NTNU

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

INTERNATIONAL MASTER´S PROGRAMMES
2008 - 2009

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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 2008/2009.

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 18 000 students, and approximately 3 800 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
1h	TKP4110	CHEM REACTION ENG		7,5
1h	TKP4140	PROCESS CONTROL	1	7,5
1h	TKP4155	REACTION KIN/CATALYS	1	7,5
1h	TKP4160	TRANSPORT PHENOMENA	1	7,5
1h	TKP4170	PROCESS DESIGN PROJ	2	7,5
1v	TKP4115	SURFACE/COLLOID CHEM	1	7,5
1v	TKP4130	POLYMER CHEMISTRY	3	7,5
1v	TKP4135	CHEM PROC SYST ENG	3	7,5
1v	TKP4145	REACTOR TECHNOLOGY	3	7,5
1v	TKP4150	PETROCH/OIL REFINING	3	7,5
1v	TKP4171	PROCESS DESIGN PROJ	2	7,5
1v	TKP4175	THERMODYN METHODS		7,5
		Supplementary courses	4	
1h	TBT4140	BIOCHEM ENGINEERING		7,5
1h	TMA4195	MATHEMATIC MODELLING		7,5
1h	TMA4215	NUMERIC MATHEMATICS		7,5
1h	TPG4105	PETROLEUM ENG BC		7,5
1h	TPG4140	NATURAL GAS		7,5
1h	TPK4120	SAFETY/RELIAB ANALYS		7,5
1h	TVM4145	WATER/WASTEW TREATM		7,5
1v	KJ2053	CHROMATOGRAPHY		7,5
1v	TBT4125	FOOD CHEMISTRY		7,5
1v	TBT4130	ENVIRONM BIOTECH		7,5
1v	TEP4215	PROCESS/HEAT INT		7,5
1v	TEP4250	MULTIPHASE TRANSPORT		7,5
1v	TEP4265	FOOD ENGINEERING		7,5
1v	TKJ4175	CHEMOMETRICS BC		7,5
1v	TKP4185	NUCLEAR POWER INTRO		7,5
1v	TKT4140	NUM METH COMP LAB		7,5
1v	TMM4175	POLYMERS/COMPOSITES		7,5
1v	TPG4230	FIELD DEV/OPERATIONS		7,5
1v	TTK4135	OPTIMISATION/CONTROL		7,5

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

1) At least 3 of these 4 courses must be selected.
2) The course can be chosen either in autumn (TKP4170) or in spring (TKP4171).
3) At least 1 of these courses must be selected.
4) Supplementary courses must be selected to obtain a total of 30 credits in each semester. The courses are not considered when planning the teaching and examination schedules.

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	REACTOR TECHN SC		7,5
2h	TKP4545	SEP/ENVIRONM TECH SC		7,5
2h	TKP4555	PROCESS SYST ENG SC		7,5
2h	TKP4565	PAPER/FIBER TECH 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	REACTOR TECHN SP		15,0
2h	TKP4531	REACTOR TECHN SP		7,5
2h	TKP4540	SEP/ENVIRONM TECH SP		15,0
2h	TKP4541	SEP/ENVIRONM TECH SP		7,5
2h	TKP4550	PROCESS SYST ENG SP		15,0
2h	TKP4551	PROCESS SYST ENG SP		7,5
2h	TKP4560	PAPER/FIBER TECH SP		15,0
2h	TKP4561	PAPER/FIBER TECH 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	CHEMICAL ENGINEERING		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 six main profiles:
   Catalysis and Petrochemistry
   Colloid and Polymer Chemistry
   Reactor Technology
   Separation and Environmental Technology
   Process Systems Engineering
   Paper and Fibre Technology
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	TBA4265	MARINE PHYS ENV		7,5
1h	TBA4325	SPREAD OF POLLUTION		7,5
1v	-	EXP IN TEAM INT PROJ		7,5
1v	TBA4145	PORT/COAST FACILITI		7,5
1v	TBA4270	COASTAL ENGINEERING		7,5
		Optional courses	1	
1h	TBA4275	DYNAMIC RESPONSE		7,5
1h	TBA4305	FREIGHT TRANSP SYST		7,5
1h	TBA5100	THEORETICAL SOIL MEC		7,5
1h	TFY4300	ENERGY/ENV PHYSICS		7,5
1h	TPK4120	SAFETY/RELIAB ANALYS		7,5
		Optional courses	2	
1v	TBA4115	FINITE ELEM GEOTECH		7,5
1v	TKT4225	CONCRETE TECHN 2	3	7,5
1v	TMR4225	MARINE OPERATIONS		7,5
		Specialization		
2h	TBA4550	MARINE CIV ENG SP		7,5
2h	TBA4555	MARINE CIV ENG SC		7,5
		Supplementary courses	4	
2h	TBA4275	DYNAMIC RESPONSE		7,5
2h	TBA4305	FREIGHT TRANS SYST		7,5
2h	TBA5100	THEORETICAL SOIL MEC		7,5
2h	TEP4240	SYSTEM SIMULATION		7,5
2h	TFY4300	ENERGY/ENV PHYSICS		7,5
2h	TMR4130	RISK SAFETY MAR TRAN		7,5
2h	AT327	ARCTIC OFFSHORE ENG	5	10,0
		Non-technical courses	6	
2h	GEOG3506	GEO HEALTH AND DEV		7,5
2h	GEOG3561	GENDER SOC CHANGE		7,5
		Master Thesis	7	
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 subjects.
2) Select one of the subjects.
3) Check the recommended previous knowledge in the Study Handbook.
4) One supplementary subject shall be chosen from the list. Check dates of exam. The courses are not considered when planning the teaching and examination schedules.
5) Two-week intensive course at UNIS, Svalbard. In agreement with the supervising professor. Check date of exam. Number of participants might be restricted.
6) Select one subject. Other available subjects might be chosen provided approval by professor in charge. Check date of exam.
7) Master thesis should if possible be taken in co-operation with partner institutions. 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	v
1v	TEP4220	ENERGY/ENV CONSEQUEN	2	7,5	v
1v	TET4120	EL MOTOR DRIVES		7,5	v1
1v	TET4135	ENERGY PLANNING		7,5	v1
1v	TET4170	EL INSTALLATIONS		7,5	v
1v	TET4180	POWER SYST STABILITY		7,5	v1
1v	TET4185	POWER MARKETS		7,5	v1
1v	TET4195	HIGH VOLTAGE EQUIPM		7,5	v1
1v	TET4200	MAR OFF ELECTROINST		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/RELIABIL ENG		7,5	v
2h	TPK5100	PROJECT MANAGEMENT		7,5	v
		Master Thesis			
2v	TET4900	ELEC POW ENG		30,0	o

o - compulsory courses
v - optional courses
v1 - at least three 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

8) The courses must each semester be selected so that the total weighting amounts to 30 credits (Cr).
9) 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
1h	TBA4110	SOIL INVESTIGATIONS		7,5
1h	TBA5100	THEORETICAL SOIL MEC		7,5
1h	TBA5150	GEOHAZARDS/RISKAN		7,5
1h	TKT4201	STRUCTURAL DYNAMICS		7,5
1v	TBA4115	FINITE ELEM GEOTECH		7,5
1v	TBA5155	LANDSLIDES AND SLOPE		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	TBA4515	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
1h	TVM5105	HYDROLOGY HYDROP BC		7,5
1h	TVM5115	DAM ENGINEERING BC		7,5
1h	TVM5125	HYDRAULIC DESIGN BC		7,5
1h	TVM5135	PLANN HYDROPOWER BC		7,5
1v	TGB5110	GEOLOGY TUNNELL BC		7,5
1v	TVM5130	HYDROPOWER PROJECT		15,0
1v	TVM5140	ENVIRONM/ECONOMI BC		7,5
2h	TGB5100	ROCK ENGINEERING AC		7,5
2h	TVM4106	HYDRO MODELLING		7,5
2h	TVM5160	HEADWORKS AND SED AC		7,5
2h	TVM5170	SOCIAL IMPACT ASS AC		7,5
		Master Thesis	1	
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
1h	TEP4223	LCA/ECO-EFFICIENCY		7,5	o	o
1h	TIØ4195	ENV MAN CORP SOC RES		7,5	v	o
1h	TVM4162	INDUSTRIAL ECOLOGY		7,5	o	o
1h	POL3507	POLICY ANALYSIS	1	15,0	v	-
1h	-	OPTIONAL COURSES	2	7,5	v	v
1v	-	EXP IN TEAM INT PROJ		7,5	o	o
1v	TEP4220	ENERGY/ENV CONSEQUEN		7,5	o	v
1v	TPD5100	ECODESIGN AC		7,5	v	v
1v	TVM4160	MATERIAL FLOW ANALYS		7,5	o	v
1v	POL1003	ENVIRONM POLITICS		7,5	v	o
1v	POL3507	POLICY ANALYSIS	1	15,0	-	v
1v	SØK1101	ENVIRONM RESOURCE		7,5	v	v
1v	-	OPTIONAL COURSES	2	7,5	v	v
2h	TEP4222	INPUT-OUTPUT ANALYS		7,5	v	v
2h	TPK4160	VALUE CHAIN CONTR		7,5	v	v
2h	TVM4170	SYSTEMS ANALYSIS		7,5	v	v
2h	KULT3304	TECHN SCIENCE II	1	15,0	v	v
2h	POL3507	POLICY ANALYSIS	1	15,0	v	v
2h	SOS3508	INST/INST DESIGN		15,0	v	v
2h	-	OPTIONAL COURSES	2	7,5/ 15,0	v	v
		Project and thesis preparation course	3			
2h	TEP5100	INDECOL PROJECT		15,0	v	v
2h	TVM5175	INDECOL PROJECT		15,0	v	v
		Master Thesis	4			
2v	TEP4930	INDUSTRIAL ECOLOGY		30,0		
2v	TVM4930	INDUSTRIAL ECOLOGY		30,0		

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) Course given in Norwegian only.
2) 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).
3) In the first semester, students will be assigned to an academic supervisor, who is associated with one of many participating departments. 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.
4) Choose one of the thesis codes.

Specialization:
1 Environmental Systems Analysis
2 Environmental Politics and Management

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
		Compulsory courses		
1h	TDT4245	COOPERATION TECHN		7,5
1h	TDT4250	MODEL-DRIVEN INF SYS		7,5
1h	TDT4290	CUSTOMER DRIVEN PROJ		15,0
1v	-	EXP IN TEAM INT PROJ		7,5
1v	TDT4215	WEB INTELLIGENCE		7,5
		Optional courses	1	
1v	TDT4220	COMP SYST PERFO EVAL		7,5
1v	TDT4240	SOFTWARE ARCHITECT		7,5
1v	TDT4252	MOD INFOSYST ADV		7,5
1v	TDT4280	DISTRIB INT AGENTS		7,5
1v	TIØ4270	HUMAN RES MANAGEMENT	2	7,5
		Compulsory courses		
2h	TDT4520	PROGR INFO SYST SP		15,0
2h	TDT4525	PROGR INFO SYST SC		7,5
		Optional courses	3	
2h	TDT4210	HEALTHCARE INFORM		7,5
2h	TIØ4135	ICT ECONOMICS		7,5
2h	TIØ4180	INNOV/INFO MANAGEM		7,5
2h	POL1004	GLOBALIZATION		7,5
		Master Thesis		
2v	TDT4900	COMPU INFO SCIENCE		30,0

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) Two courses must be chosen.
2) TIØ4270 will not be taught in 2008/09.
3) One course must be chosen.

