS	1	7,5
1v	TMA4275	LIFETIME ANALYSIS		7,5
1v	TPK5165	RAMS ENG/MANAGEMENT		7,5
2h	TPK4510	PROD QUALITY ENG SP		15,0
2h	TPK4515	PROD QUALITY ENG SC		7,5
2h	TPK5115	RISK MANAGEM PROJ		7,5
		Master Thesis		
2v	TPK4900	PROD QUALITY ENG		30,0

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Select one of the courses.

FACULTY OF NATURAL SCIENCES AND TECHNOLOGY

MSC-PROGRAMME IN SILICON AND FERROALLOY PRODUCTION (MSSILFER)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr
		Compulsory courses		
1h	TMT4155	HETEROGEN EQULIBRIA		7,5
1h	TMT4280	EXTRACT METALLURGY		7,5
1h	TMT4305	ELECTROMETALLURGY		7,5
1h	TMT4325	REFIN/RECYCL METALS		7,5
1v	-	EXP IN TEAM INT PROJ		7,5
1v	TMT4166	EXP MATR/ELECTR CHEM		7,5
1v	TMT4208	FLUID/HEAT TRANSF AC		7,5
		Optional courses	1	
1v	TEP4220	ENERGY/ENVIRONM CONS		7,5
1v	TMT4300	LIGHT/ELECTRON MICRO		7,5
1v	TMT5100	ELECTR LIGHT MET 2		7,5
1v	MT8301	CARBON MAT TECHN		7,5
		Compulsory courses		
2h	TMT4222	MECH PROP OF METALS		7,5
2h	TMT5500	PROC MET ELECTR SP		15,0
2h	TMT5505	PROC MET ELECTR SC		7,5
		Master Thesis		
2v	TMT4905	MATR TECHN		30,0

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Select one of the courses.

FACULTY OF INFORMATION TECHNOLOGY, MATHEMATICS AND ELECTRICAL ENGINEERING

MSC-PROGRAMME IN TELEMATICS - COMMUNICATION NETWORKS AND NETWORKED SERVICES (MSTCNNS)

Term 1, 2, 3 and 4

Ex	Subject no.	Subject title	Note	Cr	Specialization 1	2	3
		Compulsory courses					
1h	TTM4105	ACCESS TRANS NETW		7,5	o	o	o
1h	TTM4110	DEP AND PER WITH SIM		7,5	o	o	o
1h	TTM4150	INTERNET NETW ARCH		7,5	o	o	o
1v	-	EXP IN TEAM INT PROJ		7,5	o	o	o
1v	TTM4115	ENG DIST REAL SYS		7,5	o	o	o
1v	TTM4135	INFORMATION SEC		7,5	o	o	o
		Optional courses	1				
1h	TDT4235	SOFTWARE QUALITY		7,5	v	v	v
1h	TDT4237	SOFTWARE SECURITY		7,5	v	v	v
1v	TTM4120	DEPENDABLE SYSTEMS		7,5	v	v	v
1v	TTM4128	NETW AND SERV MAN		7,5	v	v	v
1v	TTM4130	SERV INT AND MOB		7,5	v	v	v
		Specialization courses					
2h	TTM4516	NETWORKS/QUALITY SC		7,5	o	-	-
2h	TTM4526	SERV AND SYST ENG SC		7,5	-	o	-
2h	TTM4536	INFO SECURITY SC		7,5	-	-	o
		Specialization projects					
2h	TTM4511	NETWORKS/QUALITY SP		15,0	o	-	-
2h	TTM4521	SERV AND SYST ENG SP		15,0	-	o	-
2h	TTM4531	INFO SECURITY SP		15,0	-	-	o
2h	TTM4137	WIRELESS SECURITY		7,5	-	-	o
2h	TTM4155	TELETRAFFIC THEORY		7,5	o	-	-
2h	TTM4160	SOFTWARE DESIGN		7,5	-	o	-
		Master Thesis					
2v	TTM4905	NETWORKS/SERVICES		30,0	o	o	o

o = compulsory courses
v = optional courses

Ex 1h = Term 1, Exam Autumn
Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Select one of the courses.

Specialization:
1 Networks and Quality of Service
2 Services and Systems Engineering
3 Information Security

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN INNOVATIVE SUSTAINABLE ENERGY ENGINEERING (MSISEE)

Term 2 *
Term 3 and 4

CARBON DIOXIDE CAPTURE

Ex	Subject no.	Subject title	Note	Cr
		Optional courses	1	
1v	-	EXP IN TEAM INT PROJ		7,5
1v	TEP4150	ENERGY MANAGEM/TECH	2	7,5
1v	TEP4170	HEAT/COMBUST TECH		7,5
1v	TEP4195	TURBO MACHINERY		7,5
1v	TEP4215	ENERG UTIL/PROC INT		7,5
1v	TEP4250	MULTIPHASE TRANSPORT		7,5
1v	TEP4255	HEAT PUMP PROC SYST	2	7,5
1v	TKP4150	PETROCH/OIL REFINING		7,5
1v	TMT4285	HYDROGEN TECHN		7,5
1v	TPG4135	PROC OF PETR		7,5
		Specialization courses	3	
2h	TEP4515	THERMAL ENERGY SC		7,5
2h	TEP4525	INDUS PROC TECHN SC		7,5
		Specialization projects	4	
2h	TEP4510	THERMAL ENERGY SP		15,0
2h	TEP4520	INDUS PROC TECHN SP		15,0
		Supplementary courses	5	
2h	TEP4135	ENG FLUID MECH 1		7,5
2h	TEP4165	COMP HEAT/FLUID FLOW		7,5
2h	TEP4180	EXP METH PROC ENG	6	7,5
2h	TEP4240	SYSTEM SIMULATION	6	7,5
2h	TKP4105	SEPARATION TECHN		7,5
2h	TKP4170	PROCESS DESIGN PROJ		7,5
2h	TPK4120	SAFETY RELIABILITY		7,5
		Master Thesis	7	
2v	TEP4905	INDUS PROC TECHN		30,0
2v	TEP4915	THERMAL ENERGY		30,0

Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) Optional courses must be selected to obtain a total of 30 credits in each semester.
2) The course is not considered when planning the teaching and examination schedules.
3) One specialization course must be chosen.
4) One specialization project must be chosen according to the selected specialization course.
5) Supplementary courses must be selected to obtain a total of 30 credits per semester. The courses are not considered when planning the teaching and examination schedules.
6) The course will not be taught in 2010/11.
7) The master thesis must be chosen according to the selected specialization.

The Innovative and Sustainable Energy Engineering (ISEE) programme is a joint Nordic master programme between six Nordic Universities in five Nordic Countries.

* All students will start the first semester at KTH, Stockholm.

For further information see
http://www.ntnu.no/studies/msc-sustainable-energy-engineering
http://www.nordicmaster.eu/

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN INNOVATIVE SUSTAINABLE ENERGY ENGINEERING (MSISEE)

Term 2*
Term 3 and 4

INDUSTRIAL ECOLOGY

Ex	Subject no	Subject title	Note	Cr
		Compulsory courses		
1v	TEP4220	ENERGY/ENV CONSEQUEN		7,5
1v	TVM4160	MATERIAL FLOW ANALYS		7,5
		Optional courses	1	
1v	-	EXP IN TEAM INT PROJ		7,5
1v	TPD5100	SUSTAINABLE PD AC		7,5
1v	POL1003	POLITICS ENVIRONM		7,5
1v	SØK1101	ENVIRONM RESOURCE		7,5
		Optional courses	1	
2h	TEP4222	INPUT-OUTPUT ANALYS		7,5
2h	TEP4223	LIFE CYCLE ASSESSM		7,5
2h	TPD4505	DESIGN THEORY SC	2	7,5
2h	TPK4160	VALUE CHAIN CONTR		7,5
2h	TVM4162	INDUSTRIAL ECOLOGY		7,5
2h	KULT3304	STUDIES OF TECHN II	3	15,0
2h	POL3507	POLICY ANALYSIS	3	15,0
2h	SOS3508	INST/INST DESIGN	4	15,0
		Project and thesis preparation course	5	
2h	TEP5100	INDECOL PROJECT		15,0
2h	TPD4500	PRODUCT DESIGN 9 SP	2	15,0
2h	TVM5175	INDECOL PROJECT		15,0
		Master Thesis	6	
2v	TEP4930	INDUSTRIAL ECOLOGY		30,0
2v	TPD4910	INDUSTRIAL ECOLOGY		30,0
2v	TVM4930	INDUSTRIAL ECOLOGY		30,0

Ex 1v = Term 2, Exam Spring
Ex 2h = Term 3, Exam Autumn
Ex 2v = Term 4, Master Thesis Spring

1) According to their disciplinary background, students choose optional courses from both the list of Industrial Ecology courses and from the list of Master and PhD level courses. The combination of courses must be approved by the programme. The courses are selected so that the total weighting each term amounts to 30 credits (Cr).
2) The courses are co-requisites.
3) Course given in Norwegian only.
4) The course is taught upon availability.
5) In the first semester, students will be assigned to an academic supervisor. This supervisor guides the student through the programme. The students choose optional courses, project and thesis preparation courses according to their specialization and in agreement with their supervisors. Students choose one of the listed project courses. The courses are not considered when planning the teaching and examination schedules.
6) The master thesis must be chosen according to the selected specialization.

The Innovative and Sustainable Energy Engineering (ISEE) programme is a joint Nordic master programme between six Nordic Universities in five Nordic Countries.

* All students will start the first semester at KTH, Stockholm.

For further information see
http://www.ntnu.no/studies/msc-sustainable-energy-engineering
http://www.nordicmaster.eu/

MASTER OF APPLIED ETHICS

Course outline

Applied Ethics is a growing, interdisciplinary field of study dealing with ethical problems in different areas of society. In Applied Ethics the aims of, and problems in, special fields of human activity such as business, politics, technology and medicine are analysed from an ethical point of view. From the perspective of ethics, Applied Ethics is a specialisation in one area of ethics. From the perspective of social practice, applying ethics involves focusing on the ethical aspects and ethical implications of that particular practice.

The field of Applied Ethics is so broad and expanding that it is virtually impossible for any one institution to offer expertise and professional guidance for thorough research in every field of specialisation. The formation of a consortium of four universities broadens the potential research base for students, and provides an opportunity for specialisation on the basis of both competence and interest.

The Master of Applied Ethics (MAE) is an Erasmus Mundus master, and it is open to students with a bachelor's degree with a specialisation/major in ethics, or students who have completed a programme of professional study. For application, see www.maeappliedethics.eu/start.

The programme covers two semesters of full-time study (60 ECTS credits). The first semester comprises different courses in applied ethics offered by the collaborating institutions. The second semester comprises a combination of courses in applied ethics and a 15 ECTS master's thesis.

Courses in different areas of Applied Ethics are offered by the different institutions, according to their respective academic strengths and expertise. Students in the programme may pursue their interest in a variety of fields like multiculturalism, bioethics, corporate social responsibility, environmental ethics, or technology ethics.

NTNU offers different options depending on the students' educational background and interests. Students with an academic background in ethics, with a specialisation/major in ethics or philosophy, can incorporate the MAE in a two year master programme in philosophy and students with a professional background may complement their education with a one year master in applied ethics. In addition, all courses – except for FI5203 (Masters's Thesis in Applied Ethics) – are open to all NTNU students.

Student mobility

Since each collaborating institution offers a full programme of relevant courses, students are offered plenty of possibilities for mobility within the consortium.

Aims and learning outcomes

The objective of the master's programme in Applied Ethics is to create and develop ethical reflection and ethical competence, both of which should combine relevant theoretical and practical knowledge, understanding, and evaluation. The master's programme leads both to the acquisition of professional competence and also provides a valuable learning experience in its own right. It provides students with professional competence in applied and professional ethics and develops students' knowledge of and ability for critical reflection on pertinent moral problems in a modern society.

More specifically, the aim is to achieve competence in:

- Identifying and analysing moral problems in different social and professional contexts.

- Contributing in a sound and responsible manner to public debates on moral issues, and being able to structure and evaluate these debates.
- Formulating theory-based policy recommendations and assessments regarding moral issues in specific practices (e.g. health care, law, business, ICT, or journalism).
- Organising constructive ethical deliberation in institutional and professional contexts.

The learning outcomes of a master's course in applied ethics are manifold. Students acquire knowledge of the history of ethics and applied ethics. They also learn about different fields of applied ethics. Furthermore, they learn how to identify a moral issue and they acquire the methodological competence to analyze and solve moral problems. Through thesis work, students learn how to delimit, plan, carry through and present an analysis in applied ethics.

Courses

Course code	Course title	Credits	Semester	Restricted admission
FI1105	Ethics-Ethical Theory and Moral Practice	7,5	Autumn	
FI3107	Biotechnology and Ethics	7,5	Autumn	
FI5203	Master’s Thesis in Applied Ethics	15	Spring	Yes
FI5204	Reading Course in Applied Ethics	15	Spring	Yes*)
FI5205	Corporate responsibility and ethics	7,5	Autumn	Yes
FI5206	Technology for a good society	7,5	Autumn	Yes
FI5201	Multicultural Conflicts and Ethics	15	Spring	Yes
*) Credits only to students who do not follow the 1 year Erasmus Mundus master. For further details, see separate course description.				

Teaching and examinations

Courses are examined by means of a variety of written assignments that are complemented by oral and written tests. The essays are assessed by the teacher and an additional examiner that may be appointed from any one of the other partner institutions. In the case of the master's thesis, a final presentation and defence before an examination committee is required. An examination committee, consisting of teachers from the partner institutions, will assess the quality of the thesis and will decide the grade that is awarded.

Students who have failed an examination are normally allowed to retake it. Students who have failed to receive a passing grade for their thesis will normally be given a chance to improve the thesis and re-present it later. However, this possibility is subject to different national laws relating to universities and colleges in the different countries concerned, as well as to the specific study regulations in force at the collaborating institutions.

Admission requirements

Applicants must satisfy the following general admission requirements:

Officially certified copies of all educational certificates, including transcripts and diplomas from secondary school and university education, must be submitted.

Minimum formal requirements for admission to the MAE programme are either a completed bachelor's degree or equivalent approved education, or a completed programme of professional study. In both cases at least three years of full-time study is required. Applicants must submit a paper in which they demonstrate their basic knowledge of, and their affinity with, ethical questions. Students who do not have English as their first language must document their proficiency in English by submitting results from a TOEFL test with a minimum score result of 213/550, or another internationally recognised test. The main selection criteria will be the quality of the student's previous work in ethics and his or her previous professional experience. Utrecht University will charge tuition fees.

MASTER OF PHILOSOPHY (M.PHIL.) IN ENGLISH LINGUISTICS AND LANGUAGE ACQUISITION

The Department of Modern Foreign Languages offers an international Master's programme: Master of Philosophy (abbreviated 'M. Phil.') in English Linguistics and Language Acquisition, formerly known as *Master of Philosophy (M. Phil.) in English Language and Linguistics.*

The aim of the programme is to give students a deeper insight into issues such as modern English linguistics communication studies, first and second language acquisition and translation theories.

Admission/Entry requirements

The programme is open to Quota Programme applicants and to applicants with other sources of financing.

Applicants should hold a B.A. or an equivalent degree in English or Linguistics with a sufficient background in topics related to English language or linguistics. Only candidates with a minimum of three English language/linguistics courses will be considered for acceptance.

Successfull applicants to the Master's programme must meet the minimum average grade requirement for admission, which is the grade C by the Norwegian grading scale, or equivalent approved minimum grade.

Officially certified copies of all educational certificates, including transcripts and diplomas from secondary school and university education, must be submitted.

An English proficiency test must be included. Applicants must pass either the TOEFL with a minimum paper score of 550 (230 computer) or the IELTS with 6.0 or better. Citizens of Ireland, the UK, the US, Canada, Australia and New Zealand do not have to submit TOEFL/ IELTS test results. This is also the case for applicants who have spent at least one year in any of these countries, attending higher secondary school or university. Applicants from African countries with a B.A./B.Sc./B.Eng. degree where the language of instruction has been English and those who have passed English as a subject at GCE A-level with grade C or better are also exempted. Applicants with a university degree in English language (B.A. in English) are also exempted from the English language proficiency test requirement. Please be aware that applicants from Asian countries (for example Bangladesh, India, Nepal, Pakistan, Sri Lanka, Thailand, and Vietnam) with a B.A./ B.Sc./ B.Eng. degree where the language of instruction has been English are not exempted from the English language requirements, except for candidates holding a B.A. degree in English.

Programme outline

The M. Phil. Programme requires two years of full-time studies, and starts in the autumn semester (mid or late August). The normal workload for a full-time student for one academic year is 60 ECTS credits (in Norwegian: 60 'studiepoeng'). The first year of the programme is devoted to a combination of courses comprising a total of 60 ECTS credits. At least 30 ECTS credits (of a total of 60) must be at Master's level (courses with an ENG3000 code). A maximum of 30 credits may be obtained from advanced courses at Bachelor's level (courses with an ENG2000 code). Second year students are expected to work exclusively on their Master's thesis, which also counts for a total of 60 credits. In the first year students may choose from courses offered at the Department of Modern Foreign Languages or from

courses offered by the Department of Language and Communcation Studies, and approved by the Department of Modern Foreign Languages.

Courses

Course code	Course title	ECTS credits	Semester	Restricted admission
ENG2153	First and Second Language Acquisition	7,5	Spring	
ENG2155	Theoretical approaches to English language	7,5	Autumn	
SPRÅK3000	Theories and Methods in Linguistics	15	Autumn	
ENG3122	Cognitive and Theoretical Aspects of Language	15	Spring	
ENG3123	Translation	7,5	Spring	
ENG3510	Topics in Semantics	7,5	Autumn	
ENG3910	Master's Thesis in English Language and Linguistics 2)	60	Spring and autumn	Yes 1)
ENG3920	Master's Thesis in English Linguistics and Language Acquisition 3)	60	Spring and autumn	Yes 1)
1) ENG3500 and ENG3910: Admission to the courses requires admission to the study programme Master of Philosophy (M. Phil.) in English Language and Linguistics. 2) Students who were given admission to the M. Phil. Programme autumn 2008 and earlier register for ENG3910. 3) Students who were given admission to the M. Phil. Programme autumn 2009 and onwards register for ENG3920.				

The table below shows how a Master of Philosophy in English Linguistics and Language Acquisition is usually built up.

Master of Philosophy in English Linguistics and Language Acquisition

Semester	7.5 credits	7.5 credits	7.5 credits	7.5 credits
Spring 4	ENG3920 Master's Thesis in English Linguistics and Language Acquisition 1)			
Autumn 3				
Spring 2	ENG3122 Cognitive and Theoretical Aspects of Language		ENG3123 Translation	ENG2153 First and second language acquisition
Autumn 1	SPRÅK3000 Theories and Methods in Linguistics		ENG3510 Topics in Semantics	ENG2155 Theoretical approaches to English language
1) Students who were given admission to the M. Phil. Programme in the autumn semester of 2008 and earlier register for ENG3910.				

Students who wish to include other courses offered by The Department of Modern Foreign Languages (see above), or from the list of courses offered at the Department of Language and Communication Studies, should contact the Department of Modern Foreign Languages for further information regarding the possibilities for an individual curriculum.

Topics offered in the programme

The range of topics that could be offered includes advanced topics in modern English syntax, studies of the lexicon, first language acquisition and second language acquisition studies, translation theory and communication studies.

Teaching and exams

Each 7.5 credit course normally has two hours, and each 15 credit course normally has four hours of teaching per week in the form of lectures and seminars. Some individual supervision may be offered. Assessment in the ENG-courses is usually based on a written assignment. In addition, students are required to give oral presentations and/or complete written essays or course projects. For more information, we refer to the course descriptions on the Web: www.ntnu.no/studies/courses.

Supervision

The department offers supervision in the syntax/semantics of modern English, first and second language acquisition, the syntax/semantics interface and theories on contemporary information structure.

By the end of their second semester, the Master's students must hand in a project proposal for their Master's thesis. The project proposal must written in agreement with a potential supervisor. The project description serves as a basis for the Head of Department's approval of an agreement on supervision between a student and a supervisor.

Field-work

After the first year of studies, during the period mid June to mid August, candidates are given the opportunity to go back to their home countries to do field-work if this is necessary for the completion of their theses. Students who are supported by the Quota Programme are awarded an extra grant to cover field-trip expenses.

MASTER OF PHILOSOPHY (M. PHIL.) IN LINGUISTICS: THEORETICAL, DESCRIPTIVE AND DIGITAL APPROACHES

This degree is also known as the 'International M. Phil in Linguistics'.

Admission requirements

Applicants should hold a B.A. or equivalent degree in Linguistics or an equivalent degree with a sufficient emphasis on topics related to Linguistics. Only candidates with a minimum of three Linguistics courses will be considered.

Applicants to the Master's programme must meet the minimum average grade requirement for admission, which is the grade C by the Norwegian grading scale, or equivalent approved minimum grade

Officially certified copies of all educational certificates, including transcripts and diplomas from secondary school and university education, must be submitted.

An English proficiency test result must be included. Applicants must pass either the TOEFL with a minimum paper score of 550 (230 computer) or the IELTS with a mark of 6.0 or better. Citizens of Ireland, the UK, the US, Canada, Australia and New Zealand do not have to submit TOEFL/IELTS test results. This is also the case for applicants who have spent at least one year in one of these countries, and who have attended higher secondary school or university there. Applicants from African countries with a BA/BSc/BEng degree for which the language of instruction has been English, and those who have passed English as a subject at GCE A-level with grade C or better, are also exempted from the language requirement. Applicants with a university degree in English language (BA in English) are also exempted from the language requirement. Please be aware that applicants from Asian countries (for example Bangladesh, India, Nepal, Pakistan, Sri Lanka, Thailand, and Vietnam) with a BA/BSc/BEng degree for which the language of instruction has been English are not exempted from the English language requirement, except for candidates holding a BA degree in English.

NB! The Programme is also open to non-quota programme applicants.

Course outline

The M.Phil. Programme requires two years of full-time study, and starts in the autumn term. The ECTS credits are divided between courses comprising of a total of 75 ECTS credits, and a thesis of 45 ECTS credits. 60 ECTS credits represent the normal workload for a full-time student for one academic year. LING2211 and LING3301 are compulsory courses. The other courses may include both intermediate courses (LING2xxx courses) and master's courses (LING3xxx courses) of the candidate’s choice from the first table below, in addition to maximum one of the interdisciplinary topics listed in the second table below. At least 45 ECTS credits must have a course code LING3xxx (master's level). The courses are selected from those offered to regular students in the department. It is expected that the second semester of the second year shall be devoted exclusively to work on the master’s thesis.

Topics offered in the programme

The range of topics that may be offered represents a subset of the topics offered in the regular Bachelor's and Master's Programmes in Linguistics, namely:

Course code	Course title	ECTS credits	Semester	Restricted admission
LING2208	Digital methods for speech and text processing	15	Spring	
LING2211	Semantics and Syntax	15	Autumn 1)	
LING3000	Chosen Topic	7,5	Spring	
LING3301	Phonology and Pragmatics	15	Autumn 1)	
LING3302	Master's Course II in Linguistics	15	Autumn	
LING3303	Master's Course III in Linguistics	15	Spring	
LING3392	M. Phil. Thesis in Linguistics	45	Autumn and Spring	Yes 2)
1) Compulsory courses in the M. Phil in Linguistics. 2) LING3392: Requires admission to the study programme Master of Philosophy in Linguistics.				

Interdisciplinary topics

The following courses are approved in an M.Phil. in Linguistics. Maximum one of the following courses may be admitted in the degree. More information about the courses is to be found in the course descriptions in the respective curricula.

Course code	Course title	ECTS credits	Semester	Restricted admission
FON1101	Introduction to Phonetics 1)	15	Autumn	
ENG2153	First and Second Language Acquisition	7.5	Spring	
ENG3122	Cognitive and Theoretical Aspects of Language 2)	15	Spring	
TDT4275	Natural Language Interface 3)	7,5	Spring	
TDT4136	Logic and reasoning systems	7,5	Autumn	

M.Phil. in Linguistics:

The table below shows how an M. Phil. in Linguistics can be built up.

