



## **INTERNATIONAL MASTER'S PROGRAMMES 2011 - 2012**

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

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

## **INTRODUCTION**

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

As this catalogue is revised annually, only the latest edition is valid. This edition is valid until the end of the academic year 2011/2012.

Good luck with your studies,

Student and Academic Division

## **NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY (NTNU)**

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

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

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

## GUIDE TO THE INTERNATIONAL MASTER'S PROGRAMMES

### Tables

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

### Ex (Course year and time of examination)

This box states which course year and examination period this examination can be taken for the first time.

The examination period is marked "h" for the autumn examination and "v" for the spring examination.

### Subject no.

The course code comprises 6 or 7 digits.

### Subject title

This box gives the course title in abbreviated form.

### Note

This box includes any references to footnotes.

### Cr (credits)

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

# FACULTY OF NATURAL SCIENCES AND TECHNOLOGY

## MSC-PROGRAMME IN CHEMICAL ENGINEERING (MSCHEMENG)

Term 1 and 2

| Ex | Subject no. | Subject title                          | Note | Cr  | Comp./<br>Opt. |
|----|-------------|--|------|-----|----------------|
|    |             | <b>Compulsory and optional courses</b> |      |     |                |
| 1h | TKP4140     | PROCESS CONTROL                        | 1    | 7,5 | v1             |
| 1h | TKP4155     | REACTION KIN/CATALYS                   |      | 7,5 | v1             |
| 1h | TKP4160     | TRANSPORT PHENOMENA                    |      | 7,5 | v1             |
| 1h | TKP4170     | PROCESS DESIGN PROJ                    | 2    | 7,5 | v              |
| 1v | -           | EXP IN TEAM INT PROJ                   |      | 7,5 | o              |
| 1v | TKP4115     | SURFACE/COLLOID CHEM                   |      | 7,5 | v1             |
| 1v | TKP4130     | POLYMER CHEMISTRY                      |      | 7,5 | v2             |
| 1v | TKP4135     | CHEM PROC SYST ENG                     |      | 7,5 | v2             |
| 1v | TKP4145     | REACTOR TECHNOLOGY                     |      | 7,5 | v2             |
| 1v | TKP4150     | PETROCH/OIL REFINING                   |      | 7,5 | v2             |
| 1v | TKP4171     | PROCESS DESIGN PROJ                    | 2    | 7,5 | v              |
| 1v | TKP4180     | BIOENERG FIBER TECH                    | 3    | 7,5 | v2             |
|    |             | <b>Supplementary courses</b>           | 1    |     |                |
| 1h | TBT4140     | BIOCHEM ENGINEERING                    |      | 7,5 | v              |
| 1h | TMA4195     | MATHEMATIC MODELLING                   |      | 7,5 | v              |
| 1h | TMA4215     | NUMERIC MATHEMATICS                    |      | 7,5 | v              |
| 1h | TPG4105     | PETROLEUM ENG BC                       |      | 7,5 | v              |
| 1h | TPG4140     | NATURAL GAS                            |      | 7,5 | v              |
| 1h | TPK4120     | SAFETY/RELIAB ANALYS                   |      | 7,5 | v              |
| 1v | KJ2053      | CHROMATOGRAPHY                         |      | 7,5 | v              |
| 1v | TBT4125     | FOOD CHEMISTRY                         |      | 7,5 | v              |
| 1v | TBT4130     | ENVIRONM BIOTECH                       |      | 7,5 | v              |
| 1v | TEP4215     | ENERGY AND PROCESS                     |      | 7,5 | v              |
| 1v | TEP4250     | MULTIPHASE TRANSPORT                   |      | 7,5 | v              |
| 1v | TEP4265     | FOOD ENGINEERING                       |      | 7,5 | v              |
| 1v | TKJ4175     | CHEMOMETRICS                           |      | 7,5 | v              |
| 1v | TKP4185     | NUCLEAR POWER INTRO                    |      | 7,5 | v              |
| 1v | TKP4190     | FABR/APPL NANOMAT                      |      | 7,5 | v              |
| 1v | TKT4140     | NUM METH COMP LAB                      |      | 7,5 | v              |
| 1v | TMM4175     | POLYMERS/COMPOSITES                    |      | 7,5 | v              |
| 1v | TPG4230     | FIELD DEV/OPERATIONS                   |      | 7,5 | v              |
| 1v | TTK4135     | OPTIMISATION/CONTROL                   |      | 7,5 | v              |
| 1v | TVM4145     | WATER/WASTEW TREATM                    |      | 7,5 | v              |

o - compulsory courses

v - optional courses

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

v2 - at least 1 of these courses must be selected

Ex 1h = Term 1, Exam Autumn

Ex 1v = Term 2, Exam Spring

- 1) The courses must be selected to obtain a total of 30 credits in each semester. Supplementary courses are not considered when planning the teaching and examination schedules.
- 2) The course must be chosen either in autumn (TKP4170) or in spring (TKP4171).
- 3) The course is 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   |
|----|-------------|--------------------------------|------|------|
|    |             | <b>Specialization courses</b>  | 1    |      |
| 2h | TKP4515     | CATALYS/PETROCHEM SC           |      | 7,5  |
| 2h | TKP4525     | COLL/POLYMER CHEM SC           |      | 7,5  |
| 2h | TKP4535     | ENVIRONM/REACT TECH SC         |      | 7,5  |
| 2h | TKP4555     | PROCESS SYST ENG SC            |      | 7,5  |
| 2h | TKP4565     | PULP/PAPER BIOREFIN SC         |      | 7,5  |
|    |             | <b>Specialization projects</b> | 1    |      |
| 2h | TKP4510     | CATALYS/PETROCHEM SP           |      | 15,0 |
| 2h | TKP4511     | CATALYS/PETROCHEM SP           |      | 7,5  |
| 2h | TKP4520     | COLL/POLYMER CHEM SP           |      | 15,0 |
| 2h | TKP4521     | COLL/POLYMER CHEM SP           |      | 7,5  |
| 2h | TKP4530     | ENVIRONM/REACT TECH SP         |      | 15,0 |
| 2h | TKP4531     | ENVIRONM/REACT TECH SP         |      | 7,5  |
| 2h | TKP4550     | PROCESS SYST ENG SP            |      | 15,0 |
| 2h | TKP4551     | PROCESS SYST ENG SP            |      | 7,5  |
| 2h | TKP4560     | PULP/PAPER BIOREFIN SP         |      | 15,0 |
| 2h | TKP4561     | PULP/PAPER BIOREFIN SP         |      | 7,5  |
|    |             | <b>Supplementary courses</b>   | 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  |
|    |             | <b>Master Thesis</b>           |      |      |
| 2v | TKP4900     | CHEM PROCESS TECHN             |      | 30,0 |

Ex 2h = Term 3, Exam Autumn

Ex 2v = Term 4, Master Thesis Spring

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

## **MSC-PROGRAMME IN COASTAL AND MARINE CIVIL ENGINEERING**

### No admittance 2011/12

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

No admittance 2011/12

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

cont.

- 1) Select two of the courses each term.
- 2) Two-week intensive course at UNIS, Svalbard. In agreement with the supervising professor. Check date of exam. Number of participants might be restricted.
- 3) These subjects requires that the student is at UNIS the whole semester. Special agreement with professor in charge is required.
- 4) A specialization course with the associated specialization project must be chosen. Generally specialization Marine Civil Engineering should be selected.
- 5) Specialization Geotechnics is an option for those who aim to specialize in Marine Geotechnics.
- 6) Specialization project of 15 credits is a special need for students aiming at a specialization in Arctic Marine Engineering in cooperation with UNIS and who are not at NTNU during the specialization semester.
- 7) One supplementary course must be chosen so that the total load for the semester is at least 30 credits. It shall be chosen from the list or among the optional courses listed for term 1 (1h). Check dates of exam. The courses are not considered when planning the teaching and examination schedules.
- 8) A non-technical course shall be chosen. Check language of teaching and date of exam.
- 9) Master thesis must be chosen. Students aiming a specialization in Arctic Marine Civil Engineering might in agreement with the supervising professor take the Master thesis at UNIS, Svalbard. Parts of the studies can be taken at UNIS, Svalbard. Check supplementary regulations. Studies at UNIS must be approved by the faculty.

# FACULTY OF INFORMATION TECHNOLOGY, MATHEMATICS AND ELECTRICAL ENGINEERING

## MSC-PROGRAMME IN ELECTRIC POWER ENGINEERING (MSEPOWER)

Term 1, 2, 3 and 4

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

o - compulsory courses

v - optional courses

v1 - at least two of these courses must be chosen

Ex 1h = Term 1, Exam Autumn

Ex 1v = Term 2, Exam Spring

Ex 2h = Term 3, Exam Autumn

Ex 2v = Term 4, Master Thesis Spring

- 1) In addition to the compulsory courses, the student must select courses so that the requirement of 60 credits pr year is met. Available courses are listed in the table. Other relevant courses may be accepted after application.
- 2) 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   |
|----|-------------|---------------------------|------|------|
|    |             | <b>Compulsory courses</b> |      |      |
| 1h | TBA4110     | GEOTECH FIELD/LAB IN      |      | 7,5  |
| 1h | TBA4231     | APPLIED GEOMATICS         |      | 7,5  |
| 1h | TBA5100     | THEORETICAL SOIL MEC      |      | 7,5  |
| 1h | TBA5150     | GEOHAZARDS/RISK AN        |      | 7,5  |
| 1v | -           | EXP IN TEAM INT PROJ      |      | 7,5  |
| 1v | TBA5155     | FOUNDATIONS/SLOPES        |      | 7,5  |
| 1v | TGB5110     | GEOLOGY TUNNELL BC        |      | 7,5  |
| 1v | TKT4201     | STRUCTURAL DYNAMICS       |      | 7,5  |
| 2h | TBA4116     | GEOTECH ENG AC            |      | 7,5  |
| 2h | TBA4510     | GEOTECH ENG SP            | 1    | 7,5  |
| 2h | TGB5100     | ROCK ENGINEERING AC       |      | 7,5  |
| 2h | -           | ELECTIVE COURSE           | 2    | 7,5  |
|    |             | <b>Master Thesis</b>      |      |      |
| 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   |
|----|-------------|---------------------------|------|------|
|    |             | <b>Compulsory courses</b> |      |      |
| 1h | TVM4105     | HYDROLOGY                 |      | 7,5  |
| 1h | TVM5115     | DAM ENGINEERING           |      | 7,5  |
| 1h | TVM5125     | HYDRAULIC DESIGN          |      | 7,5  |
| 1h | TVM5135     | PLANNING HYDROPOWER       |      | 7,5  |
| 1v | -           | EXP IN TEAM INT PROJ      |      | 7,5  |
| 1v | TGB5110     | GEOLOGY TUNNELL BC        |      | 7,5  |
| 1v | TVM5132     | PREF STUDY HYDRO DEV      |      | 7,5  |
| 1v | TVM5140     | ECON ASSESM HYDROPOW      |      | 7,5  |
| 2h | TGB5100     | ROCK ENGINEERING AC       |      | 7,5  |
| 2h | TVM4106     | HYDRO MODELLING           |      | 7,5  |
| 2h | TVM5160     | HEADWORKS/SEDIMENT        |      | 7,5  |
| 2h | TVM5171     | ENV IMP HYDROPOWER        |      | 7,5  |
|    |             | <b>Master Thesis</b>      | 1    |      |
| 2v | TBA4910     | PROJ MANAGEMENT           |      | 30,0 |
| 2v | TGB4910     | ROCK ENGINEERING          |      | 30,0 |
| 2v | TVM4915     | HYDROPOWER DEVELOPMENT    |      | 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              | 2 |
|    |            | <b>Compulsory and optional courses</b>       | 1    |      |                |   |
| 1h | TEP4223    | LIFE CYCLE ASSESS                            |      | 7,5  | o              | o |
| 1h | TFY4300    | ENERGY ENVIR PHYSICS                         |      | 7,5  | v              | v |
| 1h | TIØ4195    | ENV MAN CORP SOC RES                         | 2    | 7,5  | o              | o |
| 1h | TVM4162    | INDUSTRIAL ECOLOGY                           |      | 7,5  | o              | o |
| 1h | SOS1002    | RESEARCH METHODS                             | 3    | 15,0 | v              | v |
| 1v | -          | EXP IN TEAM INT PROJ                         |      | 7,5  | o              | o |
| 1v | TEP4220    | ENERGY/ENV CONSEQUEN                         |      | 7,5  | v              | v |
| 1v | TPD5100    | SUS PROD DES AC                              |      | 7,5  | v              | v |
| 1v | TVM4160    | MATERIAL FLOW ANALYS                         |      | 7,5  | o              | v |
| 1v | POL1003    | POLITICS ENVIRONMENT                         |      | 7,5  | v              | o |
| 1v | POL3004    | RESEARCH DESIGN                              | 4,5  | 7,5  | v              | v |
| 1v | PSY3590    | SAFET AND SECURITY                           | 6    | 7,5  | v              | v |
|    |            | <b>Supplementary courses</b>                 | 7    |      |                |   |
| 1h | TIØ4300    | ENV SC ECOSYS SUST                           |      | 7,5  | v              | v |
| 1h | TPD4505    | DESIGN THEORY SC                             |      | 7,5  | v              | v |
| 1v | KULT3304   | STUD TECHN/SCIENCE II                        | 8    | 15,0 | v              | v |
| 1v | SØK1101    | ENVIRONM RESOURCE                            |      | 7,5  | v              | v |
| 1v | TVM4150    | SOLID WASTE MANAGEMENT                       |      | 7,5  | v              | v |
|    |            | <b>Compulsory and optional courses</b>       | 1    |      |                |   |
| 2h | TEP4222    | INPUT-OUTPUT ANALYS                          |      | 7,5  | o              | v |
| 2h | TIØ4525    | SAFE HEALTH/ENV SC                           | 9    | 7,5  | v              | v |
| 2h | TPK4160    | VALUE CHAIN CONTR                            |      | 7,5  | v              | v |
| 2h | POL3507    | POLICY ANALYSIS                              | 7,10 | 15,0 | v              | v |
| 2h | PSY3090    | RISK PSYCHOLOGY ENV                          | 5    | 15,0 | v              | v |
|    |            | <b>Supplementary courses</b>                 | 1,7  |      |                |   |
| 2h | TIØ4300    | ENV SC ECOSYS SUST                           |      | 7,5  | v              | v |
| 2h | TPD4505    | DESIGN THEORY SC                             |      | 7,5  | v              | v |
|    |            | <b>Project and thesis preparation course</b> | 11   |      |                |   |
| 2h | TEP5100    | INDECOL PROJECT                              |      | 15,0 | v              | - |
| 2h | TIØ5235    | INDECOL PROJECT                              | 9    | 15,0 | -              | v |
| 2h | TPD4190    | DESIGN PROJECT                               | 12   | 15,0 | v              | - |
| 2h | TVM5175    | INDECOL PROJECT                              |      | 15,0 | v              | - |
| 2h | POL3520    | INDECOL PROJECT                              | 4    | 15,0 | -              | v |
|    |            | <b>Master Thesis</b>                         | 11   |      |                |   |
| 2v | TEP4930    | INDUSTRIAL ECOLOGY                           |      | 30,0 | v              | - |
| 2v | TIØ4955    | INDUSTRIAL ECOLOGY                           | 9    | 30,0 | -              | v |
| 2v | TPD4910    | INDUSTRIAL ECOLOGY                           |      | 30,0 | v              | - |
| 2v | TVM4900    | INDUSTRIAL ECOLOGY                           |      | 30,0 | v              | - |
| 2v | POL3920    | INDUSTRIAL ECOLOGY                           | 4    | 30,0 | -              | v |

o = Compulsory courses

v = Optional courses

Ex 1h = Term 1, Exam Autumn

Ex 1v = Term 2, Exam Spring

Ex 2h = Term 3, Exam Autumn

Ex 2v = Term 4, Master Thesis Spring

cont.

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

Specialization:

- 1 Environmental Systems Analysis
- 2 Environmental Politics and Management

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

# FACULTY OF INFORMATION TECHNOLOGY, MATHEMATICS AND ELECTRICAL ENGINEERING

## MSC-PROGRAMME IN INFORMATION SYSTEMS (MSINFOSYST)

Term 1, 2, 3 and 4

| Ex | Subject no. | Subject title                          | Note | Cr   | Specialization |   |
|----|-------------|--|------|------|----------------|---|
|    |             |  |      |      | 1              | 2 |
|    |             | <b>Compulsory and optional courses</b> | 1    |      |                |   |
| 1h | TDT4235     | SOFTWARE QUALITY                       |      | 7,5  | v              | v |
| 1h | TDT4237     | SOFTWARE SECURITY                      |      | 7,5  | v              | - |
| 1h | TDT4245     | COOPERATION TECHN                      |      | 7,5  | v              | v |
| 1h | TDT4250     | MODEL-DRIVEN DEV IS                    |      | 7,5  | o              | o |
| 1h | TDT4290     | CUSTOMER DRIVEN PROJ                   |      | 15,0 | o              | o |
| 1h | TPK5100     | PROJ PLAN/CONTR                        |      | 7,5  | v              | v |
| 1v | -           | EXP IN TEAM INT PROJ                   |      | 7,5  | o              | o |
| 1v | TDT4215     | WEB INTELLIGENCE                       |      | 7,5  | o              | o |
| 1v | TDT4240     | SOFTWARE ARCHITECT                     |      | 7,5  | v              | v |
| 1v | TDT4242     | REQUIREMENT TEST                       |      | 7,5  | v              | v |
| 1v | TDT4252     | MOD INFOSYST AC                        |      | 7,5  | v              | o |
| 1v | TTM4115     | ENG DIST REAL SYST                     |      | 7,5  | v              | - |
| 2h | TDT4501     | COMPUTER SCIENCE SP                    |      | 15,0 | o              | o |
| 2h | TDT4506     | COMPUTER SCIENCE SC                    |      | 7,5  | o              | o |
| 2h | TBA5200     | PROJ PLAN/ANALYSIS                     |      | 7,5  | v              | v |
| 2h | TDT4210     | HEALTHCARE INFORM                      |      | 7,5  | v              | v |
| 2h | TIØ4180     | INNOV MANAGEM                          |      | 7,5  | v              | - |
| 2h | IT3010      | RESEARCH METHODOLOGY                   |      | 7,5  | v              | - |
| 2h | IT3604      | ORGANIZATION/ICT                       |      | 7,5  | v              | v |
|    |             | <b>Master Thesis</b>                   |      |      |                |   |
| 2v | TDT4900     | COMPU INFO SCIENCE                     |      | 30,0 | o              | o |

o - compulsory courses

v - optional courses

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

Specialization:

1 Information Systems

2 Information Systems Engineering\*

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



# FACULTY OF NATURAL SCIENCES AND TECHNOLOGY

## MSC-PROGRAMME IN LIGHT METALS PRODUCTION (MSLIMETAL)

Term 1, 2, 3 and 4

| Ex | Subject no. | Subject title             | Note | Cr   |
|----|-------------|---------------------------|------|------|
|    |             | <b>Compulsory courses</b> |      |      |
| 1h | TMT4145     | CERAMIC ENGINEERING       |      | 7,5  |
| 1h | TMT4155     | HETEROGEN EQUILIBRIA      |      | 7,5  |
| 1h | TMT4253     | ELECTROCHEM/ENERGY        |      | 7,5  |
| 1h | TMT4280     | EXTRACT METALLURGY        |      | 7,5  |
| 1v | TMT4166     | EXP MATR/ELECTR CHEM      |      | 7,5  |
| 1v | TMT4850     | EXP IN TEAM INT PROJ      |      | 7,5  |
| 1v | TMT5100     | ELECTR LIGHT MET 2        |      | 7,5  |
|    |             | <b>Optional courses</b>   | 1    |      |
| 1v | TMT4208     | FLUID/HEAT TRANSF AC      |      | 7,5  |
| 1v | MT8301      | CARBON MAT TECHN          |      | 7,5  |
|    |             | <b>Compulsory courses</b> |      |      |
| 2h | TMT4325     | REFIN/RECYL METALS        |      | 7,5  |
| 2h | TMT5500     | PROC MET ELECTR SP        |      | 15,0 |
| 2h | TMT5505     | PROC MET ELECTR SC        |      | 7,5  |
|    |             | <b>Master Thesis</b>      | 2    |      |
| 2v | TMT4900     | MAT CHEM ENER TECHN       |      | 30,0 |
| 2v | TMT4905     | MATR TECHN                |      | 30,0 |

Ex 1h = Term 1, Exam Autumn

Ex 1v = Term 2, Exam Spring

Ex 2h = Term 3, Exam Autumn

Ex 2v = Term 4, Master Thesis Spring

1) Select one of the courses.

2) Select one of the thesis.

# FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

## MSC-PROGRAMME IN MARINE TECHNOLOGY (MSN1)

Term 1, 2, 3 and 4

### MARINE STRUCTURES

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

cont.

# FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

## MSC-PROGRAMME IN MARINE TECHNOLOGY (MSN1)

Term 1, 2, 3 and 4

### MARINE STRUCTURES

| Ex | Subject no. | Subject title                | Note | Cr   | Specialization |   |   |
|----|-------------|------------------------------|------|------|----------------|---|---|
|    |             |                              |      |      | 1              | 2 | 3 |
|    |             | <b>Supplementary courses</b> | 4    |      |                |   |   |
| 2h | TMA4145     | LINEAR METHODS               |      | 7,5  | -              | - | v |
| 2h | TMR4115     | DESIGN METHODS               |      | 7,5  | v              | v | - |
| 2h | TMR4130     | RISK ANALYSIS                |      | 7,5  | v              | - | - |
| 2h | TMR4135     | FISH VESSEL/WORK DES         |      | 7,5  | v              | - | - |
| 2h | TMR4200     | FATIGUE/FRACTURE             |      | 7,5  | v              | v | - |
| 2h | TMR4235     | STOCH THEORY SEALOAD         |      | 7,5  | v              | v | - |
| 2h | TMR4275     | MOD/SIM/AN DYN SYS           |      | 7,5  | -              | v | - |
| 2h | TMR4290     | MAR ELECTR PROP SYST         |      | 7,5  | -              | - | v |
| 2h | TMR4300     | EXP/NUM HYDRODYN             |      | 7,5  | -              | v | - |
| 2h | TMR4305     | ADV ANALY MAR STRUCT         |      | 7,5  | v              | - | - |
| 2h | TTK4115     | LINEAR SYST THEORY           |      | 7,5  | -              | - | v |
| 2h | TTK4150     | NONLINEAR CONTR SYST         |      | 7,5  | -              | - | v |
|    |             | <b>Master Thesis</b>         |      |      |                |   |   |
| 2v | TMR4900     | MARINE STRUCTURES            |      | 30,0 | o              | 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 at least one subject for the specialization Marine structures.
- 3) Supplementary courses are not considered when planning the teaching and examination schedules.
- 4) Select two supplementary courses. Courses are not considered when planning the teaching and examination schedules.