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	TMT4155	HETEROGEN EQUILIBRIA		7,5
1h	TMT4185	MATR SCIENCE/ENG		7,5
1h	TMT4253	ELECTROCHEM/ENERGY		7,5
1h	TMT4325	REFIN/RECYL METALS		7,5
1v	TMT4150	REFRACTORIES		7,5
1v	TMT4165	MATR/ELECTR CHEM PRO		7,5
1v	TMT5100	ELECTR LIGHT MET 2		7,5
		Optional courses	1	
1v	TMT4851	EXP IN TEAM INT PROJ		7,5
1v	TMT4208	FLUID/HEAT TRANSF AC		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	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) Choose 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	Specialization 2
		Compulsory courses				
1h	TMR4175	MARINE STRUCTURES BC	1	7,5	o	o
1h	TMR4190	ELEM METHODS STRUCT		7,5	o	o
1h	TMR4215	SEA LOADS		7,5	o	o
1v	TMR4180	MARINE DYNAMICS	1	7,5	o	o
1v	TMR4195	DESIGN OFFSHOR STRUC		7,5	o	v
		Optional courses				
1h	TMR4115	DESIGN METHODS		7,5	v	v
1h	TMR4130	RISK ANAL/SAFETY MAN		7,5	v	-
1h	TMR4135	FISH VESSEL/WORK DES		7,5	v	-
1h	TMR4200	FATIGUE/FRACTURE		7,5	v	v
1h	TMR4235	STOCH THEORY SEALOAD		7,5	v	v
1h	TMR4275	MOD/SIM/AN DYN SYS		7,5	-	v
1v	TMR4140	DES MAR PROD PLANTS		7,5	v	-
1v	TMR4145	PROD MOD DESIGN		7,5	v	-
1v	TMR4205	BUCKLING/COLLAPS STR		7,5	v	-
1v	TMR4217	HYDRO HIGH-SPEED VEH		7,5	v	v
1v	TMR4220	NAVAL HYDRODYNAMICS		7,5	v	v
1v	TMR4225	MARINE OPERATIONS		7,5	v	v
1v	TMR4230	OCEANOGRAPHY		7,5	-	v
		Specialization courses				
2h	TMR4505	MARINE STRUCTURE SC		7,5	o	-
2h	TMR4525	MARINE HYDRODYN SC		7,5	-	o
		Specialization projects				
2h	TMR4500	MARINE STRUCTURE SP		7,5	o	-
2h	TMR4520	MARINE HYDRODYN SP		7,5	-	o
		Supplementary courses	2			
2h	TMR4115	DESIGN METHODS		7,5	v	v
2h	TMR4130	RISK ANAL/SAFETY MAN		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	TMR4300	EXP AND NUM HYDRODYN		7,5	-	v
2h	TMR4305	ADV ANAL MAR STRUCT		7,5	v	-
		Master Thesis				
2v	TMR4900	MARINE STRUCTURES		30,0	o	o

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

Specialization:
1. Marine structures
2. Marine hydrodynamics

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 courses				
1h	TMR4130	RISK ANALYSIS SAFETY		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	TMR4295	DES OF MECH SYST		7,5	o	v
1v	TMR4140	DES MAR PROD PLANTS		7,5	-	o
1v	TMR4265	OPERATION TECHN BC		7,5	o	o
		Optional courses				
1h	TMR4115	DESIGN METHODS		7,5	-	v
1h	TMR4290	DIESEL-EL PROP SYST		7,5	-	v
1v	TMR4120	UNDERWATER ENG BC		7,5	v	v
1v	TMR4145	PROD MOD DESIGN		7,5	v	v
1v	TMR4180	MARINE DYNAMICS		7,5	v	v
1v	TMR4280	INTERNAL COMB ENGINE		7,5	v	v
		Supplementary courses	2			
1h	BI3061	BIOLOG OCEANOGRAPHY		7,5	-	v
1h	TIØ4120	OP RESEARCH INTRO		7,5	-	v
1h	TMM4165	JOINING TECH		7,5	-	v
1h	TMR4175	MARINE STRUCTURE BC		7,5	-	v
1h	TMR4215	SEA LOADS		7,5	-	v
1h	TMR4275	MOD/SIM/AN DYN SYST		7,5	-	v
1h	TPK4160	VALUE CHAIN CONTROL		7,5	-	v
1h	TPK5100	PROJ MANAGEMENT		7,5	-	v
1h	TTT4175	MARINE ACOUSTICS 1		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. Operation Technology
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 courses				
1h	TMR4115	DESIGN METHODS		7,5	-	o
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	DIESEL-EL PROP SYST		7,5	o	v
1h	TMR4295	DES OF MECH SYST		7,5	o	-
		Optional courses				
1h	TMR4135	FISH VESSEL WORK DES		7,5	-	v
1h	TMR4137	SUST UTIL MAR RES		7,5	-	v
1h	TMR4175	MARINE STRUCTURES BC		7,5	-	v
		Supplementary courses	2			
1h	TIØ4120	OP RESEARCH INTRO		7,5	-	v
1h	TMM4165	JOINING TECH		7,5	-	v
1h	TMR4115	DESIGN METHODS		7,5	-	v
1h	TMR4130	RISK ANALYSIS SAFETY		7,5	-	v
1h	TMR4215	SEA LOADS		7,5	-	v
1h	TMR4290	DIESEL EL PROP SYST		7,5	-	v
1h	TPK4160	VALUE CHAIN CONTROL		7,5	-	v
		Compulsory courses at Delft				
1v	MT044	NAVAL SHIP DESIGN		3,0	-	o
1v	MT113	DESIGN ADV VEHICLES		3,0	o	-
1v	MT218	MECHATRONIC MAR TECH		5,0	o	o
1v	MT713	MARINE ENGINEERING C		2,0	o	o
1v	MT728	SHIP REPAIR/SALVAGE		3,0	o	o
1v	WB4408A	DIESEL ENGINES A		4,0	o	-
1v	WB4408B	DIESEL ENGINES B		4,0	o	-
		Optional courses at Delft				
1v	CT4130	PROBABILISTIC DESIGN		4,0	v	v
1v	MT313	SHIPPING MANAGEMENT		3,0	v	v
1v	MT514	SHIP MOTIONS/MANOEUV		3,0	v	v
1v	MT515	RESISTANCE/PROPULS		2,0	v	v
1v	MT724	SHIP FINANCE		3,0	v	v
1v	MT729	MARITIME BUS GAMES		3,0	v	v
1v	MT816	COMPOSITE MAT IN MT		2,0	v	v
1v	OE4603	INTRO OFFSH STRUCT		3,0	v	v
1v	OE4652	FLOAT OFFSH STRUCT		4,0	v	v
1v	SPM9322	SIMULAT MASTER CLASS		5,0	-	v
1v	WB3420-03	LOGISTICS INTRODUCT		5,0	v	v
1v	WMO732MT	MARITIME LAW		3,0	-	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.

cont.

Specialization:
2. Marine Engineering
3. Design of Marine Systems

*For students who choose the option Marine Systems Engineering and the main profiles Marine Engineering or Design of Marine Systems, 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 (2008/09)

MARINE SYSTEMS ENGINEERING

Ex	Subject no.	Subject title	Note	Cr	Specialization		
					1	2	3
		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
		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
		Supplementary courses	1				
2h	TBA4305	FREIGHT TRANSP SYST		7,5	-	-	v
2h	TIØ4120	OP RESEARCH INTRO		7,5	v	-	-
2h	TMM4165	JOINING TECH		7,5	-	-	v
2h	TMR4115	DESIGN METHODS		7,5	v	v	-
2h	TMR4130	RISK ANALYSIS SAFETY		7,5	-	-	v
2h	TMR4135	FISH VESSEL WORK DES		7,5	v	-	-
2h	TMR4137	SUST UTIL MAR RES		7,5	-	-	v
2h	TMR4200	FATIGUE/FRACTURE		7,5	-	v	v
2h	TMR4215	SEA LOADS		7,5	-	v	v
2h	TMR4275	MOD/SIM/AN DYN SYST		7,5	-	v	v
2h	TMR4290	DIESEL-EL PROP SYST		7,5	-	v	v
		Master Thesis					
2v	TMR4905	MARINE SYST ENG		30,0	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. Marine Engineering
2. Technical Operation of Marine Systems
3. Design of Marine Systems

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	TTT4140	FUND OF NAVIGATION		7,5
1v	TMR4180	MARINE DYNAMICS	1	7,5
1v	TTT4150	NAVIGATION SYSTEMS		7,5
		Optional courses		
1v	TMR4220	NAVAL HYDRODYNAMICS		7,5
1v	TMR4217	HYDRO HIGH-SPEED VEH	2	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 SC PROJECT		7,5
2h	TMR5260	NAUTIC SC SPEC SUBJ		7,5
		Optional courses		
2h	TMR4130	RISK ANALYSIS SAFETY		7,5
2h	TMR4235	STOCH THEORY SEALOAD		7,5
2h	TTT4175	MAR ACOUSTICS		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*
1h	BI3013	EXP CELL BIOLOGY		7,5	-	-	-	-	v
1h	FY2302	BIOPHYSICS 1		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	TBT4135	BIOPOLYMERS		7,5	-	-	-	-	v
1h	TBT4145	MOL GENETICS		7,5	-	-	-	-	o
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 BASED 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	TMA4270	MULTIVAR ANALYSIS		7,5	-	-	o	-	-
1h	TTK4160	MEDICAL IMAGING		7,5	-	-	v	-	-
1h	TTT4125	INFO THEORY COD/COMP		7,5	o	-	-	-	-
1h	TTT4130	DIG COMMUNICATION		7,5	v	-	-	-	-
1h	TTT4155	REMOTE SENSING		7,5	v	-	-	-	-
1h	TTT4175	MARINE ACOUSTICS		7,5	v	-	-	-	-
1v	-	EXPH 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	IT2801	INFO RETRIEVAL		7,5	-	-	v	-	-
1v	MOL3007	FUNCTIONAL GENOMICS		7,5	-	-	-	-	v
1v	MOL4010	MOL BIOL FOR TECH	3	7,5	-	-	v	-	-
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	BIOPHYSICS SPECIAL		7,5	-	-	-	o	-
1v	TFY4320	MEDICAL PHYSICS		7,5	v	-	-	o	-
1v	TKT4150	BIOMECHANICS		7,5	-	-	-	v	-
1v	TMA4300	MODERN STAT METHODS		7,5	-	-	v	-	-
1v	TTK4165	SIGNAL PROC MED IMAG		7,5	o	-	-	-	-
1v	TTK4170	MOD/IDENT BIOL SYS		7,5	-	-	-	v	-
1v	TTT4135	MULTIMEDIA SIGN PROC		7,5	o	-	-	-	-
1v	TTT4160	MOB COMMUNICATIONS		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	TTK4505	MED 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	TTK4500	MED 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	TFE4900	SIGN PROC COMMUN	5	30,0	v	-	-	-	-
2v	TFY4900	PHYSICS		30,0	-	-	-	o	-
2v	TTK4900	ENGINEERING CYBERN	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) DT8112 will not be taught in 2008/09.
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 TTK4500/ TTK4505 and TTT4520/TTT4525.
5) Students at specialization Medical Signal Processing and Imaging should choose either TFE4900 or TTK4900.