Semester	7,5 credits	7,5 credits	7,5 credits	7,5 credits
Spring 4	LING3392 M. Phil. Thesis			
Autumn 3	LING3392 M. Phil. Thesis		LING3302 Master's Course 2 in Linguistics	
Spring 2	LING2208 Digital Methods for speech and text processing		LING3303 Master's Course 3 in Linguistics	
Autumn 1	LING2211 Semantics and Syntax		LING3301 Phonology and Pragmatics	

Teaching and exams

Each course, whether intermediate or master's, has a home exam, (one week for 7.5 ECTS credits and two weeks for 15 ECTS credits).

After the first year of study, during the period mid June to mid August, the candidates are given the opportunity to return to their home countries to do fieldwork if this is necessary for the completion of their theses. Students who are supported by the Quota programme are awarded an extra grant to cover field-trip expenses.

MASTER OF SCIENCE IN GLOBALIZATION

A description of the Master's programme in Globalization

During this two-year International Master's programme in Globalization, you will explore the interrelations between the economic, technological, cultural, social and political dimensions of Globalization. The aim of the programme is to provide you with a general understanding of the forms and consequences of the processes of Globalization, combined with an in-depth knowledge of one of the two fields of specialisations: Global Technology Management or Global Politics and Culture.

Global Politics and Culture students will gain practical experience through a five month internship in the third semester in a global corporation, multilateral organization or international campaigning group. Students with a Norwegian or Nordic educational background will undertake their internships outside Norway. International quota scholarship students on this specialisation will undertake take their internships in Norway. Self-funding international students may take their internship in or outside Norway. The specialization will focus on the implications of processes of globalization for civil society, state power, changing patterns of national culture and global markets and technologies.

Global Technology Management students will spend their third semester undertaking a work project at NTNU, linked to the university's cooperation projects with industry, on a topic relevant for globalization. In the fourth semester, the students will write their Master's thesis while located at an international company or organisation. International students will be located in companies in Norway while students with a Norwegian or Nordic educational background will be located at companies outside Norway. The Global Technology Management specialization provides the skills needed to handle the increasingly important interaction between technology, strategy and global processes. The program results in a unique competence for a career in international enterprises. The students will gain a broad and integrated set of capabilities, combining engineering and management competences with a global perspective.

The Master's in Globalization is a unique inter-disciplinary cooperative programme involving the following faculties at NTNU:

- Arts (the Humanities)
- Social Sciences and Technology Management
- Engineering Science and Technology
- Natural Sciences and Technology
- Information Technology, Mathematics and Electrical Engineering

The Master's programme is part of NTNU's university-wide Globalization Programme, which comprises 180 researchers in departments across the university.

Career Opportunities

This Master's programme in Global Politics and Culture is designed to provide its students with the specialist knowledge and transferable skills to pursue careers in global corporations, non-governmental organizations, international campaigning groups, the civil and diplomatic services or in the media, research and information sectors. By the end of their degree, students will have proved their capacity to engage in team work, gained relevant work experience in a global corporation or organization and demonstrated their ability to employ interdisciplinary approaches at both theoretical and practical levels.

The Master's programme in Technology Management is designed to give students the skills to take part in developing the future technology and sustainable solutions for global enterprises.

You will be able to both understand and successfully handle the different dimensions of global processes. Possible career positions could be:

- Production manager, with responsibility for global operations.
- Entrepreneur, initiating new global businesses.
- Supply chain manager, working with sourcing and distribution in global value chains.
- Consultant, specialising in production management and global technology transfer.
- Project manager, responsible for establishing production facilities in foreign countries.
- Technical manager, with responsibility for technology development and transfer.

COURSES

Joint courses across the two specializations

Course code	Course title	ECTS credits	Semester	Restricted admission
GEOG3518	**Knowledge Management in a Global Economy**	**7,5**	**Autumn**	
HIST3295	Contemporary International Economic History **1)**	7,5	Autumn	
SOS3050	**Empirical Research Methods 2)**	**7,5**	**Spring**	
SANT3507	Globalization, Culture and Identity	7.5	Autumn	
*)	Internship/Work Project **3)**	22,5	Autumn	5)
*)	Master's Thesis in Globalization **4)**	30	Spring	5)

1) Elective course for Global Technology Management students.
2) Students who already have already passed SOS1002 *Research Methods in the Social Sciences* (15 cr.) must replace SOS3050 with SOS3004 *Qualitative Research Methods* (7,5 cr.)
3) Global Technology Management students will do this as a work project at NTNU. Global Politics and Culture students will undertake an internship in a global company or organization. **) **The course code depends on the student's departmental belonging.***
4) Global Technology Management students will write their thesis while based at an international company or organization. Global Politics and Culture students will normally write their thesis at NTNU. **) **The course code depends on the student's departmental belonging.***
5) Requires admission to the programme of study (MSc in Globalization).

Courses: Global Technology Management (in addition to the joint courses)

Course code	Course title	ECTS credits	Semester	Restricted admission
TIØ4295	Production economics and markets	7,5	Autumn	
TPK4160	Value Chain Control and Applied Decision Support	7,5	Autumn	
TIØ4195	Environmental Management and Corporate Social Responsibility*)	7,5	Autumn	
TDT4245	Cooperation Technology*)	7,5	Autumn	
TPK5100	Project Management 1*)	7,5	Autumn	
TIØ4175	Industrial Management 4C - Logistics and Purchasing Management	7,5	Spring	
TPK4180	Global Manufacturing Strategy	7,5	Spring	
TPK4135	Logistics and Production Management	7,5	Spring	
*) Choose one of these three courses or HIST3295, see semester breakdown below.				

Courses: Global Politics and Culture (in addition to the joint courses)

Course code	Course title	ECTS credits	Semester	Restricted admission
KULT3320	Globalization Theory	7,5	Autumn	
GEOG3053	Theories of Development and Globalization	7,5	Autumn	
RVI2115	Religion and Politics in the Age of Globalization *)	15	Spring	
POL3512	The Soviet Union and Russia since 1917*)	15	Spring	
POL3517	International Development: The effects of Politics, Institutions and International Economy *)	15	Spring	
POL3005	Research Design and Methods	7,5	Spring	
*) Choose one of these three courses, see semester breakdown below.				

Structure

Joint Activities and Courses across both Specialisations

The Master's in Globalization is a two year programme, with 120 credits, 30 credits per semester over four semesters. A breakdown of each semester is given in the tables below. In the first semester, the course GEOG3518 *Knowledge Management in a Global Economy* will be taken by students in both Global Technology Management and Global Politics and Culture specializations. The Global Technology Management students may also take HIST3295 *Contemporary International Economic History* as an elective course in first semester. This course is compulsory for students in Global Politics and Culture. Students in both specializations will take the course SOS3050 *Empirical Research Methods* in the second semester. In the third semester, the students in both specializations will take *Internship*/*Work Project*. The Global Politics and Culture students will spend this third semester undertaking an internship in a global corporation or organization, while the Global Technology Management students will undertake a work project at NTNU. During this third semester, all students will also take the distance learning course SANT3507 *Globalization, Culture and Identity*. *Master's*

Thesis in Globalization (30 credits) should be completed in the fourth semester of study. For Global Technology Management students, the thesis will be written while they are located in a global corporation.

Global Technology Management Specialisation (in addition to the joint courses)
In the first semester, in addition to the joint course GEOG3518 *Knowledge Management in a Global Economy*, The Global Technology Management students will also take TIØ4295 *Production economics and markets*, TPK4160 *Value Chain Control and Applied Decision Support* and then select one additional course from the following courses: TIØ4195 *Environmental Management and Corporate Social Responsibility*, TDT4245 *Cooperation Technology*, TPK5100 *Project Management 1* or HIST3295 *Contemporary International Economic History*. In the second semester, in addition to SOS3050 *Empirical Research Methods*, they will take the courses TIØ4175 *Industrial Management 4C - Logistics and Purchasing Management*, TPK4180 *Global Manufacturing Strategy* and TPK4135 *Logistics and Production Management*.

Global Politics and Culture Specialisation (in addition to the joint courses)
In the first semester, in addition to the joint course and activities mentioned above, the Global Politics and Culture students will take KULT3320 *Globalization Theory* and GEOG3053 *Theories of Development and Globalization*. In the second semester they will take SOS3050 *Empirical Research Methods*, with the exception of students who have already taken the SOS1002 *Research Methods in the Social Sciences* exam. These students must replace SOS3050 with SOS3004 *Qualitative Research Methods*. In the second semester students will also take POL3005 *Research Design and Methods* and chose one of the following courses: RVI2115 *Religion and Politics in the Age of Globalization*, POL3512 *The Soviet Union and Russia since 1917* or POL3517 *International Development: The effects of Politics, Institutions and International Economy.* Semester Breakdown

Semester Breakdown

Global Technology Management

Semester	7.5 credits	7.5 credits	7.5 credits	7.5 credits
4th sem. Spring	Master's Thesis in Globalization (in an international company or organisation) ***)			
3rd sem. Autumn	Internship/Work Project (at NTNU) ***)			SANT3507 Globalization, Culture and Identity
2nd sem. Spring	TIØ4175 Industrial Management 4C - Logistics and Purchasing Management	TPK4180 Global Manufacturing Strategy	TPK4135 Logistics and Production Management	SOS3050 Empirical Research Methods **)
1st sem. Autumn	TIØ4295 Production economics and markets	TPK4160 Value Chain Control and Applied Decision Support	TIØ4195 Environmental Management and Corporate Social Responsibility*) TDT4245 Cooperation Technology*) TPK5100 Project Management 1*) HIST3295 Contemporary International Economic History*)	GEOG3518 Knowledge Management in a Global Economy

*) Choose one of these four courses.

****) Students who already have already passed SOS1002 *Research Methods in the Social Sciences* (15 cr.) must replace SOS3050 with SOS3004 *Qualitative Research Methods* (7,5 cr.).**

******) The course code depends on the student's departmental belonging.***

Global Politics and Culture Semester Breakdown

Semester	7.5 credits	7.5 credits	7.5 credits	7.5 credits
4th sem. Spring	Master's Thesis in Globalization (normally at NTNU) ****)			
3rd sem. Autumn	Internship/Work Project (in an international company or organisation) ****)			SANT3507 Globalization, Culture and Identity
2nd sem. Spring	**SOS3050 **) Empirical Research Methods** or **SOS3004 ***) Qualitative Research Methods**	POL3005 Research Design and Methods	RVI2115 Religion and Politics in the Age of Globalization*) POL3512 The Soviet Union and Russia since 1917*) POL3517 International Development: The effects of Politics, Institutions and International Economy *)	
1. sem. Autumn	GEOG3518 Knowledge Management in a Global Economy	HIST3295 Contemporary International Economic History	KULT3320 Globalization Theory	GEOG3053 Theories of Development and Globalization
*) Choose one of these three courses.				
****) Compulsory for all students, except those who have already taken SOS1002 *Research Methods in the Social Sciences*.**				
*****) Compulsory for all students who have already taken SOS1002 *Research Methods in the Social Sciences.***				
*******) The course code depends on the student's departmental belonging.***				

Internship (Global Politics and Culture)

The internship scheme related to the Global Politics and Culture specialization provides a unique opportunity for students to develop and build their personal, academic and professional capacities by managing an individual project. The internship project should contribute an interdisciplinary perspective and should be relevant to the needs and requirements of the company/organization. It should lead to the production of a written academic assignment, which will be undertaken under the supervision of a supervisor at NTNU, and a corporate or organizational supervisor. In the first semester, students in Global Politics and Culture will receive information about the range of internships and will complete CVs. At the beginning of the second semester the internships will be allocated. In the case where the companies and organizations have specific requirements, the company or organization will make the choice based on the CVs of the eligible candidates. For all other internships, the assignment will in the first instance be made on a random basis, after which

the students may exchange internships amongst themselves, if they so wish, on a voluntary basis. During this semester, the students will find an NTNU supervisor from a list provided by the program and be assigned an internship supervisor by the company or organization, both of whom will follow their progress. They will also complete a one to two page academic proposal (500-1000 words) relating to the internship assignment. In the beginning of the fourth semester, following their internship, the students will give a presentation of their internship project and assignment to the MSc in Globalization students and NTNU internship supervisors.

Work Project (Global Technology Management)

Students will spend their third semester undertaking a work project at NTNU, linked to the university's cooperation projects with industry, on a topic relevant for globalization. Education in Global Technology Management is based on students experiencing and exploring real-life industrial challenges in global enterprises. Theoretical topics are exemplified and discussed based on cases from Norwegian and international companies and research projects. The work project will be geared at solving industrial challenges within areas such as Production Strategy, Technology and ICT Management, Supply Chain Management, Operations Management or Project Management. Students will be required to produce a written academic assignment, relating to the internship/work project (between 30 and 40 pages; 12 pt, 1.5 spacing), which should be submitted to NTNU by the end of the second semester (22, 5 credits). The assignment should relate to the taught element of the programme and fulfil the academic requirements of a Master's level programme.

Master's Thesis

The 30 credit thesis should be between 50 and 70 pages in length (12 pt, 1.5 spacing). The contents of the thesis should fulfil an academic level appropriate to a Master's level course. Furthermore, it should relate to the interdisciplinary framework of the taught course element of the Master's programme. A project summary of 300 words should be written in the third semester followed by a more detailed proposal in the form of a written outline of the thesis (around 5 pages) at the beginning of the fourth semester. The thesis should be written over a 20-week period in the fourth semester. The deadline for submission of the thesis is normally May 1st. The students may apply for a two week extension. Students must have passed all the courses on the Masters programme before submitting the Masters thesis. Students must have passed their Master's thesis in order to present themselves for the 30-minute oral exam related to the Master's thesis. The grade for the Master's thesis may be adjusted after the oral exam. The Global Technology Management students will write their thesis while located at an international company. The Global Politics and Culture students will normally write their thesis at NTNU and may relate its contents to the internship assignment associated with *Internship/ Work Project* (22,5 credits).

Study Environment

The Master's programme is part of NTNU's highly interdisciplinary Globalization Programme, which comprises 180 researchers and research fellows from across the university. Students will benefit from this NTNU-wide Programme, which organizes regular seminars, as well as workshops and international conferences. Students on this Master's programme will be working within an interdisciplinary environment in which social contacts and professional cooperation with researchers from the Globalization Programme and with fellow students will be an important component.

Admission requirements

Who can apply to the MSc in Globalization?

The Master's in Globalization is open to:

- Students with a BA in the Humanities or Social Sciences with a specialisation of minimum 80 ECTS Credits in a discipline with relevance to the MSc in Globalization's academic components or equivalent from a university or college, such as:
  - Political Science
  - Sociology
  - Social Anthropology
  - History
  - Geography
  - European Studies
  - Economics
  - Development Studies
  - Cultural Studies
  - Cultural Heritage Studies
  - Religious Studies
  - International Relations
- Students with a BSc in a Technological or Engineering discipline or equivalent from a university or college.
- Students at selected departments at NTNU who have finished the first 3 years of a 5-year Master's of Technology/Engineering programme. These students may opt into the Master's in Globalization programme by applying to the relevant Study Board(s) of their current programme. They will remain within their original department and graduate with a siv.ing/Norwegian Engineering degree (in their original subject), with a specialization in Globalization.
- International students with equivalent backgrounds are encouraged to apply.
- The student must have achieved a minimum of the equivalent of a C grade (Norwegian grading system) in their undergraduate degree to be accepted onto this Master's programme, in accordance with NTNU regulations.

Additional Admissions Information

English language requirements for international students are TOEFL score: 500/170 or IELTS: 5.0

MASTER OF PHILOSOPHY IN CHILDHOOD STUDIES

Approved by the Board at NTNU 30.08.2005, with changes made by the Faculty of Social Sciences and Technology Management 15.01.2010.

INTRODUCTION

Norwegian Centre for Child Research (NOSEB) offers an interdisciplinary, international master's programme in Childhood Studies. The degree is awarded by the Faculty of Social Sciences and Technology Management at NTNU and administered by NOSEB. The master's programme offers an advanced education within the interdisciplinary social studies of children and childhood.

Aim of the programme

The aim of the programme is to generate knowledge about childhood, children's life-worlds, and the politics of childhood in changing societies. The programme will give a broad introduction to different theoretical and methodological perspectives and key concepts in contemporary social and historical research on children and childhood. The central issue is childhood and related themes such as generation, gender, class, identity and ethnicity, as these take form through varying processes like globalisation, institutionalisation, consumption and commercialisation.

The master's programme is theoretically and methodologically related to the social studies of childhood. A child perspective represents a main integrative approach. Children's rights to protection, provision and participation, as stated in the UN Convention on the Rights of the Child (CRC), represent an important point of departure for discussing children as participants in play, child labour, community building and social, political, and economic reproduction of society at large. CRC can be seen as part of globalisation processes, producing particular images of what it means to be a child. An important task is to create comprehensive insights in and an understanding of how the globalised conditions under which children grow up affect 'local' and 'national' childhoods both in the global North and global South. The ways in which children themselves explore and experience their everyday lives and childhoods are also explored.

Employment opportunities

MPhil in Childhood Studies qualifies for work related to research, teaching, supervision and consultancy in the field of children, welfare and development. The master's programme will be relevant for building a career related to children and childhood in different public sectors in governmental organisations. This may include policy and planning for children's living conditions in ministries and institutions which concern children, both locally and internationally. Another important area is Non-Governmental Organisations (NGOs), such as Save the Children and the Red Cross.

ADMISSION REQUIREMENTS

The master's programme accepts students financed by the Quota Programme, Norwegian/Nordic students, and international students with individual funding. The total number of admitted students is approx. 20 students pr. year.

Admittance to the programme requires a bachelor's degree within the social sciences or humanities, or other equivalent education. The average grade of the degree must be at least C by the Norwegian grading system, or equivalent, as decided by NTNU. Background in childhood studies, social anthropology, geography, sociology or history is recommended.

The language of instruction is English, and the applicants must document their English proficiency by achieving a passing grade from a Norwegian upper secondary school (videregående skole) or through a standardized test (TOEFL 550/230/80 paper based/computer based/internet based or IELTS with 6.0 or better). Applicants may document their English proficiency in other ways and students from some countries may be exempted from documenting

their competence in English as described above. For more information, please contact the Office of International Relations or consult the following website: www.ntnu.no/admission

OUTLINE OF THE MPHIL IN CHILDHOOD STUDIES

The master's programme in Childhood Studies involves two years of full-time studies. The normal workload for a full-time student for one academic year is 60 credits. The programme is structured around core courses (52.5 credits) and elective courses (7.5 credits), which both provide a general introduction to theory and methodology and provide the students with the opportunity to specialize within particular topics. In addition, the programme consists of a master's thesis (60 credits).

Term	Course	Course	Course	Course
4th sem/spring	BARN3900 Master's Thesis (60 credits)			
3rd sem/autumn				
2nd sem/spring	BARN3300 Children and Development in the South (7.5 credits)	BARN3202 Methodological Perspectives on Child and Childhood Research (7.5 credits)	Experts in Teamwork (7.5 credits)	BARN3400 Preparatory Course, Master's Thesis (7.5 credits)
1st sem/autumn	BARN3101 Social Studies of Children and Childhood (7.5 credits)	BARN3201 Methods and Techniques in Child and Childhood Research (7.5 credits)	BARN3500 Historical Perspectives on Childhood (7.5 credits)	Elective (7.5 credits)

Core courses

Code	Title	Credits	Term	Admission
BARN3101	Social Studies of Children and Childhood	7.5	Autumn	Open
BARN3201	Methods and Techniques in Child and Childhood Research	7.5	Autumn	Open
BARN3202	Methodological Perspectives on Child and Childhood Research	7.5	Spring	Open
BARN3300	Children and Development in the South	7.5	Spring	Open
BARN3400*	Preparatory Course, Master's Thesis	7.5	Spring	Admission to programme ("studierettskrav")
BARN3500	Historical Perspectives on Childhood	7.5	Autumn	Open
EiT	Experts in Teamwork	7.5	Spring	Restricted admission
BARN3900*	Master's Thesis	60	Autumn/ Spring	Admission to programme ("studierettskrav")

* Requires admission to MPhil in Childhood Studies (”studierettskrav”).

Electives

Code	Title	Credits	Term	Admission
BARN3102*	Children's Rights	7.5	Autumn	Open
BARN3600*	Cultural Representations of Childhood and Children's Everyday Life	7.5	Autumn	Open
BARN3700*	Urban Children and Youth	7.5	Autumn	Open
GEOG3006	Quantitative Methods	7.5	Spring	Open
GEOG3506	Geography, Health and Development	7.5	Autumn	Open
GEOG3515	Environment, Development and Changing Rural Livelihoods	7.5	Autumn	Open
GEOG3516	Humanitarianism: Theory and Practice	7.5	Autumn	Open
GEOG3561	Gender and Social Change	7.5	Spring	Open
PSY3529	Specialization in Community Psychology	7.5	Spring	Open
SANT3507	Globalization, Culture and Identity	7.5	Autumn	Open

* Courses may be cancelled due to the teaching capacity at Norwegian Centre for Child Research or if less than 5-7 students register for the course.

Check www.ntnu.no/studies/childhoodstudies/master/studentinformation for updated information about which courses are running. Information about cancellations will be given no later than August 25th.

Please contact the Department of Geography for information about the GEOG courses, the Department of Psychology for information about PSY3529 and the Department of Social Anthropology for information about SANT3507.

Experts in Teamwork (EiT)

Experts in Teamwork will be taught as an *intensive village* in this master's programme.

Social and academic arrangements for students

At the beginning of the first semester a common ground between students and teachers will be established. Through social and academic arrangements everyone will get the opportunity to get to know each other. Both students and teachers are encouraged to share experiences from their own childhoods and/or childhoods in their ‘home country’, and basic theoretical perspectives within Childhood Studies will be introduced and discussed.

CREDIT ADJUSTMENT DUE TO OVERLAP IN CONTENT

BARN3100	BARN3001	7.5 credits
BARN3100	BARN3101	7.5 credits
BARN3100	BARN3102	7.5 credits
BARN3101	BARN3001	7.5 credits
BARN3200	BARN3002	7.5 credits
BARN3200	BARN3201	7.5 credits
BARN3200	BARN3202	7.5 credits
BARN3201	BARN3002	4 credits
BARN3202	BARN3002	4 credits
GEOG3006	GEOG3002	7.5 credits
GEOG3006	GEOG3052	7.5 credits
GEOG3006	GEOG3004	7.5 credits
GEOG3006	AFR3002	7.5 credits
GEOG3006	AFR3005	7.5 credits
GEOG3506	SVGEO331	7.5 credits
GEOG3561	SVGEO361	7.5 credits
PSY3529	PSY3528	7.5 credits

MASTER OF PHILOSOPHY IN DEVELOPMENT STUDIES, SPECIALISING IN GEOGRAPHY

Approved by the Board at NTNU 16.12.2002, with changes made by the Faculty of Social Sciences and Technology Management 15.01.2010.

The Master in Development Studies, specialising in Geography, is a programme designed for students who want to specialise in development studies and social change. The degree is awarded by the Faculty of Social Sciences and Technology Management at NTNU and administered by the Department of Geography. It is an interdisciplinary degree that is relevant for students with backgrounds in different social sciences and development studies. The programme is relevant for a variety of jobs, including research, planning, resource management, and teaching.

The programme is open to both international and Norwegian students.

ADMISSION REQUIREMENTS

Admittance to this programme requires a Bachelor's degree in Social Sciences. The degree must include at least one year of studies within geography, planning or development studies.

The average grade of the degree must be at least C by the Norwegian grading system, or equivalent, as decided by NTNU.

The language of instruction is English. All lectures and seminars will be held in English, all reading material is in English and all term papers, assignments, exam papers and the thesis must be submitted in English.

The applicants must document their English proficiency by achieving one of the following:

A passing grade from a Norwegian upper secondary school (videregående skole), or through a standardized test:

- TOEFL (Test of English as a Foreign Language) with a minimum score of 550/230/80 paper based /computer based/internet based
- IELTS (International English Language Testing Service) with a minimum score of 6.0 points
- APIEL (Advanced Placement International English Language) examination with a minimum score of 3 points

Exceptions from this requirement can be given for certain groups of applicants. For more information about the admission requirements, please consult the following webpage:

www.ntnu.no/admission.

COURSE OUTLINE

The programme involves 2 years of full-time studies. The programme is structured around core courses (37,5 credits), electives (37,5 credits) and a Master’s thesis (45 credits).