Specialization:

1 Marine structures

2 Marine hydrodynamics

3 Marine cybernetics

# FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

## MSC-PROGRAMME IN MARINE TECHNOLOGY (MSN1)

Term 1 and 2

### MARINE SYSTEMS ENGINEERING

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

o = compulsory course

v = optional course

Ex 1h = Term 1, Exam Autumn

Ex 1v = Term 2, Exam Spring

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

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

Specialization:

1 Technical Operation of Marine Systems

4 Fisheries and Marine Resources

# FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

## MSC-PROGRAMME IN MARINE TECHNOLOGY (MSN1)

Term 1 and 2

MARINE SYSTEMS ENGINEERING - for students to TU Delft\*

| Ex | Subject no. | Subject title                          | Note | Cr  | Specialization |   |
|----|-------------|--|------|-----|----------------|---|
|    |             |  |      |     | 2              | 3 |
|    |             | <b>Compulsory and optional courses</b> |      |     |                |   |
| 1h | TMR4115     | DESIGN METHODS                         |      | 7,5 | -              | o |
| 1h | TMR4135     | FISH VESSEL WORK DES                   |      | 7,5 | -              | v |
| 1h | TMR4137     | SUST UTIL MAR RES                      |      | 7,5 | -              | v |
| 1h | TMR4170     | MARINE STRUCTURES BC                   |      | 7,5 | -              | v |
| 1h | TMR4223     | MARINE MACHINERY                       | 1    | 7,5 | o              | v |
| 1h | TMR4253     | MARINE SYST DESIGN                     | 1    | 7,5 | -              | o |
| 1h | TMR4275     | MOD/SIM/AN DYN SYST                    |      | 7,5 | o              | v |
| 1h | TMR4290     | MAR ELECTR PROP SYST                   |      | 7,5 | o              | v |
| 1h | TMR4295     | DES OF MECH SYST                       |      | 7,5 | o              | - |
|    |             | <b>Supplementary courses</b>           | 2    |     |                |   |
| 1h | TI04120     | OP RESEARCH INTRO                      |      | 7,5 | -              | v |
| 1h | TMR4125     | SHIPBUILDING                           |      | 7,5 | -              | v |
| 1h | TMR4130     | RISK ANALYSIS                          |      | 7,5 | -              | v |
| 1h | TMR4215     | SEA LOADS                              |      | 7,5 | -              | v |
| 1h | TPK4160     | VALUE CHAIN CONTROL                    |      | 7,5 | -              | v |
|    |             | <b>Compulsory courses at Delft</b>     | 3    |     |                |   |
| 1v | MT044       | NAVAL SHIP DESIGN                      |      | 3,0 | -              | o |
| 1v | MT113       | DESIGN ADV VEHICLES                    |      | 3,0 | v              | o |
| 1v | MT218       | MECHATRONIC MAR TECH                   |      | 5,0 | o              | v |
| 1v | MT313       | SHIPPING MANAGEMENT                    |      | 3,0 | -              | o |
| 1v | MT525       | MARINE PROP SYSTEMS                    |      | 2,0 | o              | v |
| 1v | MT713       | MARINE ENGINEERING C                   |      | 2,0 | o              | o |
| 1v | WB4408A     | DIESEL ENGINES A                       |      | 4,0 | o              | - |
| 1v | WB4408B     | DIESEL ENGINES B                       |      | 4,0 | o              | - |
|    |             | <b>Optional courses at Delft</b>       | 3    |     |                |   |

o = compulsory course

v = optional course

Ex 1h = Term 1, Exam Autumn

Ex 1v = Term 2, Exam Spring

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

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

Specialization:

2 Marine Engineering

3 Marine Systems Design and Logistics

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

# FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

## MSC-PROGRAMME IN MARINE TECHNOLOGY (MSN1)

Term 3 and 4

### MARINE SYSTEMS ENGINEERING

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

o = compulsory course

v = optional course

Ex 2h = Term 3, Exam Autumn

Ex 2v = Term 4, Master Thesis Spring

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

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

Specialization:

1 Technical Operation of Marine Systems

2 Marine Engineering

3 Marine Systems Design and Logistics

4 Fisheries and Marine Resources

# FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

## MSC-PROGRAMME IN MARINE TECHNOLOGY (MSN1)

Term 1, 2, 3 and 4

### NAUTICAL SCIENCE

| Ex | Subject no. | Subject title             | Note | Cr   |
|----|-------------|---------------------------|------|------|
|    |             | <b>Compulsory courses</b> |      |      |
| 1h | TMA4120     | CALCULUS 4K               | 1    | 7,5  |
| 1h | TMR4215     | SEA LOADS                 |      | 7,5  |
| 1h | TMR5230     | NAUTICAL SCIENCE BC       |      | 7,5  |
| 1h | TTT4175     | MAR ACOUSTICS             |      | 7,5  |
| 1v | -           | EXP IN TEAM INT PROJ      |      | 7,5  |
| 1v | TMR4182     | MARINE DYNAMICS           | 1    | 7,5  |
| 1v | TTT4150     | NAVIGATION SYSTEMS        |      | 7,5  |
|    |             | <b>Optional courses</b>   |      |      |
| 1v | TMR4217     | HYDRO HIGH-SPEED VEH      | 2    | 7,5  |
| 1v | TMR4220     | NAVAL HYDRODYNAMICS       | 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      | 2    | 7,5  |
|    |             | <b>Compulsory courses</b> |      |      |
| 2h | TMR5240     | NAUTICAL SCIENCE AC       |      | 7,5  |
| 2h | TMR5250     | NAUTICAL SCIENCE PRO      |      | 7,5  |
| 2h | TMR5260     | NAUTICAL SCIENCE SC       |      | 7,5  |
|    |             | <b>Optional courses</b>   |      |      |
| 2h | TMR4130     | RISK ANALYSIS             |      | 7,5  |
| 2h | TMR4235     | STOCH THEORY SEALOAD      |      | 7,5  |
|    |             | <b>Master Thesis</b>      |      |      |
| 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

The courses have to be selected so that the total weighting each term amounts to 30 credits (Cr).

- 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* |
|    |             | <b>Compulsory and optional courses</b> |      |     |                |   |   |   |    |
| 1h | BI3013      | EXP CELL BIOLOGY                       |      | 7,5 | -              | - | - | - | v  |
| 1h | FY2302      | BIOPHYSICS I                           |      | 7,5 | -              | - | - | v | -  |
| 1h | IT3604      | ORGANIZATION/ICT                       |      | 7,5 | -              | v | - | - | -  |
| 1h | MFEL3010    | MED FOR STUD OF NAT                    |      | 7,5 | o              | o | o | o | -  |
| 1h | MOL3000     | INTRO MOL MEDICINE                     |      | 7,5 | -              | - | - | - | o  |
| 1h | MOL3005     | IMMUNOLOGY                             |      | 7,5 | -              | - | - | - | o  |
| 1h | MOL3014     | NANOMED 1                              |      | 7,5 | -              | - | - | - | v  |
| 1h | TBT4135     | BIOPOLYMERS                            |      | 7,5 | -              | - | - | - | v  |
| 1h | TBT4145     | MOL GENETICS                           |      | 7,5 | -              | - | - | - | o  |
| 1h | TDT4138     | KNOW REPR/MODEL                        |      | 7,5 | -              | - | v | - | -  |
| 1h | TDT4200     | PARALLEL COMPUTING                     |      | 7,5 | -              | - | v | - | -  |
| 1h | TDT4210     | HEALTHCARE INFORM                      |      | 7,5 | -              | o | v | - | -  |
| 1h | TDT4245     | COOPERATION TECHN                      |      | 7,5 | -              | v | - | - | -  |
| 1h | TDT4250     | MODEL DRIVEN DEV IS                    |      | 7,5 | -              | v | - | - | -  |
| 1h | TFY4225     | NUCLEAR/RAD PHYS                       |      | 7,5 | -              | - | - | o | -  |
| 1h | TFY4265     | BIOPHYSICAL MICROMET                   |      | 7,5 | -              | - | - | v | -  |
| 1h | TFY4310     | MOLECULAR BIOPHYSICS                   |      | 7,5 | -              | - | - | v | -  |
| 1h | TTK4160     | MEDICAL IMAGING                        |      | 7,5 | o              | - | v | - | -  |
| 1h | TTT4130     | DIGITAL COMMUN                         |      | 7,5 | v              | - | - | - | -  |
| 1h | TTT4155     | REMOTE SENSING                         |      | 7,5 | v              | - | - | - | -  |
| 1h | TTT4175     | MARINE ACOUSTICS                       |      | 7,5 | v              | - | - | - | -  |
| 1v | -           | EXP IN TEAM INT PROJ                   |      | 7,5 | o              | o | o | o | o  |
| 1v | BI2012      | CELL BIOLOGY                           |      | 7,5 | -              | - | - | - | v  |
| 1v | BI3018      | PAT/COMMERCIALIZAT                     |      | 7,5 | -              | - | - | - | v  |
| 1v | BI3073      | GENETIC TOXICOLOGY                     |      | 7,5 | -              | - | - | - | v  |
| 1v | DT8112      | RES TOP HEALTH INFO                    |      | 7,5 | -              | v | - | - | -  |
| 1v | MOL3007     | FUNCTIONAL GENOMICS                    |      | 7,5 | -              | - | - | - | v  |
| 1v | MOL3015     | NANOMED II THERAPY                     |      | 7,5 | -              | - | - | - | v  |
| 1v | MOL4010     | MOL BIOL FOR TECH                      | 1    | 7,5 | -              | - | o | - | -  |
| 1v | MTEK3001    | APPL BIOINFORMATICS                    |      | 7,5 | -              | - | o | - | -  |
| 1v | TDT4215     | WEB INTELLIGENCE                       |      | 7,5 | -              | v | - | - | -  |
| 1v | TDT4240     | SOFTWARE ARCHITECT                     |      | 7,5 | -              | v | - | - | -  |
| 1v | TDT4242     | REQUIREMENTS/TESTING                   |      | 7,5 | -              | o | - | - | -  |
| 1v | TFY4280     | SIGNAL PROCESSING                      |      | 7,5 | -              | - | - | v | -  |
| 1v | TFY4315     | BIOPHYS IONIZ RADIAT                   |      | 7,5 | -              | - | - | o | -  |
| 1v | TFY4320     | MEDICAL PHYSICS                        |      | 7,5 | v              | - | - | o | -  |
| 1v | TMA4300     | COMP STAT METHODS                      |      | 7,5 | -              | - | o | - | -  |
| 1v | TTK4165     | SIGNAL PROC MED IMAG                   |      | 7,5 | o              | - | - | - | -  |
| 1v | TTK4170     | MOD/IDENT BIOL SYS                     |      | 7,5 | -              | - | - | v | -  |
| 1v | TTT4125     | INFO THEORY COD/COMP                   |      | 7,5 | o              | - | - | - | -  |
| 1v | TTT4240     | STAT SIGNAL THEORY                     |      | 7,5 | v              | - | - | - | -  |
| 1v | TTT4245     | MARINE ACOUSTICS II                    |      | 7,5 | v              | - | - | - | -  |

cont.



# FACULTY OF NATURAL SCIENCES AND TECHNOLOGY

## MSC-PROGRAMME IN MEDICAL TECHNOLOGY (MSMEDTEK)

| Ex | Subject no. | Subject title                  | Note | Cr   | Specialization |   |   |   |    |
|----|-------------|--------------------------------|------|------|----------------|---|---|---|----|
|    |             |                                |      |      | 1              | 2 | 3 | 4 | 5* |
| 2h | BI3016      | MOLECULAR CELL BIOL            |      | 7,5  | -              | - | - | - | o  |
| 2h | TDT4138     | KNOWLEDGE REPR MOD             |      | 7,5  | -              | o | - | - | -  |
| 2h | TDT4287     | ALGORITHMS BIOINFO             |      | 7,5  | -              | - | o | - | -  |
| 2h | TKT4150     | BIOMECHANICS                   |      | 7,5  | -              | - | - | v | -  |
| 2h | TTK4160     | MEDICAL IMAGING                |      | 7,5  | -              | - | - | v | -  |
| 2h | TTT4135     | MULTIMEDIA SIGNAL PRO          |      | 7,5  | o              | - | - | - | -  |
|    |             | <b>Specialization courses</b>  | 2    |      |                |   |   |   |    |
| 2h | TBI4505     | BIOTECHNOLOGY SC               | 3    | 7,5  | -              | - | - | - | v  |
| 2h | TBT4505     | BIOTECHNOLOGY SC               | 3    | 7,5  | -              | - | - | - | v  |
| 2h | TDT4535     | BIOINFORMATICS SC              |      | 7,5  | -              | - | o | - | -  |
| 2h | TDT4545     | HEALTHCARE INFO SC             |      | 7,5  | -              | o | - | - | -  |
| 2h | TFY4505     | BIOPHYSICS SC                  |      | 7,5  | -              | - | - | o | -  |
| 2h | TTK4555     | ENG CYBERNETICS SC             | 4    | 7,5  | v              | - | - | - | -  |
| 2h | TTT4525     | SIGNAL PROC SC                 | 4    | 7,5  | v              | - | - | - | -  |
|    |             | <b>Specialization projects</b> |      |      |                |   |   |   |    |
| 2h | TBI4500     | BIOTECHNOLOGY SP               | 3    | 15,0 | -              | - | - | - | v  |
| 2h | TBT4500     | BIOTECHNOLOGY SP               | 3    | 15,0 | -              | - | - | - | v  |
| 2h | TDT4530     | BIOINFORMATICS SP              |      | 15,0 | -              | - | o | - | -  |
| 2h | TDT4540     | HEALTHCARE INFO SP             |      | 15,0 | -              | o | - | - | -  |
| 2h | TFY4500     | BIOPHYSICS SP                  |      | 15,0 | -              | - | - | o | -  |
| 2h | TTK4550     | ENG CYBERNETICS SP             | 4    | 15,0 | v              | - | - | - | -  |
| 2h | TTT4520     | SIGNAL PROC SP                 | 4    | 15,0 | v              | - | - | - | -  |
|    |             | <b>Master Thesis</b>           |      |      |                |   |   |   |    |
| 2v | TBI4900     | BIOTECHNOLOGY                  | 3    | 30,0 | -              | - | - | - | v  |
| 2v | TBT4900     | BIOTECHNOLOGY                  | 3    | 30,0 | -              | - | - | - | v  |
| 2v | TDT4900     | COMP INFORM SCIENCE            |      | 30,0 | -              | o | o | - | -  |
| 2v | TFY4910     | BIOPHYSICS                     |      | 30,0 | -              | - | - | o | -  |
| 2v | TTK4900     | ENGINEERING CYBERN             | 4    | 30,0 | v              | - | - | - | -  |
| 2v | TTT4900     | ACOUST SIGN PROC/COM           | 4    | 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 2h = Term 3, Exam Autumn

Ex 1v = Term 2, Exam Spring

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 PBL exercises and presentations are given in English.

2) Other relevant ordinary subjects may be chosen, if taught in english.

3) Students at specialization Medical Biotechnology should choose one of the combinations TBI4500/TBI4505/TBI4900 or TBT4500/TBT4505/TBT4900.

4) Students at specialization Medical Signal Processing and Imaging should choose one of the combinations TTK4550/TTK4555/TTK4900 or TTT4520/TTT4525/TTT4900.

# FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

## MSC-PROGRAMME IN NATURAL GAS TECHNOLOGY (MSGASTECH)

Term 1, 2, 3 and 4

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

Ex 1h = Term 1, Exam Autumn

Ex 1v = Term 2, Exam Spring

- 1) Optional courses must be selected to obtain a total of 30 credits in each semester.
- 2) The course is not considered when planning the teaching and examination schedules.
- 3) The course will not be taught in 2011/12.
- 4) One specialization course must be chosen.
- 5) One specialization project must be chosen according to the selected specialization course.
- 6) Supplementary courses must be selected to obtain a total of 30 credits per semester. The courses are not considered when planning the teaching and examination schedules.
- 7) The master thesis must be chosen according to the selected specialization.

# FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

## MSC-PROGRAMME IN PETROLEUM ENGINEERING (MSG1)

Term 1, 2, 3 and 4

| Ex | Subject no. | Subject title                          | Note | Cr   | Specialization |   |   |
|----|-------------|--|------|------|----------------|---|---|
|    |             |  |      |      | 1              | 2 | 3 |
|    |             | <b>Compulsory and optional courses</b> |      |      |                |   |   |
| 1h | TPG4117     | UNCONVENT RESERVOIRS                   | 1    | 7,5  | v              | - | - |
| 1h | TPG4145     | RESERVOIR FLUIDS                       |      | 7,5  | o              | v | o |
| 1h | TPG4150     | RESERVOIR REC TECHN                    |      | 7,5  | o              | o | o |
| 1h | TPG4151     | UNDERGROUND DECISION                   | 2    | 7,5  | v              | v | v |
| 1h | TPG4155     | APPL COMPUTER METHOD                   |      | 7,5  | o              | o | o |
| 1h | TPG4162     | 3D VISUAL PETR DATA                    | 2    | 7,5  | v              | v | v |
| 1h | TPG4175     | PETROPHYSICS FUND                      |      | 7,5  | v              | v | v |
| 1h | TPG4177     | CARB RESERVOIR CHAR                    |      | 7,5  | v              | v | v |
| 1h | TPG4215     | HIGH DEV DRILLING                      |      | 7,5  | v              | o | v |
| 1h | TPG4235     | WELL TESTING AC                        | 3    | 7,5  | v              | v | v |
| 1h | TPG5140     | SPEC SUB SURF MAN                      | 2    | 7,5  | v              | v | v |
| 1v | -           | EXP IN TEAM INT PROJ                   |      | 7,5  | o              | o | o |
| 1v | TPG4115     | RES PROP DETERMIN                      |      | 7,5  | v              | - | - |
| 1v | TPG4160     | RESERVOIR SIMULATION                   |      | 7,5  | o              | v | v |
| 1v | TPG4180     | PETR PHYS INTERPR AC                   |      | 7,5  | v              | v | v |
| 1v | TPG4205     | DRILL TECH PR CONTR                    |      | 7,5  | v              | v | v |
| 1v | TPG4220     | DRILLING FLUID                         |      | 7,5  | v              | o | v |
| 1v | TPG4225     | FRACTURED RESERVOIRS                   | 2    | 7,5  | v              | - | - |
| 1v | TPG4230     | FIELD DEVELOPMENT                      |      | 7,5  | v              | v | o |
| 1v | TPG5110     | PETROLEUM ECONOMICS                    | 2    | 7,5  | v              | v | v |
| 2h | TPG4177     | CARB RESERVOIR CHAR                    |      | 7,5  | v              | v | v |
| 2h | TPG4185     | FORMATION MECHANICS                    |      | 7,5  | v              | v | v |
| 2h | TPG4235     | WELL TESTING AC                        | 3    | 7,5  | v              | v | v |
|    |             | <b>Specialization courses</b>          |      |      |                |   |   |
| 2h | TPG4515     | PETR PROD SC                           |      | 7,5  | -              | - | o |
| 2h | TPG4525     | DRILLING ENG SC                        |      | 7,5  | -              | o | - |
| 2h | TPG4535     | RESERVOIR ENG SC                       |      | 7,5  | o              | - | - |
|    |             | <b>Specialization project</b>          |      |      |                |   |   |
| 2h | TPG4510     | PETR PROD SP                           |      | 15,0 | -              | - | o |
| 2h | TPG4520     | DRILLING ENG SP                        |      | 15,0 | -              | o | - |
| 2h | TPG4530     | RESERVOIR ENG SP                       |      | 15,0 | o              | - | - |
|    |             | <b>Master Thesis</b>                   |      |      |                |   |   |
| 2v | TPG4920     | PETROL ENGINEERING                     |      | 30,0 | o              | o | o |

o - compulsory courses

v - optional courses

Ex 1h = Term 1, Exam Autumn

Ex 1v = Term 2, Exam Spring

Ex 2h = Term 3, Exam Autumn

Ex 2v = Term 4, Master Thesis Spring

1) The courses must be selected to obtain a total of 30 credits in each semester. In addition to the subjects listed 2h students can choose from 1h Petroleum Engineering, 1h Petroleum Geosciences and PhD-courses.

2) The course is not considered when planning the teaching and examination schedules.

3) The course will not be taught in 2011/12.

Specialization:

1 Reservoir Engineering

2 Drilling Engineering

3 Petroleum Production

# FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

## MSC-PROGRAMME IN PETROLEUM GEOSCIENCES (MSG2)

Term 1, 2, 3 and 4

| Ex | Subject no. | Subject title                          | Note | Cr   | Specialization |   |
|----|-------------|--|------|------|----------------|---|
|    |             |  |      |      | 1              | 2 |
|    |             | <b>Compulsory and optional courses</b> |      |      |                |   |
| 1h | TGB4160     | PETROLEUM GEOLOGY                      | 1    | 7,5  | v              | o |
| 1h | TGB4265     | STRUCT GEOLOGY AC                      | 2    | 7,5  | v              | v |
| 1h | TPG4120     | ENG/ENVIRONM GEOPHYS                   | 2    | 7,5  | v              | v |
| 1h | TPG4125     | SEISMIC WAVE PROP                      |      | 7,5  | o              | o |
| 1h | TPG4150     | RESERVOIR REC TECHN                    |      | 7,5  | v              | v |
| 1h | TPG4155     | APPL COMPUTER METHODS                  |      | 7,5  | o              | o |
| 1h | TPG4162     | 3D VISUAL PETR DATA                    | 2    | 7,5  | v              | v |
| 1h | TPG4175     | PETROPHYSICS BC                        |      | 7,5  | v              | v |
| 1h | TPG4177     | CARB RESERVOIR CHAR                    |      | 7,5  | v              | v |
| 1h | TPG4185     | FORMATION MECHANICS                    |      | 7,5  | v              | v |
| 1h | TPG4195     | GRAVIMETR MAGNETOMET                   |      | 7,5  | v              | v |
| 1h | TPG5130     | SEISMIC PROCESSING                     | 2    | 7,5  | v              | v |
| 1v | -           | EXP IN TEAM INT PROJ                   |      | 7,5  | o              | o |
| 1v | TGB4135     | BASIN ANALYSIS                         |      | 7,5  | v              | v |
| 1v | TGB4170     | DIAGENESIS/RES QUAL                    |      | 7,5  | v              | v |
| 1v | TPG4130     | SEISMIC INTERPRET                      |      | 7,5  | o              | o |
| 1v | TPG4170     | RESERVOIR SEISMICS                     |      | 7,5  | v              | v |
| 1v | TPG4180     | PETR PHYS INTERPR AC                   |      | 7,5  | v              | v |
| 1v | TPG5110     | PETROLEUM ECONOMICS                    |      | 7,5  | v              | v |
| 2h | TPG4151     | UNDERGROUND DECISION                   |      | 7,5  | -              | v |
| 2h | TPG4177     | CARB RESERVOIR CHAR                    |      | 7,5  | -              | v |
| 2h | TPG4190     | SEISMIC DATA                           |      | 7,5  | o              | v |
|    |             | <b>Specialization courses</b>          |      |      |                |   |
| 2h | TGB4565     | PETR GEOLOGY SC                        |      | 7,5  | -              | o |
| 2h | TPG4545     | PETR GEOPHYS SC                        |      | 7,5  | o              | - |
|    |             | <b>Specialization project</b>          |      |      |                |   |
| 2h | TGB4560     | PETR GEOLOGY SP                        |      | 15,0 | -              | o |
| 2h | TPG4540     | PETR GEOPHYS SP                        |      | 15,0 | o              | - |
|    |             | <b>Master Thesis</b>                   |      |      |                |   |
| 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) The courses must be selected to obtain a total of 30 credits in each semester. In addition to the subject listed 2h (TPG4190) students in specialization 2 can choose from 1h Petroleum Engineering, 1h Petroleum Geosciences and PhD-courses.