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN PETROLEUM ENGINEERING AND PETROLEUM GEOSCIENCES

Term 1, 2, 3 and 4

PETROLEUM ENGINEERING (MSG1)

Ex	Subject no.	Subject title	Note	Cr	Specialization 1	2	3	4
		Compulsory and optional courses	1					
1h	TPG4145	RESERVOIR FLUIDS		7,5	o	o	v	v
1h	TPG4150	RESERVOIR REC TECHN		7,5	o	o	o	o
1h	TPG4177	CARB RESERVOIR CHAR		7,5	v	v	v	v
1h	TPG4215	HIGH DEV DRILLING		7,5	v	v	o	v
1h	TPG4235	WELL TESTING AC	2	7,5	v	v	v	v
1h	TPG5100	MATH/COMPUTER METHOD		7,5	o	o	o	o
1h	TPG5120	PETROPHYSICS BC	3	7,5	v	v	v	v
1v	TPG4160	RESERVOIR SIMULATION		7,5	o	v	v	v
1v	TPG4180	PETR PHYS INTERPR AC	3	7,5	v	v	v	o
1v	TPG4205	DRILL TECH PR CONTR		7,5	v	v	v	v
1v	TPG4220	DRILLING FLUID		7,5	v	v	o	v
1v	TPG4225	FRACTURED RESERVOIR		7,5	v	v	v	v
1v	TPG4230	FIELD DEVELOPMENT		7,5	v	o	v	v
1v	TPG5110	PETROLEUM ECONOMICS		7,5	v	v	v	v
		Compulsory and optional courses	4					
2h	TPG4185	FORMATION MECHANICS		7,5	v	v	v	v
2h	TPG4235	WELL TESTING AC	2	7,5	v	v	v	v
2h	TPG5200	PET ENG/GEO INT PROJ		7,5	v	v	v	v
		Specialization courses	5					
2h	TPG4505	FORM EV-ENG SC		7,5	-	-	-	o
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	6					
2h	TPG4500	FORM EV-ENG SP		15,0	-	-	-	o
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

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) Two optional subjects must be chosen in the autumn semester (1h) in specialization 4. In specialization 1, 2 and 3 one optional subject must be chosen. Three subjects must be chosen in the spring semester for all specializations.
2) Prerequisite: A introductory course in well testing.
3) TPG4180 requires TPG5120 or equivalent.
4) One subject must be chosen in the third semeser (2h). In addition to the subjects listed, students can also choose from first semester, Petroleum Engineering and Petroleum Geosciences.
5) One specialization course of 7,5 credit points must be chosen.
6) Specialization projects must be chosen according to elected specialization.

cont.

Specialization:

1. Reservoir Engineering
2. Petroleum Production
3. Drilling Engineering
4. Formation Evaluation

FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

MSC-PROGRAMME IN PETROLEUM ENGINEERING AND PETROLEUM GEOSCIENCES

Term 1, 2, 3 and 4

PETROLEUM GEOSCIENCES (MSG2)

Ex	Subject no.	Subject title	Note	Cr	Specialization 1	Specialization 2
		Compulsory and optional courses	1			
1h	TGB4160	PETROLEUM GEOLOGY		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	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	TPG5100	MATH/COMPUTER METHOD		7,5	o	o
1h	TPG5120	PETROPHYSICS BC	3	7,5	v	v
1v	TGB4135	BASIN ANALYSIS		7,5	v	v
1v	TGB4170	DIAGENESIS/RESQUAL		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	3	7,5	v	v
1v	TPG5110	PETROLEUM ECONOMICS		7,5	v	v
2h	TPG4190	SEISMIC DATA		7,5	o	v
2h	TPG5200	PET ENG/GEO INT PROJ		7,5	-	v
		Specialization courses	4			
2h	TGB4565	PETR GEOLOGY SC		7,5	-	o
2h	TPG4545	PETR GEOPHYS SC		7,5	o	-
		Specialization project	5			
2h	TGB4560	PETR GEOLOGY SP		15,0	-	o
2h	TPG4540	PETR GEOPHYS SP		15,0	o	-
		Master Thesis	6			
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 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.
3) TPG4180 requires TPG5120 or equivalent.
4) One specialization course must be chosen, either one topic of 7,5 cr or two topics of 3,75.
5) Specialization projects must be chosen according to elected specialization.
6) The master thesis must be chosen according to elected specialization.

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.
1h	TIØ4265	STRATEGIC MANAGEMENT	1	7,5	v
1h	TIØ5200	PROJECT MANAGEMENT 3		7,5	o
1h	TPK5100	PROJ MANAGEMENT 1		7,5	o
1h	TPK5110	QUALITY/RISK MANAGEM		7,5	o
1v	-	EXP IN TEAM INT PROJ		7,5	o
1v	TIØ4140	PROJECT EVALUATION	2	7,5	v
1v	TIØ4175	IND MANAGEMENT 4C	2	7,5	v
1v	TIØ4235	IND MANAGEMENT 4B	2	7,5	v
1v	TIØ5210	PROJECT MANAGEMENT 5		7,5	o
1v	TIØ5215	PROJECT MANAGEMENT 6		7,5	o
		Specialization courses	3		
2h	TBA4535	PRO MAN SC		7,5	
2h	TIØ5225	PRO MAN SC		7,5	
2h	TPK4505	PRO MAN SC		7,5	
		Specialization projects	4		
2h	TBA4530	PRO MAN SP		15,0	
2h	TIØ5230	PRO MAN SP		15,0	
2h	TPK4500	PRO MAN SP		15,0	
2h	TBA5200	PROJECT MANAGEMENT 2	5	7,5	o
2h	TIØ4265	STRATEGIC MGMT	6	7,5	v
		Master Thesis	7		
2v	TBA4910	PROJ MANAGEMENT		30,0	
2v	TIØ4920	PROJ MANAGEMENT		30,0	
2v	TPK4905	PROJ MANAGEMENT		30,0	

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) Students can apply for a technical course instead of this course
2) One of these three are recommended. A technical subject may be chosen.
3) One specialization course must be chosen.
4) One specialization project must be chosen according to elected spesialization course.
5) Not for academic year 2008/09.
6) Only for academic year 2008/09. Students can apply for a technical course instead of this course.
7) 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	TMA4275	LIFETIME ANALYSIS		7,5
1v	TPK4110	QUAL PERF ORIENT		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	TPK5110	QUALITY/RISK MANAGEM		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

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	TMT4150	REFRACTORIES		7,5
1v	TMT4165	MAT/ELECTROCH PROJ		7,5
1v	TMT4208	FLUID/HEAT TRANSF AC		7,5
		Optional courses	1	
1v	-	EXP IN TEAM INT PROJ		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	TTM4142	NETW MULTIMEDIA SYS		7,5	o	o	o
1h	TTM4150	INTERNET NETW ARCH		7,5	o	o	o
1v	TTM4115	ENG DIST REAL SYS		7,5	o	o	o
1v	TTM4128	NETW AND SERV MAN		7,5	o	o	o
1v	TTM4135	INFORMATION SEC		7,5	o	o	o
		Optional courses	1				
1v	TTM4120	DEPENDABLE SYSTEMS		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	TTM4900	TELEMATICS MASTER		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

MASTER OF PHILOSOPHY (M. PHIL.) IN MARITIME ARCHAEOLOGY

The degree is also known as the 'International M.Phil. in Maritime Archaeology'.

Admission requirements

Applicants should hold a B.A. or an equivalent degree in Archaeology, or an equivalent degree with a sufficient emphasis on topics related to Archaeology. Candidates with an equivalent B.A. degree in Arts/Social Sciences and other relevant subjects (e.g. Geology, Geophysics, Marine Technology or Oceanography) can also apply, if the candidate has completed a satisfactory number of courses in Archaeology. Candidates must have completed at least 20 ECTS credits (studiepoeng) of basic courses in Archaeology from NTNU, or equivalent courses (at least 1/3 of one year of full-time study). NTNU offers a foundation course in archaeology (22,5 ECTS-credits) for applicants without previous studies/background in archaeology/prehistory. This foundation course must be completed before the student can join the MPhil. programme. Applicants with a Norwegian bachelor degree must have an average grade C on their bachelor specialization. Officially certified copies of all educational certificates, including transcripts and diplomas from secondary school and university, must be submitted.

An English proficiency test certificate must be included. Applicants must pass either the TOEFL with a minimum paper score of 550 (230 computer) or the IELTS with a grade of 6.0 or better. Citizens from 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 have attended higher secondary school or university during this time. 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 language 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 for which the language of instruction has been English are not exempted from the English language requirements, with the exception of candidates holding a B.A. degree in English.

Norwegian applicants to the international master's programmes must have passed the required exam in English language ("Engelsk grunnkurs") in the Norwegian Higher Secondary School system. Applicants from European or other industrialised countries which have ratified the Lisbon Convention, should document a minimum of seven years of English as a subject at primary and secondary school level when submitting the final application form. Applicants from some of these countries, who have less than seven years of English from primary and secondary school, must however satisfy the English test requirements (TOEFL/IELTS test with satisfactory score) mentioned above.
NB! The program is also open to non-quota program applicants.

The M.Phil. programme in Maritime Archaeology focuses on the following topics:

- Maritime Aspects of Culture: the development and scope of the subject, current research, theoretical perspectives and central issues.
- Comparative Perspectives on Maritime Cultural Landscape: interaction between land and sea in the cultural development of the world.
- Boat and Shipbuilding Technologies: materials and techniques of construction, and the major building traditions of the world, with focus on certain periods. Our main focus will be on current research projects.
- Ship Science in Archaeology: recording, reconstruction and analysis of ancient hulls.
- Seafaring in the World; covering seafaring, navigation, anchorages, harbours, trade and exchange.
- Marine Natural Resources in cultural development from a world comparative perspective.

- Underwater Cultural Heritage Management: deals with the priorities of assessing, protecting and managing underwater archaeological resources.
- Archaeological Oceanography.
- Underwater Archaeology: the application of archaeological principles in underwater environments, and associated skills – including marine archaeological field methods.
- Deep-Water Archaeology: a study program in deep-water archaeology including the use of technology and methods developed at NTNU.
- Conservation of Underwater Archaeological sites.

Course outline

The M.Phil. Programme requires two years of full-time study, and starts in the autumn term. The credits are divided between courses comprising a total of 60 credits and a thesis of 60 credits. 60 credits constitutes the normal workload for a full-time student for one academic year.

M.Phil. in Maritime Archaeology

Semester	**7,5 ECTS credits**	**7,5 ECTS credits**	**7,5 ECTS credits**	**7,5 ECTS credits**
4 Spring	ARK3095 MPhil Master's Thesis Seminar			
3 Autumn	ARK3041 Management of maritime Heritage		ARK3095 MPhil Master's Thesis Seminar	
2 Spring	ARK3016 Maritime Culture II		ARK3025 Maritime archaeological Field Research II	ARK3095 MPhil Master's Thesis Seminar
1 Autumn	ARK3011 Maritime Culture I		ARK3020 archaelogial Field Research I	ARK3095 MPhil Master's Thesis Seminar

Teaching and exams

Each course has a take-home exam. Normally each 15 credit course has four hours of teaching per week in the form of lectures and seminars. The master's thesis should be written in English.