The core courses are: GEOG3053 Theories of Development and Globalization, GEOG3054 Thesis preparation course work, Experts in Teamwork (EiT), GEOG3003 Methodology and the Research Process, and either GEOG3005 Qualitative Methods or GEOG3006 Quantitative Methods.

Students can choose electives worth 37,5 credits from a number of courses offered by the Department of Geography or other departments. Most of the electives will be offered in the autumn term. Courses other than those listed below can be chosen as electives. Other courses may be chosen if approval is given by the Department of Geography.

CORE COURSES

Code	Title	Credits	Term	Admission
GEOG3053	Theories of Development and Globalization	7,5	Autumn	Open
GEOG3054*	Thesis preparation course work	7,5	Spring	Admission to programme ("studierettskrav")
GEOG3003	Methodology and the Research Process	7,5	Autumn	Open
GEOG3005	Qualitative methods	7,5	Spring	Open
GEOG3006	Quantitative methods	7,5	Spring	Open
EiT	Experts in teamwork	7,5	Spring	Restricted admission
GEOG3920*	Master's Thesis	45	Autumn /Spring	Admission to programme ("studierettskrav")

* Requires admission to the programme ("studierettskrav").

ELECTIVES

Code	Title	Credits	Term	Admission
GEOG3030*	Natural Resources Management	7,5	Autumn	Open
GEOG3505*	Landscape and Planning	15	Autumn	Open
GEOG3506*	Geography, Health and Development	7,5	Autumn	Open
GEOG3519*	Geographical Information Systems - I	7,5	Autumn	Open
GEOG3520*	Geographical Information Systems - II	7,5	Spring	Open
GEOG3521*	Urban Application of GIS	7,5	Autumn	Restricted admission
GEOG3515*	Environment, Development and Changing Rural Livelihoods	7,5	Autumn	Open
GEOG3516*	Humanitarianism: Theory and Practice	7,5	Autumn	Open
GEOG3518*	Knowledge Management in a Global Economy	7,5	Autumn	Open
GEOG3561*	Gender and Social Change	7,5	Spring	Open
AAR4234*	Planning for Sustainability and Development (please note deadline for registration)	7,5	Spring	Open
BARN3300	Children and Development in the South	7,5	Spring	Open
POL3517	International Development: the Effects of Politics, Institutions and International Economy	15	Spring	Open

Courses may be cancelled due to the teaching capacity at the Department of Geography or if less than 5 students register for the course. Check www.ntnu.no/geografi/studentinformasjon for updated information about what courses are available. Information about cancellations will be given no later than January 10th in spring term and August 10th in autumn term. For courses available outside the department of Geography, please contact the respective department.

MPhil in Development Studies, specialising in Geography: programme structure

Term	**Course (15 cr)**		**Course (15 cr)**	
4. sem/Spring	GEOG3920			
3. sem/Autumn	GEOG3920		Electives (15 credits)	
2. sem/Spring	GEOG3054	GEOG3005 or GEOG3006	EiT	Electives (7,5 credits)
1.sem/ Autumn	GEOG3053	GEOG3003	Electives (15 credits)	

Candidates are expected to use the summer between the second and third term to collect data and conduct fieldwork for their thesis.

Experts in Teamwork (EIT)

The course is normally taught every Wednesday *throughout the spring semester* (regular village). It is not possible to take the course as an intensive village in this master's programme.

CREDIT REDUCTIONS DUE TO OVERLAP IN CONTENT

GEOG3053	GEOG3050	7,5 credits
GEOG3054	GEOG3050	7,5 credits
GEOG3053	GEOG3504	7,5 credits
GEOG3003	GEOG3002	7,5 credits
GEOG3005	GEOG3052	7,5 credits
GEOG3005	AFR3005	7,5 credits
GEOG3005	AFR3002	7,5 credits
GEOG3005	GEOG3004	7,5 credits
GEOG3005	GEOG3002	7,5 credits
GEOG3006	GEOG3002	7,5 credits
GEOG3006	GEOG3052	7,5 credits
GEOG3006	GEOG3004	7,5 credits
GEOG3006	AFR3002	7,5 credits
GEOG3006	AFR3005	7,5 credits
GEOG3510	GEOG3519	6 credits
GEOG3510	GEOG3520	3 credits
POL3503	POL8503	10 credits
GEOG3510	GEOG3521	6 credits

MASTER OF PHILOSOPHY IN DEVELOPMENT STUDIES, SPECIALISING IN URBAN CHALLENGES IN EAST AFRICA

Approved by the Faculty of Social Sciences and Technology Management 15.01.10.

The Master of Philosophy in Development Studies, specialising in Urban Challenges in East Africa, is a project and collaboration in teaching and supervision that is conducted at both NTNU and Addis Ababa University (AAU) in Ethiopia. The programme is one of two specialisations under the MPhil in Development Studies programme administered by the Department of Geography at NTNU.

The programme is designed for students who want to specialise in urban development issues. The MPhil degree is awarded by the Faculty of Social Sciences and Technology Management at NTNU. The academic profile of the programme is to depart from managerial, formal and technical perspectives and instead put emphasis on economic and governance aspects relevant for urban issues. It is an interdisciplinary degree that is relevant for students with backgrounds in different social sciences and development studies. The programme is relevant for a variety of jobs, including research, planning, management and teaching. The programme is open to 4 Norwegian/Nordic students.

Admission requirements

Admittance to this programme requires a Bachelor of Social Science degree. The degree must include at least one year of studies within geography, planning or development studies.

The average grade of the degree must be at least C by the Norwegian grading system, or equivalent, as decided by NTNU.

The language of instruction is English. All lectures and seminars will be offered in English, all reading material is in English and all term papers, assignments, exam papers and the thesis must be submitted in English.

Course outline

The programme involves 2 years of full-time studies. The programme is structured around core courses (30 credits), electives (45 credits) and a Master's thesis (45 credits).

The core courses are GEOG3053 Theories of Development and Globalization, GEOG3003 Methodology and the Research Process, UCEA602 Urban Livelihoods and UCEA604 Master course in Qualitative Methods.

Students can choose electives worth 45 credits from a number of courses offered at both NTNU and AAU. Courses other than those listed can be chosen as electives if approval is given by the Department of Geography at NTNU.

Practical issues

The students will spend their first term at NTNU and the second term at Addis Ababa University. Between the second and the third term (preferably) they will carry out data collection for their master thesis in the region of East Africa. The third term is spent at AAU while the fourth term is spent at NTNU.

Housing and living costs in Addis Ababa

AAU will provide housing, but rent must be paid by the students. Estimated costs: NOK 2500 per month. Monthly living costs in Addis Ababa, besides housing, are estimated to NOK 2000.

Travel

Students have to pay for travel to Ethiopia themselves as well as travel preparations (i.e visa and vaccination). Also travel costs related to field work in Ethiopia must be covered by the students themselves. Part of the expenses will be covered by Statens lånekasse for utdanning.

CORE COURSES

Code	Title	Cr	Sem.	Admission
GEOG3003	Methodology and the Research Process	7,5	Autumn	Open
GEOG3053 (NTNU)	Theories of Development and Globalization	7,5	Autumn	Open
UCEA602 (AAU)*	Urban Livelihoods	7,5	Spring	Restricted admission
UCEA604 (AAU)*	Master Course in Qualitative Methods	7,5	Spring	Restricted admission
GEOG3930 (NTNU)	Master's Thesis	45	Autumn/ Spring	Requires admission to the programme ("studierettskrav")

* Students who are not admitted to the programme are asked to contact the Department of Geography for further information.

ELECTIVES

Code	Title	Cr	Sem.	Admission
GEOG3506* (NTNU)	Geography, Health and Development	7,5	Autumn	Open
GEOG3518* (NTNU)	Knowledge Management in a Global Economy		Autumn	Open
GEOG3519* (NTNU)	Geographical Information System - I	7,5	Autumn	Open
GEOG3520* (NTNU)	Geographical Information system - II	7,5	Spring	Open
GEOG3521* (NTNU)	Urban Application of GIS	7,5	Autumn	Restricted Admission
UDMT603** (AAU)	Theory and Practice of Urban and Regional Planning	7,5	Spring	Requires admission to programme
DEST730** (AAU)	Gender and Development	7,5	Spring	Requires admission to programme
UDMT652** (AAU)	Housing in Developing Countries	7,5	Spring	Requires admission to programme
UDMT656** (AAU)	Introduction to Urban Transportation Planning	7,5	Spring	Requires admission to programme
UCEA603** (AAU)	Urban Governance	7,5	Autumn	Requires admission to programme
SOCI541** (AAU)	Urban Sociology	6	Autumn	Requires admission to programme
UCEA605** (AAU)	Urban Children and Youth	7,5	Autumn	Requires admission to programme

* Courses may be cancelled due to the teaching capacity at the Department of Geography or if less than 5 students register for the course. For updated information about which courses are running, check www.ntnu.no/geografi/studentinformasjon. Information about cancellations will be given no later than January 10th in spring term and August 10th in autumn term.

** These courses are offered by Addis Abeba University. Changes in these courses will be announced by Department of Geography. Students who are not admitted to the programme must contact the Department of Geography for information about possible admission.

MPhil in Development Studies, specialising in Urban Challenges in East Africa

Term	**Course (15 cr)**		**Course (15 cr)**
4. Sem/Spring (NTNU)	GEOG3930		
3. Sem/Autumn (AAU)	GEOG3930		Electives (15 credits)
2. Sem/Spring (AAU)	UCEA602	UCEA604	Electives (15 credits)
1. Sem/Autumn (NTNU)	GEOG3053	GEOG3003	Electives (15 credits)

CREDIT ADJUSTMENT DUE TO OVERLAP IN CONTENT

GEOG3510	GEOG3519	6 credits
GEOG3510	GEOG3520	3 credits
GEOG3510	GEOG3521	6 credits
GEOG3053	GEOG3050	7.5 credits
GEOG3053	GEOG3504	7.5 credits
GEOG3003	GEOG3002	7.5 credits

MASTER OF PHILOSOPHY IN HUMAN DEVELOPMENT

Approved by the Board at NTNU 09.11.2004 with changes made by the Faculty of Social Sciences and Technology Management 15.01.2010

INTRODUCTION

About the programme

The Department of Psychology at the Norwegian University of Science and Technology (NTNU) offers an international master's programme in Human Development. Since all human development takes place in specific cultural contexts, the aim of the programme is to provide an advanced education in human development and change processes on a cultural basis. The programme will focus on the formation, change, and development of the individual in his/her interaction within a culture specific context.

Perceptions of gender, generation, social class, ethnicity as well as personal identity are in constant change, but with different speed in different cultures/societies under the (different) influences of globalization. Thus the influence of media and communication technology is important in these change processes. The ideological context, in terms of art, religion and philosophy, is also central as it contributes to the development of identity in a changing context.

Objective

The objective of the master programme is to build and develop the students' reflection skills as well as theoretical and practical competence through combining relevant theoretical and applied professional knowledge in the area of human development and change processes. In the transcultural methodological approach it is important that the user's voice is heard and integrated. The programme will thus give a broad introduction to different theoretical and methodological perspectives and cover key concepts in contemporary cultural and community psychology. The student group is an international mix of Norwegians, Europeans and students from developing countries. The aim of the programme is to provide students from both the North and the South expertise that will make them capable of initiating and assisting change processes with cultural reflectivity, either in their home country or abroad.

Career opportunities

The programme will provide competence for investigatory and practical work in school, family, and in health related issues with specific emphasis on the importance of cultural context. The programme is especially relevant for these fields in multiethnic environments. Integration of cultural and social aspects of human change processes is also important for work environment issues as well as in media. The programme will also prepare for theoretical and applied research in the fields:

- Administration
- Applied science
- Research
- Studies and evaluations for the public sector

ADMISSION REQUIREMENTS

The programme accepts students financed by the Quota Programme, Norwegian /Nordic students and other international students with individual funding. Approximately 10 students will be admitted autumn 2010.

Applicants should hold a Bachelor's degree in Behavioural or Social Sciences, preferably within psychology, or the equivalent including at least 20 ECTS in Statistics, Research Methods and Theory of Science.

A Bachelor's degree in medicine, nursing or social education or the equivalent including at least 20 ECTS in Statistics, Research Methods and Theory of Science will also be considered.

The average grade of the degree must be at least C by the Norwegian grading system, or equivalent, as decided by NTNU.

The language of instruction is English, and the applicants must document their English proficiency by achieving a passing grade from a Norwegian upper secondary school (videregående skole) or through a standardized test (TOEFL 550/230/80 paper based/computer based/internet based or IELTS with 6.0 or better). Applicants may document their English proficiency in other ways and students from some countries may be exempted from documenting their competence in English as described above. For more information, please contact the Office of International Relations or consult the following website: www.ntnu.no/admission

EXPERTS IN TEAMWORK (EIT)

EiT is a project course for all master students at NTNU and part of NTNU's interdisciplinary initiative. The objective of the course is to give students practical experience with interdisciplinary teamwork, a competence that is needed in professional working life.

This compulsory course is organised as a *regular village* with teaching every Wednesday throughout the spring semester. It is not possible to take EiT as an intensive course in this programme.

WRITING COURSE

The MPhil students are welcome to attend a writing course offered by the Department of Psychology. This course has no formal exam, and is foremost thought as help to get started (writing, APA manual, web based literature search etc).

In addition, all the MPhil students must attend a master thesis seminar (2 hours per week for 15 weeks). This seminar is compulsory and aims at preparing the students for their master's thesis. The seminar is also a forum for discussion and presentation. The students have to present their master project as part of this forum before submitting their master's thesis.

COURSE OUTLINE

The programme involves 2 years of full-time studies. The normal workload for a full-time student for one academic year is 60 ECTS. The programme is structured around core courses (52.5ECTS), which provide a general introduction to theory and methodology and students with an opportunity to specialize within particular topics, including Experts in Teamwork (EiT), 7,5 ECTS. In addition to this, the programme consists of a master's thesis (60 credits).

OUTLINE OF THE MPHIL PROGRAMME IN HUMAN DEVELOPMENT

<table>
<tr><th>Term</th><th>Course</th><th>Course</th><th>Course</th><th>Course</th></tr>
<tr><td>4th sem/spring</td><td colspan="4" rowspan="2">PSY3908</td></tr>
<tr><td>3rd sem/autumn</td></tr>
<tr><td>2nd sem/spring</td><td>PSY3529 Specialization in Community Psychology</td><td>PSY3087 Research in Practice</td><td>PSY3543 Specialization in Cultural Psychology</td><td>EiT - Experts in Teamwork</td></tr>
<tr><td>1st sem/autumn</td><td colspan="2">PSY 3001 Research Methodology</td><td colspan="2">PSY3086 Introduction to Individual and Context</td></tr>
</table>

Courses

Code	Title	Credits	Term	Admission
PSY3001*	Research Methodology	15	Autumn	Admission to programme required ("studieretts-krav")
PSY3086*	Introduction to Individual and Context	15	Autumn	Admission to programme required ("studieretts-krav")
PSY3529	Specialization in Community Psychology	7,5	Spring	Open
PSY3087*	Research in Practice	7,5	Spring	Admission to programme required ("studieretts-krav")
PSY3543	Specialization in Cultural Psychology	7,5	Spring	Open
PSY3908	Master's Thesis in Human Development	60	Autumn and Spring	Admission to programme required ("studieretts-krav")
EiT	Experts in Teamwork	7,5	Spring	Restricted admission

* Admission to the programme is required. Exchange students interested in taking one of these courses must consult the Department of Psychology first.

CREDIT REDUCTIONS DUE TO OVERLAP IN CONTENT

PSY3081	PSY3001	15 ECTS
PSY3000	PSY3001	15 ECTS
PSY3540	PSY3543	15 ECTS
PSY3528	PSY3529	7,5 ECTS
PSY3904	PSY3908	45 ECTS

MASTER OF PHILOSOPHY IN RISK PSYCHOLOGY, ENVIRONMENT AND SAFETY

Approved by the Board of NTNU 01.10.2008, with changes made by the Faculty of Social Sciences and Technology Management 15.01.10

ABOUT THE PROGRAMME

The MPhil in Risk Psychology, Environment and Safety provides the opportunity to focus on issues associated with risk, environment and safety on the basis of knowledge gained in psychology and the social sciences. The programme offers studies of individual and of group reactions and actions, including risk communication, when confronting significant challenges related to threats, uncertainties and preventive measures.

The programme aims at giving students an in-depth insight into the perceived risk and risk communication fields as well as the areas of environmental psychology and of safety/security issues. There is emphasis on linking risk, environment and safety issues on the basis of an interdisciplinary knowledge platform.

From 2010 the international master programmes of RIPENSA and Industrial Ecology, both at NTNU, will collaborate closely. Students admitted to one of these international master programmes will be able to take courses and get supervision on their Master's thesis at both master programmes. Materials and tasks in the courses relate to challenges in the RIPENSA and Environment and safety areas. For example human thinking, reactions and actions related to risk, environment and safety are studied at the individual, group and societal levels in RIPENSA, and e.g. the basis of industrial ecology, and a course on life cycle assessment are provided by Industrial Ecology.

Student participation in seminars and in project groups will result in insights into the broad areas of study presented above, and include familiarity with current national and international research work. Excursions and participation in research networks offer knowledge and training in project development and of presenting research result. The planned educational content such as courses, teamwork and intensive supervision, are designed to stimulate students' own work with semester papers and their master's thesis.

The MPhil in RIPENSA will provide a sound basis of knowledge for work in the mentioned and in related areas, and is a step towards applying for a doctoral degree.

ADMISSION REQUIREMENTS

The MPhil in Risk Psychology, Environment and Safety is open to students with a bachelor's degree in Behavioural or Social Sciences including at least 20 ECTS in Statistics and Research Methods. The average grade of the bachelor's degree must be at least C or higher using the Norwegian letter grading system, or equivalent, as decided by NTNU.

The applicants must meet the English language requirements. For more information, please consult the following webpages: www.ntnu.no/admission

TEACHING METHODS AND ACTIVITIES

Traditional lectures, seminars, group work, excursions, group exercises, participation in research networking and presentations of own work and results are activities included in the programme.

Supervision

A Master agreement must been signed between the main supervisor and the student, and in this contract the student will find information about the supervision as well as rights and duties. In addition, an internal or external supervisor can be approved and consulted if project tasks or

the master's thesis require this. Students admitted to the programme will receive continuous supervision, but the frequency increases over time and is expected to be most intense in the final semester. The specified topic of the master's thesis is expected to develop over time and in discussions with the supervisor. The quality of the master's thesis shall be in accordance with international academic standards.

Curriculum

Compulsory literature and individually selected texts provide the basis of the syllabus..

Form of assessment

The forms of assessment may vary, but are mainly in the form of written examinations, semester papers, presentations of own work and other written exercises. Students will find what requirements are necessary for receiving assessment, such as participation in seminars, presentations of group work or other requirements, in the course descriptions below. An oral examination is given in relation to the submission of the master thesis.

EIT - EXPERTS IN TEAMWORK

EiT is a project course for all master's students at NTNU and part of NTNU's interdisciplinary initiative. The objective of the course is to give students practical experience with interdisciplinary teamwork, a skill that is needed in professional working life. This compulsory course is run in groups (villages). EIT is normally taught every Wednesday throughout the spring semester. It is not possible to take the EIT course as an intensive course in this master's programme.

WRITING SEMINAR

The MPhil students are welcome to attend a writing seminar offered by the Department of Psychology. This seminar has no formal examination, and is foremost thought as help to get started (writing, APA manual, web based literature search etc). In addition, all students must attend a master's thesis seminar (approx. 2 hours per week - 15 weeks). This seminar aims at preparing the students for their master's thesis. The seminar is also a forum for discussion and presentations. The students have to present their master's project as part of this forum before submitting their master’s thesis.

PROGRAMME OUTLINE

The programme involves two years of full-time studies. The normal workload for a full-time student for one academic year is 60 ECTS. The programme is structured around core courses (37,5 credits), Experts in Teamwork (7,5 credits) and a master's thesis of either 45 credits (those students attending courses in Industrial Ecology) or 60 credits.

Code	Title	Cr	Term	Admission
PSY3001*	Research Methodology	15	Autumn	Admission to the programme required ("studierettskrav")
PSY3090	Risk Psychology, Environment and Safety	15	Autumn	Open
PSY3533	Groups, Decision Making and Risk Communication	15	Spring	Open
PSY3590	Safety and Security for the Social Sciences	7,5	Spring	Open
TVM4162	Industrial Ecology	7.5	Autumn	Restricted admission
TEP4223	Life Cycle Assessment	7.5	Autumn	Restricted admission
EiT	Experts in Teamwork	7,5	Spring	Restricted admission
PSY3909	Master Thesis in Risk Psychology, Environment and Safety	60	Autumn/ Spring	Admission to programme required
PSY3910	Master Thesis in Risk Psychology, Environment and Safety	45	Autumn/ Spring	Admission to programme required

* Admission to MPhil in Human Development, MPhil in MPhil in Risk Psychology, Environment and Safety, Master in Psychology or Master in Media, Communication and Information Technology is required.

MPhil in Risk Psychology, Environment and Safety

Term	Course	Course	Course	Course
4th sem/spring and 3rd sem/autumn	PSY3909			
2nd sem/spring	PSY3533		PSY3590	EiT- Experts in Teamwork
1st sem/autumn	PSY3001		PSY3090	

MPhil in Risk Psychology, Environment and Safety including courses in Industrial Ecology

Term	Course	Course	Course	Course
4th sem/spring and	PSY3910			
3rd sem/autumn	PSY3910		TVM4162	TEP4223
2nd sem/spring	PSY3533		PSY3590	EiT- Experts in Teamwork
1st sem/autumn	PSY3001		PSY3090	

CREDIT ADJUSTMENT DUE TO OVERLAP IN CONTENT

PSY3905	PSY3909	45
PSY3909	PSY3910	45
PSY3000	PSY3001	15
PSY3001	PSY3081	15
PSY3001	PSY300	15
PSY3530	PSY3533	7,5

MASTER OF SCIENCE IN EXERCISE PHYSIOLOGY AND SPORT SCIENCES

2-year Master of Science (MSc)

Programme code: MSPORT
Webpage: www.ntnu.no/studies/msport/

This programme description is valid for students admitted in the academic year 2010/2011.

Introduction

The Master of Science in Exercise Physiology and Sport Sciences is a research and thesis-based integrated master's degree programme at the Faculty of Medicine. It is exclusively concerned with basic research training and comprises compulsory courses together with specialization courses dependent upon the research interest of students.

The MSc programme is associated with the research group in Exercise and Extreme Environments at the Department of Circulation and Medical Imaging. One of the main research interests of this group is to examine basic mechanisms for central and peripheral limitations to the supply and demand of oxygen transport, and to identify training responses. The group is also involved in examining the mechanisms for muscular and neural limitations to strength and coordination, the prescription of effective endurance and strength training, and the effects on top sports performance.

Another aspect is based upon the fact that the fastest developing diseases within the population, such as obesity, atherosclerosis, diabetes II, osteoporosis and COPD, are related to inactivity. Effective new training interventions based on basic biological adaptations have positive effects and are effective treatments with high socioeconomic as well as quality of life outcomes.

This is a 120-credit international programme, and the language of teaching and examinations is English. The degree awarded to students completing the programme is *Master of Science in Exercise Physiology and Sport Sciences*.

Career Prospects

The MSc is a research training and preparation for a PhD degree. Completion of the programme also qualifies the graduates for a wide range of other careers, for example high school and college level teaching. For students with a clinical health background, the degree is an important background for understanding and interpreting research and change in methods for prevention, treatment and rehabilitation of diseases. It is thus an important background for leading positions within the health community.

Study Environments

The MSc students have their own working place with web access in a friendly environment. The students also have access to most relevant literature and research journals. The research programme has a close co-operation with St. Olav's University Hospital. The Exercise Physiology laboratory is located in the same building as the working environment. There is a close relationship to the medical doctor students, including a joint cantina and social activities.

Soma is an academic and social organization for master's students at the Faculty of Medicine. Soma runs a buddy programme at the start of the semester, and various events through the academic year. For more information, visit http://somantnu.blogspot.com/.

Admission Requirements

Candidates should hold a bachelor's degree (or 3-year equivalent), preferably within exercise physiology / sport sciences, exercise sciences, biology, biochemistry, physiotherapy, occupational therapy, nursing or similar fields. A firm foundation in human biology is required within the bachelor's degree. The minimum average grade required is the Norwegian "C".