2) The course is not considered when planning the teaching and examination schedules.

Specialization:

1 Petroleum Geophysics

2 Petroleum Geology

# FACULTY OF SOCIAL SCIENCES AND TECHNOLOGY MANAGEMENT

## MSC-PROGRAMME IN PROJECT MANAGEMENT (MSPROMAN)

Term 1, 2, 3 and 4

| Ex | Subject no. | Subject title                  | Note | Cr   | Specialization |   |   |
|----|-------------|--------------------------------|------|------|----------------|---|---|
|    |             |                                |      |      | 1              | 2 | 3 |
|    |             | <b>Compulsory courses</b>      | 1    |      |                |   |   |
| 1h | TBA5200     | PROJ PLAN/ANALYSIS             |      | 7,5  | o              | o | o |
| 1h | TIØ5200     | PROJ ORG                       |      | 7,5  | o              | o | o |
| 1h | TPK5100     | PROJ PLAN/CONTR                |      | 7,5  | o              | o | o |
| 1v | -           | EXP IN TEAM INT PROJ           |      | 7,5  | o              | o | o |
| 1v | TIØ5210     | PROGRAM MGMT                   |      | 7,5  | o              | o | o |
| 1v | TIØ5215     | CSR GREEN SUPPLY MAN           |      | 7,5  | o              | o | o |
|    |             | <b>Optional courses</b>        | 1, 2 |      |                |   |   |
| 1h | TBA4315     | ECONOM/TRANSP INFRA            |      | 7,5  | v              | - | - |
| 1h | TBA5150     | GEOHAZARDS/RISK AN             |      | 7,5  | v              | - | - |
| 1h | TIØ4265     | STRATEGIC MANAGEMENT           |      | 7,5  | -              | v | - |
| 1h | TIØ4345     | MAN BUS RELAT/NETW             |      | 7,5  | -              | v | - |
| 1h | TPK4140     | MAINTEN MANAGEMENT             |      | 7,5  | -              | - | v |
| 1h | TPK4160     | VALUE CHAIN CONTR              |      | 7,5  | -              | - | v |
| 1h | TPK5160     | RISK ANALYSIS                  |      | 7,5  | -              | - | v |
| 1v | TGB5110     | ENG GEO/TUNNEL BC              |      | 7,5  | v              | - | - |
| 1v | TIØ4175     | PURCH LOG MGMT                 |      | 7,5  | -              | v | - |
| 1v | TPK4110     | QUAL/PERFORMANCE               |      | 7,5  | -              | - | v |
|    |             | <b>Supplementary courses</b>   | 1    |      |                |   |   |
| 1v | TIØ4140     | PROJ EVAL FINANCING            |      | 7,5  | -              | v | - |
| 1v | TIØ4235     | IND MARK                       |      | 7,5  | -              | v | - |
| 1v | TPK4135     | LOG/PROD MANAGEMENT            |      | 7,5  | -              | - | v |
| 1v | TPK4185     | IND SYST ENG                   |      | 7,5  | -              | - | v |
| 1v | TPK5165     | RAMS ENG/MANAGEMENT            |      | 7,5  | -              | - | v |
|    |             | <b>Specialization courses</b>  |      |      |                |   |   |
| 2h | TBA4128     | PRO MAN AC                     |      | 7,5  | o              | - | - |
| 2h | TIØ5225     | PRO MAN SC                     |      | 7,5  | -              | o | - |
| 2h | TPK4505     | PRO MAN SC                     |      | 7,5  | -              | - | o |
|    |             | <b>Specialization projects</b> |      |      |                |   |   |
| 2h | TBA4530     | PRO MAN SP                     |      | 15,0 | o              | - | - |
| 2h | TIØ5230     | PRO MAN SP                     |      | 15,0 | -              | o | - |
| 2h | TPK4500     | PRO MAN SP                     |      | 15,0 | -              | - | o |
| 2h | TPK5115     | RISK MANAGEM PROJ              |      | 7,5  | o              | o | o |
|    |             | <b>Master Thesis</b>           |      |      |                |   |   |
| 2v | TBA4910     | PROJ MANAGEMENT                |      | 30,0 | o              | - | - |
| 2v | TIØ4920     | PROJ MANAGEMENT                |      | 30,0 | -              | o | - |
| 2v | TPK4905     | PROJ MANAGEMENT                |      | 30,0 | -              | - | o |

o - compulsory courses

v - optional courses

Ex 1h = Term 1, Exam Autumn

Ex 2h = Term 3, Exam Autumn

Ex 1v = Term 2, Exam Spring

Ex 2v = Term 4, Master Thesis Spring

1) The courses must be selected to obtain a total of 30 credits per semester. The supplementary courses are not considered when planning the teaching and examination schedules.

2) Other courses within your field of technology may be chosen with Faculty permission.

Specialization:

1. Civil Engineering

2. Industrial Engineering

3. Production and Quality Engineering

# 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   |
|----|-------------|---------------------------|------|------|
|    |             | <b>Compulsory courses</b> |      |      |
| 1h | TPK4120     | SAFETY/RELIABILITY        |      | 7,5  |
| 1h | TPK4140     | MAIN MANAGEMENT           |      | 7,5  |
| 1h | TPK5115     | RISK MANAGEM PROJ         |      | 7,5  |
| 1h | TPK5160     | RISK ANALYSIS             |      | 7,5  |
| 1v | -           | EXP IN TEAM INT PROJ      |      | 7,5  |
| 1v | TIØ4200     | SAFETY MANAGEMENT         | 1    | 7,5  |
| 1v | TIØ4205     | SHE-METH/TOOLS SHE        | 1    | 7,5  |
| 1v | TMA4255     | APPLIED STATISTICS        | 1    | 7,5  |
| 1v | TMA4275     | LIFETIME ANALYSIS         | 1    | 7,5  |
| 1v | TPK5165     | RAMS ENG/MANAGEMENT       |      | 7,5  |
| 2h | SPRÅK3501   | SCIENTIFIC COM            | 2    | 7,5  |
| 2h | TIØ4201     | RISK GOVERNANCE           | 2    | 7,5  |
| 2h | TPK4510     | PROD QUALITY ENG SP       |      | 15,0 |
| 2h | TPK5115     | RISK MANAGEM PROJ         | 2,3  | 7,5  |
| 2h | TPK5170     | RAMS OPTIMISATION         |      | 7,5  |
|    |             | <b>Master Thesis</b>      |      |      |
| 2v | TPK4900     | PROD QUALITY ENG          |      | 30,0 |

Ex 1h = Term 1, Exam Autumn

Ex 1v = Term 2, Exam Spring

Ex 2h = Term 3, Exam Autumn

Ex 2v = Term 4, Master Thesis Spring

- 1) Select two of the courses.
- 2) Select one of the courses.
- 3) Only valid for the academic year 2011/12.

## 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   |
|----|-------------|---------------------------|------|------|
|    |             | <b>Compulsory courses</b> |      |      |
| 1h | TMT4155     | HETEROGEN EQUILIBRIA      |      | 7,5  |
| 1h | TMT4280     | EXTRACT METALLURGY        |      | 7,5  |
| 1h | TMT4305     | ELECTROMETALLURGY         |      | 7,5  |
| 1h | TMT4325     | REFIN/RECYCL METALS       |      | 7,5  |
| 1v | -           | EXP IN TEAM INT PROJ      |      | 7,5  |
| 1v | TMT4166     | EXP MATR/ELECTR CHEM      |      | 7,5  |
| 1v | TMT4208     | FLUID/HEAT TRANSF AC      |      | 7,5  |
|    |             | <b>Optional courses</b>   | 1    |      |
| 1v | TEP4220     | ENERGY/ENVIRONM CONS      |      | 7,5  |
| 1v | TMT4300     | LIGHT/ELECTRON MICRO      |      | 7,5  |
| 1v | TMT5100     | ELECTR LIGHT MET 2        |      | 7,5  |
| 1v | MT8301      | CARBON MAT TECHN          |      | 7,5  |
|    |             | <b>Compulsory courses</b> |      |      |
| 2h | TMT4222     | MECH PROP OF METALS       |      | 7,5  |
| 2h | TMT5500     | PROC MET ELECTR SP        |      | 15,0 |
| 2h | TMT5505     | PROC MET ELECTR SC        |      | 7,5  |
|    |             | <b>Master Thesis</b>      |      |      |
| 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 |
|    |             | <b>Compulsory courses</b>      |      |      |                |   |   |
| 1h | TTM4105     | ACCESS TRANS NETW              |      | 7,5  | o              | o | o |
| 1h | TTM4110     | DEP AND PER WITH SIM           |      | 7,5  | o              | o | o |
| 1h | TTM4150     | INTERNET NETW ARCH             |      | 7,5  | o              | o | o |
| 1v | -           | EXP IN TEAM INT PROJ           |      | 7,5  | o              | o | o |
| 1v | TTM4115     | ENG DIST REAL SYS              |      | 7,5  | o              | o | o |
| 1v | TTM4135     | INFORMATION SEC                |      | 7,5  | o              | o | o |
|    |             | <b>Optional courses</b>        | 1    |      |                |   |   |
| 1h | TDT4235     | SOFTWARE QUALITY               |      | 7,5  | v              | v | v |
| 1h | TDT4237     | SOFTWARE SECURITY              |      | 7,5  | v              | v | v |
| 1v | TTM4120     | DEPENDABLE SYSTEMS             |      | 7,5  | v              | v | v |
| 1v | TTM4128     | NETW AND SERV MAN              |      | 7,5  | v              | v | v |
| 1v | TTM4130     | SERV INT AND MOB               |      | 7,5  | v              | v | v |
|    |             | <b>Specialization courses</b>  |      |      |                |   |   |
| 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 |
|    |             | <b>Specialization projects</b> |      |      |                |   |   |
| 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 | - |
|    |             | <b>Master Thesis</b>           |      |      |                |   |   |
| 2v | TTM4905     | NETWORKS/SERVICES              |      | 30,0 | o              | o | o |

o = compulsory courses

v = optional courses

Ex 1h = Term 1, Exam Autumn

Ex 1v = Term 2, Exam Spring

Ex 2h = Term 3, Exam Autumn

Ex 2v = Term 4, Master Thesis Spring

1) Select one of the courses each semester.

Specialization:

1 Networks and Quality of Service

2 Services and Systems Engineering

3 Information Security



## FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

### MSC-PROGRAMME IN INNOVATIVE SUSTAINABLE ENERGY ENGINEERING (MSISEE)

Term 2 \*

Term 3 and 4

#### CARBON DIOXIDE CAPTURE

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

Ex 1v = Term 2, Exam Spring

Ex 2h = Term 3, Exam Autumn

Ex 2v = Term 4, Master Thesis Spring

- 1) Optional courses must be selected to obtain a total of 30 credits in each semester.
- 2) The course is not considered when planning the teaching and examination schedules.
- 3) The course will not be taught in 2011/12.
- 4) One specialization course must be chosen.
- 5) One specialization project must be chosen according to the selected specialization course.
- 6) Supplementary courses must be selected to obtain a total of 30 credits per semester. The courses are not considered when planning the teaching and examination schedules.
- 7) The master thesis must be chosen according to the selected specialization.

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

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

For further information see

<http://www.ntnu.no/studies/msc-sustainable-energy-engineering>

<http://www.nordicmaster.eu/>

## FACULTY OF ENGINEERING SCIENCE AND TECHNOLOGY

### MSC-PROGRAMME IN INNOVATIVE SUSTAINABLE ENERGY ENGINEERING (MSISEE)

Term 2\*

Term 3 and 4

#### INDUSTRIAL ECOLOGY

| Ex | Subject no | Subject title   | Note | Cr   |
|----|------------|---|------|------|
| 1v | TEP4220    | <b>Compulsory courses</b><br>ENERGY/ENV CONSEQUEN               |      | 7,5  |
| 1v | TVM4160    | MATERIAL FLOW ANALYS  |      | 7,5  |
| 1v | -          | <b>Optional courses</b><br>EXP IN TEAM INT PROJ                 | 1    | 7,5  |
| 1v | TPD5100    | SUSTAINABLE PD AC   |      | 7,5  |
| 1v | KULT3304   | STUDIES OF TECHN II   | 2    | 15,0 |
| 1v | POL1003    | POLITICS ENVIRONM   |      | 7,5  |
| 1v | SØK1101    | ENVIRONM RESOURCE   |      | 7,5  |
| 2h | TEP4222    | <b>Optional courses</b><br>INPUT-OUTPUT ANALYS                  | 1    | 7,5  |
| 2h | TEP4223    | LIFE CYCLE ASSESSM  |      | 7,5  |
| 2h | TPD4505    | DESIGN THEORY SC  | 3    | 7,5  |
| 2h | TPK4160    | VALUE CHAIN CONTR   |      | 7,5  |
| 2h | TVM4162    | INDUSTRIAL ECOLOGY  |      | 7,5  |
| 2h | POL3507    | POLICY ANALYSIS   | 3    | 15,0 |
| 2h | TEP5100    | <b>Project and thesis preparation course</b><br>INDECOL PROJECT | 4    | 15,0 |
| 2h | TPD4500    | PRODUCT DESIGN 9 SP   | 3    | 15,0 |
| 2h | TVM5175    | INDECOL PROJECT   |      | 15,0 |
| 2v | TEP4930    | <b>Master Thesis</b><br>INDUSTRIAL ECOLOGY                      | 5    | 30,0 |
| 2v | TPD4910    | INDUSTRIAL ECOLOGY  |      | 30,0 |
| 2v | TVM4900    | INDUSTRIAL ECOLOGY  |      | 30,0 |

Ex 1v = Term 2, Exam Spring

Ex 2h = Term 3, Exam Autumn

Ex 2v = Term 4, Master Thesis Spring

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

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

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

For further information see

<http://www.ntnu.no/studies/msc-sustainable-energy-engineering>

<http://www.nordicmaster.eu/>

## MASTER OF ARTS IN DANCE STUDIES

### About the programme

Are you interested in dance as a social and cultural phenomenon? Would you like to know about dance cultures and dance heritage in different parts of the world? What about the changing conditions safeguarding dance as intangible cultural heritage in the era of globalisation?

The Master of Arts programme in Dance Studies aims to provide students with an understanding of the relationship between dance and culture. The approach is multi-disciplinary, with emphasis on perspectives drawn from ethnochoreology, dance anthropology, cultural studies and dance history.

### Programme components

The master's programme in Dance Studies involves two years of full-time studies. The workload for a full-time student for one academic year is 60 credits. The programme is structured around core courses (15 credits) and elective courses (7.5 or 15 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 (30 credits). The student will benefit from meeting a large staff of professors from cooperating universities, and from experiencing several university environments with a broad choice in specialisations. The student will do part of the studies in Trondheim, at least the start of the first and the whole last semester in Trondheim. Part of the studies should be done in a cooperating university on an Erasmus exchange which can be one of the middle semesters or most of the first academic year. Exchange is in principle possible to 1 of 3 Nordic or 1 of 3 other European universities. During the rest of the study period the student can stay in Trondheim and travel to the 1 week intensive program offered in Copenhagen or Stockholm, or can stay in one of the other Nordic or Middle European universities, and travel to the Nordic intensive course if not staying where it is given. In the second semester the student can come back as funded exchange student to Trondheim if registered at one of the cooperating universities.

### Structure

Both specialisations require that the student starts with the welcome week and the intensive course in Dance analysis at NTNU. NTNU will also supervise the master's thesis which awards 30 ECTS credits and is written during the final semester of study or half time in each of the two last semesters. NTNU additionally offers a sufficient variety of courses to fill the electives in the Nordic Specialisation, which equal 30 ECTS and include the Erasmus Intensive Program IPEDAM. Students on exchange in the 2nd term can have their travel back to NTNU for 10 days funded. The student is free to follow one of the specialisations only, or to select elements from both, and Erasmus exchanges can be done to universities of both specialisations. If the student wants one year's Erasmus exchange, it can be done most efficiently by going on exchange during the first academic year, after the welcome week in August and the Intensive course in Dance analysis at NTNU which is finished by the middle of September.

## Semester Breakdown of the Programme of Study 2011-2012

### The Nordic Specialisation

The Nordic Specialisation is a formalised institutional co-operation that intersects historical and national borders within disciplines concerning students and lecturers. The programme of study combines professional artistic, ethnological/anthropological, and common cultural-anthropological approaches. Furthermore, it includes in-depth studies within a number of genres of dance. The compulsory courses represent the joint academic basis for the master's programme, and emphasise theory and method, dance analysis and the history of dance. The instruction of these courses is structured around intensive periods of teaching and academic supervision. The coursework amounts to three semesters of full-time study. The master's thesis awards 30 ECTS credits and is written during the two final semesters of study.

| Semester                   | 7,5 ECTS   | 7,5 ECTS | 7,5 ECTS  | 7,5 ECTS                        |
|----------------------------|--|----------|---|---------------------------------|
| <b>4th semester Spring</b> | DANS3010 <i>Master's Thesis in Dance Studies</i> (NTNU)                |          | Dance Anthropology (University of Tampere)        |                                 |
| <b>3rd semester Autumn</b> | DANS3010 <i>Master's Thesis in Dance Studies</i> (NTNU)                |          | Dance History (University of Copenhagen)          |                                 |
| <b>2nd semester Spring</b> | Dance and Cultural Theory (University of Stockholm)                    |          | Elective course (NTNU or University of Stockholm) | IPEDAM (NTNU, intensive course) |
| <b>1st semester Autumn</b> | DANS3003 <i>Dance Analysis</i> (NTNU intensive course early September) |          | Individual project (NTNU)                         |                                 |

### The Broader European specialisation

The Broader European specialisation is conceived to fill needs for expertise on cultural diversity with respect to dance and other movement systems when envisaged as intangible cultural heritage. The core disciplines are Ethnochoreology and Dance Anthropology. NTNU offers analysis of the structures of dance understood in its social and historical contexts, based on North-West-European approaches and material. SZE offers the formal-structural-morphological approach of East-European ethnochoreology and theory and methodology of the performer-centred dance research focusing on individual creativity and collective memory. RU focuses on either South Asian material, the safeguarding of dance heritage in diasporic ritual contexts, or on the performance of heritage in museum and other such contexts. UBP will provide the students with a grounding in anthropological approaches to the study of dance as Intangible Cultural Heritage, focussing critically on the contextual and movement aspects of the phenomenon taking examples from African context.

| Semester               | 7,5 ECTS   | 7,5 ECTS | 7,5 ECTS  | 7,5 ECTS                        |
|------------------------|--|----------|---|---------------------------------|
| 4th semester<br>Spring | DANS3010 <i>Master's Thesis in Dance Studies</i> (NTNU)                  |          |   |                                 |
| 3rd semester<br>Autumn | Exchange semester to Blaise Pascal, Roehampton or Szeged University      |          |   |                                 |
| 2nd semester<br>Spring | Exchange semester to Blaise Pascal, Roehampton or Szeged Universities    |          | Individual Project (self study course at NTNU)                              | IPEDAM (NTNU, intensive course) |
| 1st semester<br>Autumn | DANS3003 <i>Dance Analysis</i> (NTNU) (intensive course early September) |          | Start for exchange year to Blaise Pascal, Roehampton or Szeged Universities |                                 |

### Possible topics for a Master's thesis in Dance Studies

- Ethnographies on traditional dance
- Ethnographies on theatrical dance environments
- Dancing children
- Didactics of Dance teaching
- Processes of artistic dance creation
- Study of dance events
- Movement analysis of dance material
- Ethnographic and fieldwork methodologies
- Dance in community

### Study environment

International Master of Dance Studies, (earlier known as the Nordic Master's programme (No-ma-ds) is offered by the Department of Music in cooperation with departments of the Universities of Copenhagen, Stockholm and Tampere. The program is hosted by NTNU, which hosts a full programme for Dance Studies for the Department of Music, which includes a Bachelor's programme with a theoretical and performative specialisation, as well as PhD candidates. NTNU has large archives of audiovisual dance and music material, a large specialised library and runs many larger and smaller projects mainly within the field of dance. It can give students practical experience in fieldwork, the use of film and sound recording technologies, digitising, cataloguing and archiving methodologies and practice in teaching of dance. It also has evenings for social dance, where dance is taught and practised. NTNU is a key institution within the international dance research and hosts an Intensive Erasmus program with 60 students and 20 teachers from all over Europe. The students in this programme thus will benefit from being a part of a strong international research milieu.

### Career prospects

Master of Arts in Dance Studies will be relevant for building a career related to dance in teaching at many levels, different public sectors in governmental organizations. This may include policy and planning for dance as part of cultural policies and safeguarding actions in ministries and institutions which work with various aspects of dance, both locally and internationally. Another important area is Non-Governmental Organisations (NGOs), such voluntary organisations, festivals, and within heritage and tourist industries. New students will be invited to participate in an introductory programme at the beginning of the semester.

**Admission requirements**

The programme is open to both international and Norwegian students. Admittance to the programme requires a bachelor's degree in dance studies or another relevant discipline combined with good background in dance, or other equivalent education. Possible admission to the programme of study requires a minimum of an average grade of C or the equivalent. C is however, not a guarantee for admission.

## MASTER OF APPLIED ETHICS

### Course outline

Erasmus Mundus Masters Course in Applied Ethics (MAE) awards a total of 60 ECTS Credits. The text below is the complete syllabus for the academic year 2011/2012. The semester breakdown below presents the course of study for students who take their first semester at NTNU. Please consult the MAE homepage for information on the Linköping option, for students taking their first semester at Linköping University: [www.ntnu.edu/studies/manvetikk](http://www.ntnu.edu/studies/manvetikk)

The second semester in Utrecht is intended as a joint semester for all MAE students in the spring semester 2012.