After the first year of studies – during the period mid June to mid August – candidates are given the opportunity to return 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 IN ENGLISH LANGUAGE AND LINGUISTICS

The Department of Modern Foreign Languages offers an international Master's programme in English Language and Linguistics. The aim of the programme is to give students a deeper insight into issues such as modern English grammar and syntax, communication studies, first and second language acquisition and translation theories.

Programme outline

The M. Phil. Programme requires two years of full-time studies, and starts in the autumn term (mid August). The normal workload for a full-time student for one academic year is 60 ECTS credits. The first year of the programme is devoted to a combination of courses, comprising a total of 60 ECTS credits. Of these at least 30 ECTS credits have to be from Master's level courses (courses with a 3000 code), but up to 30 credits may be obtained from advanced courses (courses with a 2000 code). Second year students are expected to work exclusively on their master's thesis, which also counts for a total of 60 ECTS credits. In the first year students may choose from the 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 and Practical Aspects of Grammar and Translation	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	
ENG3500	English Linguistics Specialisation Course	7,5	Autumn	Yes *)
ENG3910	Master's Thesis in English Language and Linguistics	60	Spring and autumn	Yes *)
*) ENG3500 and ENG3910: Admission to the courses requires admission to the study programme Master of Philosophy (M. Phil.) in English Language and Linguistics.				

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

Master of Philosophy in English Language and Linguistics

Semester	7.5 credits	7.5 credits	7.5 credits	7.5 credits
Spring 4	ENG3910 Master's Thesis in English Language and Linguistics			
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		ENG3500 English Linguistics specialisation course	ENG2155 Theoretical and Practical Aspects of Grammar and Translation

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 (see below), 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
Normally 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 course projects. For more information, see the course descriptions on the web.

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

By the end of the second semester at the master's programme, students must hand in a project proposal for their master's thesis. The project proposal is 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.

Admission 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.

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.

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 http://www.maeappliedethics.eu/start. Deliberately integrating these diverse categories of students is part of the learning experience. The MAE curriculum has been designed to be flexible in order to fulfil the demands of both categories of student, with options that fit the specific needs, strengths and weaknesses of both student groups.

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 either a combination of courses in applied ethics and a master's thesis, or a full semester devoted solely to a master's thesis.

Courses in different areas of Applied Ethics are offered by the different institutions, according to their respective academic strengths and expertise. Hence, a student with an interest in, for instance, bioethics will take the course Bioethics offered in Linköping, or the course in Animal and Nature Ethics offered in Utrecht. During the second semester students can then write their master's thesis in Linköping or Utrecht under the supervision of the professor of bioethics at either institution. However, in order to increase flexibility and possible options it is also possible for students to take a course at one university and then to move to another university for their thesis work.

The MAE offers students different options depending on their educational background and interests. Students with an academic background in ethics, with a specialisation/major in, for example, ethics, philosophy or religious studies, can either take courses in applied ethics (approx. 30 ECTS credits), and write a master's thesis of 30 ECTS, or take courses with a combined scope of 45 ECTS and write a master's thesis of 15 ECTS. In order to acquire sufficient competence in ethics and applied ethics, students with a professional background must take courses comprising 45 ECTS credits and write a master's thesis of 15 ECTS.

Student mobility

Since each collaborating institution offers at least 75 percent of a full programme of relevant courses, students are offered plenty of possibilities for mobility within the MAE. First, all students are gathered together for the introductory course at one of the four participating universities. Then, student mobility will be determined by students' choice of courses, with the restriction that at least one of the courses chosen must be carried out at a second institution. Students are recommended to write their master's thesis at the same institution in which they take at least one of the courses.

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. 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.

In this way, the programme will enhance the quality of applied ethics as an academic field. Furthermore, it will be instrumental in focusing on the ethical aspects of medicine, technology, politics and business and, hence improve the quality of these practices on a European level. The MAE 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 It develop students' knowledge of and ability for critical reflection on pertinent moral problems in modern society.

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
FI5201	Multicultural Conflicts and Ethics	15	Autumn	Yes 1)
FI5202	Master's Thesis in Applied Ethics	30	Spring	Yes 1)
FI5204	Reading Course in Applied Ethics	15	Spring	Yes 1)
FI5205	Corporate responsibility and ethics	7,5	Autumn	Yes 1)
FI5206	Technology for a good society	7,5	Autumn	Yes 1)
1) Requires admission to the Erasmus Mundus programme Master of Applied Ethics.				

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 external examiner 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 in order to obtain a master's degree. 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 the 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.

GLOBALIZATION

MASTER OF SCIENCE IN GLOBALIZATION SPECIALISATIONS

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 and choose between two specialisations: Global Technology Management and Global Politics and Culture. You will also gain practical experience through a semester-long internship in a global corporation, multilateral organization or international campaigning group. If you are an International student, your internship will take place in Norway. If you are student with a Norwegian or Nordic educational background, your internship will take place outside Norway.

The aim of the programme is to provide you with a general understanding of the form and consequences of the processes of Globalization, combined with an in-depth knowledge of one of the two fields of specialisation. The course will investigate Globalization as a multi-dimensional phenomenon with a focus on its implications for civil society, state power, changing patterns of national culture and global markets and technologies.

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

- 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 is designed to provide its students with the specialist knowledge and transferable skills to pursue careers in global corporations, non-governmental organisations or with international campaigning groups. 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.

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	7,5	Autumn	
	Experts in team or an alternative course approved by the programme's board *)	7,5	Spring	
SANT3507	Globalization, Culture and Identity	7.5	Autumn	
GLOB3001	Internship Work Project	22,5	Autumn	**)
GLOB3900	Master's Thesis in Globalization (at NTNU)	30	Spring	**)
*) Course descriptions for the Experts in Team courses (called 'villages') will be made available from the Web in the autumn semester of 2008. Students may choose an alternative course to the EiT. Applications must be sent to the Department of Modern Foreign Languages. **) Requires admission to the programme of study (MSc in Globalization).				

Courses: Global Technology Management

Course code	Course title	ECTS credits	Semester	Restricted admission
TPK5100	Project Management 1	7,5	Autumn	
TIØ4195	Environmental Management and Corporate Social Responsibility *)	7,5	Autumn	
TDT4245	Cooperation Technology *)	7,5	Autumn	
TPK5110	Quality and Risk Management in Projects *)	7,5	Autumn	
TPK4160	Value Chain Control and Applied Decision Support*)	7,5	Autumn	
TIØ4280	Change and ICT in Complex Systems	7,5	Spring	
TPK4135	Logistics and Production Management	7,5	Spring	
TIØ4175	Industrial Management 4C - Logistics and Purchasing Management**)	7,5	Spring	
TPK4180	Global Manufacturing Strategy **)	7,5	Spring	
*) Choose one of these four courses, see semester breakdown below.				
**) Choose one of these two courses, see semester breakdown below.				

Courses: Global Politics and Culture

Course code	Course title	ECTS credits	Semester	Restricted admission
KULT3320	Globalization Theory	7,5	Autumn	
GEOG3050	Theories of Social Change	7,5	Autumn	
RVI2115	Religion and Politics in the Age of Globalization *)	15	Spring	
SØK1102	Introductory Development Economics *)	15	Spring	
MUSV1007	Music and Globalization *)	15	Spring	
POL3503	International Political Economy *)	15	Spring	
POL3004	Historical and Comparative Methods	7,5	Spring	
*) Choose one of these four courses, see semester breakdown below.				

Global Politics and Culture

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. The full names of the courses and a breakdown of each semester are given in the tables below. In the first semester, two courses (GEOG3518 *Theories of Social Change* and HIST3295 *Contemporary International Economic History*) will be taken by students in both Global Technology Management and Global Politics and Culture specializations. Students either take Experts in Team or an alternative course which must be approved by the programme's board. Applications for the alternative course must be sent to the Department of Modern Foreign Languages. All students will spend Semester 3 in a global corporation or organization, during which time they will complete a written report. During this third semester, they will also take a distance learning course on global culture. The 30 credit Master's thesis should be completed in the fourth semester of study.

Global Technology Management Specialisation

In the first semester, in addition to the joint courses and activities mentioned above, The Global Technology Management students will also take TPK5100 and then select one additional course from a choice of four specialized options (see Table A). In semester 2, in addition to Experts in Team, they will take two courses (TIØ4280 and TPK4135) and chose a further one course from a choice of two specialized options.

Global Politics and Culture Specialisation

In the first semester, in addition to the joint courses and activities mentioned above, the Global Politics and Culture students will take also take KULT3320 *Globalization Theory* and GEOG3050 *Theories of Social Change* (see Table B). In semester 2, in addition to the Experts in Team course, they will take POL3004 and chose a further one course from a choice of four specialized options.

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. An individual supervisor will be assigned in the second semester of study, who will be responsible for supervising both the internship report and the Master's thesis. Students may choose to relate the contents of their Master's thesis to the internship report. A project proposal in the form of a written outline of the thesis (around 5 pages) should be submitted in the second semester. The thesis should be written over a 20-week period in the fourth semester. The deadline for submission of the thesis is normally June 15th. Students must have passed all the courses on the Master's programme before submitting the Master's 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.

Global Technology Management Semester Breakdown

Semester	7.5 credits	7.5 credits	7.5 credits	7.5 credits
4th sem. Spring	GLOB3900 Master's Thesis in Globalization (at NTNU)			
3rd sem. Autumn	Internship			
	GLOB3001 Internship Work Project			SANT3507 Globalization, Culture and Identity
2nd sem. Spring	Experts in Team or an alternative course approved by the programme's board *)	TIØ4280 Change and ICT in Complex Systems	TPK4135 Logistics and Production Management	TIØ4175 Industrial Management 4C – Logistics and Purchasing Management or TPK4180 Global Manufacturing Strategy
1st sem. Autumn	GEOG3518 Knowledge Management in a Global Economy	HIST3295 Contemporary International Economic History	TPK5100 Project Management 1	Choose one of the courses below: TIØ4195 Environmental Management and Corporate Social Responsibility TDT4245 Cooperation Technology TPK5110 Quality and Risk Management in Projects TPK4160 Value Chain Control and Applied Decision Support
*) Course descriptions for the Experts in Team (called 'villages') will be made available on the web in the autumn semester of 2008. Students may choose an alternative course to the EiT. Applications must be sent to the Department of Modern Foreign languages.				