International applicants need to submit proof of English proficiency by form of the TOEFL examination (with a score of 500 or higher on the paper-based test, and 170 or higher on the computer-based test), alternatively the IELTS test (with a score of 5.0 or better). More details about the language requirements are available here: www.ntnu.no/international/master/

Applicants who are not citizens of the European Union (EU) or European Economic Area (EEA) need to provide a financial guarantee to get a residence permit in Norway.

Programme Structure

The master's degree is a two-year, full-time programme starting in the autumn semester. There are two main components:

- Master's thesis (60 credits)
- Theoretical and methodological courses (totalling 60 credits)

The first semester is primarily based on theory and lectures. From the second semester most attention is directed towards preparing for carrying out an experiment representing work at the forefront of the research in exercise physiology in close co-operation with the professors in the research group. The quality of research is high, and the research project is expected to contain data of a quality that makes international publication possible.

<table>
<tr><th colspan="2">Year 1</th><th colspan="2">Year 2</th></tr>
<tr><td>1st semester
(autumn)</td><td>2nd semester
(spring)</td><td>3rd semester
(autumn)</td><td>4th semester
(spring)</td></tr>
<tr><td>KLMED8004
Medical Statistics, Part I
(7.5 credits)</td><td>EiT
Experts in Teamwork
(7.5 credits)</td><td colspan="2" rowspan="4">SPO3900
Thesis in Exercise Physiology
(60 credits)</td></tr>
<tr><td>SPO3020
Training Circulation and Oxygen Consumption
(7.5 credits)</td><td>SPO3040
Environmental Adaptations
(7.5 credits)</td></tr>
<tr><td>SPO3030
Training Muscle and Force Production
(7.5 credits)</td><td rowspan="2">SPO3060
Specialisation in Exercise Physiology
(15 credits)</td></tr>
<tr><td>SPO3055
Research Methods in Exercise Physiology
(7.5 credits)</td></tr>
</table>

Experts in Teamwork (EiT) is compulsory for all master's degree students at NTNU, and it is taught intensively in the weeks 2, 3 and 4 in the second semester. Read more about EiT here: www.ntnu.no/eit/english/

By the end of the first semester, the student must choose a topic for the thesis. A master's degree agreement including a project description is drawn up by the student and submitted to the programme board within the first semester.

The student must have passed all theoretical and methodological courses before he/she can submit the thesis.

Course Descriptions

Available on the internet: www.ntnu.no/studies/courses

MASTER OF SCIENCE IN MOLECULAR MEDICINE

2-year Master of Science (MSc)

Programme code: MSMOLMED
Webpage: www.ntnu.no/studies/msmolmed/

This programme description is valid for students admitted in the academic year 2010/2011.

Introduction

Rapid developments of medical technology and new kinds of conceptual thinking within the field of biology have increased the need for laboratory specialisation. NTNU offers an MSc programme tailored to meet this demand.

The field of Molecular Medicine is often referred to as “tomorrow’s medicine”. It aims to provide a molecular understanding of how normal cellular processes change, fail or are destroyed by disease.

The mapping of the human genome in 2003 was a turning point, and our knowledge and understanding of molecules in living organisms are advancing at a fast rate. Modern technologies such as high-throughput analyses (microarray and proteomics) enable us to study thousands of genes and proteins simultaneously. This provides the foundation for a totally new understanding of biological systems and generates fresh hypotheses about the importance of genes and proteins for different diseases.

About the Programme of Study

The purpose of the MSc programme is to develop knowledge and skills in cellular and molecular biology. These have applications in both research and practical clinical work, and will contribute to an increased understanding of processes, diagnostics, and treatment of diseases.

Molecular Medicine is a rapidly changing field which requires interdisciplinary insight. Teaching on the MSc programme is provided by the Faculty of Medicine and the Faculty of Natural Sciences and Technology at NTNU, in cooperation with the Faculty of Technology at Sør-Trøndelag University College. Experts from other educational institutions also contribute to the teaching.

The MSc programme is coordinated by the Programme Board of Molecular Medicine, with representatives from the students and the participating faculties. It is administered by the Department of Laboratory Medicine, Women’s and Children’s Health at the Faculty of Medicine.

The degree awarded to students completing the programme will be *Master of Science in Molecular Medicine*. Completion of the MSc degree is a qualification for studies at the PhD level.

Career Prospects

The MSc in Molecular Medicine qualifies graduates for a wide range of careers, including:

- Research in hospitals, colleges, universities and research institutes
- Teaching
- Research and teaching administration
- Public health administration
- Practical clinical work and technical executive positions in hospital laboratories.
- Research dissemination (media, publishers, etc.)
- Pharmaceuticals and consulting firms

Admission Requirements

Admission requirements to the MSc in Molecular Medicine is a bachelor's degree (or an equivalent 3-year education) in biology, biomedical science, biotechnology, chemistry, or similar with an average grade of C or higher. A solid background in cellular and molecular biology is highly recommended within the bachelor's degree.

International applicants need to submit proof of English proficiency by form of the TOEFL examination (with a score of 500 or higher on the paper-based test, and 170 or higher on the computer-based test), alternatively the IELTS test (with a score of 5.0 or better). More details about the language requirements are available here: http://www.ntnu.no/international/master/

Applicants who are not citizens of the European Union (EU) or the European Economic Area (EEA) need to provide a financial guarantee to get a residence permit in Norway.

Study Environment

In 2005 the new Laboratory Centre opened at Øya campus in Trondheim. In this building students get to work in high-tech laboratory environments side by side with researchers both from NTNU, Sør-Trøndelag University College and St. Olav's University Hospital.

The teaching includes lectures, problem-based learning (PBL), colloquiums, laboratory exercises and project work, and is conducted in modern learning facilities. The language of instruction and examinations is English.

Soma is an academic and social organization for master's students at the Faculty of Medicine. Soma runs a buddy programme at the start of the semester, and various events through the academic year. For more information, visit http://somantnu.blogspot.com/.

Programme Structure

The MSc is a two-year, full-time programme starting in the autumn semester. There are two main components:

- Master's thesis (60 credits)
- Theoretical and methodological courses (totalling 60 credits). Two courses, making up 15 credits, are compulsory. The remaining courses, adding up to 45 credits, are selected from lists of electives. Ideally, electives should be linked to the topic of the master's thesis.

There are two lists of elective courses (see next page). *Two courses* must be selected from 'Electives 1'. The remaining elective courses can be chosen from both 'Electives 1' *and* 'Electives 2'. Additional relevant courses may be taken at NTNU or other educational institutions subject to the approval of the Faculty of Medicine.

A master's degree agreement, including a project description for the master's thesis, must be submitted by 15 March in the second semester. Potential projects will be presented in advance.

Master's Thesis

MOL3901	Thesis in Molecular Medicine	60 credits

Compulsory Courses

MOL3000	Introduction to Molecular Medicine	7.5 credits (autumn)
Various codes[1]	Experts in Teamwork	7.5 credits (spring)

Electives 1

BI3016	Molecular Cell Biology	7.5 credits (autumn)
MOL3001[2]	Medical Genetics	7.5 credits (spring)
MOL3005	Immunology	7.5 credits (autumn)
MOL3007	Functional Genomics	7.5 credits (spring)
MOL3008[3 4]	Analytical Techniques and Instrumentation	7.5 credits (spring)
MOL3011[3 4]	Molecular Diagnostics	7.5 credits (spring)
MTEK3001	Applied Bioinformatics and Systems Biology	7.5 credits (spring)

Electives 2

BI3013[5]	Experimental Cell and Molecular Biology	7.5 credits (autumn)
BI3018[4]	Patenting and Commercialization of Biotech and Medtech Inventions	7.5 credits (spring)
BT8103[4]	Molecular Mechanisms of Toxicology	7.5 credits (autumn)
KLMED8004[6]	Medical Statistics, Part I	7.5 credits (autumn)
MOL3003[4 7]	Molecular Medical Microbiology	7.5 credits (autumn)
MOL3004[8]	Morphology	7.5 credits (autumn)

[1] Experts in Teamwork (EiT) is taught intensively in the weeks 2, 3 and 4 in the second semester. Read more about EiT on this webpage: www.ntnu.no/eit/english/

[2] The course has restricted admission. Students admitted to the MSc in Molecular Medicine or the MSc in Neuroscience will be given priority if more than 28 students register for the course. Registration is done on StudentWeb in the autumn semester.

[3] The course is organized by Sør-Trøndelag University College (HiST). To register for the course, please send an email to studie@medisin.ntnu.no by 15 January 2011.

[4] The course may be cancelled if too few students register for examination.

[5] The course has restricted admission, and will be open for master's students in Molecular Medicine only if there are any available seats. Please contact the Department of Biology if you are interested.

[6] The course is at PhD level, but it is open for qualified master's degree students.

[7] The course has restricted admission. Two-thirds of the seats are reserved for the first-year master's students in Molecular Medicine. One-third of the seats are reserved for second-year master's students in Molecular Medicine and other master's students at NTNU.

[8] The course will not be taught in the academic year 2010/2011.

MOL3006[7]	Molecular Mechanisms of Nutrition	7.5 credits (spring)
MOL3009[4]	Biobanking	7.5 credits (autumn)
MOL3010	Animal Cell Culture	7.5 credits (autumn)
MOL3014[4]	Nanomedicine I – Bioanalysis	7.5 credits (autumn)
MOL3015[4]	Nanomedicine II – Therapy	7.5 credits (spring)
MOL8002[4 6]	Molecular Mechanisms of Host Defence	9.0 credits (autumn)
MOL8003[4 6]	Microarray Technology and Data Analysis	7.5 credits (spring)
MOL8005[4 6]	Molecular Mechanisms of Host Defence – Essay	6.0 credits (autumn)
NEVR8003 [6]	Laboratory Animal Science for Researchers	6.0 credits (autumn)
NEVR8013 [6]	Laboratory Animal Science – Essay	1.5 credits (spring)
TOKS3001[4]	Medical Toxicology	7.5 credits (spring)

Model of the MSc Programme (example):

<table>
<tr><th colspan="2">Year 1</th><th colspan="2">Year 2</th></tr>
<tr><td>1st semester (autumn)</td><td>2nd semester (spring)</td><td>3rd semester (autumn)</td><td>4th semester (spring)</td></tr>
<tr><td>Introduction to Molecular Medicine</td><td>Experts in Teamwork</td><td colspan="2" rowspan="4">Thesis in
Molecular Medicine</td></tr>
<tr><td>Elective course</td><td>Elective course</td></tr>
<tr><td>Elective course</td><td>Elective course</td></tr>
<tr><td>Elective course</td><td>Elective course</td></tr>
</table>

Please note that this is only a suggestion. The student can choose to start with the thesis already in the first year and postpone one or more of the elective courses to the second year.

The student must have passed all examinations in compulsory and elective courses before he/she can submit the thesis.

Course Descriptions

The course descriptions are available on the internet: www.ntnu.no/studies/courses/

MASTER OF SCIENCE IN NEUROSCIENCE

2-year Master of Science (MSc)

Programme code: MSNEUR
Webpage: www.ntnu.no/studies/msneur/

This programme description is valid for students admitted in the academic year 2010/2011.

Introduction

One of the greatest challenges of the 21st century is to understand how mental activity arises in the brain. What is the neural basis for psychological phenomena like thoughts, emotions, ideas, memories and problem-solving? These questions have interested humans for thousands of years, but the methods and technologies necessary to be able to provide the answers have only evolved during the last few decades. Neuroscience technology is rapidly developing, and progress in gene technology, electronics and data processing now allows researchers to relate activity in individual cells and cell populations directly to mental activity and disease.

This development not only lays the foundation for a better understanding of human cognition, but also contributes to preventing and treating diseases in the nervous system. Disorders of the nervous system are among the most common reasons for hospitalization in Norway. About 30 percent of the population will be struck by some disturbance in the brain, such as Alzheimer's disease, Parkinson's disease, stroke, schizophrenia, depression, multiple sclerosis or chronic pain disorders. As many of these disorders are age-related, the number of affected individuals will increase due to the rising share of the elderly in the population.

About the Programme of Study

The MSc in Neuroscience is the first of its kind in Norway, and it offers a comprehensive and coherent education in Neuroscience. The programme started in the autumn of 2003, and the curriculum is an interdisciplinary collaboration between these faculties:

- Humanities
- Information Technology, Mathematics and Electrical Engineering
- Medicine, including the Kavli Institute for Systems Neuroscience and the Centre for the Biology of Memory
- Natural Sciences and Technology
- Social Sciences and Technology Management

The MSc programme is coordinated by the Programme Board of Neuroscience, with representatives from the students and the participating faculties. It is administered by the Department of Neuroscience at the Faculty of Medicine.

The MSc in Neuroscience provides an in-depth study of brain structure and -function, reaching from the molecular to systems level. A central aim for students is to understand how neural systems may contribute to sensory experiences, thoughts, emotions and behaviour, and learn to adopt experimental methods to gain new knowledge in the field.

The degree awarded to students completing the programme will be *Master of Science in Neuroscience*. Completion of the master's degree is a qualification for studies at the PhD level.

Career Prospects

The MSc in Neuroscience offers both a basic introduction to this research area and training in research methodology. The master's programme is suitable for students motivated towards research or teaching in Neuroscience in particular or the natural sciences in general. The introduction to experimental and analytical methods is relevant to other academic areas as well. Graduates from the master's programme will be able to apply for positions at universities, university colleges, colleges and at a wide range of research institutions. The methodological introduction also provides a good background for positions in research, teaching and public health administration, academic journalism and medical publishing.

Study Environment

The master's programme has small classes, which stimulates a good study environment. The students contribute to the interdisciplinary environment with their different educational and ethnical backgrounds. Master's thesis projects are offered in multidisciplinary research teams such that students are exposed to and encouraged to participate in collaborative projects. The language of instruction and examinations is English.

Students will get access to high-tech laboratory environments, and modern reading and lecture rooms, computer labs and library facilities at Øya campus in Trondheim. NTNU shares this campus with St. Olav's University Hospital and Sør-Trøndelag University College.

Soma is an academic and social organization for master's students at the Faculty of Medicine. Soma runs a buddy programme at the start of the semester, and various events through the academic year. For more information, visit http://somantnu.blogspot.com/.

Admission Requirements

Admission to the MSc in Neuroscience requires a bachelor's degree (or an equivalent 3-year education) in biochemistry, biophysics, biology, biomedical science or psychology. Other relevant disciplines (e.g. biotechnology, informatics, mathematics, medicine, movement science, philosophy, radiography) may be accepted after an individual evaluation of the applicant's qualifications. The minimum average grade required is the Norwegian "C".

Applicants are encouraged to include the NTNU-based course NEVR2010 (Introduction to Neuroscience) as a part of their bachelor's degree. Students who do not have NEVR2010 (or an equivalent background in Neuroscience) when admitted, may be required to take an intensive course at the beginning of the first semester. The intensive course is informal, and does not give any credits.

International applicants need to submit proof of English proficiency by form of the TOEFL examination (with a score of 500 or higher on the paper-based test, and 170 or higher on the computer-based test), alternatively the IELTS test (with a score of 5.0 or better). More details about the language requirements are available here: http://www.ntnu.no/international/master/

Applicants who are not citizens of the European Union (EU) or the European Economic Area (EEA) need to provide a financial guarantee to get a residence permit in Norway.

Programme Structure

The master's degree is a two-year, full-time programme starting in the autumn semester. There are two main components:

- Master's thesis (60 credits)
- Theoretical and methodological courses (totalling 60 credits). Five courses, making up 37.5 credits, are compulsory. The remaining courses, adding up to 22.5 credits, are selected from lists of electives.

Master's Thesis

NEVR3901	Thesis in Neuroscience	60 credits

The purpose of the master's thesis is to develop the students' scientific problem-focused approach and improve their ability to pursue lifelong learning. In their work on the thesis, the students will train in resolving problems independently, undertaking critical assessment of scientific literature and formulating clear research questions.

The master's thesis gives 60 credits, and corresponds to one year of full-time work. However, planning of the thesis should commence as early as possible. The topic for the master's thesis is selected in collaboration with a supervisor, and must be approved by the Programme Board of Neuroscience.

Compulsory Courses

NEVR3001	Basic Neuroscience	7.5 credits (autumn)
NEVR3002	Sensory Neuroscience	7.5 credits (autumn)
NEVR3003	Behavioural and Cognitive Neuroscience	7.5 credits (spring)
NEVR3004	Neural Networks	7.5 credits (spring)
Various	Experts in Teamwork	7.5 credits (spring)

Elective Courses

A selection of elective courses is presented below. Note that these are only suggestions. Other courses at NTNU or other universities must be approved by the Programme Board of Neuroscience.

Some of the elective courses have entry requirements. Be sure to check this before you register for examination.

The language of instruction should normally be English, but please inquire before you register for examination.

The courses with a course code in the 8000-series are at PhD level, but are open for qualified master's degree students.

Faculty of Humanities

FI3107	Biotechnology and Ethics	7.5 credits (autumn)
NEVR3005	Philosophy of Neuroscience	15 credits (spring)

Faculty of Information Technology, Mathematics and Electrical Engineering

IT3708	Sub-symbolic AI Methods	7.5 credits (spring)
TMA4255	Applied Statistics	7.5 credits (spring)

Faculty of Medicine

KLMED8004	Medical Statistics, Part I	7.5 credits (autumn)
MOL3001	Medical Genetics	7.5 credits (spring)
MOL3005	Immunology	7.5 credits (autumn)
MOL3010	Animal Cell Culture	7.5 credits (autumn)
MOL3014	Nanomedicine I – Bioanalysis	7.5 credits (autumn)
MOL3015	Nanomedicine II – Therapy	7.5 credits (spring)
NEVR3040	Private Study of Neuroscience I	7.5 credits (both)
NEVR3050	Private Study of Neuroscience II	15 credits (both)
NEVR8003	Laboratory Animal Science for Researchers	6 credits (autumn)
NEVR8004	Cell Culture Methods in Neurotoxicology	7.5 credits (autumn)
NEVR8013	Laboratory Animal Science – Essay	1.5 credits (spring)
TOKS3001	Medical Toxicology	7.5 credits (spring)

Faculty of Natural Sciences and Technology

BI3010	Population Genetics	7.5 credits (autumn)
BI3013	Experimental Cell Biology	7.5 credits (autumn)
BI3016	Molecular Cell Biology	7.5 credits (autumn)
BI3017	Bio Visualisation	7.5 credits (spring)
BI3018	Patenting and Commercialization of Biotech and Medtech Inventions	7.5 credits (spring)
BT8104	NMR Biomolecular Spectroscopy	9 credits (spring)
TBT4145	Molecular Genetics	7.5 credits (autumn)
TFY4265	Biophysical Micromethods	7.5 credits (autumn)
TFY4280	Signal Processing	7.5 credits (spring)
TFY4310	Molecular Biophysics	7.5 credits (autumn)
TFY4320	Medical Physics	7.5 credits (spring)
ZO3020	General Ecophysiology	15 credits (both)

Faculty of Social Sciences and Technology Management

PSY3575	Multi Project in Cognitive and Biological Psychology	7.5 credits (spring)

Sør-Trøndelag University College

This course is organized by Sør-Trøndelag University College (HiST). You will get a separate transcript of records from HiST, which you should attach to your master's degree diploma. To register for the course, please send an email to studie@medisin.ntnu.no by 15 January 2011.

MOL3008	Analytical Techniques and Instrumentation	7.5 credits (spring)

Undergraduate Courses

The elective courses should normally be at master's degree level. However, if the student lacks appropriate background in areas relevant for the master's thesis, undergraduate courses in biology, chemistry, informatics, mathematics, medicine, physics, psychology or statistics may be accepted as well. You can consult a student counsellor at the Faculty of Medicine to get advice on which courses you should select.

Progression

NEVR3001 and NEVR3002 should be taken during the first semester. NEVR3001 is taught in the first half of the semester, and the final written examination is held in October. NEVR3002 is taught in the second half of the semester and the final written examination is held in December.

NEVR3003 and NEVR3004 should be taken during the second semester. NEVR3003 is taught in the first half of the semester, and the final written examination is held in March. NEVR3004 is taught in the second half of the semester and the final written examination is held in May or June.

The course *Experts in Teamwork* (EiT) is compulsory for all master's degree students at NTNU, and is taught intensively in the weeks 2, 3 and 4 in the second semester. Read more about EiT here: www.ntnu.no/eit/english/

The elective courses are to be taken when convenient for the work with the master's thesis, either in the first, second or third semester.

In the second semester, the student must choose a topic for the thesis. A contract for the master's thesis including a project description is drawn up by the student and submitted to the Department of Neuroscience within 15 March. Due to the nature of experimental projects in Neuroscience, it is recommended to work continuously with the master's thesis during the two years of the study.

Model of the MSc in Neuroscience (example)

<table>
<tr><th colspan="2">Year 1</th><th colspan="2">Year 2</th></tr>
<tr><td>1st semester (autumn)</td><td>2nd semester (spring)</td><td>3rd semester (autumn)</td><td>4th semester (spring)</td></tr>
<tr><td>NEVR3001</td><td>NEVR3003</td><td colspan="2" rowspan="4">NEVR3901
(Thesis in Neuroscience)</td></tr>
<tr><td>NEVR3002</td><td>NEVR3004</td></tr>
<tr><td>Elective course</td><td>Experts in Teamwork</td></tr>
<tr><td>Elective course</td><td>Elective course</td></tr>
</table>

Please note that this is only a suggestion. As mentioned above, the student can choose to start with the thesis already in the first year and postpone one or more of the elective courses to the second year.

The student must have passed all examinations in compulsory and elective courses before he/she can submit the thesis.

Course Descriptions

The course descriptions are available on the internet: www.ntnu.no/studies/courses/

MASTER OF SCIENCE IN URBAN ECOLOGICAL PLANNING

ADDITIONAL REGULATIONS

1. Learning Goal

The goal of the Masters course in Urban Ecological Planning is to enable the candidates to act as planners in urban settings based on an understanding of the dynamics of urban change in a global context.

The course is grounded in an ideology that focuses on exploring and utilizing contextual knowledge and localized resources while at the same time acknowledging the relational complexity that exist in the urban reality of the developing world. Through a practice oriented learning approach the course adheres to the principles of equity, sustainability and in promoting the interests of the marginalized.

2. Course Structure

This is a two year course where each of the four semesters comprises core modules and electives from the natural or social sciences depending on the candidate's interests or qualifications. There are also multidisciplinary courses, "Experts in Team" that may be chosen as electives.
Semester I: International 'Field Work and Project' taking place in a third country done in cooperation with students from other international universities and faculties of NTNU.
Semester II: Core courses (Urban Ecological Planning; Planning for Sustainability and Development; Research Methods; GIS for Urban Planning).
Semester III: Core courses (Planning Theory, Methods) + electives.
Semester IV: Master thesis; analyses and final write-up.

Individual study plans for each semester has to be agreed upon with the course coordinator and submitted by deadlines set by the university

3. Career Prospects

The course will give the candidate in insight into the dynamics of urban change, and prevalent development challenges of the developing world, and furthermore advise on possible ways of dealing with the constitutive problems and possibilities. The candidate is thus qualified to fill positions within public administration, private and public planning institutions, in private consulting businesses, NGOs, aside from positions in educational institutions. Our candidates have previously settled into all the mentioned positions.

4. Entry Qualifications

1: International Students (excluding students from Nordic countries) Students are required to have a B.Sc/ B. Engg/ BA university degree preferably in Urban Planning, Architecture or Civil Engineering. Candidates with a BA degree in Social Sciences that are relevant to the field of Planning such as Geography, Sociology, Cultural Studies etc in combination with 2 – 5 years work experience in Urban Planning will also be considered for admission.
2: Students from Nordic countries: Equivalent to those for international students. Nordic students may also apply on the basis of exams in relevant areas from the University Colleges (høyskolene).

English Language Requirements:
TOEFL Scroe 500/170
IELTS mark 5.0

5. Studies at other universities

Candidates may spend one of the four semesters as echange student at another university on the condition that the courses taken are equivalent ot those taught at our course.