### Semester Breakdown for the Academic Year 2011/2012 – NTNU option

| Semester  | 7,5 ECTS Credits                           | 7,5 ECTS Credits  | 7,5 ECTS Credits                      | 7,5 ECTS Credits                |
|---|--|---|---------------------------------------|---------------------------------|
| <b>2 V</b><br>(Utrecht)   | Law Morality and Policy                    | Ethics in Medicine and Public Health<br>OR<br>Research Ethics | Master's Thesis in Applied Ethics **) |                                 |
| <b>1 H</b><br>(NTNU)  | <i>Ethical Theory and Moral Practice *</i> | FI5205 Corporate Responsibility and Ethics                    | FI5206 Technology for a Good Society  | FI3107 Biotechnology and Ethics |
| *) A joint/common course for all students offered by Utrecht University.  |  |   |                                       |                                 |
| **) NTNU option: FI5203 Master's Thesis in Applied Ethics, for students who have been granted the option to complete their Master's thesis at NTNU. |  |   |                                       |                                 |

### Institutions

This Erasmus Mundus Masters Course is offered by Linköping University, The Centre for Applied Ethics, (Sweden), Utrecht University, the Ethics Institute, (The Netherlands), and the Norwegian University of Science and Technology, Department of Philosophy, Programme for Applied Ethics (Trondheim, Norway).

### Subject

Applied ethics is a growing, interdisciplinary field studying ethical issues in different areas of society. It includes for instance social and political ethics, medical ethics, bioethics, environmental ethics, business ethics, research ethics, ethics and technology and it also relates to different forms of professional ethics.

### Aim

The programme offers a complementary education on master's level in applied ethics for students already holding a university degree or a professional degree. The aim of the programme is to offer both European students and students from outside the European Union the opportunity to pursue advanced studies in applied ethics.

### **The students will**

- acquire knowledge of ethical theories and different fields of applied ethics,
- develop ability to identify, analyse and critically examine ethical problems and
- develop capacity to argue for a chosen position in discussions on ethics and applied ethics and to formulate (and advise about) strategies for handling ethical dilemmas in different kinds of social practices.

### **Student mobility**

Erasmus Mundus Master's Courses/Programmes require student mobility. This entails that students are required to visit at least two partner institutions during their one-year course of study.

#### **On student mobility in the Erasmus Mundus Master in Applied Ethics (MAE)**

In the first semester of study, students gather in Linköping in their first semester of study (autumn semester 2011). For the remaining part of the first semester, the students are divided between Linköping and NTNU.

In the second and last semester of study (spring semester 2012), all students stay in Utrecht for their course studies. The supervisor for the Master's theses will vary (NTNU, Linköping or Utrecht), depending on the students' academic interest. It might be possible for students to relocate if their supervisor is based in Linköping or at NTNU.

### **Aims and learning outcomes**

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

More specifically, the aim is to achieve competence in:

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

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



## Courses

| Course code   | Course title                               | Credits   | Semester      | Restricted admission |
|---|--|-----------|---------------|----------------------|
| FI1105  | Ethics-Ethical Theory and Moral Practice   | 7,5       | Autumn        |                      |
| FI3107  | Biotechnology and Ethics                   | 7,5       | Autumn        |                      |
| FI5203  | Master's Thesis in Applied Ethics          | 15        | Spring        | Yes                  |
| <i>FI5204</i>   | <i>Reading Course in Applied Ethics 1)</i> | <i>15</i> | <i>Spring</i> |                      |
| FI5205  | Corporate responsibility and ethics        | 7,5       | Autumn        |                      |
| FI5206  | Technology for a good society              | 7,5       | Autumn        |                      |
| FI5201  | Multicultural Conflicts and Ethics         | 15        | Spring        |                      |
| 1) The course will not be taught in the academic year 2011/2012 |  |           |               |                      |

## Teaching and examinations

### Academic Writing

Parallel to the courses during the year the students are trained in academic writing.

### Teaching

Instruction relies on literature-based lectures and seminars. It also takes the form of individualised reading, tutoring and research supervision.

### Examination

Examinations will take the form of various kinds of essay assignments that may be complemented by oral or written tests. In the case of the master's thesis, a final presentation and defence before a discussant and examiners is required in order to obtain the degree. The student must also him/herself be an opponent to another master's thesis.

Students who have failed an examination are normally allowed to retake it on two additional occasions, one of which should be arranged shortly after the first examination. Students who have failed an exam covering either the entire course or part of the course two times are entitled to have a new examiner appointed for the re-examination. Students who have passed an examination may not retake it in order to improve their grades.

### Grading

Students are awarded grades according to the ECTS's grading scale A-F.

Students taking courses in Utrecht will also be given grades according to the Dutch grading system: marks between 1 and 5 (failed) and 6 and 10 (pass).

### Transfer of credits

The Faculty Board or person nominated by the Board decides whether or not previous education can be transferred into the programme.

## Admission requirements

**A1.** The applicant must hold a Bachelor's degree obtained after at least three years of study. The degree work should include a thesis or final paper. Students who cannot submit a final thesis or project works written in English in a subject relevant to the programme in question must enclose a paper of some 500 words of length, written in English, which describes her/his previous studies. The paper should focus on the studies relevant to the master's level programme applied for. It must also describe why the applicant is interested in following the programme.

**A2.** The programme is also open to applicants holding a professional degree (Bachelor's level) who have earned *at least 30 ECTS credits in the ethics field or in an equivalent field of study*.

## Professional degree

*All applicants holding a professional degree must submit a paper written in English concerning a subject within the field of (applied) ethics.*

The paper can be a discussion and analysis of a concrete moral problem in a practical or professional field; or a clarification of a problem in philosophical ethics, moral theology; or an analysis of a moral problem from the perspective of law, political science, etc. The paper should of course be written by the applicant her/himself. The length of the paper should be between 2500 and 3500 words. It is perfectly acceptable for the student to 're-use' a paper written in the context of a (e.g. bachelor's) course in (applied) ethics. In many academic courses, students are required to write longer essays. Papers written during earlier studies are acceptable as long as they do not exceed 5000 words. Please indicate the name and the level of the course for which the paper was originally written.

## Knowledge of English

Documented knowledge of English equivalent to "Engelska B"; i.e. English as native language or an internationally recognized test, e.g. TOEFL (minimum scores: Paper based 575 + TWE-score 4.5, and internet based 90), IELTS, academic (minimum score: Overall band 6.5 and no band under 5.5), or equivalent.

## Selection

Each applicant must enclose a Letter of Intent written in English, explaining why they want to study this programme, and a summary of their bachelor's essay or project. If applicants hold a degree that does not include a bachelor's essay or project, their Letter of Intent should describe previous studies and any academic activities that are related to the master's programme or the programmes applied for.

The MAE Consortium Selection Committee will rank the applicants and put forward a proposal to the degree-awarding institutions regarding preferred candidates. The selection is mainly based on previous academic performance.

**Programme specific requirements**

All applicants must have a basic competence in ethics. Previous studies should be in a relevant field such as ethics, religious studies, philosophy or equivalent. Please note all documents under professional degree above should be sent to:

*University Studies in Sweden*

*FE 1*

*SE-833 83 Strömsund*

*SWEDEN*

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

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

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

### Admission/Entry requirements

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

Applicants should hold a B.A. or an equivalent degree in English or Linguistics with a sufficient background in topics related to English language or linguistics. As of the academic year 2012/2013 only candidates with a minimum of 20 ECTS in English language/linguistics courses will be considered for acceptance.

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

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

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

### Programme outline

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

## Courses

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

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

## Master of Philosophy in English Linguistics and Language Acquisition

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

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

### **Topics offered in the programme**

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

### **Teaching and exams**

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

### **Supervision**

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

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

### **Field-work**

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

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

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

### **Admission requirements**

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

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

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

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

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

### **Course outline**

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

### **Topics offered in the programme**

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

| Course code   | Course title                                   | ECTS credits | Semester          | Restricted admission |
|---|--|--------------|-------------------|----------------------|
| LING2208  | Digital methods for speech and text processing | 15           | Spring            |                      |
| LING2211  | Semantics and Syntax                           | 15           | Autumn 1)         |                      |
| LING3000  | Chosen Topic                                   | 7,5          | Spring            |                      |
|   |  |              |                   |                      |
| LING3304  | Phonology I                                    | 7,5          | Autumn 1)         |                      |
| LING3305  | Pragmatics I                                   | 7,5          | Autumn 1)         |                      |
| LING3302  | Master's Course in Syntax and Semantics        | 15           | Autumn            |                      |
|   |  |              |                   |                      |
| LING3308  | Master's Course in Phonology                   | 7,5          | Spring            |                      |
| LING3309  | Master's Course in Pragmatics                  | 7,5          | Spring            |                      |
| LING3392  | M. Phil. Thesis in Linguistics                 | 45           | Autumn and Spring | Yes 2)               |
| 1) Compulsory courses in the M. Phil in Linguistics.<br>2) LING3392: Requires admission to the study programme Master of Philosophy in Linguistics. |  |              |                   |                      |

### Interdisciplinary topics

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

| Course code  | Course title                                     | ECTS credits | Semester | Restricted admission |
|--|--|--------------|----------|----------------------|
| FON1101  | Introduction to Phonetics                        | 15           | Autumn   |                      |
| ENG2153  | First and Second Language Acquisition            | 7,5          | Spring   |                      |
| ENG3122  | Cognitive and Theoretical Aspects of Language 1) | 15           | Spring   |                      |
| TDT4275  | Natural Language Interface                       | 7,5          | Spring   |                      |
| 1) Students who choose ENG3122 are exempted from LING2206 and LING3000 |  |              |          |                      |



**M. Phil. in Linguistics:**

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

| Semester  | 7,5 credits  | 7,5 credits | 7,5 credits   | 7,5 credits                                   |
|---|--|-------------|---|---|
| Spring 4  | LING3392 M. Phil. Thesis                                   |             |   |   |
| Autumn 3  | LING3392 M. Phil. Thesis                                   |             | LING3302<br>Master's Course in Syntax and Semantics |   |
| Spring 2  | LING2208 Digital Methods for speech and text processing *) |             | LING3308<br>Master's Course in Phonology            | and LING3309<br>Master's Course in Pragmatics |
| Autumn 1  | LING2211<br>Semantics and Syntax                           |             | LING3304<br>Phonology I                             | LING3305<br>Pragmatics I                      |
| *) LING2208 can be combined with LING3000 and TDT4275 |  |             |   |   |

## MASTER OF PHILOSOPHY IN CHILDHOOD STUDIES

Approved by the Board at NTNU 30.08.2005, with changes made by the Faculty of Social Sciences and Technology Management 12.01.2011.

### INTRODUCTION

The 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 in interdisciplinary social studies of children and childhood.

### Aim of the programme

The programme aims at providing the student with:

- Understanding of and knowledge about the main perspectives in interdisciplinary social studies of children and childhood'.
- Knowledge about how children's everyday lives and notions of childhood vary and are embedded in historical, geographical, political and cultural contexts.
- Knowledge about the UN Convention on the Rights of the Child, as well as the rights perspective as a tool to improve children's welfare.
- Knowledge and skills in doing research with children and on childhood as a social phenomenon.
- Skills in promoting children's voices in public services etc.

In addition, the programme aims at providing the student with the following general competencies:

- Training in developing, planning and carrying out a research project.
- Skills in working in national and international organisations, where cultural diversity and multiple working languages are part of everyday work.
- Communication skills in contexts in which several parties are involved.

Furthermore, a main focus 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 social studies of childhood. A child perspective, including participatory approaches and conducting research with children, represents a main integrative approach. The UN Convention on the Rights of the Child (CRC) is discussed as a tool to promote children's well-being worldwide. Important topics are children as participants in play, education, child labour, community building, and the social, political and economic reproduction of society in general. CRC can be seen as part of globalisation processes, producing particular images of what it means to be a child. An important aim is to encourage comprehensive insights in and an understanding of how the globalised conditions under which children grow up affect 'local' and 'national' childhoods in both the global North and the global South. The ways in which children themselves explore and experience their everyday lives and childhoods are also explored.

## Employment opportunities

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

## ADMISSION REQUIREMENTS

The master's programme accepts students financed by the Quota Programme, Norwegian/Nordic students, as well as international students with individual funding. The total number of admitted students is 20-25 per year.

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

The language of instruction is English, and 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](http://www.ntnu.no/admission)

## OUTLINE OF THE MPHIL IN CHILDHOOD STUDIES

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

| Term           | Course (7,5 cr)   | Course (7,5 cr)  | Course (7,5 cr)                           | Course (7,5 cr)   |
|----------------|---|--|---|---|
| 4th sem/spring | BARN3900 Master's Thesis (60 cr)                                    |  |   |   |
| 3rd sem/autumn |   |  |   |   |
| 2nd sem/spring | BARN3300<br>Children and<br>Development in<br>the South (7,5 cr)    | BARN3201<br>Methods and<br>Techniques in<br>Child and<br>Childhood<br>Research (7,5 cr)      | Experts in<br>Teamwork (7,5 cr)           | BARN3400<br>Preparatory<br>Course,<br>Master's Thesis<br>(7,5 cr) |
| 1st sem/autumn | BARN3101 Social<br>Studies of<br>Children and<br>Childhood (7,5 cr) | BARN3202<br>Methodological<br>Perspectives on<br>Child and<br>Childhood<br>Research (7,5 cr) | BARN3102<br>Children's Rights<br>(7,5 cr) | Elective (7,5 cr)   |

### Core courses

| Code      | Title   | Credits | Term              | Admission              |
|-----------|---|---------|-------------------|------------------------|
| BARN3101  | Social Studies of Children and Childhood                    | 7,5     | Autumn            | Open                   |
| BARN3102  | Children's Rights   | 7,5     | Autumn            | Open                   |
| BARN3201  | Methods and Techniques in Child and Childhood Research      | 7,5     | Spring            | Open                   |
| BARN3202  | Methodological Perspectives on Child and Childhood Research | 7,5     | Autumn            | Open                   |
| BARN3300  | Children and Development in the South                       | 7,5     | Spring            | Open                   |
| BARN3400* | Preparatory Course, Master's Thesis                         | 7,5     | Spring            | Admission to programme |
| EiT       | Experts in Teamwork   | 7,5     | Spring            | Restricted admission   |
| BARN3900* | Master's Thesis   | 60      | Autumn/<br>Spring | Admission to programme |

\* Requires admission to MPhil in Childhood Studies. Exception: BARN3400 is open for exchange students from the MA Children, Youth and International Development, Brunel University.

### Elective courses

| Code      | Title  | Credits | Term   | Admission |
|-----------|--|---------|--------|-----------|
| GEOG3006* | Quantitative Methods   | 7,5     | Spring | Open      |
| GEOG3506* | Geography, Health and Development                              | 7,5     | Autumn | Open      |
| GEOG3515* | Environment, Development and Changing Rural Livelihoods        | 7,5     | Autumn | Open      |
| GEOG3516* | Humanitarianism: Theory and Practice                           | 7,5     | Autumn | Open      |
| GEOG3522* | Migration and Development                                      | 7,5     | Spring | Open      |
| PED3520*  | Democracy and Education: Perspectives in Educational Sociology | 7,5     | Autumn | Open      |
| PSY3529*  | Specialization in Community Psychology                         | 7,5     | Spring | Open      |
| SANT3507* | Globalization, Culture and Identity                            | 7,5     | Autumn | Open      |

\* For up-to-date information about which courses are running, please contact the Department of Geography (GEOG courses), the Department of Education (PED3520), the Department of Psychology (PSY3529) and the Department of Social Anthropology (SANT3507).

### Experts in Teamwork (EiT)

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

### Social and academic arrangements for students

At the beginning of the first semester, a common ground between students and teachers will be established. Through social and academic arrangements everyone will have the opportunity to get to know one another. 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**

| <b>Course</b> | <b>Course</b> | <b>Credits</b> |
|---------------|---------------|----------------|
| BARN3100      | BARN3101      | 7,5 credits    |
| BARN3100      | BARN3102      | 7,5 credits    |
| BARN3101      | BARN3001      | 7,5 credits    |
| BARN3200      | BARN3201      | 7,5 credits    |
| BARN3200      | BARN3202      | 7,5 credits    |
| BARN3201      | BARN3002      | 4 credits      |
| BARN3202      | BARN3002      | 4 credits      |
| GEOG3006      | GEOG3002      | 7,5 credits    |
| GEOG3006      | GEOG3052      | 7,5 credits    |
| GEOG3006      | GEOG3004      | 7,5 credits    |
| GEOG3006      | AFR3002       | 7,5 credits    |
| GEOG3006      | AFR3005       | 7,5 credits    |
| GEOG3506      | SVGEO331      | 7,5 credits    |
| PSY3529       | PSY3528       | 7,5 credits    |

## MASTER OF PHILOSOPHY IN DEVELOPMENT STUDIES, SPECIALISING IN GEOGRAPHY

Approved by the Board at NTNU 16.12.2002, with changes made by the Faculty of Social Sciences and Technology Management 14.01.2011.

### INTRODUCTION

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

- Gain a thorough understanding of key concepts and theories within the field of development studies and geography
- Acquire robust/suitable methodological and analytical skills
- Be able to identify and formulate relevant and feasible research objectives for a scientific study
- Be able to carry out an independent research project by:
  - Identifying an appropriate research design, collecting and analysing data
  - Applying relevant theories and when analysing empirical data
  - Writing a scientific text and disseminating scientific knowledge
  - Complying with established ethical norms for research and dissemination.
- Acquire skills relevant for employment in public and private sectors and in academic research.

The programme is open to both international and Norwegian students. The language of instruction is English for this study programme and we expect students to do all their compulsory and examinations in English. No exceptions will be made in this regard.

### ADMISSION REQUIREMENTS

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

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

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

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

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

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

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

[www.ntnu.no/admission](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: GEOG3053 Theories of Development and Globalization, GEOG3054 Thesis preparation course work, Experts in Teamwork (EiT), GEOG3003 Methodology and the Research Process, and either GEOG3005 Qualitative Methods or GEOG3006 Quantitative Methods.

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

## CORE COURSES

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

\* Requires admission to the programme.

## ELECTIVES

| Code      | Title  | Credits | Term   | Admission |
|-----------|--|---------|--------|-----------|
| GEOG3030  | Natural Resources Management   | 7,5     | Autumn | Open      |
| GEOG3505  | Landscape and Planning   | 15      | Autumn | Open      |
| GEOG3506  | Geography, Health and Development  | 7,5     | Autumn | Open      |
| GEOG3515  | Environment, Development and Changing Rural Livelihoods                                    | 7,5     | Autumn | Open      |
| GEOG3516  | Humanitarianism: Theory and Practice   | 7,5     | Autumn | Open      |
| GEOG3518  | Knowledge Management in a Global Economy   | 7,5     | Autumn | Open      |
| GEOG3519  | Geographical Information Systems - I   | 7,5     | Autumn | Open      |
| GEOG3520  | Geographical Information Systems - II  | 7,5     | Spring | Open      |
| GEOG3522  | Migration and Development  | 7,5     | Spring | Open      |
| AAR4234** | Planning for Sustainability and Development  | 7,5     | Spring | Open      |
| BARN3300  | Children and Development in the South  | 7,5     | Spring | Open      |
| POL3517   | International Development: the Effects of Politics, Institutions and International Economy | 15      | Spring | Open      |

Elective courses may be cancelled due to the teaching capacity at the Department of Geography or if less than 5 students register for the course. Check [www.ntnu.no/geografi/studentinformasjon](http://www.ntnu.no/geografi/studentinformasjon) for updated information about what courses are available. Information about cancellations will be

given no later than January 10th in spring term and August 10th in autumn term. For courses available outside the department of Geography, please contact the respective department.

**\*\*Please note deadline for registration.**

*MPhil in Development Studies, specialising in Geography, programme structure:*

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

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

### **Experts in Teamwork (EiT)**

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

### **CREDIT REDUCTIONS DUE TO OVERLAP IN CONTENT**

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



## MASTER OF SCIENCE IN GLOBALIZATION

Approved by the Board at NTNU 12.10.2006, with changes made by the Faculty of Social Sciences and Technology Management 15.02.2011.

### A DESCRIPTION OF THE MASTER'S PROGRAMME IN GLOBALIZATION

During this two-year international Master's programme in Globalization, students will explore the interrelations between the economic, technological, cultural, social and political dimensions of Globalization. The aim of the programme is to provide students with a general understanding of the forms and consequences of the processes of Globalization, combined with an in-depth knowledge of one of the two fields of Specializations:

- **Global Technology Management** (abbreviated 'GTM')
- **Global Politics and Culture** (abbreviated 'GPC')

#### Global Technology Management

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

#### Global Politics and Culture

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

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

- Humanities
- Social Sciences and Technology Management
- Engineering Science and Technology
- Natural Sciences and Technology
- Information Technology, Mathematics and Electrical Engineering

The Faculty of Social Sciences and Technology Management hosts the programme of study from January 2011.

The Master's programme is part of NTNU's university-wide Globalization Programme, which comprises nearly 200 researchers in departments across the university.

### CAREER OPPORTUNITIES

The Master's programme's specialization in *Global Politics and Culture* is designed to provide its students with the specialist knowledge and transferable skills to pursue careers in global corporations, non-governmental organizations (NGOs), and international campaigning groups,

the civil and diplomatic services or in the media, research and information sectors. By the end of their degree, students will have proved their capacity to engage in team work, gained relevant work experience in a global corporation or organization and demonstrated their ability to employ interdisciplinary approaches at both theoretical and practical levels.

The Master's programme's specialization in *Global Technology Management* is designed to give students the skills to take part in developing the future technology and sustainable solutions for global enterprises. Students will be able to both understand and successfully handle the different dimensions of global processes. Possible career positions could be:

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

## COURSES

### I. Joint courses across the two specializations

| Code     | Title  | Credits    | Term   | Admission |
|----------|--|------------|--------|-----------|
| GEOG3518 | Knowledge Management in a Global Economy       | 7,5        | Autumn | Open      |
| HIST3295 | Contemporary International Economic History 1) | 7,5        | Autumn | Open      |
| SOS3050  | Empirical Research Methods 2)                  | 7,5        | Spring | Open      |
| SANT3507 | <i>Globalization, Culture and Identity</i>     | 7,5        | Autumn | Open      |
| *)       | Internship/Work Project 3)                     | 22,5 or 30 | Autumn | 5)        |
| *)       | Master's Thesis in Globalization 4)            | 30         | Spring | 5)        |

1) Elective course for Global Technology Management students.