Global Politics and Culture Semester Breakdown

<table>
<tr><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>4th sem. Spring</td><td colspan="4">GLOB3900 Master’s Thesis in Globalization (at NTNU)</td></tr>
<tr><td rowspan="2">3rd sem. Autumn</td><td colspan="4">Internship</td></tr>
<tr><td colspan="3">GLOB3001 Internship Work Project</td><td>SANT3507 Globalization, Culture and Identity</td></tr>
<tr><td>2nd sem. Spring</td><td>Experts in Team or an alternative course approved by the programme’s board *)</td><td>POL3004 Historical and Comparative Methods</td><td colspan="2">Choose one of the courses below:

RVI2115 Religion and Politics in the Age of Globalization

SØK1102 Introductory Development Economics

MUSV1007 Music and Globalization

POL3503 International Political Economy</td></tr>
<tr><td>1. sem. Autumn</td><td>GEOG3518 Knowledge Management in a Global Economy</td><td>HIST3295 Contemporary International Economic History</td><td>KULT3320 Globalization Theory</td><td>GEOG3050 Theories of Social Change</td></tr>
<tr><td colspan="5">*) Course descriptions for the Experts in Team (called ‘villages’) will be made available on the web in the autumn semester of 2008. Students may choose an alternative course to the EiT. Applications must be sent to the Department of Modern Foreign languages.</td></tr>
</table>

Experts in Team (EiT)

Experts in Team is an inter-disciplinary project-based course which is compulsory for all Master’s students at NTNU. The teams are called ‘villages’. The course focuses on problem-based learning and multidisciplinary cooperation in problem-solving within “real” industrial, commercial or social contexts.

The students may choose to take an alternative course of 7,5 credits instead of EiT. This course must be approved by the programme’s board, and applications must be sent to the Department of Modern Foreign Languages.

Internships

The internship in the third semester provides a unique opportunity for students to develop and build their personal, academic and professional capacities by managing an individual work project within a global company or multilateral organization or international campaigning group. The work project should contribute an interdisciplinary perspective and should be relevant to the needs and requirements of the company/institution. It should lead to the production of a written report, which relates to the taught element of the programme and which fulfils the academic requirements of a Master’s level programme. The internship will be undertaken under the supervision of an academic supervisor at NTNU and an internship manager. In the first semester, students will receive information about the selection of internships and will send their CVs to the companies/organisations which interest them. In

the second semester, students will receive project descriptions from the companies/organisations. During this semester, students will be matched with an NTNU supervisor and an internship supervisor, both of whom will follow their progress. A written report relating to the internship work project (between 30 and 40 pages; 12 pt, 1.5 spacing) should be submitted to NTNU by the end of the second semester (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. The Master's programme includes a series of guest lectures, specifically geared at this programme, given by national and international specialists in Globalization research.

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 or equivalent from a university or college.
- 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. degree (in their original subject), with a specialization in Globalization.
- International students with equivalent backgrounds are encouraged to apply.

Additional Admissions Information

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

MASTER OF PHILOSOPHY (M.PHIL.) IN LINGUISTICS

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.

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 15 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
LING2206	Computational Linguistics I	7,5	Spring	
LING2216	Computational Linguistics II	7,5	Autumn	
LING2211	Semantics and Syntax	15	Autumn *)	

LING3000	Chosen Topic	7,5	Spring	
LING3301	Phonology and Pragmatics	15	Autumn *)	
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	**)
*) Compulsory courses in the M. Phil in Linguistics.				
**) 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 *)	15	Autumn	
ENG2153	First and Second Language Acquisition	7.5	Spring	
ENG3122	Cognitive and Theoretical Aspects of Language **)	15	Spring	
*) Students who choose FON1101 are exempted from LING3302.				
**) Students who choose ENG3122 are exempted from LING2206 and LING3000.				

M.Phil. in Linguistics:

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	LING2206 Computational Linguistics I	LING3000 Chosen Topic	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.

MPHIL PROGRAMME IN CHILDHOOD STUDIES

Approved by the Board at NTNU 30.08.2005, with changes made by the Faculty of Social Sciences and Technology Management 20.01.2008

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. 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 new 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 in the western world, as well as in countries in the South. The ways in which children themselves explore and experience their everyday lives and childhoods are also explored.

Employment opportunities

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. In addition, the master's programme qualifies for work related to research, consultancy, teaching and supervision in the field of children, welfare and development.

ADMISSION REQUIREMENTS

The master's programme accepts students financed by the Quota Programme, Norwegian/Nordic students, and other students with individual funding. The total number of admitted students is 15 pr. year.
Admittance to the programme requires a bachelor's degree in a social science or humanities discipline, 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 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

COURSE OUTLINE

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).

Core courses

Code	Title	Cr	Term	Restricted admission
BARN3101	Social Studies of Children and Childhood: Research Perspectives	7.5	Autumn	No
BARN3102	Children's Rights	7.5	Autumn	No
BARN3200	Methodology in Child and Childhood Research	15	Spring	No
BARN3300	Children and Development in the South	7.5	Spring	No
BARN3400	Preparatory Course, Master's Thesis	7.5	Spring	Yes 1)
BARN3500	Historical Perspectives on Childhood	7.5	Autumn	No
BARN3900	Master's Thesis	60	Autumn/spring	Yes 1)

1) Requires admission to the master programme

Elective courses

Code	Title	Cr	Term	Restricted admission
GEOG3506	Geography, Health and Development	7.5	Autumn	No
GEOG3515	Environment, Development and Changing Rural Livelihoods	7.5	Autumn	No
GEOG3516	Humanitarianism: Theory and Practice	7.5	Autumn	No
GEOG3561	Gender and Social Change	7.5	Autumn	No
SANT3502	Anthropological Perspectives on Sex and Gender	7.5	Autumn	No

Outline of the MPhil programme in Childhood Studies

Semester	Course	Course	Course	Course
4th sem/spring 3rd sem/autumn	BARN3900 Master's Thesis (60 credits)			
2nd sem/spring	BARN3200 Methodology in Child and Childhood Research (15 credits)		BARN3300 Children and Development in the South (7.5 credits)	BARN3400 Preparatory Course, Master's Thesis (7.5 credits)
1st sem/autumn	BARN3101 Social Studies of Children and Childhood: Research Perspectives (7.5 credits)	BARN3102 Children's Rights (7.5 credits)	BARN3500 Historical Perspectives on Childhood (7.5 credits)	Elective (7.5 credits)

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
SANT3502	SVSANT342	7.5 credits

GEOG3506	SVGEO331	7.5 credits
GEOG3561	SVGEO361	7.5 credits

MPHIL PROGRAMME IN DEVELOPMENT STUDIES

Approved by the Board at NTNU 16.12.2002, with changes made by the Faculty of Social Sciences and Technology Management 21.01.2007.

The Master in Development Studies 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 foreign and Norwegian students.

ADMISSION REQUIREMENTS

Applicants should hold a Bachelor of Social Science. The degree should 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 teaching language is English, and the applicants must document their English proficiency by achieving one of the following:

- Pass in the foundation course ("grunnkurs") in English at a Norwegian Upper Secondary School.
- TOEFL-test with a minimum of 550 points (213 computer based test).
- IELTS-test with 6,0 points or better.

Exceptions from this requirement can be given for certain groups of applicants. For more information about the admission requirements, please consult the following webpage: http://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: GEOG3050 Theories of Social Change and Development, Interdisciplinary Teamwork (EiT), GEOG3003 Methodology and the Research Process, and 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 and other departments. Most of the electives will be offered in the autumn term. Courses other than those listed below can be chosen as electives if approval is given by the Department of Geography.

CORE COURSES:

Code	Title	Cr	Term	Restricted admission
GEOG3050	Theories of Social Change and Development	15	Autumn /Spring	No
GEOG3003	Methodology and the Research Process	7,5	Autumn	No
GEOG3005	Qualitative methods	7,5	Spring	No
GEOG3006	Quantitative methods	7,5	Spring	No
EiT	Interdisciplinary Teamwork	7,5	Spring	Yes
GEOG3920	Master's Thesis	45	Autumn /Spring	Yes 1)

1) Requires admission to the programme

ELECTIVES:

Code	Title	Cr	Term	Restricted admission
GEOG3505*	Landscape and Planning	15	Autumn	No
GEOG3506*	Geography, Health and	7,5	Autumn	No

Code	Title	Cr	Term	Restricted admission
	Development			
GEOG3510*	Geographical Information Systems	15	Autumn	No
GEOG3511*	Remote Sensing	15	Autumn	No
GEOG3515*	Environment, Development and Changing Rural Livelihoods	7,5	Autumn	No
GEOG3516*	Humanitarianism: Theory and Practice	7,5	Autumn	No
GEOG3518	Knowledge Management in a Global Economy	7,5	Autumn	No
GEOG3561*	Gender and Social Change	7,5	Spring/Autumn	No
AAR4234*	Planning for Sustainability and Development	7,5	Spring	No
BARN3300*	Children and Development in the South	7,5	Spring	No
POL3503*	International Political Economy	15	Spring	No

*Courses will only be given if a minimum number of students have signed up for them

MPhil in Development Studies: programme structure

Semester	Title (15 cr)		Title (15 cr)	
4. Spring	GEOG3920			
3. Autumn	GEOG3920		Electives (15 credits)	
2. Spring	GEOG3050	GEOG3005 or GEOG3006	EiT	Electives
1. Autumn	GEOG3050	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. The thesis is expected to be completed within four terms from admission to the course. Supervision will not be given beyond this. The thesis must be written in English.

Interdisciplinary Teamwork

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 ADJUSTMENT DUE TO OVERLAP IN CONTENT

GEOG3050	SVGEO350	15 credits
GEOG3050	GEOG3504	7,5 credits
GEOG3050	GEOG3053	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
GEOG3506	SVGEO331	7,5 credits
GEOG3505	SVGEO326	7,5 credits
GEOG3505	SVGEO302	7,5 credits
GEOG3505	SVGEO323	7,5 credits
GEOG3510	SVGEO328	15 credits
GEOG3511	SVGEO329	15 credits
GEOG3561	SVGEO361	7,5 credits

MPHIL PROGRAMME IN HUMAN DEVELOPMENT

Approved by the Board at NTNU 09.11.04 2004, with changes made by the Faculty of Social Sciences and Technology Management 20.01.2008

INTRODUCTION

The aim of this programme is to provide a broad, interdisciplinary knowledge-base for disciplines concerned with human change throughout the life span. To fulfil this aim, the Department of Psychology offers this programme in collaboration with other departments at NTNU. It interfaces related themes from Psychology and a wide range of other disciplines. Its distinguishing feature is the inclusion of different theoretical approaches and a variety of methodological stances. English, both orally and written, will be the language of instruction.
The over-arching concerns throughout the course include but are not limited to:
The process of change within the individual

Human change is multi-modal, always comprising the multi-facteted dimensions of human existence. Nowadays, the position is widely accepted that a general developmental perspective for understanding human change must include the full spectrum of perspectives within Psychology –for example, perception-action coupling, motor skills, personality, and social psychology. Likewise, it must dialogue with research findings of allied disciplines, such as Geography, Anthropology, Sociology, Human Movement Science, Architecture, Health Science and Medicine.
The process of human change across all phases of the life course

Developmental psychology has traditionally been largely synonymous with child psychology. However, reaching chronological adulthood does not halt development and human change. Today it is widely accepted that an individual develops through his or her entire life.
The process of societal change, and how it affects – and is affected by – individuals

Change is not a one-way process, where a few factors cause a few outcomes. The processes of change follow the rules of multi-causality and multi-finality. This means that many agents interact in a dynamic way. Therefore, the impacts of shifting individual coping styles upon society cannot be separated or isolated from the way upheavals in society impact individual adjustment. So it is necessary to study the effect human change has on society as well as the ways individuals cope with societal change.
The central theme of this programme is change within the individual (ontogenesis) and between individuals, but also micro genetic change, that is, change in the real time deployment of behaviour in particular areas of human activity, for example, skills, habits, or communicative interaction.
Ontogenesis:
Human beings have to cope with change throughout their lifespan. Some of these changes are biological-maturational, such as growing up and learning to move, puberty, menarche and constant body changes related to age. These changes occur for all healthy human beings within certain periods of their life. Other changes are of a normative social character, heavily influenced by the culture and historical time the individual lives in. These are changes like beginning school, marrying, becoming a parent, retirement, and so on. Finally, there are non-normative changes, challenges some individuals will meet and others not, at unpredictable points in their lifespan. These include minor challenges such as dealing with everyday experiences, new tasks in social life, work and leisure time, and significant life events, such as coping with divorce, illness or unemployment. Facing changes and dealing with them successfully is the motor of human development: the cessation of change is the beginning of stagnation. The aim of the programme is to understand and study human reactions in the face of change across the lifespan, and to find applications of this knowledge in dealing with human beings in different settings.
Microgenesis:
Change also involves development of skills, such as motor skills, social skills and skills involved in man-machine interaction. Actions develop into routines and habits emerge, both in the individual and in the interaction between individuals.
Emphasis will be put on the process of change, in contrast to traditional approaches in developmental psychology, where the outcome of change processes is the main issue. In this process the relationship between changes in the individual and changes in the environment is looked upon as a complex whole; for example, the individual's own actions may lead to changes in the environment, which, in turn, may influence the individual. In this respect the relationship between ontogenetic change and micro genetic change is a central issue.