6. Contacts

For further information on admission and administrative matters: studadm@ab.ntnu.no.
For information on academic matters: hans.skotte@ntnu.no or hans.c.bjonness@ntnu.no

MASTER OF SCIENCE IN URBAN ECOLOGICAL PLANNING

Compulsory core courses:

Semester:	Subject no.:	Title:	Autumn	Spring	Note
1.sem	AAR4525	Urban Ecological Planning in Developing Countries. Project work	15 Sp		3
1.sem	AAR4816	Urban Ecological Planning. Method	7,5 Sp		3
1.sem	AAR4820	Urban Ecological Planning. Theory	7,5 Sp		3
2.sem		Electives (see list)		7,5 Sp	
2.sem		Electives (see list)		7,5 Sp	
2.sem	AAR 5305	Urban Ecological Planning in Diverse Cultures		7,5 Sp	3
2. sem	AAR5250	Preparation for fieldwork for master's students		7,5 Sp	
3.sem	AAR5200	Processing Field Study Data	15 Sp		
3.sem	FP4350	Planning theory and planning process skills	7,5 Sp		
3. sem		Electives (see list)	7,5 Sp		
4.sem	AAR5400	Master In Urban Ecological Planning		30 Sp	

3) Teaching not 2010/2011

Electives:

Subject no.	Title:	Note	Autumn	Spring
AAR8100	Housing Theory and History	1	7,5 Sp	
GEOG3505	Landscape and Planning	1	15 Sp	
GEOG3506	Geography, Health and Development	1	7,5 Sp	
GEOG3561	Gender and Social Change	2		7,5 Sp
AAR4944	Planning for Sustainability and Development	2		7,5 Sp
AAR5260	GIS in Urban Planning			7,5 Sp
AAR5270	Globalisation and Urban Development			7,5 Sp

1)
Autumn:
Elective courses offered during the autumn can only be selected if a study plan tailored to the M.Sc. thesis subject is agreed with the Faculty, and recommended by the M.Sc. thesis supervisor and course responsible.
2)
Spring:
Elective courses amounting to 15 Sp shall be selected from the above list
3)
Teaching not 2010/2011

The subject description be found at http://www.ntnu.no/studier/sokemne

MASTER OF SCIENCE IN SUSTAINABLE ARCHITECTURE – Towards a zero emission built environment

ADDITIONAL REGULATIONS

1. Learning Aims

Participants in the international MSc programme for Sustainable Architecture will learn to identify and apply the correct measures and resources to design high-quality, cost effective architecture that contributes towards achieving a zero emission built environment.

In a global and European perspective, buildings are accountable for about 40 % of all GHG emissions. IPCC reports point to measures in the building sector as being the most economical (when compared to other important sectors).

The MSc programme aims to educate and train building professionals in the use and development of competitive methods and solutions for existing and new buildings that will contribute to lowering GHG emissions related to the production, use, management, and demolition of architecture in a life-cycle perspective. The Master programme encompasses residential, commercial and public architecture as well as its effect on the urban and rural built environment.

2. Course Structure

The curriculum consists of 3 consecutive semesters with theory and project courses, and a fourth semester during which the participants write their MSc thesis. Throughout the two years of the MSc programme, a holistic perspective stresses the many architectural expressions and possibilities encompassed within a zero emission built environment. Within each of the theory and project courses, high demands are made towards integrated design strategies to ensure usability and synergy of the design with its surroundings and users. The students are continuously trained in interdisciplinary co-operation in order for them to integrate this integrated design method in their professional practice.

- Semester 1: Concepts and strategies related to energy efficient, sustainable and zero emission buildings and built environment (theory); Climate and Built Form (theory); Project course
- Semester 2: Energy systems and services and their integration in architectural design (theory); Sustainable building materials and components (theory); Project course
- Semester 3: Use and operation of zero emission buildings (theory); Elective Course (theory – to be agreed upon with supervisor and course coordinator); Project course
- Semester 4: Master thesis

3. Career Prospects

The MSc programme in Sustainable Architecture lies in the forefront of research, innovation and implementation related to reducing GHG emissions in architecture which the students will be able to transfer into their practice as building professionals. The continuous focus on integrated design methodology will enable the students to perform in any building design team, both as co-worker and leader.

The programme's close link to the interdisciplinary Research Centre on Zero Emission Buildings ensures close contact with State-of-the-Art research and practice in Norway and abroad with whom the students will be in contact during their education: education and research institutions; producers of materials and products for the building industry; contractors, consultants, architects; trade organisations; public administration; public and private construction and property management; and users. Among the international partners of the Research Centre are VTT (Finland), Chalmers (Sweden), Fraunhofer (Germany), TNO

(The Netherlands), LBL and MIT (USA), University of Strathclyde (Scotland), and Tsinghua University (China).

4. Entry Qualifications

A 3-year Bachelor Degree in Architecture, Engineering or Urban Planning. Students with a background in other relevant fields may be considered for admission as well, after discussion with the MSc coordinator and Advisory Board.

English Language Requirements: TOEFL Score 500/170; IELTS mark 5.0

5. Studies at other universities

Students may spend one of the four semesters as exchange student at another university on the condition that the courses taken are equivalent to the programme at NTNU.

6. Contacts

For further information on admission and administrative matters: studadm@ab.ntnu.no.

For information on academic matters: annemie.wyckmans@ntnu.no.

MASTER OF SCIENCE IN SUSTAINABLE ARCHITECTURE

Semester	Subject no.:	Title:	Autumn	Spring
1st semester	AAR4532	Climate and Built Form Design Project	15 Sp	
1st semester	AAR4833	Concepts and Strategies in Sustainable Architecture	7,5 Sp	
1st semester	AAR4832	Climate and Built Form	7,5 Sp	
2st semester	AAR4616	Integrated Energy Design Project		15 Sp
2st semester	AAR4926	Integrated Energy Desing		7,5 Sp
2st semester	AAR4907	Sustainable Building Materials and Components		7,5 Sp
3st semester	AARxxxx	Design of Zero Emission Buildings	15 Sp	
3st semester	AARxxxx	Use and Operation of Zero Emission Buildings	7,5 Sp	
3st semester	AARxxxx	Elective Course	7,5 Sp	
4st semester	AARxxxx	Master Thesis		30 Sp

The subject description be found at http://www.ntnu.no/studier/sokemne

MASTER OF SCIENCE IN ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY

Programme code: MSENVITOX

Man-made pollution is one of the most significant threats to the environment. Organic and inorganic environmental toxicants originating from human activities are distributed throughout the world via oceanic currents and atmospheric transport processes. This issue is of global importance, and there is a high demand from both society and industry for scientists with competence within the interdisciplinary scientific area of environmental toxicology and chemistry.

Learning outcomes

This programme provides the vital link between environmental toxicology and environmental chemistry. The main focus will be the fate and effects of pollutants, and how they are distributed in the environment (including air, water, and food chains) both on a local and a global scale. You will study the interaction between environmental toxicants and organisms, and how this impacts on populations and ecosystems. Methods will include field work and/or experimental exposure studies in laboratory on individual organisms (in vivo) or on cell cultures (in vitro). It is also possible to specialise within the area of environmental monitoring of organic and inorganic chemical toxicants. This will include method development, and quality assurance using state of the art equipment. You will also study a wide range of environmental pollutants and methods of pollution control which are of utmost importance for the management of natural resources and ecosystems. Such skills and experience are extremely marketable, making you attractive to a wide range of employers both in the public and private sectors.

Career prospects

Graduates of the Masters programme will be internationally qualified for a wide range of positions in public and government institutions, administrative environmental agencies, consultancy companies and industry (e.g. oil and energy companies and the chemical industry) both as researcher or adviser. Some examples are Statoil and other oil companies, Det Norske Veritas, SINTEF, and national environmental authorities. Furthermore, there is an increasing need for competence within the area of risk assessment (REACH).

Through this programme you will be part of a large international scientific and industrial network. The candidates in environmental toxicology can after five years of work experience apply to become a “European Registered Toxicologist”.

Admission requirements

One of the following requirements has to be fulfilled to qualify for admission to the programme:

- BSc in Biology (minimum of 80 ECTS credits biology courses) including chemistry and pollution biology.
- BSc in Chemistry (minimum of 80 ECTS credits chemistry courses) including environmental and/or analytical chemistry.
- Bachelor degrees within other related areas may be considered on an individual basis.

Below you find the admission requirements for NTNU BSc students. Compulsory courses are written in bold.

BSc in Chemistry, Environmental and Analytical Chemistry:

Year	Semester				
3	6. Spring	Elective Course	KJ2022 Spectroscopic Methods in Organic Chemistry	KJ2051 Analytical Chemistry, Advanced Course	**BI2072 Pollution Biology for Non-Biologists**
	5. Autumn	Elective Course	**ST0103 Statistics with Applications**	BI 1003 Evolutionary Biology, Ecology and Ethology	
2	4. Spring	**KJ1042 Basic Thermodyna-mics with Laboratory**	**KJ2070 Environmental Chemistry**		**KJ2053 Chromato-graphy**
	3. Autumn	**KJ1041 Chemical Bonds, Spectroscopy and Kinetics**	**KJ2050 Analytical Chemistry, Basic Course**	**KJ1030 Inorganic Chemistry**	
1	2. Spring	**Perspective Course**	**MA0002 Mathematical Methods B**	**KJ1020 Organic Chemistry**	
	1. Autumn	**EXPH0001 Philosophy and Theory of Science**	**MA0001 Mathematical Methods A**	**KJ1000 General Chemistry**	
ECTS Credits:		7,5	7,5	7,5	7,5

BSc in Biology, Cell and Molecular Biology:

Year	Semester				
3	6 Spring	**BI2071 Pollution Biology I**		**ST0104 Statistical modelling for biologists/bio-technologists**	**KJ2071 Environmental Chemistry, Introduction course**
	5 Autumn	**BI2014 Molecular Biology**	**BI2015 Molecular Biology, Laboratory Course**	**Perspective Course**	Elective Course
2	4 Spring	**EXPH0001 Philosophy and Theory of Science**	**BI2012 Cell Biology**	**KJ1020 Organic Chemistry**	
	3 Autumn	**BI1004 Physiology**		**MA0001 Mathematical Methods A**	**ST0103 Statistics with Applications**
1	2 Spring	**BI1001 Cell and Molecular Biology**		**BI1002 Faunistics and Floristics in Norwegian Ecosystems**	
	1 Autumn	**BI1003 Evolutionary Biology, Ecology and Ethology**		**KJ1000 General Chemistry**	
ECTS Credits:		7,5	7,5	7,5	7,5

BSc in Biology, Physiology:

Year	Semester				
3	6 Spring	**BI2071 Pollution Biology I**		**ST0104 Statistical modelling for biologists/bio-technologists**	**KJ2071 Environmental Chemistry, Introduction course**
	5 Autumn	**ZO2022 Zoo-Physiology or BO2021 Plant Ecophysiology or BO2022 Plant Growth and Development**		**Perspective Course**	Elective Course
2	4 Spring	**EXPH0001 Philosophy and Theory of Science**	**BI2012 Cell Biology**	**KJ1020 Organic Chemistry**	
	3 Autumn	**BI1004 Physiology**		**MA0001 Mathematical Methods A**	**ST0103 Statistics with Applications**
1	2 Spring	**BI1001 Cell and Molecular Biology**		**BI1002 Faunistics and Floristics in Norwegian Ecosystems**	
	1 Autumn	**BI1003 Evolutionary Biology, Ecology and Ethology**		**KJ1000 General Chemistry**	
ECTS Credits:		7,5	7,5	7,5	7,5

Programme Structure and Specialisations

A diverse team of scientists is ready to offer you a two year international, interdisciplinary Masters programme in close collaboration with SINTEF and industrial partners (one of Europe's largest oil and gas company, Statoil). You will work in a group incorporating both Norwegian and international students. All teaching is in English. The programme also offers you the opportunity to experience one semester in Svalbard (UNIS), an island archipelago situated in the heart of the Arctic.

The programme requires two years of full-time study, beginning with the autumn term (mid August). The normal workload for a full-time student for one academic year is 60 ECTS credits. There are two main components to the Masters programme:

Masters thesis (60 ECTS credits)
Theoretical and methodological courses, some compulsory and some elective (60 ECTS credits)

There are two areas of scientific specialisation in this Masters programme:

Environmental Chemistry
Environmental Toxicology

Below you will find tables and lists of courses that describe the programme structure for each of these specialisations. The final structure of the course will be individually selected by each student allowing you to create the study programme most suited to your interests and skills. Advice will be given by the course administrators if required, and all study plans must be approved by the respective department.

You will find the course descriptions at the following web sites:
NTNU courses: http://www.ntnu.no/studies/courses
UNIS courses: http://www.unis.no/10_STUDIES/1020_Courses/

Environmental Chemistry:

<table>
<tr><td>Year</td><td>Semester</td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">2</td><td>4 Spring
NTNU:</td><td colspan="2">KJ3091/KJ3093 (7,5/10 ECTS) Special syllabus for Master’s degree</td><td colspan="2">Master thesis</td></tr>
<tr><td>3 Autumn
NTNU:</td><td>KJ3053** (7,5 (ETCS) Analytical methods for industrial- and environmental monitoring or Master thesis</td><td colspan="3">Master thesis</td></tr>
<tr><td rowspan="3">1</td><td rowspan="2">2 Spring
UNIS:

or

NTNU:</td><td colspan="2">AT-324 (10 ECTS) Techniques for the Detection of Organo-Chemical Pollutants in the Arctic Environment</td><td>AT-321 (10 ECTS) Fate and Modelling of Pollutants in the Arctic</td><td>Master thesis</td></tr>
<tr><td>Experts in Team</td><td>Elective course</td><td colspan="2">Master thesis</td></tr>
<tr><td>1 Autumn
NTNU:</td><td>KJ3050 (7,5 ECTS) Organic marine environmental chemistry</td><td colspan="2">KJ3070 (15 ECTS)
Advanced Aquatic Chemistry</td><td>RFEL3070* (7,5 ECTS) Scientific Seminars in Pollution</td></tr>
<tr><td colspan="2">ECTS Credits</td><td>7,5</td><td>7,5</td><td>7,5</td><td>7,5</td></tr>
</table>

* The students have to follow the RFEL3070 course in all semesters at NTNU.
** KJ3053 is compulsory in the third semester for students that stay at NTNU in the second semester.

Compulsory courses:
KJ3050 Organic marine environmental chemistry (7,5)
REFEL3070 Scientific Seminars in Pollution (7,5)

AT-321 Fate and Modelling of Pollutants in the Arctic (10)
AT-324 Techniques for the Detection of Organo-Chemical Pollutants in the Arctic Environment (10)
or

Experts in team
KJ3053 Analytical methods for industrial- and environmental monitoring (7,5)

KJ3091 Special syllabus for Master's degree (7,5), or
KJ3093 Special syllabus for Master's degree (10) only for those who follow courses at UNIS.

Elective courses:
KJ3053 Analytical methods for industrial- and environmental monitoring (7,5) (Autumn)
KJ3055 Analytical Atomic Spectrometry (7,5) (Spring)
KJ3056 Chemical Sensors and Biosensors (7,5) (Autumn)
KJ3058 Analytical Chemical Separation Techniques (7,5) (Autumn)
KJ3070 Advanced Aquatic Chemistry (15) (Autumn)
BI3071 Advanced Ecotoxicology (7,5) (Autumn)
BI3072 Environmental Toxicology (7,5) (Autumn)
BI3074 Environmental Toxicology, complex mixtures (7,5) (Spring)

Environmental toxicology:

<table>
<tr><td>Year</td><td>Semester</td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">2</td><td>4 Spring
NTNU:</td><td>BI3091/BI3093 (7,5/10 ECTS) Special syllabus for Master's degree</td><td colspan="3">Master thesis</td></tr>
<tr><td>3 Autumn
NTNU:</td><td>BI3075 (7,5 ECTS) Experimental Ecotoxicology</td><td>Elective courses (7,5 ECTS))/Master thesis</td><td colspan="2">Master thesis</td></tr>
<tr><td rowspan="4">1</td><td rowspan="2">2 Spring
UNIS:

or

NTNU:</td><td colspan="2">AT-324 (10 ECTS) Techniques for the Detection of Organo-Chemical Pollutants in the Arctic Environment</td><td>AT-321 (10 ECTS) Fate and Modelling of Pollutants in the Arctic</td><td>Elective courses (10 ECTS)/Master thesis</td></tr>
<tr><td>Experts in team (7,5 ECTS)</td><td>Elective courses (7,5 ECTS)</td><td colspan="2">Master thesis</td></tr>
<tr><td>1 Autumn
NTNU:</td><td>BI3071 (7,5 ECTS) Advanced Ecotoxicology</td><td>BI3072 (7,5 ECTS) Environmental Toxicology</td><td>RFEL3070* (7,5 ECTS) Scientific Seminars in Pollution</td><td>Master thesis</td></tr>
<tr><td colspan="2">ECTS Credits</td><td></td><td></td><td></td><td></td></tr>
</table>

* The students have to follow the RFEL3070 course in all semesters at NTNU.

Compulsory courses:
RFEL3070 Scientific Seminars in Pollution
BI3071 Advanced Ecotoxicology
BI3072 Environmental Toxicology
BI3075 Experimental Ecotoxicology

BI3091 Special syllabus for Master's degree (7,5)
or
BI3093 Special syllabus for Master's degree (10) only for those who follow courses at UNIS.

Elective courses:
AB-203 Arctic Environmental Management (15) (Spring)
AB-323 Light, Climate and Primary Production in the Arctic (10) (Spring)
AT-321 Fate and Modelling of Pollutants in the Arctic (10) (Spring)
AT-324 Techniques for the Detection of Organo-Chemical Pollutants in the Arctic Environment (10) (Spring)
BI3073 Genetic Toxicology (7,5) (Spring)
BI3074 Environmental Toxicology – Complex Mixtures (7,5) (Spring)
KJ3050 Organic marine environmental chemistry (7,5) (Autumn)

Examples of Master Theses

- Developing and establishing analytical methods and tools for use in environmental monitoring of marine and coastal areas, including quality assurance of these methods.
- Impacts of oil and gas activities on the marine environment, including biomonitoring and studies of harmful effects on invertebrates and fish.
- Distribution of brominated flame retardants in nature, including their bioaccumulation and toxicological effects in different organisms (e.g. polar bears, seals, and sea birds).
- Long-range atmospheric transport, deposition and effects of trace metals (e.g. lead, mercury, cadmium) in air, snow, soil, water, and ecosystems. An example of this is the chemistry of mercury in the Arctic after polar sunrise.
- Occurrence of environmental pollutants in complex mixtures. To increase the understanding of their interaction, in vitro studies are carried out, in which cells are exposed to individual toxicants and mixtures of known environmental pollutants (e.g. PAHs, PCBs, trace metals)
- Fate and effects of crude oil in the marine environment following accidental and chronic releases. The behaviour of spilled oil in the environment and the use of analytical chemical methods for oil spill identification and monitoring.

Contact information and counselling

Address: NTNU, Faculty for Natural Sciences and Technology, 7491 Trondheim, Norway
Telephone: 73 59 41 97
E-mail: postmottak@nt.ntnu.no
URL: http://www.ntnu.no/nt/english
http://www.ntnu.no/studies/msc-environmental-toxicology-chemistry

Student advisors:
Siri.Bremdal@nt.ntnu.no +47 73 59 45 52
Lisbeth.Aune@bio.ntnu.no +47 73 59 62 73
Lillian.Hanssen@chem.ntnu.no +47 73 55 13 40

Academic advisors:
Associate professor Åse Krøkje (ase.krokje@bio.ntnu.no)
Professor Øyvind Mikkelsen (oyvind.mikkelsen@chem.ntnu.no)

MASTER OF SCIENCE IN CONDENSED MATTER PHYSICS

OUTLINE OF THE PROGRAMME

The Master of Science programme (MSc) in Condensed Matter Physics at NTNU is designed to train the student in fields of experimental and/or theoretical condensed matter physics, and in scientific work and research. The programme is relevant for the strategic area Materials at NTNU. The Department of Physics has strong research groups in condensed matter physics.

The MSc programme consists of two years corresponding to 120 credits (ECTS credits) including a thesis of 60 credits. The rest of the programme is scheduled courses of 7.5 credits. The courses should be chosen in topics which are related to the specialization in the thesis work and in collaboration with the supervisor.

<table>
<tr><th>Year</th><th>Semester</th><th>7.5 credits</th><th>7.5 credits</th><th>7.5 credits</th><th>7.5 credits</th></tr>
<tr><td rowspan="2">2nd</td><td>Spring</td><td>Self Study
or
Elective</td><td colspan="3" rowspan="2">Master’s Thesis</td></tr>
<tr><td>Autumn</td><td>Elective</td></tr>
<tr><td rowspan="2">1st</td><td>Spring</td><td>TFY4245 Solid State Physics, Advanced Course</td><td>Experts in Teamwork</td><td>Elective</td><td rowspan="2">Master’s Thesis</td></tr>
<tr><td>Autumn</td><td>FY3114 Functional Materials</td><td>Elective</td><td>Elective</td></tr>
</table>

Elective courses are listed below and should be chosen with help from the supervisor.

Examination: The courses may have different examination forms, but most often an examination, oral or written, will be arranged at the end of the semester in which the course is offered. However, the exam in one of the courses or in a specially selected curriculum (self study) from scientific articles or books relevant for the thesis work must be taken as an oral exam as part of the final examination. The thesis must be submitted at least one month before this final examination, in which the candidate will also be questioned on the content of the thesis. The set of courses for the master’s degree and the topic for the thesis will be approved by the Department of Physics.

For all examinations, and also for the thesis, the scale of grading is from A (highest) to E (lowest), or F (fail).

Master’s Thesis

The Master’s thesis corresponds to a total of 60 credits and the work is done continually over the four semesters. Already in the first semester the work on the thesis is corresponding to 7.5 credits, and it is therefore important that the planning of the thesis work can begin as early as possible. With help from the Coordinator of the MSc programme an academic supervisor will be appointed to each student.

The topic of the thesis' work must be within the research areas of the Department of Physics' research divisions.

Topics offered in the programme

The activities in condensed matter physics cover both experimental and theoretical topics. Experimental activities are focused on physical properties of different materials, such as polymers, molecular crystals, functional oxides, magnetic materials, metals, semiconductors, complex materials, using a variety of experimental techniques. The activities also include experimental studies of structural, electronic, mechanical and optical properties of surfaces. Applied activities exist within solar energy–and environmental physics, and optical measurement techniques are developed. Theoretical studies are performed in different subjects such as soft condensed matter physics, superconductors, self-consistent equations of state, liquid crystals and solid–solid transitions, as well as on the theory of strongly correlated fermion systems, in particular low-dimensional ones. Fermi liquids, heavy fermion systems, quantum magnets, non-fermi liquids, gauge-field theories of strongly correlated systems, novel phase transitions and quantum phase transitions are also studied.

PLAN OF STUDY

1st year, autumn
Compulsory:
FY3114 Functional Materials

Elective:
TFY4205 Quantum Mechanics II
TFY4300 Energy and Environmental Physics
FY3006 Sensors and Transducers

1st year, spring
Compulsory:
TFY4245 Solid State Physics, Advanced Course
Experts in Teamwork, Interdisciplinary Project

Elective:
TFY4190 Instrumentation
TFY4195 Optics
TFY4200 Optics, Advanced Course
TFY4210 Quantum Theory of Many-Particle Systems
TFY4235 Computational Physics
TFY4275 Classical Transport Theory
TFY4280 Signal Processing
FY3201 Atmospheric Physics and Climate Change
FY3402 Subatomic Physics
FY3464 Quantum Field Theory I

2nd year, autumn
Elective:
TFY4255 Materials Physics
TFY4292 Quantum Optics
FY3403 Particle Physics
FY3466 Quantum Field Theory II*
FY8302 Quantum Theory of Solids
Courses listed under 1st year autumn can also be chosen.

2nd year, spring
One elective course, or a self study course to be agreed upon with the academic supervisor.

* FY3466 will not be given 2010/2011, next time autumn 2011.

MASTER OF SCIENCE IN NATURAL RESOURCES MANAGEMENT

The programme is especially designed to give the students an understanding of the importance of management for sustainable use of natural resources, an understanding of the connections and the ability to communicate between different disciplines and actors.