2) Students who already have already passed SOS1002 Research Methods in the Social Sciences (15 cr.) must replace SOS3050 with SOS3004 Qualitative Research Methods (7.5 cr.)

3) Global Technology Management students will do this as a work project at NTNU. Global Politics and Culture students will undertake an internship in a global company or organization.

\*) The course code depends on the student's departmental belonging. Both Global Technology Management and Global Politics and Culture students will take the 22.5 credit internship, apart from Global Politics and Culture students undertaking their internship outside Norway who have financial support from Norwegian State Educational Loan Fund (Lånekassen). They will take the 30 credit internship. See course codes below (IV. Courses: Codes for the Internship/Work project).

4) Global Technology Management students will write their thesis while based at an international company or organization. Global Politics and Culture students will normally write their thesis at NTNU. \*) The course code depends on the student's departmental belonging. See course codes below (V. Courses: Codes for the Master's thesis).

5) Requires admission to the programme of study (MSc in Globalization). See course codes below (IV. and V.).

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

| Code    | Title  | Credits | Term   | Admission |
|---------|--|---------|--------|-----------|
| TIØ4295 | Managerial Economics   | 7.5     | Autumn | Open      |
| TPK4160 | Value Chain Control and Applied Decision Support               | 7.5     | Autumn | Open      |
| TIØ4195 | Environmental Management - strategy, systems and governance *) | 7.5     | Autumn | Open      |
| TDT4245 | Cooperation Technology*)                                       | 7.5     | Autumn | Open      |
| TPK5100 | Project Planning and Control *)                                | 7.5     | Autumn | Open      |
| TIØ4175 | Purchasing and Logistics Management                            | 7.5     | Spring | Open      |
| TPK4180 | Manufacturing Strategy   | 7.5     | Spring | Open      |
| TPK4135 | Logistics and Production Management                            | 7.5     | Spring | Open      |

\*) Choose one of these three courses, or HIST3295. See semester breakdown below.

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

| Code     | Title  | Credits | Term   | Admission |
|----------|--|---------|--------|-----------|
| KULT3320 | Globalization Theory   | 7.5     | Autumn | Open      |
| GEOG3053 | Theories of Development and Globalization  | 7.5     | Autumn | Open      |
| RVI2115  | Religion and Politics in the Age of Globalization **)  | 15      | Spring | Open      |
| POL3517  | International Development: The effects of Politics, Institutions and International Economy **) | 15      | Spring | Open      |
| POL3005  | Research Design and Methods for Interdisciplinary Studies                                      | 7.5     | Spring | *)        |

\*) Requires admission to the programme of study (MSc in Globalization).

\*\*) Choose one of these two courses, see semester breakdown below.

## IV. Courses: Codes for the Internship/Work project \*)

| Course   | Department   | Credits | Term   | Admission |
|----------|--|---------|--------|-----------|
| RVI3011  | Department of Archaeology and Religious Studies              | 22.5    | Autumn | *)        |
| RVI3012  | Department of Archaeology and Religious Studies              | 30      | Autumn | *)        |
| HIST3011 | Department of History and Classical Studies                  | 22.5    | Autumn | *)        |
| HIST3012 | Department of History and Classical Studies                  | 30      | Autumn | *)        |
| GEOG3011 | Department of Geography                                      | 22.5    | Autumn | *)        |
| GEOG3012 | Department of Geography                                      | 30      | Autumn | *)        |
| POL3011  | Department of Sociology and Political Science                | 22.5    | Autumn | *)        |
| POL3012  | Department of Sociology and Political Science                | 30      | Autumn | *)        |
| IØ3011   | Department of Industrial Economics and Technology Management | 22.5    | Autumn | *)        |

\*) Requires admission to the programme of study (MSc in Globalization).

## V. Courses: Codes for the Master's thesis \*)

| Course   | Department   | Credits | Term   | Admission |
|----------|--|---------|--------|-----------|
| RVI3910  | Department of Archaeology and Religious Studies              | 30      | Spring | *)        |
| HIST3910 | Department of History and Classical Studies                  | 30      | Spring | *)        |
| GEOG3910 | Department of Geography                                      | 30      | Spring | *)        |
| POL3910  | Department of Sociology and Political Science                | 30      | Spring | *)        |
| KULT3910 | Department of Interdisciplinary Studies of Culture           | 30      | Spring | *)        |
| SANT3910 | Department of Social Anthropology                            | 30      | Spring | *)        |
| IØ3910   | Department of Industrial Economics and Technology Management | 30      | Spring | *)        |
| TPK4900  | Departement of Production and Quality Engineering            | 30      | Spring | *)        |

\*) Requires admission to the programme of study (MSc in Globalization).

## STRUCTURE

### Joint Activities and Courses across both Specializations

The Master's programme in Globalization is a two year programme, which awards a total 120 ECTS credits, 30 credits per semester over four semesters. A breakdown of each semester is given in the tables below.

- **First semester:** In the first semester, the course GEOG3518 Knowledge Management in a Global Economy will be taken by students in both Global Technology Management and Global Politics and Culture specializations. The Global Technology Management students may also take HIST3295 Contemporary International Economic History as an elective course in first semester. This course is compulsory for students in Global Politics and Culture.
- **Second semester:** Students in both specializations will take the course SOS3050 Empirical Research Methods in the second semester.
- **Third semester:** In the third semester, the students in both specializations will take Internship/Work Project. The Global Politics and Culture students will spend this third semester undertaking an internship in a global corporation or organization, while the Global Technology Management students will undertake a work project at NTNU. During this third semester, students who take the 22.5 credits internship will also take the distance learning course SANT3507 Globalization, Culture and Identity.
- **Fourth semester:** Master's Thesis in Globalization (30 credits) should be completed in the fourth semester of study. For Global Technology Management students, the thesis will be written while they are located in a global corporation.

### Global Technology Management Specialization (in addition to the joint courses)

- **First semester:** In the first semester, in addition to the joint course GEOG3518 Knowledge Management in a Global Economy, The Global Technology Management students will also take TIØ4295 Managerial Economics, TPK4160 Value Chain Control and Applied Decision Support and then select one additional course from the following courses: TIØ4195 Environmental Management - strategy, systems and governance, TDT4245 Cooperation Technology, TPK5100 Project Planning and Control or HIST3295 Contemporary International Economic History.
- **Second semester:** In the second semester, in addition to SOS3050 Empirical Research Methods, they will take the courses TIØ4175 Purchasing and Logistics Management, TPK4180 Manufacturing Strategy and TPK4135 Logistics and Production Management.

### Global Politics and Culture Specialization (in addition to the joint courses)

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

### SEMESTER BREAKDOWN

#### Global Technology Management

| Term                       | 7.5 credits   | 7.5 credits   | 7.5 credits                                       | 7.5 credits  |
|----------------------------|---|---|---|--|
| <b>4th sem.<br/>Spring</b> | Master's Thesis in Globalization (in an international company or organisation) ***) |   |   |  |
| <b>3rd sem.<br/>Autumn</b> | Work Project (at NTNU) ***)   |   |   | SANT3507<br>Globalization, Culture<br>and Identity         |
| <b>2nd sem.<br/>Spring</b> | TIØ4175<br>Purchasing<br>and Logistics<br>Management                                | TPK4180<br>Manufacturing<br>Strategy                              | TPK4135 Logistics and<br>Production<br>Management | SOS3050 Empirical<br>Research Methods **)                  |
| <b>1st sem.<br/>Autumn</b> | TIØ4295<br>Managerial<br>Economics  | TPK4160 Value<br>Chain Control and<br>Applied Decision<br>Support | TIØ4195, TDT4245,<br>TPK5100 or HIST3295          | GEOG3518<br>Knowledge<br>Management in a<br>Global Economy |

\*) Choose one of these four courses.

\*\*) Students who already have already passed SOS1002 *Research Methods* in the Social Sciences (15 cr.) must replace SOS3050 with SOS3004 *Qualitative Research Methods* (7.5 cr.).

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

## Global Politics and Culture

| Term                   | 7.5 credits  | 7.5 credits   | 7.5 credits  | 7.5 credits  |
|------------------------|--|---|--|--|
| <b>4th sem. Spring</b> | Master's Thesis in Globalization (normally at NTNU) ****)                            |   |  |  |
| <b>3rd sem. Autumn</b> | Internship (in an international company or organisation) ****)                       |   |  | SANT3507 Globalization, Culture and Identity ****) |
|                        | Internship (in an international company or organisation) ****)                       |   |  |  |
| <b>2nd sem. Spring</b> | SOS3050 Empirical Research Methods ***) or SOS3004 ***) Qualitative Research Methods | POL3005 Research Design and Methods for Interdisciplinary Studies | RVI2115 Religion and Politics in the Age of Globalization*) or POL3517 International Development: The effects of Politics, Institutions and International Economy *) |  |
| <b>1. sem. Autumn</b>  | GEOG3518 Knowledge Management in a Global Economy                                    | HIST3295 Contemporary International Economic History              | KULT3320 Globalization Theory  | GEOG3053 Theories of Development and Globalization |

\*) Choose one of these two courses.

\*\*) Compulsory for all students, except those who have already taken SOS1002 Research Methods in the Social Sciences.

\*\*\*) Compulsory for all students who have already taken SOS1002 *Research Methods* in the Social Sciences.

\*\*\*\*) The course code depends on the student's departmental belonging. All Global Politics and Culture students will take the 22.5 credit internship and SANT3507, apart from those Global Politics and Culture students undertaking their internship outside Norway with support from Norwegian State Educational Loan Fund ('Lånekassen'). They will take the 30 credit internship and will not take SANT3507.

## INTERNSHIP (GLOBAL POLITICS AND CULTURE)

The internship scheme related to the Global Politics and Culture specialization provides a unique opportunity for students to develop and build their personal, academic and professional capacities by managing an individual project. The internship project should contribute an interdisciplinary perspective and should be relevant to the needs and requirements of the company/organization. It should lead to the production of a written academic assignment, which will be undertaken under the supervision of a supervisor at NTNU, and a corporate or organizational supervisor.

- **First semester:** In the first semester, students in Global Politics and Culture will receive information about the range of internships and will complete CVs.
- **Second semester:** At the beginning of the second semester the internships will be allocated. In the case where the companies and organizations have specific requirements, the company or organization will make the choice based on the CVs of the eligible candidates. For all other internships, the assignment will in the first instance be made on a random basis, after which the students may exchange internships amongst themselves, if they so wish, on a voluntary basis. If students wish to find their own internships, then they must submit their proposed internship project for approval to the MSc in Globalization Academic Coordinator at the beginning of the second semester. During this semester, all students will find an NTNU supervisor from a list provided by the programme, and be assigned an internship supervisor by the company or organization, both of whom will follow their progress. The students will also complete a one to two page academic proposal (of 500-1000 words) relating to the internship assignment.

- **Third semester:** At the end of the third semester, the students will submit their internship assignment (around 35 pages for the 22.5 credit version, and 45 pages for the 30 credit version - 12 pt, 1.5 spacing).
- **Fourth semester:** In the beginning of the fourth semester, following their internship, the students will give a presentation of their internship project and assignment to the MSc in Globalization students and NTNU internship supervisors.

## **WORK PROJECT (GLOBAL TECHNOLOGY MANAGEMENT)**

Students will spend their third semester undertaking a work project at NTNU, linked to the university's cooperation projects with industry, on a topic relevant for globalization. Education in Global Technology Management is based on students experiencing and exploring real-life industrial challenges in global enterprises. Theoretical topics are exemplified and discussed based on cases from Norwegian and international companies and research projects. The work project will be geared at solving industrial challenges within areas such as Production Strategy, Technology and ICT Management, Supply Chain Management, Operations Management or Project Management. Students will be required to produce a written academic assignment, relating to the internship/work project (between 30 and 40 pages; 12 pt, 1.5 spacing), which should be submitted to NTNU by the end of the second semester (22.5 credits). The assignment should relate to the taught element of the programme and fulfill the academic requirements of a Master's level programme.

## **MASTER'S THESIS**

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

## **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 programme of study

## ADMISSION REQUIREMENTS

### Who can apply to the MSc in Globalization?

*For the Global Politics and Culture Specialization:*

- Students with a BA in the Humanities or Social Sciences with a specialization of minimum 80 ECTS Credits in a discipline with relevance to the MSc in Globalization's academic components or equivalent from a university or college defined as:
  - Political Science
  - Sociology
  - Social Anthropology
  - History
  - Geography
  - European Studies
  - Economics
  - Development Studies
  - Cultural Studies
  - Cultural Heritage Studies
  - Religious Studies
  - International Relations
- For the Global Politics and Culture Specialization, English language requirements for international students are TOEFL 550/230/80 paper based /computer based/internet based or IELTS with 6.0 or better.

*For the Global Technology Management Specialization:*

- Students with a BSc in a Technological or Engineering discipline or equivalent from a university or college. For the Global Technology Management Specialization: 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 Civil Engineering ('siv.ing.') degree /Norwegian Engineering degree (in their original subject), with a specialization in Globalization.
- For the Global Technology Management Specialization, English language requirements for international students are TOEFL 550/213/79 paper based /computer based/internet based or IELTS with 6.0 or better.

*For both specializations:*

- International students with equivalent backgrounds are encouraged to apply.
- Successful applicants must have achieved a minimum of the equivalent of a C grade (Norwegian grading system) in their undergraduate degree to be accepted onto this Master's programme, in accordance with NTNU regulations.



# MASTER OF PHILOSOPHY IN HUMAN DEVELOPMENT

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

## INTRODUCTION

### About the programme

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

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

### Objective

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

### Career opportunities

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

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

## ADMISSION REQUIREMENTS

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

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

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

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

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

## EXPERTS IN TEAMWORK (EiT)

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

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

## WRITING COURSE

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

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

## COURSE OUTLINE

*Outline of the MPHIL Programme in Human Development:*

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

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

## Courses

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

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

## CREDIT REDUCTIONS DUE TO OVERLAP IN CONTENT

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

# **MASTER OF PHILOSOPHY IN RISK PSYCHOLOGY, ENVIRONMENT AND SAFETY**

Approved by the Board of NTNU 01.10.2008, with changes made by the Faculty of Social Sciences and Technology Management 15.01.2010

## **ABOUT THE PROGRAMME**

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

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

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

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

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

## **ADMISSION REQUIREMENTS**

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

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

## **TEACHING METHODS AND ACTIVITIES**

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

### **Supervision**

A Master agreement must be signed between the main supervisor and the student, and in this contract the student will find information about the supervision as well as rights and duties. In addition, an internal or external supervisor can be approved and consulted if project tasks or the master's thesis require this. Students admitted to the programme will receive continuous supervision, but the frequency increases over time and is expected to be most intense in the final semester. The specified topic of the master's thesis is expected to develop over time and in

discussions with the supervisor. The quality of the master's thesis shall be in accordance with international academic standards.

## Curriculum

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

## Form of assessment

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

## EIT - EXPERTS IN TEAMWORK

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

## WRITING SEMINAR

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

## PROGRAMME OUTLINE

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

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

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

*MPhil in Risk Psychology, Environment and Safety*

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

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

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

**CREDIT ADJUSTMENT DUE TO OVERLAP IN CONTENT**

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

# MASTER OF SCIENCE IN EXERCISE PHYSIOLOGY AND SPORT SCIENCES

## 2-year Master of Science (MSc)

Programme code: MSPORT

Webpage: [www.ntnu.edu/studies/msport/](http://www.ntnu.edu/studies/msport/)

This programme description is valid for students admitted in the academic year 2011/2012.

### Introduction

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

The MSc programme is associated with the research group in Exercise and Extreme Environments at the Department of Circulation and Medical Imaging. One of the main research interests of this group is to examine basic mechanisms behind 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 behind 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 chronic obstructive pulmonary disease (COPD), are related to inactivity. Effective new training interventions based on basic biological adaptations have positive effects and are effective treatments with high socioeconomic as well as quality of life outcomes.

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

### Career Prospects

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

### Admission Requirements

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

International applicants need to submit proof of English proficiency (TOEFL, IELTS, APIEL or University of Cambridge test). More details about the language requirements are available at [www.ntnu.edu/studies/langcourses/languagerequirements](http://www.ntnu.edu/studies/langcourses/languagerequirements)

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

### Programme Structure

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

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

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.

| Year 1   |  | Year 2  |                                      |
|--|--|---|--------------------------------------|
| 1 <sup>st</sup> semester<br>(autumn)   | 2 <sup>nd</sup> semester<br>(spring)                                       | 3 <sup>rd</sup> semester<br>(autumn)                            | 4 <sup>th</sup> semester<br>(spring) |
| <i>SPO3020</i><br>Training Circulation<br>and Oxygen<br>Consumption<br>(7.5 credits) | <i>EiT</i><br>Experts in Teamwork<br>(7.5 credits)                         | <i>SPO3900</i><br>Thesis in Exercise Physiology<br>(60 credits) |                                      |
| <i>SPO3030</i><br>Training Muscle and<br>Force Production<br>(7.5 credits)           | <i>SPO3040</i><br>Environmental<br>Adaptations<br>(7.5 credits)            |   |                                      |
| <i>SPO3055</i><br>Research Methods in<br>Exercise Physiology<br>(7.5 credits)        | <i>SPO3060</i><br>Specialisation in<br>Exercise Physiology<br>(15 credits) |   |                                      |
| <i>ST3001</i><br>Introduction to Medical<br>Statistics<br>(7.5 credits)              |  |   |                                      |

Experts in Teamwork (EiT) is compulsory for all master's degree students at NTNU, and it is taught intensively in the weeks 2, 3 and 4 in the second semester. Read more about EiT here: [www.ntnu.edu/dmf/studies/eit](http://www.ntnu.edu/dmf/studies/eit)

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

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



**Study Environment**

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

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

**Course Descriptions**

The course descriptions are available on the internet: [www.ntnu.edu/dmf/studies/courses](http://www.ntnu.edu/dmf/studies/courses)

# MASTER OF SCIENCE IN MOLECULAR MEDICINE

## 2-year Master of Science (MSc)

Programme Code: MSMOLMED

Webpage: [www.ntnu.edu/studies/msmolmed/](http://www.ntnu.edu/studies/msmolmed/)

This programme description is valid for students admitted in the academic year 2011/2012.

### Introduction

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

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

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

### About the Programme of Study

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

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

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

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

## Career Prospects

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

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

## Admission Requirements

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

International applicants need to submit proof of English proficiency (TOEFL, IELTS, APIEL or University of Cambridge test). More details about the language requirements are available at [www.ntnu.edu/studies/langcourses/languagerequirements](http://www.ntnu.edu/studies/langcourses/languagerequirements)

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

## Programme Structure

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

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

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

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

## Master's Thesis

|         |                              |            |
|---------|------------------------------|------------|
| MOL3901 | Thesis in Molecular Medicine | 60 credits |
|---------|------------------------------|------------|

## Compulsory Courses

|                            |                                    |                      |
|----------------------------|------------------------------------|----------------------|
| MOL3000                    | Introduction to Molecular Medicine | 7.5 credits (autumn) |
| Various codes <sup>1</sup> | Experts in Teamwork                | 7.5 credits (spring) |

## Electives 1

|          |  |                      |
|----------|--|----------------------|
| BI3016   | Molecular Cell Biology                     | 7.5 credits (autumn) |
| MOL3001  | Medical Genetics                           | 7.5 credits (spring) |
| MOL3005  | Immunology                                 | 7.5 credits (autumn) |
| MOL3007  | Functional Genomics                        | 7.5 credits (spring) |
| MOL3008  | Analytical Techniques and Instrumentation  | 7.5 credits (autumn) |
| MOL3016  | Molecular Diagnostics                      | 7.5 credits (spring) |
| MTEK3001 | Applied Bioinformatics and Systems Biology | 7.5 credits (spring) |

## Electives 2

|                       |   |                      |
|-----------------------|---|----------------------|
| BI3013 <sup>2</sup>   | Experimental Cell and Molecular Biology                               | 7.5 credits (autumn) |
| BI3018                | Patenting and Commercialization of Biotech and Medtech Inventions     | 7.5 credits (spring) |
| BT3103                | Molecular Mechanisms of Toxicology                                    | 7.5 credits (autumn) |
| MOL3003 <sup>3</sup>  | Molecular Medical Microbiology  | 7.5 credits (autumn) |
| MOL3009               | Biobanking  | 7.5 credits (autumn) |
| MOL3010               | Animal Cell Culture   | 7.5 credits (autumn) |
| MOL3014               | Nanomedicine I – Bioanalysis  | 7.5 credits (autumn) |
| MOL3015               | Nanomedicine II – Therapy   | 7.5 credits (spring) |
| MOL3017 <sup>4</sup>  | Cell Imaging and Interpretation                                       | 7.5 credits (both)   |
| MOL8002 <sup>5</sup>  | Molecular Mechanisms of Host Defence                                  | 9.0 credits (autumn) |
| MOL8003 <sup>5</sup>  | Microarray Technology and Data Analysis (with Laboratory Training)    | 7.5 credits (spring) |
| MOL8004 <sup>5</sup>  | Microarray Technology and Data Analysis (without Laboratory Training) | 4.5 credits (spring) |
| MOL8005 <sup>5</sup>  | Molecular Mechanisms of Host Defence – Essay                          | 6.0 credits (autumn) |
| NEVR8003 <sup>5</sup> | Laboratory Animal Science for Researchers                             | 6.0 credits (autumn) |
| NEVR8013 <sup>5</sup> | Laboratory Animal Science – Essay                                     | 1.5 credits (spring) |
| ST3001                | Introduction to Medical Statistics                                    | 7.5 credits (autumn) |
| TOKS3001              | Medical Toxicology  | 7.5 credits (spring) |

<sup>1</sup> Experts in Teamwork (EiT) is taught intensively in the weeks 2, 3 and 4 in the second semester. Read more about EiT on this webpage: [www.ntnu.edu/dmf/studies/eit](http://www.ntnu.edu/dmf/studies/eit)

<sup>2</sup> The course has restricted admission, and will be open for master's students in Molecular Medicine only if there are any available seats. Please contact the Department of Biology if you are interested.

<sup>3</sup> The course has restricted admission. Two-thirds of the seats are reserved for the first-year master's students in Molecular Medicine. One-third of the seats are reserved for second-year master's students in Molecular Medicine and other master's students at NTNU.

<sup>4</sup> The course has restricted admission. Students admitted to the MSc in Molecular Medicine will get priority. The course is taught over two semesters (autumn + spring).

<sup>5</sup> The course is at PhD level, but it is open for qualified and motivated master's students.

Courses may be cancelled if few students register for the examination.