Integration:
This programme has the ambition to give students a broad and integrated understanding of the change processes underlying human development. It is therefore important that the students get acquainted with as well intra-individual (such as biological and cognitive) change processes as inter-individual (relational, social, and cultural) change processes. Also, acquaintance with different methodological approaches pertaining to different aspects of human change processes will be emphasized. However, students may come to this programme with varying backgrounds and interests. They will be encouraged to develop their own meaningful and comprehensive plans for the study. Coordination and cooperation among the teachers as well as between teachers and the students involved will help the students to maintain integration in their individual projects.

Employment opportunities

Administration
Applied science
Research
Studies and evaluations for the public sector

ADMISSION REQUIREMENTS

The programme is open to international and Norwegian/Nordic students. 10 students will be admitted autumn 2008. .
Applicants should hold a bachelor's degree in Social Sciences with 1.5 years of university studies within Psychology covering courses within Statistics, Research Methods, and Theory of Science. 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 paperbased/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

Code	Title	Cr	Semester	Restricted admission
PSY3080	Biological and Cognitive Aspects of Development	15	Autumn	Yes 1)
PSY3081	Research Methodology, Theories of Sciences and Ethics	15	Spring	Yes 1)
PSY3082	Relational and Cultural Aspects of Development	15	Autumn	Yes 1)
PSY3083	Specialization in Biological and Cognitive Aspects of Development	7,5	Spring	Yes 1)
PSY3084	Individually Selected Texts	15	Autumn	No
PSY3085	Specialization in Relational and Cultural Aspects of Development	7,5	Spring	Yes 1)
PSY3904	Master’s Thesis	45	Autumn and Spring	Yes 1)

1) Admission to the programme is required

Outline of the programme

Semester	Course	Course	Course	Course
Semester 4 Spring	PSY3904 Master's Thesis			
Semester 3 Autumn	PSY3904 Master's Thesis		PSY3084 Individually Selected Texts	
Semester 2 Spring	PSY3081 Research Methodology, Theories of Sciences and Ethics		PSY3085 Specialization in Relational and Cultural Aspects of Development	PSY3083 Specialization in Biological and Cognitive Aspects of Development
Semester 1 Autumn	PSY3080 Biological and Cognitive Aspects of Development		PSY3082 Relational and Cultural Aspects of Development	

CREDIT REDUCTIONS DUE TO OVERLAP IN CONTENT

SANT3506	PSY3085	7, 5 credits

Master of Science in Exercise Physiology and Sport Sciences
2-year International Master's Programme

Programme code: MSPORT

The Master of Science in Exercise Physiology and Sport Sciences is a research and thesis-based integrated graduate 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 teaching and tutoring are in 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. It is a graduate level degree that gives entrance to 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.

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.

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 6.0 or better). More details about the language requirements are available here: http://www.ntnu.no/international/master

Applicants from Non-EU/EEA countries need to provide a financial guarantee.

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>MFEL1010
Medicine for Non-Medical Students, Introduction
(7.5 credits)</td><td>Interdisciplinary Project
(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>

Interdisciplinary Project (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/

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

Course Despriptions

Molecular Medicine

2-year International Master's Programme

Programme code: MSMOLMED

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.

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.

The degree awarded to students completing the programme will be *Master of Science in Molecular Medicine*.

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
- Practical clinical work in hospital laboratories.
- Technical executive positions in hospital laboratories
- Research dissemination (media, publishers, etc.)
- Pharmaceuticals
- Medical technology
- Consulting firms

Completion of the MSc degree is a qualification for study at PhD level.

Admission Requirements
Admission requirements to the MSc in Molecular Medicine is a bachelor's degree (or an equivalent 3-year education) in biomedical science, biology, chemistry, biotechnology, 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 6.0 or better). More details about the language requirements are available here: http://www.ntnu.no/international/master

Applicants from Non-EU/EEA countries need to provide a financial guarantee.

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 researcher both from NTNU, Sør-Trøndelag University College and St. Olav's Hospital.

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 Food Science and Medical Technology at Sør-Trøndelag University College. Experts from other educational institutions also contribute to the teaching.

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 is English.

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. Two courses must be selected from 'Electives 1'. The remaining elective courses can be chosen from 'Electives 1' *or* 'Electives 2'. Additional relevant courses may be taken at NTNU or other educational institutions subject to the approval of the Faculty of Medicine.

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>Interdisciplinary Teamwork</td><td>Elective course</td><td rowspan="4">Thesis in Molecular Medicine</td></tr>
<tr><td>Elective course</td><td>Elective course</td><td rowspan="3"></td></tr>
<tr><td>Elective course</td><td>Elective course</td></tr>
<tr><td>Elective course</td><td></td></tr>
</table>

<u>Master's Thesis</u>		
MOL3901	Thesis in Molecular Medicine	60 credits
<u>Compulsory Courses</u>		
MOL3000	Introduction to Molecular Medicine	7.5 credits (autumn)
Various codes	Interdisciplinary Teamwork	7.5 credits (spring)
<u>Electives 1</u>		
KLMED8004	Medical Statistics, Part I	7.5 credits (autumn)
MOL3001	Medical Genetics	7.5 credits (spring)
MOL3005	Immunology	7.5 credits (autumn)
MOL3007	Functional Genomics	7.5 credits (spring)
MTEK3001	Applied Bioinformatics and Systems Biology	7.5 credits (spring)
BI3016*	Molecular Cell Biology	7.5 credits (autumn)
<u>Electives 2</u>		
MOL3003**	Molecular Medical Microbiology	7.5 credits (autumn)
MOL3004**	Morphology	7.5 credits (autumn)

MOL3006***	Molecular Mechanisms of Nutrition	7.5 credits (spring)
MOL3008	Analytical Techniques and Instrumentation	7.5 credits (spring)
MOL3009**	Biobanking	7.5 credits (autumn)
MOL3010**	Animal Cell Culture	7.5 credits (autumn)
MOL8002**	Molecular Mechanisms of Host Defence	9 credits (autumn)
MOL8003**	Microarray Technology and Data Analysis	7.5 credits (spring)
MOL8005**	Molecular Mechanisms of Host Defence – Essay	6 credits (spring)
MOL8006**	Receptor Signalling and Trafficing	10 credits (spring)
NEVR8003**	Laboratory Animal Science for Researchers	6 credits (autumn)
TOKS3001	Medical Toxicology	7.5 credits (spring)
BI3013*	Experimental Cell Biology	7.5 credits (autumn)
BI3072*	Environmental Toxicology	7.5 credits (autumn)
BI3073*	Genetic Toxicology	7.5 credits (spring)
BI3074*	Environmental Toxicology – Complex Mixtures	7.5 credits (spring)
BT8102*	Molecular and Cellular Bioinformatics	7.5 credits (autumn)
BT8103****	Molecular Mechanisms of Toxicology	7.5 credits (autumn)
BT8115*	Protein Structures	7.5 credits (spring)
KJ3065****	Enzyme Chemistry	7.5 credits (spring)

* The course is organized by the Faculty of Natural Sciences and Technology. The language of instruction should normally be English, but please inquire before you register for exam.

** The course may be cancelled if not a sufficient number of students have registered for exam.

*** The course is taught every second year. It will be taught in the spring of 2009, but not in 2010.

**** The course is taught every second year. It will *not* be taught in the spring of 2009.

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

Interdisciplinary 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/

ADDITIONAL REGULATIONS – MASTER OF SCIENCE IN URBAN ECOLOGICAL PLANNING

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	AAR5300	Urban Ecological Planning in Diverse Cultures		15 Sp	3
2. sem	AAR5250	Preparation for fieldwork for master's students		7,5 Sp	3
3.sem	AAR5200	Analysis of Field Work for M.Sc. thesis in Urban Ecological Planning	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 2008/2009

Electives:

Subject no.	Title:	Note	Autumn	Spring
AAR8100	Housing Theory and History	1	7,5 Sp	
GEOG3050	Theories of Social Change	1	15 Sp	
GEOG3561	Gender and Social Change	1	7,5 Sp	
GEOG3505	Landscape and Planning	1	15 Sp	
GEOG3506	Geography, Health and Development	1	7,5 Sp	
AAR4944	Planning for Sustainability and Development	2		7,5 Sp
AAR5260	GIS in Urban Planning	3		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 2008/2009

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 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>2</td><td>Spring</td><td>Self Study Course</td><td colspan="3" rowspan="2">Master’s Thesis</td></tr>
<tr><td>2</td><td>Autumn</td><td>Elective</td></tr>
<tr><td>1</td><td>Spring</td><td>Elective</td><td>Elective</td><td>Elective</td><td rowspan="2">Master’s Thesis</td></tr>
<tr><td>1</td><td>Autumn</td><td>Elective</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 ECTS 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 every 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 studied.

PLAN OF STUDY

1st year, autumn
Elective:
TFY4205 Quantum Mechanics (from autumn 2009)
TFY4300 Energy and Environmental Physics
FY3006 Sensors and Transducers
FY3114 Functional Materials
FY3464 Quantum Field Theory I

1st year, spring
Elective:
TFY4190 Instrumentation
TFY4195 Optics
TFY4200 Optics, Advanced Course
TFY4210 Applied Quantum Mechanics
TFY4235 Computational Physics
TFY4245 Solid State Physics, Advanced Course
TFY4275 Classical Transport Theory
TFY4280 Signal Processing
Experts in a Team, Interdisciplinary Project
FY3201 Atmospheric Physics and Climate Change
FY3466 Quantum Field Theory II

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

2nd year, spring
Self study course to be designed by the academic supervisor.