Sustainable use of natural resources such as water, fossil energy, minerals and biological resources in land and water ecosystems are essential for the survival and development of mankind. However, the increasing needs and demands for these natural resources resulting from the growth of the human population combined with the decrease of the finite resources urgently calls for a sustainable management of these resources. Such management requires an interdisciplinary approach encompassing in-depth knowledge about specific resources as well as a holistic perspective, including ecological, economic and social aspects. It also requires a strong ability to communicate in order to establish dialogues between the different disciplines involved in such management as well as between the users of the resources, and a good understanding of the connections between these different actors.

Learning outcomes

This programme aims at giving unique education and knowledge required to solve a number of interdisciplinary challenges related to the management of natural resources.

Career Prospects

The MSc programme in Natural Resources Management at NTNU will qualify for positions in public sector authorities and organizations on all levels, from regional to global.

As a result of developing national and international laws and regulations for utilizing sustainable resources, the demand of professionals with this special education on these issues is expected to increase in the future.

Admission requirements

The Master in Natural Resources Management is an interdisciplinary cooperative programme involving four faculties at NTNU. The programme is administrated by the Faculty of Natural Sciences and Technology (NT). The programme offers specialisation in four lines of study.

The specialisations are as follows:
- Biology
- Chemistry
- Resource Geology
- Geography

General admission requirements:

Norwegian/Nordic and international applicants should hold a BSc degree or equivalent university education either in Biology, Chemistry, Resource Geology or Geography. Applicants holding another related Bachelor degree may also be considered. There will be an individual evaluation of applicants.

The bachelor degree must also include courses in resources management, planning and interdisciplinary project management equivalent of minimum one quarter of a year full time study.

Applicants are recommended to have background in introductory university level in Mathematics and Statistics.

Applicants who are not exempted from the English language requirement, must document that they have passed a recognized test in English; TOEFL or IELTS. More information about the Admission and English language requirements can be found at this link.

Further admission requirements for each specialisation has to be fulfilled to qualify for admission to the programme:

- Applicants who would like to apply for **specialisation in Biology** need to have a Bachelor degree including basic courses in biology, minimum 80 ECTS. As example of requirements, check the plan of study in BSc degree in Biology at NTNU. http://www.ntnu.no/studies/msc-natural-resources/admission
- Applicants who would like to apply for **specialisation in Chemistry** need to have Bachelor degree in Chemistry and a specialisation in or an emphasis on analytical and/or environmental Chemistry and containing a minimum 1,5 years of Chemistry. As example of requirements, check the plan of study in BSc degree in chemistry at NTNU http://www.ntnu.no/studies/msc-natural-resources/admission
- Applicants who would like to apply for **specialisation in Resource Geology** need to have a Bachelor degree in Bedrock-and Resource Geology or equivalent including compulsory courses in geology. As example of requirements, check the plan of study in BSc degree in Bedrock- and Resource Geology at NTNU. http://www.ntnu.no/studies/msc-natural-resources/admission
- Applicants who would like to apply for **specialisation in Geography** should hold a Bachelor degree including at least 1,5 year of studies within geography or natural resources management. Other relevant qualifications can be accepted upon approval by the Department of Geography.

For NTNU students, please look for details concerning admission requirements at
Biology: http://www.nt.ntnu.no/studiehandbok/202.pdf
Chemistry: http://www.nt.ntnu.no/studiehandbok/206.pdf
Resource Geology: http://www.nt.ntnu.no/studiehandbok/204.pdf
Geography: http://www.ntnu.no/svt/studiehandbok/

Programme Structure and Specialisations

The MSc programme in Natural Resources Management is integrating both Norwegian/ Nordic and international students.

The programme requires two years of full-time study (120 ECTS credits), beginning with the autumn term (mid August). The normal workload for a full-time student for one academic year is 60 ECTS credits. The study is structured around 3 core courses, elective courses and a Master's thesis (60 ECTS credits). The first and second semesters consist of 3 compulsory courses. One of them is a scientific seminar which is running through all the 4 semesters. There are also a number of elective courses which gives options to fit background and interests for the student throughout the studies.

The Master's thesis (60 ECTS credits) is to be planned and started already in the first semester and has to be completed in semester 4. The thesis work will as far as possible be intergrated in ongoing research projects at the respectively department according to the field of study. The content of the thesis should fullfill an academic level appropriate to master level course. A project proposal in the form of a written outline of the thesis should be submitted within 15 October. By then the student will also have to sign an agreement about the thesis, the education plan and the supervising at the respectively department. An individual supervisor will be assigned in semester 1, who will be responsible for supervising the Master thesis.
The Special syllabus for Master's Degree is a special selected curriculum (self study) from scientific articles or books relevant for the thesis work, selected in agreement with the

supervisor and the department.

There are different introductory courses when starting the study depending on the specialisations. The respectively departments will give detailed informations.

Year	Semester					
2	Spring	**RFEL3080 Scientific Seminars in Natural Resources Manage-ment 7,5 credits**	Elective Courses 30 credits (check the list of Elective Courses)	**Special Syllabus for Master Degree* 7,5 credits**	**Master Thesis 60 credits****	
	Autumn					
1	Spring					
	Autumn			**RFEL3081 Natural Resources Management, Interdisciplinary Project**	**GEOG3030 Natural Resources Management**	
Course credits:		7,5 credits	7,5 credits	7,5 credits	7,5 credits	7,5 credits

* Course code for Special Syllabus for Master's Degree for each of the specialisations in the programme:

Biology:	BI3091
Chemistry:	KJ3091
Resource Geology:	GEOL3093
Geography:	GEOG3091

** Course code for Master's Thesis for each of the specialisations in the programme:

Biologi:	NATRBI 3900
Chemistry:	NATRKJ 3900
Resource Geology:	GEOL 3090
Geography:	GEOG 3940

Elective courses -MSc Natural Resources Management

Elective Courses in Chemistry

KJ 3053 Analytical Electrochemistry and its Application within Industrial and Environmental Monitoring (7,5 credits) Autumn
KJ 3055 Analytical Atomic Spectrometry (7,5 credits) Spring
KJ 3056 Chemical Sensors and Biosensors (7,5 credits) Autumn
KJ 3070 Advanced Aquatic Chemistry (15 credits) Autumn
KJ 3071 Applied geochemistry (7,5 credits) Autumn

Elective Courses in Biology
BI2017 Genetics and Evolution I (7,5 credits) Spring **NB!***
BI2018 Genetics and Evolution II (7,5 credits) Spring
ZO2041 Ethology (7,5 credits) Spring **NB!***
BI2043 Biodiversity and Conservation Biology I (7,5 credits)Autumn **NB!***
BI3003 Faunistics II (7,5 credits) Autumn
BI3004 **Behaviour and Conservation Biology (7,5 credits) Autumn NB!****
BI3005 Fish Behaviour and Ecology (7,5 credits) Spring
BI3010 Population Genetics (7,5 credits) Autumn
BI3032 Population Dynamics (7,5 credits) Spring
BI3035 Evolutionary Ecology (7,5 credits) Autumn
(no lectures Autumn 2010) NB!**
BI3051Evolutionary Analyses (7,5 credits) Spring
BI3072 Environmental Toxicology (7,5 credits) Autumn
BI3082 Biodiversity and Conservation Biology II (7,5 credits) Autumn
ZO3031Behavioural Ecology (7,5 credits) Spring
ZO3032 Sexual Selection (7,5 credits) Spring **NB!****

NB!* BI2043 is mandatory in BSc Biology at NTNU and NTNUstudents can't choose this elective course for their MSc.

NB!No lectures spring 2010. These courses are given only every second year.**

Elective Courses in Geology
TGB4115 Mineral Deposit Geology (7,5 credits) Autumn
TGB4120 Prospecting and Formation of Selected Ore-Depotits (7,5 credits) Spring
TGB4135 Basin Analysis(7,5 credits) Spring
TGB4145 Geological Analytical Methods(7,5 credits) Spring
TGB4170 Diagenesis/Reservoir Quality(7,5 credits) Spring
TGB4175 Resource Geological Principles (7,5credits), Autumn **NB!***
TPG4177 Carbonate Reservoir Characterization(7,5 credits) Autumn
NB!* The course is not given in 2010/2011.

Elective Courses in Geography
GEOG3005 Qualitative Methods (7,5 credits) Spring
GEOG3006 Quantitative Methods (7,5 credits) Spring
GEOG3505 Landscape and Planning (15 credits) Autumn
GEOG3515 Environment, Development and ChangingRuralLivelihoods (7,5 credits) Autumn
GEOG3519 Geographical Information System I (7,5 credits) Autumn
GEOG3520 Geographical Information System II (7,5credits) Spring
GEOG3003 Methodology and the ResearchProcess(7,5 sp) Autumn
GEOG3521GIS, Urban Applications of GIS (7,5 sp) Autumn

Other Elective Courses
SØK3524 Environmental and Resource Economics (15 credits) Autumn and Spring

It is possible to choose other courses according to spesific interest and in agreement with the supervisor and responsible Department.

Examples of Master's Thesis

- Wildlife-livestock Land Use Conflict, a case study in Bale Mountains National Park, Ethiopia.
- Biodiversity Conservation and Resource Utilization: Conflict between Wildlife Management and Local Stake holders and its Fate to Migratory birds. In southern great rift valley of Ethiopia, Abiyata Shala Lakes National Park.
- Eco tourism and local sustainable development in Singapore? A Case study of: Pulau Ubin Island, Singapore.
- Downstream Impact of Hydropower Dams on the Livelihood Changes of Local Inhabitants".
- In what way does the personal background of a caseworker influence natural resource management decisions?"
- Research on perceptions and attitudes of local communities towards forest management: A case study in Takoradi Forest District.
- Elemental Composition of moose dietary plants.
- Management of protected areas in Europa and Africa. Do the differences in management regime result in different conflict types and - levels?

Field work

After the first year of studies, during the period of mid June to mid august, candidates are given the opportunity to go back to their home countries to do field work if this is necessary for the completion of their thesis. Students who are supported by the Quota Programme are awarded an extra grant to cover field-trip expenses, while other students will have to finance the field-trip themselves. In some cases there could be specially project allowances.

Registration and Examinations

Masters' students will have to register for courses and examination every semester.
The courses may have different examination forms, oral or written, and will be arranged at the end of the semester in which the course is offered.
http://www.ntnu.no/studies/examinations
The student calendar gives important dates for the studies, deadlines and so on.
http://www.item.ntnu.no/student/calendar

Contact information and counselling

Student advisors:

Siri.Bremdal@nt.ntnu.no +47 73 59 45 52
Lisbeth.Aune@bio.ntnu.no +47 73 59 62 73
Lillian.Hanssen@chem.ntnu.no +47 73 55 13 40
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Marit.Snilsberg@ntnu.no +47 73 59 49 67

MASTER OF SCIENCE IN MARINE COASTAL DEVELOPMENT

This Master of Science degree programme in Marine Coastal Development is an integrated, two year study programme for Norwegian and foreign students. The programme is designed according to the current framework for engineering graduate studies at NTNU. The normal workload for a full-time student for one academic year is 60 credits

The programme is especially designed to give the students a broad understanding of the complex interactions in the coastal zone and how human activity affects this environment.

Admission

Entry requirement to this Msc programme is a Bachelor degree (or equivalent) in Science or Engineering with an academic profile in marine science.
Norwegian students can enter the full M.Sc.programme, or select individual courses from the program in their study curriculum.
Foreign students can be admitted through the Quota Programme, with participants from developing countries and from Central and Eastern Europe. Students with other sources of financing may also be admitted to the full M.Sc.programme.
Foreign exchange students can select individual courses from the programme, provided they have the necessary qualifications for the courses.

Specializations

The following three lines of specializations are offered: The students have to choose one of them. Deadline 15th October 1st semester.

1. Aquaculture

Marine Juvenile Technology –60 credits thesis possible
Contact: Professor Helge Reinertsen

Sea-based Engineering - Both 30 and 60 credits thesis possible
Contact: Professor Helge Reinertsen – 60 credits thesis
Professor Arne Fredheim – 30 credits thesis

Environmental Engineering and Analysis -30 credits thesis possible
Contact: Professor Helge Brattebø

2. Fisheries and Marine Resources

Processing of Marine Resources - Both 30 and 60 credits thesis possible
Contact: Professor Turid Rustad – Both 30 and 60 credits thesis

Fishing Vessels and Gear - 30 credits thesis possible
Contact: Professor Harald Ellingsen

3. Marine Biology and Biochemistry

Marine Biology and Ecology - 60 credits thesis possible
Contact: Professor Yngvar Olsen

Marine Biochemistry and Biotechnology - Both 30 and 60 credits thesis possible
Contact: Professor Kjell Morten Vaarum – Both 30 and 60 credits thesis

Contacts:
Professor Helge Reinertsen, Department of Biology
Helge.Reinertsen@bio.ntnu.no
Professor II Arne Fredheim, Department of Marine Technology
Arne.Fredheim@sintef.no
Professor Yngvar Olsen, Department of Biology
Yngvar.Olsen@bio.ntnu.no
Professor Helge Brattebø, Department of Hydraulic and Environmental Engineering
Helge.Brattebo@ntnu.no
Professor Tor Ove Leiknes, Department of of Hydraulic and Environmental Engineering
torove.Leiknes@ntnu.no
Professor Harald Ellingsen, Department of Marine Technology
Harald.Ellingsen@ntnu.no
Professor Turid Rustad, Department of Biotechnology
Turid.Rustad@biotech.ntnu.no
Professor Kjell Morten Vaarum, Department of Biotechnology
Kjell.Morten.Vaarum@biotech.ntnu.no

Compulsory courses (O)

All students shall study two subjects in common, that is TMR 4137 *Sustainable utilization of marine resources,* BI3061 *Biological oceanography* and *"Experts in teamwork"*, and choose up to two optional subjects from other disciplines.
Every specialization has strongly recommended courses, look in the tables.

Experts in Teamwork

We recommend all students to follow the same course in Experts in Teamwork, BI 2098. This course is designed for this programme. Experts in Teamwork is compulsory.

Thesis

The thesis consists of 60 credits or 30 credits. This depends of the students education and the chosen field of study. For instance (e.g.) all students taking their thesis at the Department of Biology takes the 60 credits thesis. These students will start their work on the thesis in the 2.nd semester. Students with a former technology education on the Environmental Analysis and Technology takes a 30 credits thesis in their 4.th semester.

Thesis – 60 credits

Spring semester as the 4 th semester: Deadline for handing in the Master's thesis is the 15th of May, deadline for the exams is the 15th of June.

More information

www.ntnu.no/macodev

Master of Science in Marine Coastal Development (MACODEV)

1st and 2nd year Specialization 60 credits

Ex	Subject no	Subject title	Note	Cr	Specialization 1	2	3
		Compulsory courses (O)					
1st sem	TMR4137	SUST UTIL OF MARINE RESOURCES		7,5	O	O	O
autumn	BI3061	BIOL OCEANOGRAPHY		7,5	O	O	O
	BI3062	SCIENTIFIC SEMINARS, MARINE		0	O	O	O
		Optional courses A-list (V)	a				
	AK3001	FEED ORGANISMS IN MARINE FRY PROD	1,d	7,5	V	V	V
	BI3060	EXPERIMENTAL MARINE ECOL METHODS	1,3,d	7,5	V	V	V
	BI3063	BIOLOGICAL AND GENETIC STOCK MANAGE	2,3	7,5	V	V	V
	TBT4135	BIOPOLYMERS	3	7,5	V	V	V
	TBT4145	MOLECULAR GENETICS	3	7,5	V	V	V
	TMR4115	DESIGN METHODS	1,2	7,5	V	V	V
	TMR4130	RISK ANALYSES AND SAFETY MANAGEMENT	1,2	7,5	V	V	V
	TMR4135	FISHING VESSEL AND WORK BOAT DESIGN	2	7,5	V	V	V
		Optional courses B-list (V)	b				
	BI3010	POPULATION GENETICS		7,5	V	V	V
	TBT4140	BIOCHEMICAL ENGINEERING		7,5	V	V	V
	TIØ4120	OPERATION RESEARCH, INTRO		7,5		V	
	TMR4215	SEA LOADS	2	7,5	V	V	V
	TMR4295	DESIGN OF MECHANICAL SYSTEMS	2	7,5	V	V	V
	TTT4175	MARINE ACOUSTICS		7,5	V	V	V
	TVM4145	UNIT PROC IN WATER AND WASTEWAT TREATM		7,5	V	V	V
	TVM4162	INDUSTRIAL ECOLOGY		7,5	V	V	V
2nd sem		**Compulsory courses (O)**					
spring	BI2098	EXPERTS IN TEAMWORK		7,5	O	O	O
	BI3062	SCIENTIFIC SEMINARS, MARINE		0	O	O	O
	BI3905	MASTER THESIS IN MaCoDev		15	O	O	O
		Optional courses A-list (V)	a				
	AK3005	EARLY LIFE HISTORY OF FISH	1,d	7,5	V	V	V
	BI3005	FISH BEHAVIOR AND ECOLOGY	1,2,3	7,5	V	V	V
	TBT4155	INCREASED VALUE OF MAR BIOLOGICAL RESOURC	1,3	7,5	V	V	V
	TEP4265	FOOD ENGINEERING	2	7,5	V	V	
	TMR4140	DESIGN OF MARINE PRODUCTIONS PLANTS	1	7,5	V	V	V
	TMR4120	UNDERWATER ENGINEERING, BC	2	7,5	V	V	
	TMR4230	OCEANOGRAHY	2	7,5	V	V	V
	TMR4225	MARINE OPERATIONS		7,5	V		V
		Optional courses B-list (V)	b				
	BI3032	POPULATION DYNAMICS	3	7,5			V
	SØK2004	INDUSTRIAL ECONOMICS		7,5		V	
	TBT4107	BIOCHEMISTRY 2		7,5	V		V
	TBT4110	MICROBIOLOGY		7,5	V		
	TBT4125	FOOD CHEMISTRY	2,3	7,5	V	V	V
	TMR4240	MARINE CONTROL SYSTEMS		7,5		V	
	TTK4170	MOD AND IDENTIFIc OG BIOLOGICAL SYST	1	7,5	V		
	TTT4195	MARINE OBSERVATION TECHNOLOGY	1,3	7,5	V	V	V

Ex	Subject no	Subject title	Note	Cr	Specialization 1	2	3
3rd sem autumn		**Compulsory courses (O)**					
	BI3062	SCIENTIFIC SEMINARS, MARINE		7,5	O	O	O
	BI3905	MASTER THESIS IN MaCoDev		22,5	O	O	O
4th sem spring		**Compulsory courses (O)**					
	BI3091	SPECIAL SYLLABUS FOR MASTER DEGREE		7,5	O	O	O
	BI3905	MASTER THESIS IN MaCoDev		22,5	O	O	O

Specialization 60 credits:
1. Aquaculture
2. Fisheries and Marine Resources
3. Marine biology and Biotechnology

1) Aquaculture:
The following courses are recommended in specialization
Marine Juvenile Technology
Autumn: AK3001, BI3060, TMR4115 Spring: AK3005, BI3005, TBT4155, TMR4140
Marine Aquaculture Systems
Autumn: AK3001, TMR4115 Spring: AK3005, BI3005, TBT4155, TMR4140, TTK4170, TTT4195

2) Fisheries and Marine Resources:
The following courses are recommended in specialization
Processing of Marine Resources
Autumn: BI3063, TMR4115, TMR4130, TMR4135, TMR4215, TMR4295 Spring: TBT4125, TEP4265, TMR4120, TMR4230

3) Marine biology and Biotechnology:
The following courses are recommended in specialization
Marine Biology and Ecology
Autumn: BI3060, BI3063, TBT4135, TBT4145 Spring: BI3005, BI3032, TBT4125, TBT4155, TTT4195
Marine Biochemistry and Biotechnology
Autumn: BI3060, BI3063, TBT4135, TBT4145, Spring: BI3005, TBT4125, TBT4155, TEP4265, TTT4195

d) This course is taught intensivly
a) **A-list:** Courses are considered when planning the teaching and examination schedule
b) **B-list:** Courses are NOT considered when planning the teaching and examination schedule

Other courses can be chosen
O=Compulsory
V= Optional

Master of Science in Marine Coastal Development (MACODEV)

1st and 2nd year Specialization 30 credits

Ex	Subject no	Subject title	Note	Cr	Specialization 1	2	3
1st sem		**Compulsory courses (O)**					
autumn	TMR4137	SUST UTIL OF MARINE RESOURCES		7,5	O	O	O
	BI3061	BIOL OCEANOGRAPHY		7,5	O	O	O
		Optional courses A-list (V)	a				
	AK3001	FEED ORGANISMS IN MARINE FRY PRODUCTIONS	1,d	7,5	V	V	V
	TBT4135	BIOPOLYMERS	3	7,5	V	V	V
	TBT4145	MOLECULAR GENETICS	3	7,5	V	V	V
	TMR4115	DESIGN METHODS	1,2	7,5	V	V	V
	TMR4130	RISK ANALYSES AND SAFETY MANAGEMENT	1,2	7,5	V	V	V
	TMR4135	FISHING VESSEL AND WORK BOAT DESIGN	2	7,5	V	V	V
		Optional courses B-list (V)	b				
	BI3060	EXPERIMENTAL MARINE BIOLOGICAL METHODS	3,d	7,5	V	V	V
	BI3063	BIOLOGICAL AND GENETIC STOCK MANAGEMENT	2,3	7,5	V	V	V
	TBT4140	BIOCHEMICAL ENGINEERING		7,5	V	V	V
	TIØ4120	OPERATION RESEARCH, INTRO		7,5		V	
	TMR4215	SEA LOADS	2	7,5	V	V	V
	TMR4295	DESIGN OF MECHANICAL SYSTEMS	2	7,5	V	V	V
	TTT4175	MARINE ACOUSTICS		7,5	V	V	V
	TVM4145	UNIT PROC IN WATER AND WASTEWAT TREATM		7,5	V	V	V
	TVM4162	INDUSTRIAL ECOLOGY		7,5	V	V	V
2nd sem		**Compulsory courses (O)**					
spring	BI2098	EXPERTS IN TEAMWORK		7,5	O	O	O
		Optional courses A-list (V)	a				
	BI3005	FISH BEHAVIOR AND ECOLOGY	1,2,3, d	7,5			V
	TBT4155	INCREASED VALUE OF MAR BIOLOGICAL RESOURC	3,d	7,5	V	V	V
	TEP4265	FOOD ENGINEERING	2	7,5	V	V	
	TMR4120	UNDERWATER ENGINEERING, BC	2	7,5	V	V	
	TMR4140	DESIGN OF MARINE PRODUCTIONS PLANTS	1	7,5	V	V	V
	TMR4230	OCEANOGRAHY	2	7,5	V	V	V
	TMR4225	MARINE OPERATIONS		7,5	V		V
		Optional courses B-list (V)	b				
	AK3005	EARLY LIFE HISTORY OF FISH	1,d	7,5	V	V	V
	BI3032	POPULATION DYNAMICS	3	7,5			V
	BI3073	GENETICS TOXICOLOGY	1,d	7,5	V		V
	SØK2004	INDUSTRIAL ECONOMICS		7,5		V	
	TBT4107	BIOCHEMISTRY 2		7,5	V		V
	TBT4110	MICROBIOLOGY		7,5	V		
	TBT4125	FOOD CHEMISTRY	2,3	7,5	V	V	
	TMR4240	MARINE CONTROL SYSTEMS		7,5		V	
	TTT4195	MARINE OBSERVATION TECHNOLOGY	1,3	7,5		V	V

Ex	Subject no	Subject title	Note	Cr	1	2	3
3rd sem		**Compulsory courses (O)**					
autumn		**Specialization courses**					
	TBT4505	BIOTECHNOLOGY, SPEC COURSE	3	7,5	O	O	O
	TMR4575	FISHERIES AND MARINE RESOURCES, SPEC COURSE	2	7,5	O	O	O
		Specialization projects (O)					
	TBT4505	BIOTECHNOLOGY, SPEC PROJ	3	7,5	O	O	O
	TMR4570	FISHERIES AND MARINE RESOURCES, SPEC PROJ	2	7,5	O	O	O
		Optional courses (V)					
	AK3001	FEED ORGANISMS IN MARINE FRY PRODUCTIONS	1	7,5	V	V	V
	BI3060	EXPERIMENTAL MARINE ECOL METHODS	2	7,5	V	V	V
	BI3063	BIOLOGICAL AND GENETICAL STOCK MANAGEMENT	3	7,5	V	V	V
	BI3071	ADV ECOTOXICOLOGY	1	7,5	V		
	TBA4265	MARINE PHYSICAL ENVIRONMENT		7,5		V	
	TBT4135	BIOPOLYMERS	2	7,5	V	V	V
	TBT4140	BIOCHEMICAL ENGINEERING	1	7,5	V	V	
	TBT4145	MOLECULAR GENETICS		7,5	V	V	V
	TMR4115	DESIGN METHODS		7,5	V	V	
	TMR4135	FISHING VESSEL AND WORK BOAT DESIGN	2	7,5	V	V	V
	TMR4190	FINITE ELEMENT METHODS IN STRUCTURAL ANALYSES	2	7,5	V	V	V
	TMR4215	SEA LOADS		7,5	V	V	V
	TMR4295	DESIGN OF MECHANICAL SYSTEMS		7,5	V	V	
	TTT4175	MARINE ACOUSTICS		7,5	V	V	
	TVM4162	INDUSTRIAL ECOLOGY		7,5	V	V	
	TVM4145	UNIT PROC IN WATER AND WASTEWAT TREATM		7,5	V	V	
4th sem		**Compulsory courses**					
spring	TBT4900	BIOTECHNOLOGY, MASTER THESIS		30	O	O	O
	TMR4905	MARINE SYSTEMS, MASTER THESIS		30	O	O	O

Specialization 30 credits:
1. Aquaculture
2. Fisheries and Marine Resources
3. Marine biology and Biotechnology

1) Aquaculture:

The following courses are recommended in specialization:
Marine Aquaculture Systems
Autumn: AK3001, TMR4115, TMR4130 Spring: AK3005, BI3005, TMR4140, TTK4170, TTT4195
Environmental Engineering and Analysis
Autumn: AK3001, BI3071, TBT4130, TMR4115, TMR4130 Spring: AK3005, BI3073, TBT4140, TBT4155, TMR4140, TTK4170

2) Fisheries and Marine Resources:
The following courses are recommended in specialization:
Processing of Marine Resources
Autumn: BI3060, BI3063, TEP4265, TMR4115, TMR4135, Spring: BI3005, TBT4125, TBT4135, TMR4215
Sustainable Marine Harvesting
Autumn: TEP4265, TMR4115, TMR4130, TMR4135 Spring: TBT4125, TMR4190, TMR4215, TMR4120, TMR4230, TMR4295

3) Marine biology and Biotechnology:
The following courses are recommended in specialization:
Marine Biochemistry and Biotechnology
Autumn: BI3060, BI3063, TBT4135, TBT4145 Spring: BI3005, TBT4125, TBT4155, TTT4195

d) This course is taught intensivly
a) **A-list:** Courses are considered when planning the teaching and examination schedule
b) **B-list:** Courses are NOT considered when planning the teaching and examination schedule

Other courses can be chosen
O=Compulsory
V= Optional

MASTER OF SCIENCE IN MATHEMATICS

Degree Program

The degree program for the Master of Science in Mathematics for international students at NTNU is stipulated to take two years. One year of full studies corresponds to 60 credit points, i.e. in total 120 credit points are needed. The degree consists of two parts. The program starts with course work corresponding to 75 credit points and concludes with writing a thesis corresponding to 45 credit points.