Model of the MSc Programme (Example):

| Year 1                                      |   | Year 2                                      |   |
|---|---|---|---|
| <i>1<sup>st</sup> semester<br/>(autumn)</i> | <i>2<sup>nd</sup> semester (spring)</i> | <i>3<sup>rd</sup> semester<br/>(autumn)</i> | <i>4<sup>th</sup> semester (spring)</i> |
| Introduction to Molecular Medicine          | Experts in Teamwork                     | Thesis in Molecular Medicine                |   |
| Elective course                             | Elective course                         |   |   |
| Elective course                             | Elective course                         |   |   |
| Elective course                             | Elective course                         |   |   |

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

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

### Study Environment

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

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

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

### Course Descriptions

The course descriptions are available on the internet: [www.ntnu.edu/dmf/studies/courses](http://www.ntnu.edu/dmf/studies/courses)

# MASTER OF SCIENCE IN NEUROSCIENCE

## 2-year Master of Science (MSc)

Programme code: MSNEUR

Webpage: [www.ntnu.edu/studies/msneur/](http://www.ntnu.edu/studies/msneur/)

This programme description is valid for students admitted in the academic year 2011/2012.

### Introduction

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

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

### About the Programme of Study

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

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

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

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

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

## Career Prospects

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

## Admission Requirements

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

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

International applicants need to submit proof of English proficiency (TOEFL, IELTS, APIEL or University of Cambridge test). More details about the language requirements are available at [www.ntnu.edu/studies/langcourses/languagerequirements](http://www.ntnu.edu/studies/langcourses/languagerequirements)

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

## Programme Structure

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

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

## Master's Thesis

|           |                        |            |
|-----------|------------------------|------------|
| NEVR3901* | Thesis in Neuroscience | 60 credits |
|-----------|------------------------|------------|

\* The course code FY3901 is used by students with a supervisor at the Department of Physics.

## Compulsory Courses

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

## Elective Courses

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

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

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

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

### Faculty of Humanities

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

### Faculty of Information Technology, Mathematics and Electrical Engineering

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

### Faculty of Medicine

|          |   |                      |
|----------|---|----------------------|
| MOL3001  | Medical Genetics  | 7.5 credits (spring) |
| MOL3005  | Immunology  | 7.5 credits (autumn) |
| MOL3008  | Analytical Techniques and Instrumentation   | 7.5 credits (autumn) |
| MOL3010  | Animal Cell Culture   | 7.5 credits (autumn) |
| MOL3014  | Nanomedicine I – Bioanalysis  | 7.5 credits (autumn) |
| MOL3015  | Nanomedicine II – Therapy   | 7.5 credits (spring) |
| NEVR3040 | Private Study of Neuroscience I   | 7.5 credits (both)   |
| NEVR3050 | Private Study of Neuroscience II  | 15 credits (both)    |
| NEVR8001 | Brain Metabolism Studied by <sup>13</sup> C Nuclear Magnet Resonance Spectroscopy and Other Methods | 7.5 credits (autumn) |
| NEVR8002 | Aspects of Neurobiology   | 4.5 credits (both)   |
| NEVR8003 | Laboratory Animal Science for Researchers   | 6 credits (autumn)   |
| NEVR8013 | Laboratory Animal Science – Essay   | 1.5 credits (spring) |
| ST3001   | Introduction to Medical Statistics  | 7.5 credits (autumn) |
| TOKS3001 | Medical Toxicology  | 7.5 credits (spring) |



### Faculty of Natural Sciences and Technology

|         |   |                      |
|---------|---|----------------------|
| BI3010  | Population Genetics   | 7.5 credits (autumn) |
| BI3013  | Experimental Cell Biology   | 7.5 credits (autumn) |
| BI3016  | Molecular Cell Biology  | 7.5 credits (autumn) |
| BI3017  | Bio Visualisation   | 7.5 credits (spring) |
| BI3018  | Patenting and Commercialization of Biotech and Medtech Inventions | 7.5 credits (spring) |
| TBT4145 | Molecular Genetics  | 7.5 credits (autumn) |
| TFY4265 | Biophysical Micromethods  | 7.5 credits (autumn) |
| TFY4280 | Signal Processing   | 7.5 credits (spring) |
| TFY4310 | Molecular Biophysics  | 7.5 credits (autumn) |
| TFY4320 | Medical Physics   | 7.5 credits (spring) |

### Faculty of Social Sciences and Technology Management

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

### Undergraduate Courses

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

### **Progression**

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

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

The course *Experts in Teamwork* (EiT) is compulsory for all master's degree students at NTNU, and is taught intensively in the weeks 2, 3 and 4 in the second semester. Read more about EiT here: [www.ntnu.edu/dmf/studies/eit](http://www.ntnu.edu/dmf/studies/eit)

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

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

Model of the MSc in Neuroscience (example)

| Year 1                                      |   | Year 2   |   |
|---|---|--|---|
| <i>1<sup>st</sup> semester<br/>(autumn)</i> | <i>2<sup>nd</sup> semester<br/>(spring)</i> | <i>3<sup>rd</sup> semester<br/>(autumn)</i>    | <i>4<sup>th</sup> semester<br/>(spring)</i> |
| NEVR3001                                    | NEVR3003                                    | NEVR3901 or FY3901<br>(Thesis in Neuroscience) |   |
| NEVR3002                                    | NEVR3004                                    |  |   |
| Elective course                             | Experts in Teamwork                         |  |   |
| Elective course                             | Elective course                             |  |   |

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

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

### Study Environment

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

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

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

### Course Descriptions

The course descriptions are available on the internet:  
[www.ntnu.edu/dmf/studies/courses](http://www.ntnu.edu/dmf/studies/courses)

# MASTER OF SCIENCE IN URBAN ECOLOGICAL PLANNING

## ADDITIONAL REGULATIONS

### 1. Learning Goal

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

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

### 2. Course Structure

This is a two year course where each of the four semesters comprises core modules and electives from the natural or social sciences depending on the candidate's interests or qualifications. There are also multidisciplinary courses, "Experts in Team" that may be chosen as electives.

*Semester I:* International 'Field Work and Project' taking place in a third country done in cooperation with students from other international universities and faculties of NTNU.

*Semester II:* Core courses (Urban Ecological Planning; Planning for Sustainability and Development; Research Methods; GIS for Urban Planning).

*Semester III:* Core courses (Planning Theory, Methods) + electives.

*Semester IV:* Master thesis; analyses and final write-up.

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

### 3. Career Prospects

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

### 4. Entry Qualifications

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

*2: Students from Nordic countries:* Equivalent to those for international students. Nordic students may also apply on the basis of exams in relevant areas from the University Colleges (høgskolene).

#### *English Language Requirements:*

TOEFL Score 500/170

IELTS mark 5.0

### 5. Studies at other universities

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

## 6. Contacts

For further information on admission and administrative matters: [studadm@ab.ntnu.no](mailto:studadm@ab.ntnu.no).

For information on academic matters: [hans.skotte@ntnu.no](mailto:hans.skotte@ntnu.no) or [hans.c.bjonness@ntnu.no](mailto:hans.c.bjonness@ntnu.no)

## MASTER OF SCIENCE IN URBAN ECOLOGICAL PLANNING 2011/2012

### Compulsory core courses:

| Semester: | Subject no.: | Title:  | Autumn | Spring |
|-----------|--------------|---|--------|--------|
| 1.sem     | AAR4525      | Urban Ecological Planning in Developing Countries. Project work | 15 Sp  |        |
| 1.sem     | AAR4816      | Urban Ecological Planning. Method                               | 7,5 Sp |        |
| 1.sem     | AAR4820      | Urban Ecological Planning. Theory                               | 7,5 Sp |        |
| 2.sem     |              | Electives (see list)  |        | 7,5 Sp |
| 2.sem     |              | Electives (see list)  |        | 7,5 Sp |
| 2.sem     | AAR5305      | Urban Ecological Planning in Diverse Cultures                   |        | 7,5 Sp |
| 2. sem    | AAR5250      | Preparation for fieldwork                                       |        | 7,5 Sp |
| 3.sem     | AAR5200      | Processing Field Study Data                                     | 15 Sp  |        |
| 3.sem     | FP4350       | Planning theory and planning process skills                     | 7,5 Sp |        |
| 3. sem    |              | Electives (see list)  | 7,5 Sp |        |
| 4.sem     | AAR5400      | Master In Urban Ecological Planning                             |        | 30 Sp  |

### Electives:

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

1)

#### Autumn:

Elective courses offered during the autumn can only be selected if a study plan tailored to the M.Sc. thesis subject is agreed with the Faculty, and recommended by the M.Sc. thesis supervisor and course responsible.

2)

#### Spring:

Elective courses amounting to 15 Sp shall be selected from the above list

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

# **MASTER OF SCIENCE IN SUSTAINABLE ARCHITECTURE**

## **– Towards a zero emission built environment**

### **ADDITIONAL REGULATIONS**

#### **1. Learning Aims**

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

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

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

#### **2. Course Structure**

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

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

#### **3. Career Prospects**

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

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

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

#### 4. Entry Qualifications

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

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

#### 5. Studies at other universities

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

#### 6. Contacts

For further information on admission and administrative matters: [studadm@ab.ntnu.no](mailto:studadm@ab.ntnu.no).

For information on academic matters: [annemie.wyckmans@ntnu.no](mailto:annemie.wyckmans@ntnu.no).

### MASTER OF SCIENCE IN SUSTAINABLE ARCHITECTURE 2011/2012

| Semester                 | Subject no.: | Title:  | Autumn | Spring |
|--------------------------|--------------|---|--------|--------|
| 1 <sup>st</sup> semester | AAR4532      | Climate and Built Form Design Project               | 15 Sp  |        |
| 1 <sup>st</sup> semester | AAR4833      | Concepts and Strategies in Sustainable Architecture | 7,5 Sp |        |
| 1 <sup>st</sup> semester | AAR4832      | Climate and Built Form                              | 7,5 Sp |        |
|                          |              |   |        |        |
| 2 <sup>st</sup> semester | AAR4616      | Integrated Energy Design Project                    |        | 15 Sp  |
| 2 <sup>st</sup> semester | AAR4926      | Integrated Energy Desing                            |        | 7,5 Sp |
| 2 <sup>st</sup> semester | AAR4907      | Sustainable Building Materials and Components       |        | 7,5 Sp |
|                          |              |   |        |        |
| 3 <sup>st</sup> semester | AAR4546      | Design of Zero Emission Buildings                   | 15 Sp  |        |
| 3 <sup>st</sup> semester | AAR4817      | Use and Operation of Zero Emission Buildings        | 7,5 Sp |        |
| 3 <sup>st</sup> semester |              | Elective Course                                     | 7,5 Sp |        |
|                          |              |   |        |        |
| 4 <sup>st</sup> semester | AAR4993      | Master Thesis                                       |        | 30 Sp  |

**Electives:**

| Subject no.                       | Title:  | Note | Autumn | Spring |
|-----------------------------------|---|------|--------|--------|
| Subject may be thought in english |   |      |        |        |
| BI2050                            | Biological Resources                            |      | 7,5 Sp |        |
| TVM4162                           | Industrial Ecology                              |      | 7,5 Sp |        |
| AAR4820                           | Urban Ecological Planning. Theory               |      | 7,5 Sp |        |
| AAR4850                           | Principles in Lighting                          |      | 7,5 Sp |        |
| AAR4863                           | Off-site Fabrication and Building Info Modeling |      | 7,5 Sp | 7,5 Sp |
| AAR4816                           | Urban Ecological Planning. Method               |      | 7,5 Sp |        |
| TMM4225                           | Engineering Collaboration in Distributed Teams  |      | 7,5 Sp |        |
| AAR4873                           | Sections  | 1    | 7,5 Sp |        |
| Thought in norwegian              |   |      |        |        |
| FP4100                            | Arkitektur og stedsforming                      |      | 7,5 Sp |        |
| EP0100                            | Energifremtider og miljøvisjoner                |      | 7,5 Sp |        |
| HFEL0006                          | Energi, miljø og samfunn                        |      | 7,5 Sp |        |
| SFEL2000                          | Samfunnsfaglige persp på naturressursforvalt    |      | 7,5 Sp | 7,5 Sp |
| SANT2006                          | Kultur, natur og miljø                          |      | 7,5 Sp |        |
| TBA4155                           | Prosjektplanlegging og analyse                  |      | 7,5 Sp |        |
| TBA4160                           | Bygningsfysikk, grunnkurs                       |      | 7,5 Sp |        |
| TBA4135                           | Organisasjon og økonomi I BA-prosjekt           |      | 7,5 Sp |        |
| TBA4122                           | Bygningsmaterialer                              |      | 7,5 Sp |        |
| GEOG1000                          | Menneske og sted I                              |      | 7,5 Sp |        |
| TMM4220                           | Innovasjon                                      |      | 7,5 Sp |        |
| TIØ4258                           | Teknologiledelse                                |      | 7,5 Sp | 7,5 Sp |
| TPD4142                           | Designntenkning                                 |      | 7,5 Sp |        |
| FI1105                            | Etikk   |      | 7,5 Sp |        |

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

1) The course will not be taught in the academic year 2011/2012



## **MASTER OF SCIENCE IN ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY**

Programme code: MSENVITOX

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

### **Learning outcomes**

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

### **Career prospects**

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

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

### Admission requirements

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

- BSc in Biology (minimum of 80 ECTS credits biology courses) including chemistry and pollution biology.
- BSc in Chemistry (minimum of 80 ECTS credits chemistry courses) including environmental and/or analytical chemistry.
- Bachelor degrees within other related areas may be considered on an individual basis. The candidates background should provide a biological and/or chemical relevant basis for the master study in Environmental toxicology and chemistry (e.g courses listed below in the bachelor degrees at NTNU forming the basis for this master study).

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

### BSc in Chemistry, Environmental and Analytical Chemistry:

| Year          | Semester  |   |  |  |  |
|---------------|-----------|---|--|--|--|
| 3             | 6. Spring | KJ2022<br>Spectroscopic<br>Methods in Organic<br>Chemistry          | KJ2051<br>Analytical<br>Chemistry,<br>Advanced Course        | <b>KJ2053<br/>Chromatography</b>                         | <b>TBI4110<br/>Ecotoxicology<br/>and<br/>Environmental<br/>Resources</b> |
|               | 5. Autumn | Elective Course   | <b>ST0103<br/>Statistics with<br/>Applications</b>           | BI 1003<br>Evolutionary Biology, Ecology and<br>Ethology |  |
| 2             | 4. Spring | <b>KJ1042<br/>Basic<br/>Thermodynamics<br/>with Laboratory</b>      | <b>KJ2070<br/>Environmental Chemistry</b>                    |  | <b>Perspective<br/>Course</b>  |
|               | 3. Autumn | <b>KJ1041<br/>Chemical Bonds,<br/>Spectroscopy and<br/>Kinetics</b> | <b>KJ2050<br/>Analytical<br/>Chemistry, Basic<br/>Course</b> | <b>KJ1030 Inorganic Chemistry</b>                        |  |
| 1             | 2. Spring | FY0001<br>Service course in<br>physics                              | <b>MA0002<br/>Mathematical<br/>Methods B</b>                 | <b>KJ1020<br/>Organic Chemistry</b>                      |  |
|               | 1. Autumn | <b>EXPH0001<br/>Philosophy and<br/>Theory of Science</b>            | <b>MA0001<br/>Mathematical<br/>Methods A</b>                 | <b>KJ1000<br/>General Chemistry</b>                      |  |
| ECTS Credits: |           | 7,5   | 7,5  | 7,5  | 7,5  |

**BSc in Biology, Cell and Molecular Biology:**

| Year          | Semester |  |  |  |  |
|---------------|----------|--|--|--|--|
| 3             | 6 Spring | <b>BI2071<br/>Pollution Biology I</b>                        |  | <b>ST2304<br/>Statistical modelling for biologists/bio-technologists</b> | <b>KJ2071<br/>Environmental Chemistry, Introduction course</b> |
|               | 5 Autumn | <b>BI2014<br/>Molecular Biology</b>                          | <b>BI2015<br/>Molecular Biology, Laboratory Course</b> | <b>Perspective Course</b>  | KJ2050<br>Analytical Chemistry, Basic Course                   |
| 2             | 4 Spring | <b>EXPH0001<br/>Philosophy and Theory of Science</b>         | <b>BI2012<br/>Cell Biology</b>                         | <b>KJ1020<br/>Organic Chemistry</b>                                      |  |
|               | 3 Autumn | <b>BI1004<br/>Physiology</b>                                 |  | <b>MA0001<br/>Mathematical Methods A</b>                                 | <b>ST0103<br/>Statistics with Applications</b>                 |
| 1             | 2 Spring | <b>BI1001<br/>Cell and Molecular Biology</b>                 |  | <b>BI1002<br/>Faunistics and Floristics in Norwegian Ecosystems</b>      |  |
|               | 1 Autumn | <b>BI1003<br/>Evolutionary Biology, Ecology and Ethology</b> |  | <b>KJ1000<br/>General Chemistry</b>                                      |  |
| ECTS Credits: |          | 7,5  | 7,5  | 7,5  | 7,5  |

**BSc in Biology, Physiology:**

| Year          | Semester |   |                                |  |  |
|---------------|----------|---|--------------------------------|--|--|
| 3             | 6 Spring | <b>BI2071<br/>Pollution Biology I</b>   |                                | <b>ST2304<br/>Statistical modelling for biologists/bio-technologists</b> | <b>KJ2071<br/>Environmental Chemistry, Introduction course</b> |
|               | 5 Autumn | <b>ZO2022<br/>Zoo-Physiology<br/>or<br/>BO2021 Plant Ecophysiology<br/>or<br/>BO2022<br/>Plant Growth and Development</b> |                                | <b>Perspective Course</b>  | KJ2050<br>Analytical Chemistry, Basic Course                   |
| 2             | 4 Spring | <b>EXPH0001<br/>Philosophy and Theory of Science</b>  | <b>BI2012<br/>Cell Biology</b> | <b>KJ1020<br/>Organic Chemistry</b>                                      |  |
|               | 3 Autumn | <b>BI1004<br/>Physiology</b>  |                                | <b>MA0001<br/>Mathematical Methods A</b>                                 | <b>ST0103<br/>Statistics with Applications</b>                 |
| 1             | 2 Spring | <b>BI1001<br/>Cell and Molecular Biology</b>  |                                | <b>BI1002<br/>Faunistics and Floristics in Norwegian Ecosystems</b>      |  |
|               | 1 Autumn | <b>BI1003<br/>Evolutionary Biology, Ecology and Ethology</b>  |                                | <b>KJ1000<br/>General Chemistry</b>                                      |  |
| ECTS Credits: |          | 7,5   | 7,5                            | 7,5  | 7,5  |

## **Programme Structure and Specialisations**

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

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

- Masters thesis (60 ECTS credits)

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

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

- Environmental Chemistry

- Environmental Toxicology

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

You will find the course descriptions at the following web sites:

**NTNU courses:** <http://www.ntnu.no/studies/courses>

**UNIS courses:** [http://www.unis.no/10\\_STUDIES/1020\\_Courses/](http://www.unis.no/10_STUDIES/1020_Courses/)

**Environmental Chemistry:**

| Year         | Semester          |   |  |  |  |
|--------------|-------------------|---|--|--|--|
| 2            | 4 Spring<br>NTNU: | <b>KJ3091/KJ3093<br/>(7,5/10 ECTS)<br/>Special syllabus for<br/>Master's degree</b>   |  | <b>Master thesis</b>   |  |
|              | 3 Autumn<br>NTNU: | <b>KJ3053<sup>3)</sup><br/>(7,5 (ETCS)<br/>Analytical<br/>methods for<br/>industrial- and<br/>environmental<br/>monitoring<br/>or<br/>Master thesis</b> |  | <b>Master thesis</b>   |  |
| 1            | 2 Spring<br>UNIS: | <b>AT-324 (10 ECTS)<br/>Techniques for the<br/>Detection of Organo-<br/>Chemical Pollutants in<br/>the Arctic Environment</b>                           |  | <b>AT-321 (10 ECTS)<br/>Fate and Modelling of<br/>Pollutants in the Arctic</b> | <b>Master thesis</b>   |
|              | or<br><br>NTNU:   | <b>Experts in Team</b>  | Elective course                                | <b>Master thesis</b>   |  |
|              | 1 Autumn<br>NTNU: | <b>KJ3050<sup>1)</sup><br/>(7,5 ECTS)<br/>Organic marine<br/>environmental<br/>chemistry</b>  | KJ3070 (15 ECTS)<br>Advanced Aquatic Chemistry |  | <b>RFEL3070<sup>2)</sup><br/>(7,5 ECTS)<br/>Scientific<br/>Seminars in<br/>Pollution</b> |
| ECTS Credits |                   | 7,5   | 7,5  | 7,5  | 7,5  |

<sup>1)</sup> KJ3050 requires previous knowledge in general chemistry corresponding to KJ1000 and a basic course in analytical chemistry (e.g. KJ2050).

<sup>2)</sup> The students have to follow the RFEL3070 course in all semesters at NTNU.

<sup>3)</sup> KJ3053 is compulsory in the third semester for students that stay at NTNU in the second semester.

**Compulsory courses:**

KJ3050<sup>1)</sup> Organic marine environmental chemistry (7,5)

REFEL3070 Scientific Seminars in Pollution (7,5)

AT-321 Fate and Modelling of Pollutants in the Arctic (10)

AT-324 Techniques for the Detection of Organo-Chemical Pollutants in the Arctic Environment (10)

or

Experts in team

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

KJ3091 Special syllabus for Master's degree (7,5), or

KJ3093 Special syllabus for Master's degree (10) only for those who follow courses at UNIS.

*Elective courses:*

KJ2050<sup>1)</sup> Analytical Chemistry, Basic Course (7,5) (Autumn)  
 KJ3053 Analytical methods for industrial- and environmental monitoring (7,5) (Autumn)  
 KJ3055 Analytical Atomic Spectrometry (7,5) (Spring)  
 KJ3058 Analytical Chemical Separation Techniques (7,5) (Autumn)  
 KJ3070 Advanced Aquatic Chemistry (15) (Autumn)  
 BI3071 Advanced Ecotoxicology (7,5) (Autumn)  
 BI3072 Environmental Toxicology (7,5) (Autumn)

**Environmental toxicology:**

| Year         | Semester          |  |   |  |   |
|--------------|-------------------|--|---|--|---|
| 2            | 4 Spring<br>NTNU: | <b>BI3091/BI3093<br/>(7,5/10 ECTS)<br/>Special syllabus<br/>for Master's<br/>degree</b>                            | Master thesis   |  |   |
|              | 3 Autumn<br>NTNU: | <b>BI3075 (7,5 ECTS)<br/>Experimental<br/>Ecotoxicology</b>  | Elective courses<br>(7,5<br>ECTS) )/Master<br>thesis      | Master thesis  |   |
| 1            | 2 Spring<br>UNIS: | AT-324 (10 ECTS)<br>Techniques for the<br>Detection of Organo-<br>Chemical Pollutants in<br>the Arctic Environment |   | AT-321 (10 ECTS)<br>Fate and Modelling of<br>Pollutants in the Arctic                    | Elective courses (10<br>ECTS)/Master thesis |
|              | or<br><br>NTNU:   | <b>Experts in team<br/>(7,5 ECTS)</b>  | Elective courses<br>(7,5 ECTS)                            | Master thesis  |   |
|              | 1 Autumn<br>NTNU: | <b>BI3071 (7,5 ECTS)<br/>Advanced<br/>Ecotoxicology</b>  | <b>BI3072 (7,5 ECTS)<br/>Environmental<br/>Toxicology</b> | <b>RFEL3070<sup>2)</sup><br/>(7,5 ECTS)<br/>Scientific<br/>Seminars in<br/>Pollution</b> | Master thesis                               |
| ECTS Credits |                   |  |   |  |   |

<sup>1)</sup> KJ3050 requires previous knowledge in general chemistry corresponding to KJ1000 and a basic course in analytical chemistry (e.g. KJ2050).