Master in Natural Resource Management

<table>
<tr><td>Year</td><td>Semes-ter</td><td></td><td></td><td colspan="3"></td></tr>
<tr><td rowspan="2">2</td><td>Spring</td><td rowspan="4">“R FEL 3080” Scientific Seminars in Natural Resource Management (7,5 credits)</td><td rowspan="4">Elective Courses (22,5 credits)</td><td>Special Syllabus for Master’s Degree</td><td colspan="2">Master’s Thesis 60 credits</td></tr>
<tr><td>Autumn</td><td colspan="3"></td></tr>
<tr><td rowspan="2">1</td><td>Spring</td><td>Experts in Team, Interdisciplinary Project</td><td colspan="2"></td></tr>
<tr><td>Autumn</td><td>“RFEL3081” Natural Resourses Management, Interdisciplinary Project</td><td>GEOG3030 Natural Resourses Management</td><td></td></tr>
<tr><td colspan="2">Emnestørrelse:</td><td colspan="2">7,5 credits</td><td>7,5 credits</td><td>7,5 credits</td><td>7,5 credits</td></tr>
</table>

Elective Courses in Chemistry:
KJ 3055 Analytical Atomic Spectrometry (7,5 credits) Spring
KJ 3071 Applied geochemistry (7,5 credits) Autumn
KJ 8056 Chemical Sensors and Biosensors (7,5 credits) Autumn
KJ 8052 Analytical Electrochemistry and its Application within Industrial and Environmental Monitoring (7,5 credits) Autumn
KJ 8070 Advanced Aquatic Chemistry (15 credits) Autumn

Elective Courses in Biology:
BI3004 Behaviour and Conservation Biology (7,5 credits) Autumn
BI3032 Population dynamics (7,5 credits) Spring
BI3072 Environmental Toxicology (7,5 credits) Autumn
BI3080 Biodiversity and Conservation Biology II (7,5 credits)Autumn

Elective Courses in Geology:
TGB4115 The Geology of Mineral Deposits(7,5 credits)Spring
TGB4120 Thematic Ore Geology(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
TGB4240 Mineral Raw Materials(7,5 credits)Autumn
TPG4177 Carbonate Reservoir Characterization(7,5 credits)Autumn

MSC-PROGRAMME 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.

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.

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. The following four lines of specialization are offered:

- Aquaculture
- Fisheries and marine resources
- Marine biology and biochemistry
- Environmental analysis and environmental technology

All students shall study two subjects in common, that is “Sustainable utilization of marine resources” and “Experts in team”, and choose up to two optional subjects from other disciplines.

Every semester you should choose courses that makes 30 credits (In specialization A the Thesis count for 15 credits the 2nd semester.)

MSc in Marine Coastal Development (MACODEV)
1st year

Aquaculture

Teaching	Subject no	Subject title	Com-ments	Cre	A (60)	B (30)
Autumn		**Compulsory courses**				
1st	TMR4137	Sustainable Utilization of Mar Resources		7,5	o	o
semester	BI3061	Biological Oceanography		7,5	o	o
	BI3062	Scientific seminars, marine	1	-	o	-
		Optional courses A-list	2			
	AK3001	Feed Organisms in Marine Fry Prod		7,5	v	v
	TBT4135	Biopolymers		7,5	v	v
	TBT4145	Molecular Genetics		7,5	v	v
	TMR4135	Fishing Vessel and Workboat Design		7,5	v	v
	TVM4145	Unit Proc in Water and Wastewat Treatm		7,5	v	v
	TVM4162	Industrial Ecology		7,5	v	v
				7,5	v	v
		Optional courses B-list				
	BI3060	Experimental Marine Ecol. Methods		7,5	v	v
	BI3063	Biological and genetic stock manage		7,5	v	v
	TBT4140	Biochemical Engineering		7,5	v	v
	TMR4115	Design Methods		7,5	v	v
	TMR4215	Sea Loads		7,5	v	v
	TMR4295	Design of Mechanical Systems		7,5	v	v
	TTT4175	Marine acoustics		7,5	v	v
Spring:		**Compulsory courses**				
2nd	-	Experts in Team, Interdisciplinary Project		7,5	o	o
semester	BI3062	Scientific seminars, marine	1	-	o	-
	BI3905	Master thesis (60 sp)		15	o	-
		A-list				
	AK3005	Early life history of fish		7,5	v	v
	TBT4125	Food chemistry		7,5	v	v
	TBT4155	Increased Value of Marine Biological		7,5	v	v
	TEP4265	Food Engineering		7,5	v	v
	TMR4140	Design of Marine Production Plants		7,5	v	v
	TMR4120	Underwater Engineering, Basic Course		7,5	v	v
		B-list		7,5	v	v
	TBT4107	Biochemistry II		7,5	v	v
	TBT4110	Microbiology		7,5	v	v
	TBT4130	Environmental Biotechnology		7,5	v	v
	TMR4225	Marine Operations		7,5	v	v
	TMR4230	Oceanography				

1) Scientific seminars, marine shall be followed through the study, with the exams in the 3rd semester
2) Two of the courses must be chosen from this list

A) Specialization 60 credits thesis (Work with the thesis starts the 2nd semester)
B) Specialization 30 credits thesis (Work with the thesis in the 4th semester)

B-list – Courses are not considered when planning the teaching and examination schedules
o - compulsory courses
v - optional courses

Composition of education schedule shall be approved in the 1st semester

MSc in Marine Coastal Development (MACODEV)
2nd year

Aquaculture

Teaching	Subject no	Subject title	Com-ments	Cre	A (60)	B (30)
Autumn		**Compulsory courses**				
3rd	BI3905	Master thesis (60 sp)		22,5	o	-
semester	BI3062	Scientific seminars, marine	1	7,5	o	-
		Specialization courses	2			
	TBT4500	Biotechnology, SC		7,5	-	o
	TMR4575	Fisheries and marine resources SC		7,5	-	o
		Specialization projects	2			
	TBT4505	Biotechnology, SP		7,5	-	o
	TMR4570	Fisheries and marine resources SP		7,5	-	o
		Supplementary courses				
	AK3001	Feed Organisms in Marine Fry Prod		7,5	-	v
	BI3060	Experimental Marine Ecol. Methods		7,5	-	v
	TBT4135	Biopolymers		7,5	-	v
	TMR4115	Design Methods		7,5	-	v
	TMR4135	Fishing Vessel and Workboat Design		7,5	-	v
	TVM4145	Unit Proc in Water and Wastewat Treatm		7,5	-	v
	BI3063	Biological and genetic stock manage		7,5	-	v
	TBT4140	Biochemical Engineering		7,5	-	v
	TBT4145	Molecular Genetics		7,5	-	v
	TMR4190	Finite Element Methods Struc Analyses		7,5	-	v
	TMR4215	Sea Loads		7,5	-	v
	TMR4295	Design of Mechanical Systems		7,5	-	v
	TVM4162	Marine acoustics		7,5	-	v
	TTT4175	Industrial Ecology		7,5	-	v
		Master thesis				
Spring:	BI3905	Master thesis (60 sp)		22,5	o	-
4th	BI3091	Special syllabus		7,5	o	-
semester	TMR4905	Master thesis (30 sp)		30	-	o

1) Scientific seminars, marine shall be followed through the study, with the exams in the 3rd semester
2) Which Specialization course and project depends on the department you belongs to, choose one spec course and one project

A) Specialization 60 credits thesis (Work with the thesis starts the 2nd semester)
B) Specialization 30 credits thesis (Work with the thesis in the 4th semester)

B-list – Courses are not considered when planning the teaching and examination schedules
o - compulsory courses
v - optional courses

Composition of education schedule shall be approved in the 1st semester

MSc in Marine Coastal Development (MACODEV)
1st year

Fisheries and marine resources

Teaching	Subject no	Subject title	Com-ments	Cre	A (60)	B (30)
Autumn		**Compulsory courses**				
1st	TMR4137	Sustainable Utilization of Mar Resources		7,5	o	o
semester	BI3061	Biological Oceanography		7,5	o	o
	BI3062	Scientific seminars, marine	1	-	o	-
		Optional courses A-list	2			
	AK3001	Feed Organisms in Marine Fry Prod		7,5	v	v
	TBT4135	Biopolymers		7,5	v	v
	TBT4145	Molecular Genetics		7,5	v	v
	TMR4115	Design Methods		7,5	v	v
	TMR4135	Fishing Vessel and Workboat Design		7,5	v	v
	TVM4162	Industrial Ecology		7,5	v	v
		Optional courses B-list				
	BI3060	Experimental Marine Ecol. Methods		7,5	v	v
	BI3063	Biological and genetic stock manage		7,5	v	v
	TBT4140	Biochemical Engineering		7,5	v	v
	TMR4215	Sea Loads		7,5	v	v
	TMR4295	Design of Mechanical Systems		7,5	v	v
	TTT4175	Marine acoustics		7,5	v	v
	TVM4145	Unit Proc in Water and Wastewat Treatm		7,5	v	v
	TIØ4120	Operations Research, Introduction		7,5	v	v
Spring:		**Compulsory courses**				
2nd	-	Experts in Team, Interdisciplinary Project		7,5	o	o
semester	BI3062	Scientific seminars, marine	1	-	o	-
	BI3905	Master thesis (60 sp)		15	o	-
		A-list	3			
	TBT4155	Increased Value of Marine Biological		7,5	v	v
	TEP4265	Food Engineering		7,5	v	v
	TMR4140	Design and Marine Production Plants		7,5	v	v
	TMR4120	Underwater, Engineering BC		7,5	v	v
	TMR4230	Oceanography		7,5	v	v
		Blist				
	AK3005	Early life history of fish		7,5	v	v
	POL1003	Environmental Politics		7,5	v	v
	TBT4125	Food Chemistry		7,5	v	v
	TMR4240	Marine Control System		7,5	v	v
	SØK2004	Industrial Economics		7,5	v	v
	TTT4195	Marin Observation Technology		7,5	v	v

1) Scientific seminars, marine shall be followed through the study, with the exams in the 3rd semester
2) Two of the courses must be chosen from this list 3) Every semester you should choose courses that makes 30 credits (In Specialization A the thesis count for 15 credits the 2nd semester)

A) Specialization 60 credits thesis (Work with the thesis starts the 2nd semester)
B) Specialization 30 credits thesis (Work with the thesis in the 4th semester)

B-list – Courses are not considered when planning the teaching and examination schedules
o - compulsory courses
v - optional courses
Composition of education schedule shall be approved in the 1st semester

MSc in Marine Coastal Development (MACODEV)
2nd year

Fisheries and marine resources

Teaching	Subject nr	Subject title	Com-ments	Cre	A (60)	B (30)
Autumn		**Compulsory courses**				
3rd	BI3062	Scientific seminars, marine		7,5	o	-
semester	BI3905	Master thesis (60 sp)	1	22,5	o	-
		Specialization courses	2			
	TBT4500	Biotechnology, SC		7,5	-	o
	TMR4575	Fisheries and marine resources SC		7,5	-	o
		Specialization projects	2			
	TBT4505	Biotechnology, SP		7,5	-	o
	TMR4570	Fisheries and marine resources SP		7,5	-	o
		Supplementary courses				
	TBA4265	Marine Physical Environment		7,5	v	v
	TMR4115	Design Methods		7,5	v	v
	TMR4190	Fin Elem Meth in Structural Analysis		7,5	v	v
	TTT4175	Marine Acoustics 1		7,5	v	v
	TVM4162	Industrial Ecology		7,5	v	v
	AK3001	Feed Organism in Mar Fry Production		7,5	v	v
	BI3060	Experimental Marine Ecol. Methods		7,5	v	v
	BI3063	Biological and genetic stock manage		7,5	v	v
	TBT4140	Biochemical Engineering		7,5	v	v
	TBT4135	Biopolymers		7,5	v	v
	TBT4145	Molecular Genetics		7,5	v	v
	TMR4135	Fishing Vessel and Workboat Design		7,5	v	v
	TMR4215	Sea Loads		7,5	v	v
	TMR4295	Design of Mechanical Systems		7,5	v	v
	TVM4145	Unit Proc in Water and WastewatTreatm		7,5	v	v
	TVM4162	Industrial Ecology		7,5	v	v
		Master thesis				
Spring:	BI3905	Master thesis (60 sp, exams)		22,5	o	-
4th	BI3091	Special syllabus		7,5	o	-
semester	TMR4905	Master thesis (30 sp)		30	-	o