Admission requirements

To be accepted as a student to this program one has to have:

- Bachelor's degree consisting of at least three years of university studies.
- Studied mathematics at a university for at least 1½ years.
- For the study directions in **algebra**, **analysis** and **topology**: Reached the level and covered material equivalent to

  - MA1101 Basis calculus I,
  - MA1102 Basis calculus II,
  - MA1201 Linear algebra and geometry,
  - MA1202 Linear algebra with applications,
  - MA1103 Vector calculus,
  - MA1301 Number theory,
  - MA2201 Algebra,
  - TMA4120 Calculus 4K

- For the study direction in **numerical analysis**: Reached the level and covered material equivalent to

  - MA1101 Basic calculus,
  - MA1102 Basic calculus II,
  - MA1201 Linear algebra and geometry,
  - MA1202 Linear algebra with applications,
  - MA1103 Vector calculus,
  - ST1101 Probability,
  - ST1201 Statistical methods.

- For the study direction in **statistics**: Reached the level and covered material equivalent to

  - MA1101 Basic calculus,
  - MA1102 Basic calculus II,
  - MA1201 Linear algebra and geometry,
  - MA1202 Linear algebra with applications,
  - MA1103 Vector calculus,
  - ST1101 Probability,
  - ST1201 Statistical methods,

  and at least two statistic courses on the level of ST2101 or TMA4250 or higher.

(All codes for these courses refer to the 2010/2011-course catalogue).

Applications for this program are filed through the http://www.ntnu.no/intersek/ Office of International Relations. For further information and requirements see the homepage mentioned above.

Description of the degree

All students are required to take the course “Interdisciplinary Teamwork, (Eksperter i Team)” (EiT). This should be done the second semester.

The Department of Mathematical Sciences offers various courses at graduate level in addition to more specialized graduate seminars. Currently we offer five directions of study, algebra, analysis (functional analysis and complex and harmonic analysis, differential equations), numerical analysis, statistics and topology.

Algebra, analysis and topology: All students must take at least 30 credit points amongst the courses

- MA3201 Rings and modules,
- MA3202 Galois theory,
- TMA4145 Linear methods,
- TMA4225 Foundations of analysis,
- TMA4190 Manifolds,
- MA3402 Analysis on manifolds

(unless the material has been covered in previous courses).

For the **algebra** direction, which builds upon MA3201 Rings and modules, MA3202 Galois theory, the courses MA3203 Ring theory and MA3204 Homological algebra should be taken. Some possible areas for topics for the thesis in algebra are presently representation theory of finite dimensional algebras, homological algebra and higher dimensional rings and orders.

For the **analysis** direction, which builds upon TMA4145 Linear methods, TMA4225 Foundations of analysis, the courses TMA4230 Functional analysis and TMA4175 Complex analysis should be taken. Some possible areas for topics for the thesis in analysis are presently geometric function theory, function spaces, harmonic analysis, continued fractions, dynamical systems, operator theory, topological measure theory and partial differential equations.

For the **topology** direction, which builds upon TMA4190 Manifolds, MA3402 Analysis on manifolds, the course MA3403 Algebraic topology I should be taken, and at least one more topology course. Some possible areas for the thesis in topology are homotopy theory, K-theory, generalized cohomology theories, category theory, non-linear dynamics, Lie-groups and differential geometry.

Numerical analysis: If the admission background does not cover TMA4215 Numerical Mathematics and TMA4212 Numerical Solution of Differential Equations these should be taken. In addition TMA4220 Numerical Solution of Partial Differential Equations Using Element Methods and TMA4205 Numerical Linear Algebra should be taken. Some possible areas for the thesis in numerical analysis are numerical solution of ordinary and partial differential equations, numerical linear algebra and topics within computational sciences.

Statistics: For the statistics direction the courses TMA4295 Statistical inference and TMA4300 Computer intensive statistical methods should be taken. If the admission background does not cover TMA4265 Stochastic processes and TMA4267 Linear statistical models, the courses must be taken as part of the master program. Some possible areas for the thesis in statistics are biomodelling, computational statistics, design of experiments, functional genomics, life time analysis and spatial statistics.

As mentioned above, the coursework will take almost 2½ semester (75/30 semester). All the courses in the degree must be approved by the Department of Mathematical Sciences, NTNU.

The Thesis

The thesis could contain some independent research, but could also be of purely expository nature. The student may be required to follow seminars on the topic of the thesis. These seminars will in addition to the courses help the student to obtain the necessary background needed for writing the thesis. The work with the thesis should correspond to a workload of 45 credit points.

Exams

The exam in each of the courses is either a written exam or an oral exam normally at the end of the semester when the course is taught.

Grades

For all exams and also for the thesis the scale of grading is from A (highest) to F (lowest) or Fail.

EXAMINATION REGULATIONS AT THE NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY (NTNU)

Adopted by the Board of NTNU on 7 December 2005 in accordance with the Act of 1 April 2005 relating to Universities and University Colleges, subsections 3-3, 3-4, 3-5, 3-9, 3-10 and 5-3. Revised by the Board on 24 January 2006 and on 22 May 2008.

Chapter 1 Scope, Purpose and Definitions

§ 1 Scope and Purpose

1. The regulations are valid for all studies at the Norwegian University of Science and Technology (NTNU).
2. The regulations contain rules about the organization of studies, examinations and assessment, requirements for the award of degrees, and regulations concerning the rights and obligations of the University and students at NTNU. The regulations are to ensure that studies and examinations at NTNU are carried out properly

§ 2 Definitions

Final examination	A type of assessment that normally follows at the end of the semester under conditions that can be controlled. The final examination generally is the concluding assessment of the student in a course or a group of courses.
Course	The smallest unit in which the student can receive an assessment and course grade. The extent of the course is measured in credits. The course involves activities that form the basis for assessment. The activities may be compulsory.
Subject	A collection of courses in one group in a curriculum.
Main profile	Courses in a curriculum which are defined as belonging to the same discipline which can supplement each other and build on foundation course level in a programme of study. In case a Master's degree is based on a completed Bachelor's degree, the main profile contains the academic qualifications required for admission to the Master's degree.
final grade	The grade given after a course or group of courses. It is based on the assessments that count during that course. The weighting of the grades in assessments during the course is stated in the course description.
Credits	Measure of the study workload. The normal workload in one academic year is 60 credits.
Programme of study	A group of courses that forms one academic entity that students can apply for admission to, receive the right to study, and leads to a degree.
Field of study	A specialization within a programme of study, which is described in the curriculum for that programme of study.
Assessment	The evaluations a student receives on the basis of his/her performance in a course, or a group of courses and that lead to a grade.
One-year programme	A structured group of courses totalling 60 credits and having separate admission.

These regulations refer to the Act relating to Universities and University Colleges of 1 April 2005, no. 15.

Chapter 2 Admission and individual education plan

§ 3 Admission

The valid admission regulations are the relevant regulations adopted by the Ministry of Education and Research and NTNU's own admission regulations.

§ 4 Admission to study and progress in studies

1. Admission involves the right to take the courses in the programme of study, a one-year programme or separate courses which the student has gained admission to. Admission provides the opportunity to take the courses specified in the individual education plan or in accordance with the progress in studies approved by the Faculty. Admission to study is valid from the day NTNU receives confirmation of the student's acceptance of his/her admission.
2. The right to take the programme of study which the student has been admitted to ceases when
   - the student fulfils the criteria allowing him/her to receive a certificate after completing the programme of study
   - the student has completed the one-year programme
   - the student's progress in studies is insufficient, according to the definition given in Section 4, subsection 3
   - the student himself/herself confirms that he/she has withdrawn from the programme of study before it is completed
   - the student has not paid the semester fee by the stipulated deadline, see Section 6.
3. In programmes of study that are divided into year courses/ years, a student cannot take the next year if he/she has an outstanding deficit of more than 22.5 credits from the two previous years. Students who want to take the 4th year cannot have any unfinished courses from the 1st year. Students who want to take the 5th year cannot have any unfinished courses from the 1st and 2nd years, and students who want to take the 6th year cannot have any unfinished courses from the 1st, 2nd, and 3rd years.

   The student loses the right to study a programme of study if he/she has an outstanding deficit of more than 22.5 credits. No student is permitted to use more than 2 academic years to take the same year in a programme of study. The time spent in each year should be adjusted according to any leave that has been granted, and any possible reductions in the study progress (part-time studies) that have been approved in the individual education plan, ref. Sections 5, 7, and 8.

   It is to be evident from the curriculum whether the programme of study is divided into years, ref. Section 14, subsection 1.

   Students that apply for re-admission to the same programme of study will, if applicable, be given recognition of previous studies in the year the student is admitted to. The same is true when there is great degree of similarity between a programme of study a student has applied for admission to and another programme of study a student has or had been admitted to. Exemption to this regulation can be made when more than three years have elapsed since the student was admitted to the other programme of study.

4. The Faculty is to decide whether the right to study should be terminated in accordance with the above regulations. The Faculty may grant exemptions from the regulations in Section 4, subsection 3 in cases of illness, serious family problems, when the main part of the studies has already been completed, extraordinary conditions related to the subject (taking the next year) or other reasons found to warrant special treatment. Where the Board of NTNU has established an inter-Faculty board for a group of programmes of study, the latter board is authorized to reach decisions in cases related to exemptions.
5. A student who is not covered the regulations in Section 4, subsection 3 has admission withdrawn if he/she has not earned any credits during one academic year in the programme of study or one-year programme that the student is admitted to. This does not apply if the student has registered for and been present at one or more examinations and when it is agreed in the individual education plan that the student is not to earn any credits. The Faculty is to decide in matters of withdrawal of admission.
6. A student who has gained admission to a programme of study and has had normal progress (without adjustment for leave or reduced progress in studies), is not to be affected by changes in the disciplinary objectives, level and structure of the programme while completing his/her work on the programme. The student nevertheless has to accept that there may be changes in the courses and the structure of the programme of study that will not cause a delay in his/her progress.
7. A student who has gained admission to a programme of study, one-year programme or individual courses at NTNU, has the right to follow other courses he/she is qualified to take and receive assessment of his/her performance in these courses. The student also has the right to follow lectures in courses outside the programme of study or one-year programme if there are no restrictions on the admission to the courses. The student maintains these rights also after having completed the programme of study.

§ 5 Individual education plan

The Faculty together with students who have gained admission to study for 60 credits or more are to agree on an individual education plan before the end of the first semester. The individual education plan can be amended in agreement with the Faculty. The individual education plan is a mutual agreement between the student and NTNU concerning the duties and responsibilities of each party for progress in studies as well as the duties and responsibilities of each student towards his/her fellow students. The individual education plan gives the content and progress of the planned studies, cf. Section 6, subsection 2.

§ 6 Registration

1. Students who have been admitted to NTNU have to register and pay the semester fee at NTNU each semester by the deadline set by the Rector. The deadline is given in the curriculum and on NTNU's Internet pages. Students who do not pay the semester fee by the stipulated deadline will have their admission withdrawn in accordance with the regulations relating to Student Welfare Organizations of 12 February 2001, Section 10. The Faculty is to decide in matters of withdrawal of admission due to non-payment of the semester fee.
2. For students who have agreed to an individual education plan, this registration is to determine and confirm the information in the plan for the current semester concerning
   - which courses the student will attend
   - which courses the student is to be given assessment in
   - other possible activities determined in the programme of study which the student follows

- other information where adjustments are possible and which is relevant for the student's progress in his/her studies.

3. Students who are not obliged to agree on an individual education plan or who have not yet entered into an individual education plan also have the duty to register. This registration is to indicate which courses the student will attend and receive assessment in.
4. The registration gives access to the resources offered by NTNU in order to enable the student to complete his/her courses that semester.

§7 Leave of absence

1. The Faculty is to handle applications for leave of absence. Such leave from study is primarily given for one academic year. For shorter periods, leave can be given until the end on the semester. A student must have completed more than 30 credits in the courses included in the programme of study in order to apply for leave of absence without stating a reason.
2. The Faculty may accept an application for leave for more than one academic year if there are special circumstances or pressing reasons, such as illness, extensive demands for child-care etc., military service or civilian service.
3. The student must accept that there may be changes in the programme of study during a period when he/she has a leave of absence.

§ 8 Part-time studies

Studies at NTNU may be taken on a part-time basis following agreement with the Faculty. The percentage of the nominal progress in studies is to be included in the individual education plan.

§ 9 Students without the right to study

1. Those who have not been granted admission have the right to receive assessment in a course in accordance with the Act relating to Universities and University Colleges, Section 3-10. The Faculty decides whether the requirements for registration have been fulfilled and may specify further regulations concerning assessment in the absence of normal admission.
2. The Rector may decide upon a special deadline for registration for this type of assessment. The Rector can also decide that those who have not been admitted as students should pay an examination fee in order to cover the extra cost of carrying out such assessments.

§ 10 Teaching – delegation of authority in accordance with the Act relating to Universities and University Colleges Section 3-8

1. The Faculty has the authority to reserve certain lectures just for the students of the University or specified groups of students if the nature of the lectures makes this necessary, cf. the Act relating to Universities and University Colleges Section 3-8, subsection 2.
2. The Faculty has the authority to allow people who are not following normal courses to attend lectures and participate in exercises whenever there is sufficient space.

§ 11 Suspension, exclusion – delegation of authority in accordance with the Act relating to Universities and University Colleges Section 4-8, subsection 1

1. In cases where a student behaves in a way that seriously disturbs the work of fellow students or the general activities of the University, the Faculty has the authority to give a written warning stating that if such behaviour is continued a recommendation concerning suspension will be presented to the Board. In cases that are not specifically related to an individual Faculty, this authority rests with the Rector.
2. The Faculty has the authority to give a written warning to a student that an exclusion recommendation will be presented to the Board unless the suspension decision made by the Board is respected. In cases that are not specifically related to an individual Faculty, this authority rests with the Rector.
3. Complaints about decisions involving a written warning should be sent to the Appeals Committee at NTNU.

Chapter 3 Organization of studies

§ 12 The academic year

1. The academic year consists of 40 weeks and is divided into two semesters. The autumn semester extends over 19 weeks and finishes before the end of the year. The spring semester lasts 21 weeks.
2. The Board of NTNU may approve that a programme of study at NTNU deviates from the ordinary structure described in Section12, subsection 1 if the duration of the programme is more than 40 weeks and has teaching and/or studies which can be pursued independently of the other studies at NTNU.

§ 13 Programmes of study

1. Programmes of study at NTNU are organized according to the following models, they can
   - lead to a Bachelor's degree which subsequently forms the basis for a Master's degree.
   - be an integrated study which leads to a Master's degree or a professional degree
   - lead to a Master's degree which is based on a completed Bachelor's degree or equivalent education.

   The Board establishes and terminates each programme of study at NTNU. When the Board creates a new programme of study, it should simultaneously decide which Faculty is to administer the programme.
2. Each programme of study has a main profile, which gives disciplinary specialization of at least 80 credits. All programmes of study involving 5-year integrated Master's degrees should also satisfy the requirements of the Bachelor's degree.
3. Each programme of studies consists of different courses. The courses offered should each be of 7.5 credits or a multiple of that. The courses given in the programme of study are either compulsory or optional. The Faculty establishes new courses and terminates old ones. When the Board at NTNU has created an inter-Faculty board for a group of programmes of study, this authority is vested in this board. The Board at NTNU is to approve the establishment of courses where it is assumed that this will increase the basic disbursement in the State appropriation model.

4. All programmes of study leading to a lower degree as well as integrated programmes of study leading to a higher degree or a professional degree are to contain three introductory courses:
   - Ex. phil. of 7.5 credits that is to be common for all students. Ex. phil. should ideally be a first semester course but this is not compulsory if there are academic grounds to do otherwise.
   - Ex. fac. of 7.5 credits is specific for the relevant Faculty. It should be part of the main profile is and is to be taken in the first year.
   - Perspective course of 7.5 credits that is to represent a different field of study from that included in the student's programme of study.

§ 13a One-year programmes

The Rector is to establish and terminate each one-year programme at NTNU following a recommendation from the Education Committee. The rector is also to decide which Faculty is to administer each one-year programme.

§ 14 Curriculum and course description

Each programme of study is to be described in a curriculum. The Faculty administering the programme of study is to approve the curriculum. Where an inter-Faculty board has been established by NTNU to cover a group of programmes of study, this board is responsible for compiling the curriculum. The curriculum should contain information about possible admission requirements and ranking regulations for the programme of study. The curriculum should stipulate:

- the learning outcomes and professional objectives of the programme of study
- any required previous knowledge for the programme of study
- which Faculty is to administer the programme of study
- which courses are included in the programme of study
- the scope of the programme of study in terms of credits
- what course combination meets the required main profile
- the structure of the programme of study, whether the programme of study has been divided into years, the fields of study, which are the common courses, which are compulsory and optional courses, and the sequence of the courses
- the possibilities for student exchanges abroad
- other issues which affect the implementation and quality assurance
- transitional arrangements as a result of changes in the curriculum.

All courses are to be presented in a course description. Each Faculty is to provide a description of its own subject areas. Each course description should include:

- learning outcomes
- the qualifications necessary to gain admission to the course
- the content of the course
- teaching methods
- how many credits the course is worth

- the extent of the education
- possible compulsory education
- which activities are included, their extent and which of them are compulsory, for instance courses in methodology, exercises, work experience, field courses, excursions, laboratory work, group exercises, semester papers and other written exercises, artistic performances
- the requirements for receiving assessment
- activities that will be subject to on-going assessment and which of them will count in the course grade
- the organization of a possible final examination (how often, when in the semester, date and similar information)
- what examination support material can be used
- the form of assessment and grading scale for the assessments during the course
- the weighting of assessments during the course that are to count in the course grade

§ 15 Recognition of external studies/practical experience

1. The Faculty is to handle applications concerning recognition of external studies or practical experience in accordance with the Act relating to Universities and University Colleges Sections 3-4 and 3-5. A condition is that the external education has been approved as education at university or university college level.
2. The Faculty is to handle applications concerning the approval of an equivalent degree or education in accordance with the Act relating to Universities and University Colleges Section 3-4 subsection 3.

§ 16 Exemption from assessment

1. The Faculty is to grant exemption from the final examination, test or other assessment in cases where the student can document that similar assessment has already been done by NTNU or another institution. The Faculty may also grant exemption on basis of other recognized examinations, tests or other kinds of assessment, or on basis of documented practical experience, in accordance with the Act relating to Universities and University Colleges Section 3-5. When processing such applications for exemption, the Faculty should take both a student's previous education into account, as well as the assessment in terms of level, scope and content.
2. The student is to send such an application to the Faculty that administers the programme of study in which he/she has the right to study.

§ 17 Reduction of credits

If a student receives assessment in courses where the content wholly or partially overlaps, the total of credits for these courses should be reduced accordingly. The Faculty decides the extent of the reduction in each separate case. If some of the courses to which the student has gained admission to are compulsory, the reduction should take place in the optional courses. The reduction should be done in a way that provides the student with the best grade that has been awarded. The basis for the reduction should be evident from the transcript or certificate.

Chapter 4 Degrees

§ 18 Awarding degrees

The Faculties award degrees with their respective titles in accordance with their delegated responsibility from the Board when the latter approves a new programme of studies.

§ 19 Bachelor's degree

1. The Faculty awards the Bachelor's degree on basis of a completed programme of study or a free selection of courses in cases where the student has completed a total of 180 credits. The 180 credits should include:
   - a main profile of at least 80 credits, where the curriculum defines the requirements of the main profile
   - introductory courses of 22.5 credits, ref. Section 13 subsection 4.
2. If the Bachelor's degree is not based on an established programme of study, the Faculty that awards the degree is to cover the area where the major part of the disciplinary content belongs. If the student has a degree where more than one major parts are is included, the student can decide which of the relevant faculties should award the degree.

§ 20 Master's degree

1. In order to gain admission to a Master's programme which is based on a lower degree, the student must
   - have been awarded a Bachelor's degree or its equivalent
   - have received a passing degree in courses corresponding to 80 credits in the subject area of the relevant Master's degree, as specified in the curriculum for the relevant Master's programme
   - have fulfilled the other requirements for admission, as specified in the curriculum for the Master's programme.

   When admission to a Master's programme is based on experience, the second point is not valid. Instead, at least 2 years of relevant professional experience is demanded.
2. In order to receive a Master's degree, the student must
   - either satisfy the admission criteria of the Master's programme and in addition have passes in relevant studies corresponding to 120 credits, where the curriculum allows 30 credits to be replaced by relevant practical experience
   - or have completed a course of studies corresponding to 300 credits, where the requirements of the Bachelor's degree are included.
3. In the Master's programme described in Section 20, subsection 2, a Master's thesis corresponding to at least 30 credits, but no more than 60 credits, should be included.
4. In order to receive a Master's degree corresponding to less than 90 credits, the specified requirements relevant for such a degree programme must have been met.

§ 21 Candidata/candidatus medicinae

In a programme of studies leading to the degree candidata/candidatus medicinae, introductory courses as defined in Section 13 subsection 4 are included. The degree is based on a coherent course of study corresponding to 360 credits. The Faculty of Medicine

will decide the content of the programme of study as well as additional criteria for awarding the degree.