<sup>2)</sup> The students have to follow the RFEL3070 course in all semesters at NTNU.

*Compulsory courses:*

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

BI3091 Special syllabus for Master's degree (7,5)

or

BI3093 Special syllabus for Master's degree (10) only for those who follow courses at UNIS.

*Elective courses:*

AB-203 Arctic Environmental Management (15) (Spring)

AB-323 Light, Climate and Primary Production in the Arctic (10) (Spring)

AT-321 Fate and Modelling of Pollutants in the Arctic (10) (Spring)

AT-324 Techniques for the Detection of Organo-Chemical Pollutants in the Arctic Environment (10) (Spring)

BI3073 Genetic Toxicology (7,5) (Spring)

KJ2050<sup>1)</sup> Analytical Chemistry, Basic Course (7,5) (Autumn)

KJ3050<sup>1)</sup> Organic marine environmental chemistry (7,5) (Autumn)

**Examples of Master Theses**

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

**Contact information and counselling**

Address: NTNU, Faculty for Natural Sciences and Technology, 7491 Trondheim, Norway

Telephone: 73 59 41 97

E-mail: [studies-master@nt.ntnu.no](mailto:studies-master@nt.ntnu.no)

URL: <http://www.ntnu.no/nt/english>

<http://www.ntnu.no/studies/msc-environmental-toxicology-chemistry>

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## MASTER OF SCIENCE IN CONDENSED MATTER PHYSICS

### OUTLINE OF THE PROGRAMME

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

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

| Year            | Semester | 7.5 credits  | 7.5 credits            | 7.5 credits | 7.5 credits     |
|-----------------|----------|--|------------------------|-------------|-----------------|
| 2 <sup>nd</sup> | Spring   | Self Study<br>or<br>Elective                       | Master's Thesis        |             |                 |
|                 | Autumn   | Elective   |                        |             |                 |
| 1 <sup>st</sup> | Spring   | TFY4245 Solid<br>State Physics,<br>Advanced Course | Experts in<br>Teamwork | Elective    | Master's Thesis |
|                 | Autumn   | FY3114<br>Functional<br>Materials                  | Elective               | Elective    |                 |

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

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

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

### Master's Thesis

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

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



## Topics offered in the programme

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

## PLAN OF STUDY

### 1<sup>st</sup> year, autumn

*Compulsory:*

FY3114 Functional Materials

*Elective:*

TFY4205 Quantum Mechanics II

TFY4300 Energy and Environmental Physics

FY3006 Sensors and Transducers

### 1<sup>st</sup> year, spring

*Compulsory:*

TFY4245 Solid State Physics, Advanced Course

Experts in Teamwork, Interdisciplinary Project

*Elective:*

TFY4190 Instrumentation

TFY4195 Optics

TFY4200 Optics, Advanced Course

TFY4210 Quantum Theory of Many-Particle Systems

TFY4235 Computational Physics

TFY4275 Classical Transport Theory

TFY4280 Signal Processing

TFY4340 Mesoscopic Physics

FY3201 Atmospheric Physics and Climate Change

FY3402 Subatomic Physics

FY3464 Quantum Field Theory I

### 2<sup>nd</sup> year, autumn

*Elective:*

TFY4255 Materials Physics

TFY4292 Quantum Optics

TFY4515 Physics, Specialization Course

FY3403 Particle Physics

FY3466 Quantum Field Theory II

FY8302 Quantum Theory of Solids

Courses listed under 1<sup>st</sup> year autumn can also be chosen.

### 2<sup>nd</sup> year, spring

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

## MASTER OF SCIENCE IN NATURAL RESOURCES MANAGEMENT

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

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

### Learning outcomes

This study programme provides a vital link between fundamental knowledge about natural resources and how these resources can be sustainably managed in a complex society with multiple interests and stakeholders. Based on your disciplinary background (BSc-degree within either geography, biology, chemistry or resource geology) you will obtain in-depth competence about how natural resources can be successfully managed in order to ensure the maintenance of fundamental ecosystem services in addition to providing the fundamental needs for the human population in the future.

Through mandatory and eligible courses you will obtain a multidisciplinary background which is a necessity because most challenges and conflicts over management of natural resources involves several governmental sectors, as well as various stakeholders and interests.

In your master project you will carry out a scientific study which is related to a relevant challenge/conflict over the management of natural resources based on your disciplinary background. You will apply fundamental scientific methods within your discipline which may involve;

- collection of data (presumably through fieldwork),
- developing relevant hypotheses and predictions based on current scientific theory within your discipline and
- carrying out state of the art statistical analyses in order to obtain results which will be discussed and evaluated according to the status of knowledge within focal scientific field and the question raised.

Accordingly you will contribute with science based knowledge which will be relevant for the management of the natural resource in question. Such skills and experience are highly marketable today, making you attractive to a wide range of employers both within research, governmental and public administration as well as private sectors.

### Admission requirements:

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

The specialisations are as follows:

- Biology
- Chemistry
- Resource Geology
- Geography

General admission requirements:

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

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

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

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

<http://www.ntnu.edu/studies/langcourses/languagerequirements>

Then these further admission requirements for each specialisation has to be fulfilled to qualify for admission to the programme:

- Applicants who would like to apply for **specialisation in Biology** need to have a Bachelor degree including basic courses in biology, minimum 80 ECTS. As example of requirements, check the plan of study in BSc degree in Biology at NTNU.  
<http://www.ntnu.no/studies/msc-natural-resources/admission>
- Applicants who would like to apply for **specialisation in Chemistry** need to have Bachelor degree in Chemistry and a specialisation in or an emphasis on analytical and/or environmental Chemistry and containing a minimum 1,5 years of Chemistry. As example of requirements, check the plan of study in BSc degree in chemistry at NTNU <http://www.ntnu.no/studies/msc-natural-resources/admission>  
Autumn 2013 is the last opportunity to apply and to be admitted to the specialisation in Chemistry in this programme.
- Applicants who would like to apply for **specialisation in Resource Geology** need to have a Bachelor degree in Bedrock-and Resource Geology or equivalent including compulsory courses in geology. As example of requirements, check the plan of study in BSc degree in Bedrock- and Resource Geology at NTNU.  
<http://www.ntnu.no/studies/msc-natural-resources/admission>
- Applicants who would like to apply for **specialisation in Geography** should hold a Bachelor degree including at least 1,5 year of studies within geography or natural resources management. Other relevant qualifications can be accepted upon approval by the Department of Geography.

For NTNU students, please look for details concerning admission requirements at

Biology: <http://www.nt.ntnu.no/studiehandbok/202.pdf>

Chemistry: <http://www.nt.ntnu.no/studiehandbok/206.pdf>

Resource Geology: <http://www.nt.ntnu.no/studiehandbok/204.pdf>

Geography: <http://www.ntnu.no/svt/studiehandbok/>

## Programme Structure and Specialisations:

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

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

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

The Special syllabus for the Master's Degree is a special selected curriculum (self study) from scientific articles or books relevant for the thesis work, selected in agreement with the supervisor and the department.

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

## The plan of the study for the 2- year international Master's programme MSc in Natural Resources Management

| Year            | Semester |   |  |   |  |             |
|-----------------|----------|---|--|---|--|-------------|
| 2               | Spring   | RFEL 3080 Scientific Seminars in Natural Resources Management 7,5 credits | Elective Courses 30 credits (check the list of Elective Courses) | Special Syllabus for Master Degree* 7,5 credits                   | Master Thesis 60 credits**             |             |
|                 | Autumn   |   |  |   |  |             |
| 1               | Spring   |   |  |   |  |             |
|                 | Autumn   |   |  | RFEL 3081 Natural Resources Management, Interdisciplinary Project | GEOG 3030 Natural Resources Management |             |
| Course credits: |          | 7,5 credits   | 7,5 credits  | 7,5 credits   | 7,5 credits                            | 7,5 credits |

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

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

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

|                   |             |
|-------------------|-------------|
| Biology:          | NATRB1 3900 |
| Chemistry:        | NATRKJ 3900 |
| Resource Geology: | GEOL 3090   |
| Geography:        | GEOG 3940   |

## **Elective courses -MSc Natural Resources Management:**

### **Elective Courses in Chemistry:**

|         |   |
|---------|---|
| KJ3053  | Analytical Electrochemistry and its Application within Industrial and Environmental Monitoring (7,5 credits) Autumn |
| KJ 3055 | Analytical Atomic Spectrometry (7,5 credits) lectures <b>Spring 2013</b>  |
| KJ 3056 | Chemical Sensors and Biosensors (7,5 credits) Autumn  |
| KJ 3070 | Advanced Aquatic Chemistry (15 credits) Autumn  |
| KJ 3071 | Applied Geochemistry (7,5 credits) Autumn   |

### **Elective Courses in Biology:**

|        |  |
|--------|--|
| BI2017 | Genetics and Evolution I (7,5 credits) Spring <b>NB!*</b>                |
| BI3003 | Faunistics II (7,5 credits) Autumn                                       |
| BI3004 | Behaviour and Conservation Biology (7,5 credits) Autumn                  |
| BI3005 | Fish Behaviour and Ecology (7,5 credits) Spring <b>NB! **</b>            |
| BI3010 | Population Genetics (7,5 credits) Autumn                                 |
| BI2043 | Biodiversity and Conservation Biology I (7,5 credits) Autumn <b>NB!*</b> |
| BI3051 | Evolutionary Analyses (7,5 credits) Spring                               |
| BI3072 | Environmental Toxicology (7,5 credits) Autumn                            |
| BI3082 | Biodiversity and Conservation Biology II (7,5 credits) Autumn            |
| BI3083 | Evolutionary and Ecological Genetics (7,5 credits)                       |
| ZO2041 | Ethology (7,5 credits) Spring <b>NB!*</b>                                |
| ZO3031 | Behavioural Ecology (7,5 credits) Spring                                 |
| ZO3032 | Sexual Selection (7,5 credits) Spring <b>NB!**</b>                       |

**NB!\*** These courses are mandatory in BSc Biology at NTNU and NTNU students can't choose these elective courses for their Master's degree.

**NB!\*\*** The course is not given in 2011-2012

### **Elective Courses in Geology:**

|         |   |
|---------|---|
| TGB4115 | Mineral Deposit Geology (7,5 credits) Autumn                            |
| TGB4120 | Prospecting and Formation of Selected Ore-Deposits (7,5 credits) Spring |
| TGB4135 | Basin Analysis (7,5 credits) Spring                                     |
| TGB4170 | Diagenesis/Reservoir Quality (7,5 credits) Spring                       |
| TGB4175 | Resource Geological Principles (7,5 credits), Autumn                    |
| TPG4177 | Carbonate Reservoir Characterization (7,5 credits) Autumn               |

More courses given at the Department of Geology and Mineral Resources Engineering are relevant for the Master's programme in Natural Resources Management, depending on the specific interest of each student. The courses should be chosen in collaboration with the professor who will be the supervisor for the Master's thesis.

### **Elective Courses in Geography:**

GEOG3005 Qualitative Methods (7,5 credits) Spring  
 GEOG3006 Quantitative Methods (7,5 credits) Spring  
 GEOG3505 Landscape and Planning (15 credits) Autumn  
 GEOG3515 Environment, Development and Changing Rural Livelihoods (7,5 credits) Autumn  
 GEOG3519 Geographical Information System I (7,5 credits) Autumn  
 GEOG3520 Geographical Information System II (7,5 credits) Spring  
 GEOG3003 Methodology and the Research Process (7,5 sp) Autumn  
 GEOG3521 GIS, Urban Applications of GIS (7,5 sp) Autumn

### **Other Elective Courses:**

SØK3524 Environmental and Resource Economics (15 credits) Autumn and Spring  
 POL3517 International development: The Effects of Politics, Institutions and International Economy (15 credits) Spring  
 FI5201 Multicultural Conflicts and Ethics, (15 credits/7,5 credits)

*It is possible to choose other courses according to specific interest and in agreement with the supervisor and responsible department. Not all courses are guaranteed free lecture or examination collision so please check this before registering for the courses.*

### **Examples of Master's Thesis:**

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

### **Field work:**

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

**Registration and Examinations:**

Masters' students will have to register for courses and examination every semester.

The courses may have different examination forms, oral or written, and will be arranged at the end of the semester in which the course is offered.

<http://www.ntnu.no/studies/examinations>

The student calendar gives important dates for the studies, deadlines and so on.

<http://www.item.ntnu.no/student/calendar>

**Contact information and counselling:**

Student advisor:

[Siri.Bremdal@nt.ntnu.no](mailto:Siri.Bremdal@nt.ntnu.no) +47 73 59 45 52

# MASTER OF SCIENCE IN MARINE COASTAL DEVELOPMENT

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

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

## Admission

Entry requirement to this Msc programme is a Bachelor degree (or equivalent) in Science or Engineering with an academic profile in marine science.

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

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

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

## Specializations

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

### **1. Aquaculture**

*Marine Juvenile Technology* –60 credits thesis possible

Contact: Professor Helge Reinertsen

*Marine Aquaculture system* - Both 30 and 60 credits thesis possible

Contact: Professor Helge Reinertsen – 60 credits thesis  
Professor Arne Fredheim – 30 credits thesis

*Recycling Aquaculture and Environmental Analysis* -30 credits thesis possible

Contact: Professor Helge Brattebø

### **2. Marine Harvesting**

*Processing of Marine Resources* - Both 30 and 60 credits thesis possible

Contact: Professor Turid Rustad – Both 30 and 60 credits thesis

*Sustainable Marine Harvesting* - 30 credits thesis possible

Contact: Professor Harald Ellingsen

### **3. Marine Biology and Biochemistry**

*Marine Biology and Ecology* - 60 credits thesis possible

Contact: Professor Yngvar Olsen

*Marine Biochemistry and Biotechnology* - Both 30 and 60 credits thesis possible

Contact: Professor Kjell Morten Vaarum – Both 30 and 60 credits thesis



**Contacts:**

Professor Helge Reinertsen, Department of Biology

Helge.Reinertsen@bio.ntnu.no

Professor Il Arne Fredheim, Department of Marine Technology

Arne.Fredheim@sintef.no

Professor Yngvar Olsen, Department of Biology

Yngvar.Olsen@bio.ntnu.no

Professor Helge Brattebø, Department of Hydraulic and Environmental Engineering

Helge.Brattebo@ntnu.no

Professor Tor Ove Leiknes, Department of of Hydraulic and Environmental Engineering

torove.Leiknes@ntnu.no

Professor Harald Ellingsen, Department of Marine Technology

Harald.Ellingsen@ntnu.no

Professor Turid Rustad, Department of Biotechnology

Turid.Rustad@biotech.ntnu.no

Professor Kjell Morten Vaarum, Department of Biotechnology

Kjell.Morten.Vaarum@biotech.ntnu.no

**Compulsory courses**

All students shall study two subjects in common, that is TMR 4137 *Sustainable Utilization of Marine Resources*, BI3061 *Biological Oceanography* and “*Experts in Teamwork*”, and choose up to two optional subjects from other disciplines.

Every specialization has strongly recommended courses, look in the tables.

**Experts in Teamwork**

Experts in Teamwork is compulsory.

**Thesis**

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

**Thesis – 60 credits**

Spring semester as the 4<sup>th</sup> semester: Deadline for handing in the Master’s thesis is the 15th of May, deadline for the exams is the 15<sup>th</sup> of June.

**More information**

[www.ntnu.no/macodev](http://www.ntnu.no/macodev)

## MSc in Marine Coastal Development (MSMACODEV)

### 1st and 2nd year Specialization 60 credits

| Ex                | Subject no    | Subject title                       | Note    | Cr  | Specialization |   |   |
|-------------------|---------------|-------------------------------------|---------|-----|----------------|---|---|
|                   |               |                                     |         |     | 1              | 2 | 3 |
| 1st sem<br>autumn |               | <b>Compulsory courses</b>           |         |     |                |   |   |
|                   | TMR4137       | SUST UTIL OF MARINE RESOURCES       |         | 7,5 | C              | C | C |
|                   | BI3061        | BIOL OCEANOGRAPHY                   |         | 7,5 | C              | C | C |
|                   | BI3062        | SCIENTIFIC SEMINARS, MARINE         |         | 0   | C              | C | C |
|                   |               | <b>Optional courses A-list</b>      | a       |     |                |   |   |
|                   | BI3064        | FEED ORGANISMS IN MARINE FRY PROD   | 1,d     | 7,5 | O              | O | O |
|                   | BI3060        | EXPERIMENTAL MARINE ECOL METHODS    | 1,3,d   | 7,5 | O              | O | O |
|                   | BI3063        | BIOLOGICAL AND GENETIC STOCK MANAGE | 2,3     | 7,5 | O              | O | O |
|                   | TBT4135       | BIOPOLYMERS                         | 3       | 7,5 | O              | O | O |
|                   | TBT4145       | MOLECULAR GENETICS                  | 3       | 7,5 | O              | O | O |
|                   | TMR4115       | DESIGN METHODS                      | 1,2     | 7,5 | O              | O | O |
|                   | TMR4130       | RISK ANALYSES AND SAFETY MANAGEMENT | 1,2     | 7,5 | O              | O | O |
|                   | TMR4135       | FISHING VESSEL AND WORK BOAT DESIGN | 2       | 7,5 | O              | O | O |
|                   |               | <b>Optional courses B-list</b>      | b       |     |                |   |   |
|                   | BI3010        | POPULATION GENETICS                 |         | 7,5 | O              | O | O |
|                   | TBT4140       | BIOCHEMICAL ENGINEERING             |         | 7,5 | O              | O | O |
|                   | TIØ4120       | OPERATION RESEARCH, INTRO           |         | 7,5 |                | O |   |
|                   | TMR4215       | SEA LOADS                           | 2       | 7,5 | O              | O | O |
|                   | TMR4295       | DESIGN OF MECHANICAL SYSTEMS        | 2       | 7,5 | O              | O | O |
|                   | TTT4175       | MARINE ACOUSTICS                    |         | 7,5 | O              | O | O |
| 2nd sem<br>spring |               | <b>Compulsory courses</b>           |         |     |                |   |   |
|                   | -             | EXPERTS IN TEAMWORK                 |         | 7,5 | C              | C | C |
|                   | BI3062        | SCIENTIFIC SEMINARS, MARINE         |         | 0   | C              | C | C |
|                   | BI3905/BT3905 | MASTER THESIS IN MaCoDev            |         | 15  | C              | C | C |
|                   |               | <b>Optional courses A-list</b>      | a       |     |                |   |   |
|                   | BI3065        | EARLY LIFE HISTORY OF FISH          | 1,d, e  | 7,5 | O              | O | O |
|                   | BI3005        | FISH BEHAVIOR AND ECOLOGY           | 1,2,3,e | 7,5 | O              | O | O |
|                   |               | INCREASED VALUE OF MAR BIOLOGICAL   |         |     |                |   |   |
|                   | TBT4155       | RESOURC                             | 1,3     | 7,5 | O              | O | O |
|                   | TEP4265       | FOOD ENGINEERING                    | 2       | 7,5 | O              | O |   |
|                   | TMR4140       | DESIGN OF MARINE PRODUCTIONS PLANTS | 1       | 7,5 | O              | O | O |
|                   | TMR4120       | UNDERWATER ENGINEERING, BC          | 2       | 7,5 | O              | O |   |
|                   | TMR4230       | OCEANOGRAPHY                        | 2       | 7,5 | O              | O | O |
|                   | TMR4225       | MARINE OPERATIONS                   |         | 7,5 | O              |   | O |
|                   |               | <b>Optional courses B-list</b>      | b       |     |                |   |   |
|                   | BI3032        | POPULATION DYNAMICS                 | 3       | 7,5 |                |   | O |
|                   | SØK2004       | INDUSTRIAL ECONOMICS                |         | 7,5 |                | O |   |
|                   |               |                                     |         |     |                |   |   |
|                   | TBT4125       | FOOD CHEMISTRY                      | 2,3     | 7,5 | O              | O | O |
|                   | TMR4240       | MARINE CONTROL SYSTEMS              |         | 7,5 |                | O |   |
|                   | TTK4170       | MOD AND IDENTIFIC BIOLOGICAL SYST   | 1       | 7,5 | O              |   |   |
|                   | TTT4195       | MARINE OBSERVATION TECHNOLOGY       | 1,3     | 7,5 | O              | O | O |

| Ex                | Subject no    | Subject title                      | Note | Cr   | Specialization |   |   |
|-------------------|---------------|------------------------------------|------|------|----------------|---|---|
|                   |               |                                    |      |      | 1              | 2 | 3 |
| 3rd sem<br>autumn |               | <b>Compulsory courses</b>          |      |      |                |   |   |
|                   | BI3062        | SCIENTIFIC SEMINARS, MARINE        |      | 7,5  | C              | C | C |
|                   | BI3905/BT3905 | MASTER THESIS IN MaCoDev           |      | 22,5 | C              | C | C |
| 4th sem<br>spring |               | <b>Compulsory courses</b>          |      |      |                |   |   |
|                   | BI3091        | SPECIAL SYLLABUS FOR MASTER DEGREE |      | 7,5  | C              | C | C |
|                   | BT3092        | SPECIAL SYLLABUS FOR MASTER DEGREE |      | 7,5  | C              | C | C |
|                   | BI3905/BT3905 | MASTER THESIS IN MaCoDev           |      | 22,5 | C              | C | C |

Specialization 60 credits:

1. Aquaculture
2. Marine Harvesting
3. Marine biology and Biotechnology

**1) Aquaculture:**

The following courses are recommended in specialization

*Marine Juvenile Technology*

Autumn: BI3064, BI3060, TMR4115 Spring: BI3065, BI3005, TBT4155, TMR4140

*Marine Aquaculture Systems*

Autumn: BI3064, TMR4115 Spring: BI3065, BI3005, TBT4155, TMR4140, TTK4170, TTT4195