1) Scientific seminars, marine shall be followed through the study, with the exams in the 3rd semester
2) Which Specialization course and project depends on the department you belongs to, choose one spec course and one project

A) Specialization 60 credits thesis (Work with the thesis starts the 2nd semester)
B) Specialization 30 credits thesis (Work with the thesis in the 4th semester)

B-list – Courses are not considered when planning the teaching and examination schedules
o - compulsory courses
v - optional courses
Composition of education schedule shall be approved in the 1st semester

MSc in Marine Coastal Development (MACODEV)
1st year

Marine biology and biochemistry

Teaching	Subject nr	Subject title	Com-ments	Cre	A (60)	B (30)
Autumn		**Compulsory courses**				
1st	TMR4137	Sustainable Utilization of Mar Resources		7,5	o	o
semester	BI3061	Biological Oceanography		7,5	o	o
	BI3062	Scientific seminars, marine	1	-	o	-
		Optional courses A-list	2			
	AK3001	Feed Organisms in Marine Fry Prod		7,5	v	v
	TBT4135	Biopolymers		7,5	v	v
	TBT4145	Molecular Genetics		7,5	v	v
	TMR4115	Design Methods		7,5	v	v
	TMR4135	Fishing Vessel and Workboat Design		7,5	v	v
	TVM4145	Unit Proc in Water and Wastewat Treatm		7,5	v	v
	TVM4162	Industrial Ecology		7,5	v	v
		Optional courses B-list				
	BI3060	Experimental Marine Ecol. Methods		7,5	v	v
	BI3063	Biological and genetic stock manage		7,5	v	v
	TBT4140	Biochemical Engineering		7,5	v	v
	TMR4115	Design Methods		7,5	v	v
	TMR4215	Sea Loads		7,5	v	v
	TMR4295	Design of Mechanical Systems		7,5	v	v
	TTT4175	Marine acoustics		7,5	v	v
Spring:		**Compulsory courses**				
2nd	-	Experts in Team, Interdisciplinary Project		7,5	o	o
semester	BI3905	Master thesis (60 sp)		15	o	-
	BI3062	Scientific seminars, marine		-	o	-
		A-list	3			
	BI3005	Fish Behaviour and ecology		7,5	v	v
	TBT4107	Biochemistry II		7,5	v	v
	TBT4155	Increased Value of Marine Biological		7,5	v	v
	TMR4140	Design of Marine Production Plants		7,5	v	v
	TMR4230	Oceanography		7,5	v	v
	TMR4225	Marine Operations		7,5	v	v
		B-list				
	AK3005	Early life history of fish		7,5	v	v
	BI3032	Population dynamics		7,5	v	v
	ZO3033	Behavioural Ecology		7,5	v	v
	TTT4195	Marine Observation Technology		7,5	v	v

1) Scientific seminars, marine shall be followed through the study, with the exams in the 3rd semester
2) Two of the courses must be chosen from this list

A) Specialization 60 credits thesis (Work with the thesis starts the 2nd semester)
B) Specialization 30 credits thesis (Work with the thesis in the 4th semester)

B-list – Courses are not considered when planning the teaching and examination schedules
o - compulsory courses
v - optional courses
Composition of education schedule shall be approved in the 1st semester

MSc in Marine Coastal Development (MACODEV)
2nd year

Marine biology and biochemistry

Teaching	Subject nr	Subject title	Com-ments	Cre	A (60)	B (30)
Autumn		**Compulsory courses**				
3rd	BI3905	Master thesis (60 sp)		22,5	o	-
semester	BI3062	Scientific seminars, marine	1	7,5	o	-
		Specialization courses	2			
	TBT4500	Biotechnology, SC		7,5	-	o
	TMR4575	Fisheries and marine resources, SC		7,5	-	o
		Specialization projects	2			
	TBT4505	Biotechnology, SP		7,5	-	o
	TMR4570	Fisheries and marine resources, SP		7,5	-	o
		Supplementary courses				
	TMR4135	Fishing Vessel and Finite Element		7,5	-	v
	TMR4190	Methods in Structural Analyses		7,5	-	v
	TMR4215	Sea Loads		7,5	-	v
	BI3060	Experimental Marine Ecol. Methods		7,5	-	v
	TBT4135	Biopolymers		7,5	-	v
	BI3063	Biological and genetic stock management		7,5	-	v
	AK3001	Feed Organisms in Marine Fry Production		7,5	-	v
		Master thesis:				
Spring:	BI3905	Master thesis (60 sp)		22,5	o	-
4th	BI3091	Special syllabus		7,5	o	-
semester	TBT3905	Master thesis (30 sp)		30	-	o

1) Scientific seminars, marine shall be followed through the study, with the exams in the 3rd semester
2) Which Specialization course and project depends on the department you belongs to, choose one spec course and one project

A) Specialization 60 credits thesis (Work with the thesis starts the 2nd semester)
B) Specialization 30 credits thesis (Work with the thesis in the 4th semester)

B-list – Courses are not considered when planning the teaching and examination schedules
o - compulsory courses
v - optional courses
Composition of education schedule shall be approved in the 1st semester

MSc in Marine Coastal Development (MACODEV)
1st year

Environmental analysis and environmental technology

Teaching	Subject nr	Subject title	Com-ments	Cre	A (60)	B (30)
Autumn		**Compulsory courses**				
1st	TMR4137	Sustainable Utilization of Mar Resources		7,5	o	o
semester	BI3061	Biological Oceanography		7,5	o	o
	BI3062	Scientific seminars, marine	1	-	o	-
		Optional courses A-list	2			
	AK3001	Feed Organisms in Marine Fry Prod		7,5	v	v
	TBT4135	Biopolymers		7,5	v	v
	TBT4145	Molecular Genetics		7,5	v	v
	TMR4135	Fishing Vessel and Workboat Design		7,5	v	v
	TVM4145	Unit Proc in Water and Wastewat Treatm		7,5	v	v
	TVM4162	Industrial Ecology		7,5	v	v
		Optional courses B-list				
	BI3060	Experimental Marine Ecol. Methods		7,5	v	v
	BI3063	Biological and genetic stock manage		7,5	v	v
	TBT4140	Biochemical Engineering		7,5	v	v
	TMR4115	Design Methods		7,5	v	v
	TMR4215	Sea Loads		7,5	v	v
	TMR4295	Design of Mechanical Systems		7,5	v	v
	TTT4175	Marine acoustics		7,5	v	v
Spring:		**Compulsory courses**				
2nd	-	Experts in Team, Interdisciplinary Project		7,5	o	o
semester	TBT3905	Master thesis (60 sp)		15	o	-
	BI3062	Scientific seminars, marine	1	-	o	-
		A-list	3			
	BI3005	Fish Behaviour and ecology		7,5	v	v
	TEP4265	Food Engineering		7,5	v	v
	TMR4120	Underwater, Engineering BC		7,5	v	v
	TMR4240	Marine Control Systems		7,5	v	v
	TMR4230	Oceanography		7,5	v	v
	TBT4155	Increased Value of Marine Biological		7,5	v	v
		B-list				
	AK3005	Early life history of fish		7,5	v	v
	BI3073	Genetoxicology		7,5	v	v
	POL1003	Environmental Politics		7,5	v	v
	SØK2004	Industrial Econimics		7,5	v	v
	TBT4125	Food Chemistry		7,5	v	v

1) Scientific seminars, marine shall be followed through the study, with the exams in the 3rd semester
2) Two of the courses must be chosen from this list

A) Specialization 60 credits thesis (Work with the thesis starts the 2nd semester)
B) Specialization 30 credits thesis (Work with the thesis in the 4th semester)

B-list – Courses are not considered when planning the teaching and examination schedules
o - compulsory courses
v - optional courses
Composition of education schedule shall be approved in the 1st semester

MSc in Marine Coastal Development (MACODEV)
2nd year

Environmental analysis and environmental technology

Teaching	Subject nr	Subject title	Com-ments	Cre	A (60)	B (30)
Autumn		**Compulsory courses**				
3rd	BI3905	Master thesis (60 sp)		22,5	o	-
semester	BI3062	Scientific seminars, marine	1	7,5	o	-
		Specialization courses	2			
	TBT4500	Biotechnology, SP		7,5	-	o
	TMR4575	Fisheries and marine resources, SP		7,5	-	o
		Specialization projects	2			
	TBT4505	Biotechnology, SC		7,5	-	o
	TMR4570	Fisheries and marine resources, SC		7,5	-	o
		Supplementary courses				
	AK3001	Feed organisms of Marine fry prod		7,5	-	v
	BI3060	Experimental Marine Ecol. Methods		7,5	-	v
	TBT4135	Biopolymers		7,5	-	v
	TMR4135	Fishing Vessel and Finite Element		7,5	-	v
	TMR4190	Methods in Structural Analyses		7,5	-	v
	TMR4215	Sea Loads		7,5	-	v
	BI3071	Pollution Toxicology				
		Master thesis				
Spring:	BI3905	Master thesis (60 sp)		22,5	o	-
4th	BI3091	Special syllabus		7,5	o	-
semester	TMR4905	Master thesis (30 sp)		30	-	o

1) Scientific seminars, marine shall be followed through the study, with the exams in the 3rd semester
2) Which Specialization course and project depends on the department you belongs to, choose one spec course and one project

A) Specialization 60 credits thesis (Work with the thesis starts the 2nd semester)
B) Specialization 30 credits thesis (Work with the thesis in the 4th semester)

B-list – Courses are not considered when planning the teaching and examination schedules o - compulsory courses
v - optional courses
Composition of education schedule shall be approved in the 1st semester

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 82.5 credit points and concludes with writing a thesis corresponding to 37.5 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,
  - MA2104 Differential equations and complex function theory.

- 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 one of TMA4265 Stochastic processes and TMA4267 Linear statistical models.

(All codes for the courses refer to the 2007/2008-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

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 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 Modern statistical methods should be taken. If the admission background does not cover both of TMA4265 Stochastic processes and TMA4267 Linear statistical models, the missing one 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 1½ year (87.5/60 year). 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 37.5 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.

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 Programme 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 an examination, he/she has the right to repeat that examination once in one course every academic year in order to improve the grade. In this case, the best grade will count. In cases where the grade is based on a number of partial assessments, all the different components have to be repeated.

§ 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:

Grade	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.

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.