§ 22 Candidata/candidatus psychologiae

In a programme of studies leading to the degree candidata/candidatus psychologiae, introductory courses as defined in Section 13 subsection 4 are included. The degree is based on a study of 60 credits and a subsequent, coherent professional study corresponding to 300 credits. The Faculty of Social Sciences and Technology Management will decide the content of the programme of study as well as additional criteria for awarding the degree.

Chapter 5 Assessment

§ 23 Assessment

1. In all courses or groups of courses included in a programme of study, the possibility for assessment and subsequent grading of the knowledge and skills of the students should be available each academic year. The assessment should be given as a final evaluation, or possibly an evaluation based on different types of on-going assessments described in the curriculum.
2. In order to receive assessment, the student must have registered that same semester, and also meet the academic requirements for assessment given in the course description.
3. A student who has handed in a paper in an assessment cannot prevent the assessment from being done. The student cannot block an assessment if the examination began with an oral test.

§ 24 Examination periods

Final examinations take place at the end of each semester. The Rector decides the time of the examination periods. The dates are given in the curriculum. The Rector may decide to organize the examinations outside the regular examination periods, if practical considerations related to the courses or other things make this necessary.

§ 25 Final examination

The course description states whether the course is to be concluded with a final examination and what requirements the student has to satisfy in order to sit the final examination. A grade is always awarded at the final examination.

§ 26 Instructions at final examination

The Rector can issue general instructions for

- students who are allowed to sit a final examination

- invigilators

- the presence of teaching staff during a written final examination.

These instructions are found in the curriculum.

§ 27 Legitimate leave of absence at final examination

1. If a student is unable to sit a final examination due to illness or other pressing reasons, an application for approved absence has to be submitted to the Division of Student and Academic Affairs. The application, which has to be submitted at the latest one week after the first final examination to which the absence applies, has to contain information about which final examinations the application concerns. Documentation should be included in the application. The period of absence is to be indicated on the medical certificate.
2. A student who is taken ill during a final examination should notify the principal invigilator in the examination hall or the external examiner/internal examiner at oral examinations. The student subsequently has to see a doctor quickly and submit a medical certificate, as stated in the regulations in Section 27 subsection 1.

§ 28 Re-sit examination

1. In a course where the final examination is to be held only once in the academic year, a re-sit examination is to be arranged before the next normal examination. Students with an approved absence may take the re-sit examination. This also applies to students who have not passed the initial examination.
2. Students must register for the re-sit examination within the deadline stated by the Faculty or in the supplementary regulations.
3. The Faculty can in agreement with the Rector decide to organize the re-sit examination during the same period as the normal examination, in the next examination period or at a later time outside the examination period. For certain programmes of study, the time of the re-sit examination will be a standard arrangement that can be stated in the supplementary regulations.
4. During a re-sit examination, the quality of the assessment should correspond to the one given at the normal final examination. Alternative forms of assessment at re-sit examination should be stated in the course description.

§ 29 Approved absence from other types of assessment than final examination

The Faculty should, if practically possible, ensure that students with approved absence from other types of assessment than in the final examination can be assessed during the semester and before any possible final examination in the course.

§ 30 Re-examination

1. A student who has failed to pass the examination in a course has the right to repeat the examination and receive a new assessment. The course description or the supplementary regulations determine what areas have to be repeated after a student has failed to pass an examination.
2. The student has the right to complete a second period of practical work experience if he/she failed to pass the first period of practical work experience.
3. If the student has passed, he/she only has the right to re-take an examination once more in each course in order to improve his/her grade. If the student is registered for an examination and has not withdrawn his/her examination registration by the deadline decided by the Director of the Student and Academic Division, this is regarded as one attempt. The highest grade obtained is the one that counts. When the grade for a course is based on two or more assessments or tests, these have to be re-taken.

This amendment comes into force from the start of the academic year 2008/2009. The new arrangement will be evaluated.

§ 31 New assessment of Master's thesis

A student may submit a new or revised Master's thesis once in cases where the thesis has not been awarded a passing grade. If the thesis has been given a passing grade, there is no opportunity for a new assessment in the same programme of study.

§ 32 Syllabus at new assessment/re-sit examinations

In case of new assessment and re-sit examinations, the syllabus of the course at the time of the new assessment or the re-sit examination is to be valid. In cases of changes in the national framework plans, the Ministry may decide upon special arrangements. If there are significant changes in the syllabus, there is to be a possibility to be assessed according to the former syllabus for at least one year, but no more than two years after the introduction of the changes.

§ 33 Adjusted forms of assessment

1. In order to give all students approximately the same working conditions when receiving assessment, students with particular requirements that have been sufficiently documented may apply for an adjusted form of assessment. Such an assessment does not imply any reduction in the general degree requirements.
2. The adjusted forms of assessment may be practically oriented in order to allow the use of special aids or extended time. In particular cases, types of assessment that differ from the normal one may also be accepted.
3. If the requirements of the student are permanent, the use of special aids may be allowed throughout his/her studies.
4. An application, including documentation, should be sent to the Division of Student and Academic Affairs before the registration deadline. The application is to be decided by the Rector. Applications for different forms of assessment from the one given in the course description are to be decided by the Rector in consultation with the Faculty.
5. Students with sudden acute requirements should as far as possible be given the same rights with regard to assessment as described above. An application containing sufficient documentation should be sent to the Division of Student and Academic Affairs as soon as possible after the acute situation has arisen.

§ 34 Form of language/language by written assessment

1. Arrangements with regard to the form of language used in examination papers are given in Regulations concerning forms of language in examination papers of 7 July 1987. The regulations are in accordance with the Act of 11 April 1980 no. 5 concerning the use of Forms of Language in the Public Services.
2. Examination papers written in Norwegian should contain a version in the other form of the Norwegian language (*bokmål* and *nynorsk*). The exception is examination papers in the subject Norwegian. In case all the students prefer the same form of language, the examination papers may only be written in this form. The students choose their form of language as they register for an examination.

3. If the lectures are given in a non-Scandinavian language, the examination paper should also include a version in the language that has been used in the lectures. Applications requesting the examination paper to be in a language different from Norwegian or that used in teaching are to be decided by the Faculty.
4. If a significant portion of the curriculum of the course is written in a language that is different from the one used in lectures, the Faculty may decide that the examination paper should contain a version in this language as well.

§ 35 Oral examinations behind closed doors

At the request of the student, the Faculty may decide against making an oral examination public in cases where there are pressing reasons, ref. the Act relating to Universities and University Colleges Section 3-9, subsection 3. The Faculty should ensure that the assessment in these cases also satisfies the normal academic level in the programme of study.

§ 36 Academic misconduct or an examination offence/attempted academic misconduct or an examination offence

1. In cases of academic misconduct or an examination offence/attempted academic misconduct or an examination offence, the University Appeals Committee may cancel the assessment in accordance with the Act relating to Universities and University Colleges Section 4-7. The same applies to the recognition of courses, credits or education, as well as exemption from assessment.
2. In accordance with the Act relating to Universities and University Colleges Section 4-8, subsection 3, the University Appeals Committee may expel a student who has behaved contrary to the regulations for up to one year. The student may also lose his/her right to sit for examinations within institutions affected by the ruling for up to one year.
3. More detailed information about reactions to academic misconduct or an examination offence is given in Guidelines for reactions to academic misconduct or examination offences/attempts at academic misconduct or examination offences at NTNU of 30 May 2001.

Chapter 6 Determination of grades

§ 37 Examiners

1. The Faculty appoints the examiners, ref. the Act relating to Universities and University Colleges Section 3-9, subsection 2. For inter-faculty courses such as “Experts in Team” that are not administered by one faculty, the rector is to appoint the external examiner(s). If there is an appeal, the Faculty is to appoint the external examiner(s). The examiners are appointed for 3 years at a time.
2. At least two examiners are to be present at oral examinations and assessment of vocational training or other activities of a type that cannot be subsequently checked. At least two examiners, of whom at least one should be external, should be present at the assessment of Master’s theses, ref. the Act relating to Universities and University Colleges Section 3-9, subsection 2.
3. The Faculty determines the guidelines regarding external participation at the assessment, whether general or a specific programme of study. This could be done by external participation in each separate assessment or through an external evaluation of the assessment procedures.

§ 38 Deadlines for determination of grades

In accordance with the Act relating to Universities and University Colleges Section 3-9, subsection 4, the deadline for determination of grades is 3 weeks following the examination, unless special reasons make it necessary to use more time. When special reasons occur, a new deadline should be announced. The deadline for assessment of the Master's thesis is 3 months after the thesis has been handed in.

Chapter 7 Grades

§ 39 Grading scales

Assessment is given on basis of grading, either through a scale ranging from A to F or on the basis of Passed/Not Passed. Grade A is the highest pass grade, while Grade E is the lowest pass grade. The grading scale is based on the following descriptions and general qualitative descriptions:

symbol	description	General, qualitative description of valuation criteria
A	Excellent	An excellent performance, clearly outstanding. The candidate demonstrates excellent judgement and a high degree of independent thinking.
B	Very good	A very good performance. The candidate demonstrates sound judgement and a very good degree of independent thinking.
C	Good	A good performance in most areas. The candidate demonstrates a reasonable degree of judgement and independent thinking in the most important areas.
D	Satisfactory	A satisfactory performance, but with significant shortcomings. The candidate demonstrates a limited degree of judgement and independent thinking.
E	Sufficient	A performance that meets the minimum criteria, but no more. The candidate demonstrates a very limited degree of judgement and independent thinking.
F	Fail	A performance that does not meet the minimum academic criteria. The candidate demonstrates an absence of both judgement and independent thinking.

Passed/Not Passed is used where assessment is not required.

The Faculty is to provide descriptions of the assessment criteria that are specific for each subject.

§ 40 Grade Point Average

The Grade Point Average can be estimated as long as letter grades have been given for at least 75% of the credits. When estimating the Grade Point Average, all grades in each separate course should be included. The Grade Point Average is determined as follows:

1. Each letter grade is replaced by its equivalent number, A=5, B=4, C=3, D=2, E=1.

2. The numerical equivalent is multiplied by the number of credits in the course, and the separate sums of credits and numerical equivalents are added up for all courses that are included.
3. This total is subsequently divided by the total number of credits included in all the courses.
4. The quotient is calculated to one decimal place.
5. The Grade Point Average is the letter degree which represents the equivalent of the full number of the quotient after the normal rounding-up rule has been applied.

§ 41 Final grade

1. Whether or not a final grade is to be given is decided by supplementary regulations.
2. The final grade means the overall grade for the entire programme of study at the award of degree. The grade is a weighted average based on the letter grades in the courses included in the degree. In order to get a final grade the student must have a pass mark in courses at NTNU corresponding to at least 120 credits, and at least 75% of these must have been given a letter grade. The method for calculating the final grade is the same as that described for the Grade Point Average in Section 40.

§ 42 Explanations and appeals

1. Cases involving the explanation of grades and complaints about them are to be handled in accordance with the Act relating to Universities and University Colleges Section 5-3. Requests for an explanation of grades and complaints should be forwarded to the Faculty. If written guidelines for determining grades have been issued, these are to be made available for students after the grade has been decided, ref. the Act relating to Universities and University Colleges Section 5-3, subsection 3.
2. If there is a new assessment of a grade, at least two new examiners, including at least one external, are to be involved, ref. the Act relating to Universities and University Colleges Section 3-9, subsection 5. The new examiners should not have any information about the initial grade, the explanation for it or the basis of the student's complaint.
   If during first-time assessment of a grade the examiner(s) discover that a text is copied without its source being stated but the matter is not considered to be serious enough to report it as cheating the examiner(s) can decide to inform the Department. If the student lodges a complaint about his/her grade, the Department can inform the new examiners about this lack of reference to sources. If this is done, the Department is to explain to the student that the new examiners will be informed about this lack of reference to sources.
3. When on-going assessment is used, the student cannot lodge a complaint until he/she has received the grade in the relevant course or group of courses. Although the student cannot lodge a complaint following each separate assessment, he/she has the right to an explanation of the grading for each separate assessment.
4. Complaints against procedural errors can be submitted in accordance with the Act relating to Universities and University Colleges Section 5-2. The complaint is to be sent to the Faculty. In accordance with Section 5-2 of the Act relating to Universities and University Colleges, complaints can only be made about on-going assessments which will be included in the certificate or that count as part of the final grade.
5. Complaints about the grading of group work, where a common grade is given, all participating students must agree and sign the complaint. The same applies to complaints about procedural errors in these cases.

Chapter 8 Certificates and transcripts

§ 43 Certificates

1. Certificates are issued after the completion of a degree or an educational programme. A certificate is normally issued only once for the same degree/education. The certificate is to contain information about the programme of study the degree is based on. The certificate should show the semester and year the degree/educational programme was completed. The final grade (if applicable) is to be given on the certificate. Diploma supplements form a part of the certificate. A transcript of grades showing the courses the student has passed should be attached to the certificate.

2. In order to receive a certificate for a completed degree at NTNU, at least 60 credits have to been taken at NTNU. Of the 60 credits, at least 30 must belong to the main educational profile. With regard to a higher degree, the Master's thesis must be part of the 60 credits.

§ 44 Transcript

Upon request, students are to receive a transcript confirming their passing grades. The transcript should show the grades given in each course, the year and semester in which the grades were obtained, as well as the title and number of credits for the courses.

Chapter 9 Supplementary regulations and implementation

45 Supplementary regulations

The Faculty has the authority to add supplementary regulations to these regulations. With inter-Faculty programmes of study, the supplementary regulations are to be accepted by all faculties involved. When an inter-Faculty board has been established by the Board of NTNU for a group of programmes of study, the supplementary regulations should be decided by the inter-Faculty board.

§ 46 Implementation

These regulations are to come into force immediately.

EXTRACTS FROM ACT OF 1 APRIL 2005 RELATING TO UNIVERSITIES AND UNIVERSITY COLLEGES

Chapter 3 Academic decisions - accreditation

§ 3-9. Examinations and marking

1. Universities and university colleges shall ensure that students' knowledge and skills are tested and assessed in a manner that is impartial and academically sound. Assessment shall also safeguard the academic standards of the course of study in question. An external evaluation shall be made of the assessment or assessment arrangements.
2. The board shall appoint examiners for examinations, tests, assessments of assignments or other assessments the results of which are entered on the diploma or included in the mark given for the course of study in question. When assessing candidates' independent work in higher degree courses, each candidate shall be assessed by at least two examiners, of whom at least one shall be external.
3. The oral parts of examinations and tests shall be public unless regard for the examination or test arrangements indicates otherwise. The board may make exceptions to the rule concerning public examinations in particular cases at the request of the examination candidate concerned when particularly weighty reasons so indicate.
4. Marks shall be made known within three weeks unless for special reasons more time is required. The board may itself make exceptions in respect of specific examinations and may in temporary regulations pursuant to the seventh paragraph set a longer time limit when it is not possible to provide the number of qualified examiners required to complete the marking within three weeks. The board may itself in a regulation pursuant to the seventh paragraph set a longer time limit for dissertations and similar large written works.
5. Re-marking pursuant to sections 5-2 and 5-3 shall be carried out by at least two new examiners, of whom at least one shall be external. Marks may be changed in the appellant's favour and disfavour. If the final mark is set on the basis of both a written and an oral test and an appeal against a mark for the written part of the examination is upheld, a new oral test shall be held to determine the final mark.
6. The mark awarded following an examination, test, assessment of an assignment or other assessment shall either be pass/fail or be based on a graded scale of six marks from A to F, where A to E indicate a pass and F indicates a fail.
7. The board itself issues regulations governing the taking and arrangement of examinations and tests, including the conditions for resitting an examination or test and for permission to retake a practice period, and provisions concerning registration and the conditions for registration for examinations. In the case of courses for which national curriculum regulations have been established pursuant to section 3-2, second paragraph, the regulations must be based on any general provisions concerning examinations and assessment contained in the curriculum regulations. The board may delegate the issue of supplementary provisions concerning special circumstances relating to particular examinations to a faculty or department.

Chapter 4 The students' rights and obligations

§ 4-7. Annulment of examinations or tests

1. The board itself or the board's appeals committee, cf. section 5-1, may annul an examination or test or recognition of a course if the student
   a) by using a false diploma or by other dishonest means, has gained admission to the examination or test or to attend the course concerned, or
   b) has attempted to cheat or wilfully or through gross negligence has cheated in the course of or prior to the final assessment of the examination or test concerned, or while taking the course in question.
2. The board itself or the institution's appeals committee, cf. section 5-1, may annul credit for or recognition of a course or exemption from an examination or test if the student obtained it by using a false diploma or by other dishonest means.
3. Annulment decisions pursuant to the first and second paragraph may be appealed to the Ministry or to a special appeals body appointed by the Ministry, cf. section 5-1, seventh paragraph.
4. The right to annulment has no time limit.
5. An annulment decision entails an obligation to return any diplomas or mark transcripts to the institution. If such diploma or mark transcript is not returned to the institution at the proper time, the institution may obtain the assistance of an enforcement officer (namsmann) to secure its return, pursuant to the provisions laid down in Chapter 13 of the Enforcement Act.
6. If the diploma can form the basis of authorization for the exercise of a profession or trade, the institution shall notify the authority concerned of the annulment.

7. Other institutions under the present Act may be informed of the annulment of an examination or test. The Ministry issues specific provisions concerning information routines, etc.

§ 4-8. Exclusion

1. A student who despite written warning by the board repeatedly behaves in a manner which seriously disturbs the work of fellow students or other activities at the institution may be excluded by the board itself or the institution's appeals committee, cf. section 5-1, from specific parts of the institution for up to one year. If a student after receiving a written warning from the board continues not to respect such exclusion, the board itself or the institution's appeals committee, cf. section 5-1, may exclude him or her from attending courses for up to one year.
2. A student who has behaved in such a seriously censurable manner as to endanger the life or health of patients, clients, children attending a day care institution, pupils or others with whom the student comes into contact in connection with clinical or practical training or who in relation to such persons commits serious breaches of the obligation to observe secrecy or behaves with gross indecency, may, if the board itself or the institution's appeals committee, cf. section 5-1, so decides, be excluded from attending courses for up to three years. The institution shall inform the Norwegian Directorate for Health and Social Welfare of any exclusion pursuant to this provision of students attending courses that may result in a right of authorization pursuant to section 48, first paragraph, of the Health Personnel Act.
3. A student who has behaved as described in section 4-7, first or second paragraph, if the board itself or the institution's appeals committee so decides, cf. section 5-1, may be excluded from the institution and deprived of the right to sit examinations at institutions under this Act for up to one year. The Ministry issues specific provisions concerning information routines, etc.
4. A decision to exclude a student requires a majority of at least two-thirds. The student may appeal against such a decision pursuant to the provisions laid down in the Public Administration Act. The Ministry or a special appeals body appointed by the Ministry is the appeals body.
5. The student is entitled to seek the assistance of a lawyer or other spokesman from the date the question of exclusion is raised or from the date of any written warning pursuant to the first paragraph. The cost of such assistance shall be met by the institution.

Chapter 5 Appeals

§ 5-2. Complaints against procedural errors in connection with examinations

1. A candidate who has taken an examination or test may complain of procedural errors within three weeks of the date when he or she became or should have become aware of the circumstance on which the complaint is based. Such complaints are ruled on by the board itself or the institution's appeals committee. 1 April 2005
2. If an error was committed which may have affected the student's performance or its assessment, the mark shall be rescinded. If the error can be corrected by remarking the papers submitted, they shall be re-marked. Otherwise a new examination or test shall be held with new examiners. The mark awarded in a second assessment pursuant to the present section may be appealed against pursuant to the provisions laid down in section 5-3.
3. If a request for explanation of or an appeal against a mark has been submitted, the time limit for an appeal pursuant to this section is reckoned from the date when the student receives the explanation or when the appeal is finally ruled on.
4. If the board or the board's appeals committee finds that formal errors were committed and that this can reasonably be supposed to have affected the performance of one or more candidates or the assessment of that performance, the decision may be taken to carry out a new assessment or to hold a new examination or test.

§ 5-3. Complaints regarding marks awarded - right to explanation

1. A student is entitled to an explanation of the marks awarded for his or her performance. At oral examinations or assessments of practical skills, a request for such an explanation must be made immediately on notification of the mark. Requests for explanations of other assessments must be submitted within one week after the candidate learns of the mark, but never more than three weeks after the announcement of the mark.
2. Explanations shall normally be given within two weeks after the candidate requests them. They shall state the general principles on which the assessment was based and explain the assessment of the candidate's performance. Explanations may be given orally or in writing at the examiner's discretion.
3. If written guidelines for assessments have been issued, they shall be available to students after the marks have been decided.
4. A student may appeal in writing against a mark awarded for his or her performance within three weeks of the announcement of the examination results. The performance shall then be reassessed. In the event of a request for an explanation of a mark or a complaint of procedural errors in the question-setting, the examination procedure or the assessment procedure, the time limit for appeals pursuant to this section is reckoned from the date when the student receives the explanation or when the appeal is finally ruled on. In connection with the use of

continuous assessment, the institution may decide whether the student shall submit an appeal following the assessment of a separate examination, assignment or other assessment or whether an appeal shall be submitted on announcement of the result of assessment of the study programme, discipline, or module.

5. Appeals may not be lodged against marks awarded for oral performance and assessment of practical training or the like which, owing to the nature of the test cannot be reviewed. The results of preliminary examinations (forprøver) may only be appealed against when the examination is failed.
6. Marks awarded following re-marking pursuant to this section may not be appealed against.

INFORMATION ABOUT CHEATING AND ACADEMIC MISCONDUCT IN HOME EXAMINATIONS, SEMESTER ASSIGNMENTS AND OTHER EXAMINATIONS AT NTNU

On 12 October 2006, the Board of NTNU passed Guidelines concerning the action to be taken in cases of students cheating or attempting to cheat at examinations at NTNU. This extract from these Guidelines is written to give students important information about this matter.NTNU regards cheating as a serious matter with grave consequences when a student is even suspected of cheating. Failing to respect the work of others by not citing sources can lead to an examination being failed and even expulsion from NTNU and all higher education in Norway for up to one year.

NTNU defines cheating as actions that are in conflict with the examination regulations that lead to the results being more favourably judged than would otherwise be the case. This is a broad definition that includes gross negligence. The following examples clarify what NTNU can regard as cheating:

- An examination answer paper with all or some of the text from the Internet that is presented as the student's own work
- An examination answer paper with all or some of the text used by someone else at a previous examination
- An examination answer paper with all or some of the text used by the student at a previous examination
- An examination answer paper with all or some of the text written by someone else
- Work that is handed in as the student's own work that is written, designed or composed by someone else
- Quotes from textbooks, other sources, or the Internet that are not presented with their sources and are not clearly marked as quotations (plagiarism)
- Using examination support material that is not permitted

Ask your professors, Student Service or student advisers at NTNU if you are unsure about the rules relating to cheating. It is the student's own responsibility to find out about the rules relating to the use of other people's work - plagiarism - which is against Norwegian law (see below). In an examination, each student must find out what examination support material is permitted.

Plagiarism detection
NTNU has acquired a system for plagiarism detection. This system is designed to detect plagiarism in examination answer papers submitted in connection with teaching at NTNU. This means that texts submitted by students in courses at NTNU can be checked for plagiarism.

What Norwegian law says about cheating

The Act of 1 April 2005 relating to Universities and University Colleges Section 4-7, Subsection 1, b. states that the University Appeals Committee can annul an examination or test or approval of a course if the student has

attempted to cheat or on purpose or with gross negligence has cheated in the course of or prior to the final assessment of the examination or test concerned, or while taking the course in question.

Annulment of the examination (The above Law, Section 4-7, Subsection 1, b)
The least severe reaction is annulment of the examination. Annulment alone is used in the least serious cases of cheating. An attempt to cheat includes gross negligence. The matter is decided by the University Appeals Committee.

Suspension from further studies (The above Law, Section 4-8, Subsection 3)
In the graver cases of cheating the student may be excluded from NTNU and may lose the right to take examinations at other institutions covered by the Act relating to Universities and University Colleges for a period of one year. The matters is decided by the University Appeals Committee and requires two-thirds majority, see Act of 1 April 2005 relating to Universities and University Colleges Section 4-8, Sub-section 4.

NTNU's Examination Regulations can be found on http://www.ntnu.no/studier/reglement. See Examination Regulations at the Norwegian University of Science and Technology (NTNU) (pdf).