**2) Marine Harvesting**

The following courses are recommended in specialization

*Processing of Marine Resources*

Autumn: BI3063, TMR4115, TMR4130, TMR4135, TMR4215, TMR4295 Spring: TBT4125, TEP4265, TMR4120, TMR4230

**3) Marine biology and Biotechnology:**

The following courses are recommended in specialization

*Marine Biology and Ecology*

Autumn: BI3060, BI3063, TBT4135, TBT4145 Spring: BI3005, BI3032, TBT4125, TBT4155, TTT4195

*Marine Biochemistry and Biotechnology*

Autumn: BI3060, BI3063, TBT4135, TBT4145, Spring: BI3005, TBT4125, TBT4155, TEP4265, TTT4195

d) This course is taught intensively

**a) A-list**

Courses are considered when planning the teaching and examination schedule

**b) B-list**

Courses are NOT considered when planning the teaching and examination schedule

Other courses can be chosen

**C=Compulsory**

**O= Optional**

e) BI3005 and BI3065 runs every second year, not 2011- 2012

## MSc in Marine Coastal Development (MSMACODEV)

### 1st and 2nd year Specialization 30 credits

| Ex                | Subject no | Subject title                             | Note       | Cr  | Specialization |   |   |
|-------------------|------------|---|------------|-----|----------------|---|---|
|                   |            |   |            |     | 1              | 2 | 3 |
| 1st sem<br>autumn |            | <b>Compulsory courses</b>                 |            |     |                |   |   |
|                   | TMR4137    | SUST UTIL OF MARINE RESOURCES             |            | 7,5 | C              | C | C |
|                   | BI3061     | BIOL OCEANOGRAPHY                         |            | 7,5 | C              | C | C |
|                   |            | <b>Optional courses A-list</b>            | a          |     |                |   |   |
|                   | BI3065     | FEED ORGANISMS IN MARINE FRY PRODUCTIONS  | 1,d        | 7,5 | O              | O | O |
|                   | TBT4135    | BIOPOLYMERS                               | 3          | 7,5 | O              | O | O |
|                   | TBT4145    | MOLECULAR GENETICS                        | 3          | 7,5 | O              | O | O |
|                   | TMR4115    | DESIGN METHODS                            | 1,2        | 7,5 | O              | O | O |
|                   | TMR4130    | RISK ANALYSES AND SAFETY MANAGEMENT       | 1,2        | 7,5 | O              | O | O |
|                   | TMR4135    | FISHING VESSEL AND WORK BOAT DESIGN       | 2          | 7,5 | O              | O | O |
|                   |            | <b>Optional courses B-list</b>            | b          |     |                |   |   |
|                   | BI3060     | EXPERIMENTAL MARINE BIOLOGICAL METHODS    | 3,d        | 7,5 | O              | O | O |
|                   | BI3063     | BIOLOGICAL AND GENETIC STOCK MANAGEMENT   | 2,3        | 7,5 | O              | O | O |
|                   | TBT4140    | BIOCHEMICAL ENGINEERING                   |            | 7,5 | O              | O | O |
|                   | TIØ4120    | OPERATION RESEARCH, INTRO                 |            | 7,5 |                | O |   |
|                   | TMR4215    | SEA LOADS                                 | 2          | 7,5 | O              | O | O |
|                   | TMR4295    | DESIGN OF MECHANICAL SYSTEMS              | 2          | 7,5 | O              | O | O |
|                   | TTT4175    | MARINE ACOUSTICS                          |            | 7,5 | O              | O | O |
|                   | TVM4145    | UNIT PROC IN WATER AND WASTEWAT TREATM    |            | 7,5 | O              | O | O |
|                   | TVM4162    | INDUSTRIAL ECOLOGY                        |            | 7,5 | O              | O | O |
| 2nd sem<br>spring |            | <b>Compulsory courses</b>                 |            |     |                |   |   |
|                   |            | EXPERTS IN TEAMWORK                       |            | 7,5 | C              | C | C |
|                   |            | <b>Optional courses A-list</b>            | a          |     |                |   |   |
|                   | BI3005     | FISH BEHAVIOR AND ECOLOGY                 | 1,2,3, d,e | 7,5 |                |   | O |
|                   | TBT4155    | INCREASED VALUE OF MAR BIOLOGICAL RESOURC | 3,d        | 7,5 | O              | O | O |
|                   | TEP4265    | FOOD ENGINEERING                          | 2          | 7,5 | O              | O |   |
|                   | TMR4120    | UNDERWATER ENGINEERING, BC                | 2          | 7,5 | O              | O |   |
|                   | TMR4140    | DESIGN OF MARINE PRODUCTIONS PLANTS       | 1          | 7,5 | O              | O | O |
|                   | TMR4230    | OCEANOGRAPHY                              | 2          | 7,5 | O              | O | O |
|                   | TMR4225    | MARINE OPERATIONS                         |            | 7,5 | O              |   | O |
|                   |            | <b>Optional courses B-list</b>            | b          |     |                |   |   |
|                   | BI3065     | EARLY LIFE HISTORY OF FISH                | 1,d,e      | 7,5 | O              | O | O |
|                   | BI3032     | POPULATION DYNAMICS                       | 3          | 7,5 |                |   | O |
|                   | BI3073     | GENETICS TOXICOLOGY                       | 1,d        | 7,5 | O              |   | O |
|                   | SØK2004    | INDUSTRIAL ECONOMICS                      |            | 7,5 |                | O |   |
|                   | TBT4125    | FOOD CHEMISTRY                            | 2,3        | 7,5 | O              | O |   |
|                   | TMR4240    | MARINE CONTROL SYSTEMS                    |            | 7,5 |                | O |   |
|                   | TTT4195    | MARINE OBSERVATION TECHNOLOGY             | 1,3        | 7,5 |                | O | O |

| Ex                | Subject no | Subject title                                 | Note | Cr  | Specialization |   |   |
|-------------------|------------|---|------|-----|----------------|---|---|
|                   |            |   |      |     | 1              | 2 | 3 |
| 3rd sem<br>autumn |            | <b>Compulsory courses</b>                     |      |     |                |   |   |
|                   |            | <b>Specialization courses</b>                 |      |     |                |   |   |
|                   | TBT4505    | BIOTECHNOLOGY, SPEC COURSE                    | 3    | 7,5 | C              | C | C |
|                   | TMR4575    | FISHERIES AND MARINE RESOURCES, SPEC COURSE   | 2    | 7,5 | C              | C | C |
|                   |            | <b>Specialization projects</b>                |      |     |                |   |   |
|                   | TBT4505    | BIOTECHNOLOGY, SPEC PROJ                      | 3    | 7,5 | C              | C | C |
|                   | TMR4570    | FISHERIES AND MARINE RESOURCES, SPEC PROJ     | 2    | 7,5 | C              | C | C |
|                   |            | <b>Optional courses</b>                       |      |     |                |   |   |
|                   | BI3064     | FEED ORGANISMS IN MARINE FRY PRODUCTIONS      | 1    | 7,5 | O              | O | O |
|                   | BI3060     | EXPERIMENTAL MARINE ECOL METHODS              | 2    | 7,5 | O              | O | O |
|                   | BI3063     | BIOLOGICAL AND GENETICAL STOCK MANAGEMENT     | 3    | 7,5 | O              | O | O |
|                   | BI3071     | ADV ECOTOXICOLOGY                             | 1    | 7,5 | O              |   |   |
|                   | TBA4265    | MARINE PHYSICAL ENVIRONMENT                   |      | 7,5 |                | O |   |
|                   | TBT4135    | BIOPOLYMERS                                   | 2    | 7,5 | O              | O | O |
|                   | TBT4140    | BIOCHEMICAL ENGINEERING                       | 1    | 7,5 | O              | O |   |
|                   | TBT4145    | MOLECULAR GENETICS                            |      | 7,5 | O              | O | O |
|                   | TMR4115    | DESIGN METHODS                                |      | 7,5 | O              | O |   |
|                   | TMR4135    | FISHING VESSEL AND WORK BOAT DESIGN           | 2    | 7,5 | O              | O | O |
|                   | TMR4190    | FINITE ELEMENT METHODS IN STRUCTURAL ANALYSES | 2    | 7,5 | O              | O | O |
|                   | TMR4215    | SEA LOADS                                     |      | 7,5 | O              | O | O |
|                   | TMR4295    | DESIGN OF MECHANICAL SYSTEMS                  |      | 7,5 | O              | O |   |
|                   | TTT4175    | MARINE ACOUSTICS                              |      | 7,5 | O              | O |   |
|                   | TVM4162    | INDUSTRIAL ECOLOGY                            |      | 7,5 | O              | O |   |
|                   | TVM4145    | UNIT PROC IN WATER AND WASTEWAT TREATM        |      | 7,5 | O              | O |   |
| 4th sem<br>spring |            | <b>Compulsory courses</b>                     |      |     |                |   |   |
|                   | BT3910     | BIOTECHNOLOGY, MASTER THESIS                  |      | 30  | C              | C | C |
|                   | TMR4905    | MARINE SYSTEMS, MASTER THESIS                 |      | 30  | C              | C | C |

1. Aquaculture
2. Marine Harvesting
3. Marine biology and Biotechnology

**1) Aquaculture:**

The following courses are recommended in specialization:

*Marine Aquaculture Systems*

Autumn: BI3064, TMR4115, TMR4130 Spring: BI3065, BI3005, TMR4140, TTK4170, TTT4195

*Recycling Aquaculture and Environmental Analysis*

Autumn: BI3064, BI3071, TBT4130, TMR4115, TMR4130 Spring: BI3065, BI3073, TBT4140, TBT4155, TMR4140, TTK4170

**2) Marine Harvesting**

The following courses are recommended in specialization:

*Processing of Marine Resources*

Autumn: BI3060, BI3063, TEP4265, TMR4115, TMR4135, Spring: BI3005, TBT4125, TBT4135, TMR4215

*Sustainable Marine Harvesting*

Autumn: TEP4265, TMR4115, TMR4130, TMR4135 Spring: TBT4125, TMR4190, TMR4215, TMR4120, TMR4230, TMR4295

3) **Marine biology and Biotechnology:**

The following courses are recommended in specialization:

*Marine Biochemistry and Biotechnology*

Autumn: BI3060, BI3063, TBT4135, TBT4145 Spring: BI3005, TBT4125, TBT4155, TTT4195

d) This course is taught intensively

a) **A-list** Courses are considered when planning the teaching and examination schedule

b) **B-list** Courses are NOT considered when planning the teaching and examination schedule

Other courses can be chosen

**C=Compulsory**

**O= Optional**

e) BI3005 and BI3065 runs every second year, not 2011- 2012

## MASTER OF SCIENCE IN MATHEMATICS

### Degree Program

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

### Admission requirements

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

- Bachelor's degree consisting of at least three years of university studies.
- Studied mathematics at a university for at least 1½ years.
- For the study directions in **algebra**, **analysis** and **topology**: Reached the level and covered material equivalent to
  - MA1101 Basis calculus I,
  - MA1102 Basis calculus II,
  - MA1201 Linear algebra and geometry,
  - MA1202 Linear algebra with applications,
  - MA1103 Vector calculus,
  - MA1301 Number theory,
  - MA2201 Algebra,
  - TMA4120 Calculus 4K.
- For the study direction in **numerical analysis**: Reached the level and covered material equivalent to
  - MA1101 Basic calculus,
  - MA1102 Basic calculus II,
  - MA1201 Linear algebra and geometry,
  - MA1202 Linear algebra with applications,
  - MA1103 Vector calculus,
  - ST1101 Probability,
  - ST1201 Statistical methods.

- For the study direction in **statistics**: Reached the level and covered material equivalent to
  - MA1101 Basic calculus,
  - MA1102 Basic calculus II,
  - MA1201 Linear algebra and geometry,
  - MA1202 Linear algebra with applications,
  - MA1103 Vector calculus,
  - ST1101 Probability,
  - ST1201 Statistical methods
 and at least two statistic courses on the level of ST2101 or TMA4250 or higher.

(All codes for these courses refer to the 2011/2012-course catalogue).

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

### Description of the degree

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

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

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

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

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

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

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



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

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

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

As mentioned above, the coursework will take  $2\frac{1}{2}$  semesters (75/30 semester). All the courses in the degree must be approved by the Department of Mathematical Sciences, NTNU.

## The Thesis

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

## Exams

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

# 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, 22 May 2008 and on 30 March 2011.*

## 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 4<sup>th</sup> year cannot have any unfinished courses from the 1<sup>st</sup> year. Students who want to take the 5<sup>th</sup> year cannot have any unfinished courses from the 1<sup>st</sup> and 2<sup>nd</sup> years, and students who want to take the 6<sup>th</sup> year cannot have any unfinished courses from the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> 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 Section 12, subsection 1 if the duration of the programme is more than 40 weeks and has teaching and/or studies which can be pursued independently of the other studies at NTNU.

### **§ 13 *Programmes of study***

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

The Board establishes and terminates each programme of study at NTNU. When the Board creates a new programme of study, it should simultaneously decide which Faculty is to administer the programme.

2. Each programme of study has a main profile, which gives disciplinary specialization of at least 80 credits. All programmes of study involving 5-year integrated Master's degrees should also satisfy the requirements of the Bachelor's degree.
3. Each programme of studies consists of different courses. The courses offered should each be of 7.5 credits or a multiple of that. The courses given in the programme of study are either compulsory or optional. The Faculty establishes new courses and terminates old ones. When the Board at NTNU has created an inter-Faculty board for a group of programmes of study, this authority is vested in this board. The Board at NTNU is to approve the establishment of courses where it is assumed that this will increase the basic disbursement in the State appropriation model.
4. All programmes of study leading to a lower degree as well as integrated programmes of study leading to a higher degree or a professional degree are to contain three introductory courses:
  - Ex. phil. of 7.5 credits that is to be common for all students. Ex. phil. should ideally be a first semester course but this is not compulsory if there are academic grounds to do otherwise.
  - Ex. fac. of 7.5 credits is specific for the relevant Faculty. It should be part of the main profile is and is to be taken in the first year.
  - Perspective course of 7.5 credits that is to represent a different field of study from that included in the student's programme of study.

### **§ 13a *One-year programmes***

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

#### ***§ 14 Curriculum and course description***

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

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

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

learning outcomes

the qualifications necessary to gain admission to the course

the content of the course

teaching methods

how many credits the course is worth

the extent of the education

possible compulsory education

which activities are included, their extent and which of them are compulsory, for instance courses in methodology, exercises, work experience, field courses, excursions, laboratory work, group exercises, semester papers and other written exercises, artistic performances

the requirements for receiving assessment

activities that will be subject to on-going assessment and which of them will count in the course grade

the organization of a possible final examination (how often, when in the semester, date and similar information)

what examination support material can be used

the form of assessment and grading scale for the assessments during the course

the weighting of assessments during the course that are to count in the course grade

#### ***§ 15 Recognition of external studies/practical experience***

1. The Faculty is to handle applications concerning recognition of external studies or practical experience in accordance with the Act relating to Universities and University Colleges Section 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 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 coherent professional study corresponding to 360 credits. The Faculty of Social Sciences and Technology Management will decide the content of the programme of study as well as additional criteria for awarding the degree.

## **Chapter 5 Assessment**

### ***§ 23 Assessment***

1. In all courses or groups of courses included in a programme of study, the possibility for assessment and subsequent grading of the knowledge and skills of the students should be available each academic year. The assessment should be given as a final evaluation, or possibly an evaluation based on different types of on-going assessments described in the curriculum.

2. In order to receive assessment, the student must have registered that same semester, and also meet the academic requirements for assessment given in the course description.

3. A student who has handed in a paper in an assessment cannot prevent the assessment from being done. The student cannot block an assessment if the examination began with an oral test.

### ***§ 24 Examination periods***

Final examinations take place at the end of each semester. The Rector decides the time of the examination periods. The dates are given in the curriculum. The Rector may decide to organize the

examinations outside the regular examination periods, if practical considerations related to the courses or other things make this necessary.

### ***§ 25 Final examination***

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

### ***§ 26 Instructions at final examination***

The Rector can issue general instructions for

- students who are allowed to sit a final examination
- invigilators
- the presence of teaching staff during a written final examination.

These instructions are found in the curriculum.

### ***§ 27 Legitimate leave of absence at final examination***

1. If a student is unable to sit a final examination due to illness or other pressing reasons, an application for approved absence has to be submitted to the Division of Student and Academic Affairs. The application, which has to be submitted at the latest one week after the first final examination to which the absence applies, has to contain information about which final examinations the application concerns. Documentation should be included in the application. The period of absence is to be indicated on the medical certificate.

2. A student who is taken ill during a final examination should notify the principal invigilator in the examination hall or the external examiner/internal examiner at oral examinations. The student subsequently has to see a doctor quickly and submit a medical certificate, as stated in the regulations in Section 27 subsection 1.

### ***§ 28 Re-sit examination***

1. In a course where the final examination is to be held only once in the academic year, a re-sit examination is to be arranged before the next normal examination. Students with an approved absence may take the re-sit examination. This also applies to students who have not passed the initial examination.

2. Students must register for the re-sit examination within the deadline stated by the Faculty or in the supplementary regulations.

3. The Faculty can in agreement with the Rector decide to organize the re-sit examination during the same period as the normal examination, in the next examination period or at a later time outside the examination period. For certain programmes of study, the time of the re-sit examination will be a standard arrangement that can be stated in the supplementary regulations.

4. During a re-sit examination, the quality of the assessment should correspond to the one given at the normal final examination. Alternative forms of assessment at re-sit examination should be stated in the course description.

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

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

### ***§ 30 Re-examination***

1. A student who has failed to pass the examination in a course has the right to repeat the examination and receive a new assessment. The course description or the supplementary regulations determine what areas have to be repeated after a student has failed to pass an examination.

2. The student has the right to complete a second period of practical work experience if he/she failed to pass the first period of practical work experience.

3. If the student has passed, he/she only has the right to re-take an examination once more in each course in order to improve his/her grade. If the student is registered for an examination and has not withdrawn his/her examination registration by the deadline decided by the Director of the Student and Academic Division, this is regarded as one attempt. The highest grade obtained is the one that counts. When the grade for a course is based on two or more assessments or tests, these have to be re-taken.

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

### ***§ 31 New assessment of Master's thesis***

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

### ***§ 32 Syllabus at new assessment/re-sit examinations***

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

### ***§ 33 Adjusted forms of assessment***

1. In order to give all students approximately the same working conditions when receiving assessment, students with particular requirements that have been sufficiently documented may apply for an adjusted form of assessment. Such an assessment does not imply any reduction in the general degree requirements.

2. The adjusted forms of assessment may be practically oriented in order to allow the use of special aids or extended time. In particular cases, types of assessment that differ from the normal one may also be accepted.

3. If the requirements of the student are permanent, the use of special aids may be allowed throughout his/her studies.

4. An application, including documentation, should be sent to the Division of Student and Academic Affairs before the registration deadline. The application is to be decided by the Rector. Applications for different forms of assessment from the one given in the course description are to be decided by the Rector in consultation with the Faculty.

5. Students with sudden acute requirements should as far as possible be given the same rights with regard to assessment as described above. An application containing sufficient documentation should

be sent to the Division of Student and Academic Affairs as soon as possible after the acute situation has arisen.

### ***§ 34 Form of language/language by written assessment***

1. Arrangements with regard to the form of language used in examination papers are given in Regulations concerning forms of language in examination papers of 7 July 1987. The regulations are in accordance with the Act of 11 April 1980 no. 5 concerning the use of Forms of Language in the Public Services.

2. Examination papers written in Norwegian should contain a version in the other form of the Norwegian language (*bokmål* and *nynorsk*). The exception is examination papers in the subject Norwegian. In case all the students prefer the same form of language, the examination papers may only be written in this form. The students choose their form of language as they register for an examination.

3. If the lectures are given in a non-Scandinavian language, the examination paper should also include a version in the language that has been used in the lectures. Applications requesting the examination paper to be in a language different from Norwegian or that used in teaching are to be decided by the Faculty.

4. In examinations at higher degree level, the Faculty may decide that the text in the examination paper is in a non-Scandinavian language even though there is no requirement that the examination answer paper is to be written in that language. Higher degree level means master's programmes or the 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> years in integrated programmes of study. The decision concerning this is to be indicated in the course description.

5. 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.

6. Assessment papers and Master's theses can be written in Norwegian, Danish, Swedish or English unless stipulated otherwise in the course description or in description of the programme of study.

7. If another foreign language than English is part of the characteristics of the course, its learning objectives or curriculum, the Faculty is to determine which language the candidate is to use in his/her assessment paper.

8. The Master's thesis is to be written in the language that is most relevant to the content of the topic and the practical conditions of each individual master's student. The Faculty is to determine which languages can be approved within this framework. Master's theses that are written in Norwegian are to have a summary in English or another relevant language. Master's theses written in a non-Scandinavian language are to have a short summary in Norwegian. The Faculty may waive this provision if the candidate is an international student and does not speak one of the Scandinavian languages (Norwegian, Swedish or Danish).

### ***§ 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 Completed/Not Completed. Grade A is the highest pass grade, while Grade E is the lowest pass grade. The grading scale is based on the following descriptions and general qualitative descriptions:

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

Completed/Not Completed 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 of the credits to be included in the basis of calculation of the degree have to been taken at NTNU.
3. For the degrees that are awarded in cooperation with other Norwegian or foreign institutions (joint degrees) at least 30 credits have to be taken at NTNU.
4. When recognition is given for education that has previously been used in the basis of calculation of a degree or as part of a degree or professional training, a student must also have completed at least 60 new credits before he/she can be awarded a new degree. The Faculty may decide requirements for up to 90 new credits for certain programmes. Where the Board of NTNU has established a joint faculty board for a group of programmes of study, the latter has the authority to adopt requirements for up to 90 new 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***

The changes in Sections 22 and 34 subsection 8, come into force from the academic year 2011/2012. The other changes are to come into force immediately.



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

### Chapter 3 Academic decisions - accreditation

#### § 3-9. *Examinations and marking*

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

### Chapter 4 The students' rights and obligations

#### § 4-7. *Annulment of examinations or tests*

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

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

#### § 4-8. *Exclusion*

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

### Chapter 5 Appeals

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

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

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

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

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

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

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

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

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

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

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

### Plagiarism detection

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

### What Norwegian law says about cheating

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

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

**Annulment of the examination** (The above Law, Section 4-7, Subsection 1, b)

The least severe reaction is annulment of the examination. Annulment alone is used in the least serious cases of cheating. An attempt to cheat includes gross negligence. The matter is decided by the University Appeals Committee.

**Suspension from further studies** (The above Law, Section 4-8, Subsection 3)

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

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