NTNU

Fakultet for ingeniørvitenskap og teknologi

Dato 27.04.2011 Referanse 2011/474/SR

Notat

Til:	Studieavdelingen
Kopi til:	Dekanat, instituttledere, studieprogramledere, FTRer og fakultetsadministrasjonen
Fra:	Fakultet for ingeniørvitenskap og teknologi
Signatur:	Ingvald Strømmen/Svein Remseth

Utvikling av studieprogramportefølje for IVT på lengre sikt

Studieprogrammene ved vårt fakultet er innenfor teknologi bortsett fra realfagsprogrammene i geologi (et 3-årig bachelorprogram og et 2-årig masterprogram). I tillegg samarbeider vi med NT om programmet Marine Coastal Development som har både teknologi og realfag. Både teknologiprogrammene og realfagsprogrammene er i all hovedsak bransjeorientert. Vi mener at dette bidrar sterkt til det tette samarbeid vi har og stadig utvikler med næringsliv og forvaltning relatert både til utdanning og forskning.

Våre nåværende studieprogram

Studieprogram	Programtype	Programråd
Bygg- og miljøteknikk	Integrert 5-årig teknologiprogram	Bygg- og miljøteknikk
Coastal and Marine Civil Engineering	2-årig internasjonalt MSc	Bygg- og miljøteknikk
Geotechnics and Geohazards	2-årig internasjonalt MSc	Bygg- og miljøteknikk
Hydropower Development (ikke ordinært)	2-årig internasjonalt MSc	Bygg- og miljøteknikk
Coastal and Marine Engineering and Management	Erasmus Mundus (MSc)	Bygg- og miljøteknikk
Petroleumsfag	Integrert 5-årig teknologiprogram	Geologi og petroleum
Petroleum Engineering	2-årig internasjonalt MSc	Geologi og petroleum
Petroleum Geosciences	2-årig internasjonalt MSc	Geologi og petroleum
Tekniske geofag	Integrert 5-årig teknologiprogram	Geologi og petroleum
Bachelor i geologi (3-årig)	Realfag	Geologi og petroleum
Master i geologi (2-årig)	Realfag	Geologi og petroleum
Marin teknikk	Integrert 5-årig teknologiprogram	Marin teknikk
Marine Technology (ikke ordinært)	2-årig internasjonalt MSc	Marin teknikk

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Pro-dekan Svein Remseth
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Marine Coastal Development	2-årig internasjonalt MSc	Marin teknikk
Maritime Engineering	N5T	Marin teknikk
Produktutvikling og produksjon	Integrert 5-årig teknologiprogram	Produktutv. og produksjon
Reliability, Availability, Maintainability and Safety	2-årig internasjonalt MSc	Produktutv. og produksjon
Ingeniørvitenskap og IKT:	Integrert 5-årig teknologiprogram	I & IKT
Industriell Design	Integrert 5-årig teknologiprogram	Industriell design
Energi og miljø (IME er vertsfakultet)	Integrert 5-årig teknologiprogram	Energi og miljø
Natural Gas Technology	2-årig internasjonalt MSc	Energi og miljø
Innovative Sustainable Energy Engineering	N5T	Energi og miljø
Industrial Ecology	2-årig internasjonalt MSc	Industrial Ecology
Undervannsteknologi (samarb. med HiB)	2-årig nasjonalt masterprogram	Undervannsteknologi

De femårige integrerte teknologiprogrammene tar også opp studenter fra ingeniørhøgskolene til toårige masterstudier. Unntakene er "Ingeniørvitenskap og IKT" og "Tekniske geofag".

Ovenfor er studieprogrammene gruppert etter bransjer/fagområder. Som det fremgår har vi lagt opp til felles håndtering av programmene innenfor et område gjennom felles studieprogramråd der også de faglige kontaktpersonene for de internasjonale programmene er medlemmer.

Videre utvikling av vår portefølje av studietilbud

Bransjeorientering

Som nevnt innledningsvis anser vi det som strategisk viktig å beholde våre integrerte 5-årige programmer inkludert de tilhørende 2-årige nasjonale masterprogrammene som bransjeorienterte. Selv om vi da får et betydelig antall programmer er fordelene med samhandling mellom studieprogram og bransje av stor strategisk betydning for IVT. Det synes heller ikke å være noen ulempe i forhold til rekruttering av studenter at en har denne strukturen i studieprogramporteføljen.

Mulig kombinasjon av nasjonale og internasjonale 2-årige masterprogram

Siden fakultetet har engelskspråklig undervisning i alle emner i masterdelen av studiene der det er behov og alt læringsmateriell foreligger på engelsk for emnene på masternivå er det av stor interesse for oss å kunne kombinere nasjonale og internasjonale masterprogram. Vi håper derfor at dette så snart som mulig kan utredes og konkluderes på NTNU-nivå.

Nedlegging / kombinasjon av internasjonale program

Vi har nå sendt søknad om fornyelse av vårt Erasmus Mundus-program *Coastal and Marine Engineering and Management*. Hvis denne søknaden innvilges ønsker vi å legge ned det internasjonale masterprogrammet *Coastal and Marine Civil Engineering*, og vi vil i den anledning ikke ta opp studenter til dette programmet nå i 2011. Vi vil også vurdere å se på mulighetene for å kombinere noen internasjonale programmer.

Samarbeid med andre fakultet om studieprogram

IME-fakultetet har nå også besluttet å gjennomføre en utviklingsprosess for alle sine studieprogram innen teknologi og IVT vil i 2011 og 2012 gjennomføre en tilsvarende prosess for de to siste av våre 5-årige program. Ett av disse er *Ingeniørvitenskap og IKT*. For dette programmet bør en da samhandle med IKT-relaterte program ved IME for å få til gode felles løsninger.

Utdanningsnettverk med andre nasjonale utdanningsinstitusjoner

IVT-fakultetet har nå i to år hatt et felles masterprogram i *Undervannsteknologi* sammen med Høgskolen i Bergen. NTNU tildeler graden. Erfaringen fra dette samarbeidet er så langt veldig positivt. Slikt samarbeid bør prioriteres i den grad det kan gi positivt tilskudd i forhold til studenttilgang og utvidet industrisamarbeid, ikke minst innen forskning. Dette bør også sees på som en del av NTNU sitt samfunnsoppdrag med å bidra til gode master-kandidater til regionalt næringsliv. IVT-fakultetet fortsetter å vurdere nettverkssamarbeid med flere ingeniørhøgskoler.

Strategi for hvilke type studier som skal prioriteres også med hensyn til studenttall

Grunnstammen i studietilbudene ved IVT er de integrerte 5-årige programmene inkludert de nasjonale 2-årige mastertilbudene. Så er vi også meget positive til og ser det som en viktig strategi å utvikle internasjonalt samarbeid og samhandling for utdanningen. Vi får snart en evaluering av samarbeidet med TU Delft innen Marin teknikk. Her deles ett studieår slik at studenter ved begge universitet har ett og samme semester ved hvert av universitetene. Etter evalueringen vil vi vurdere dette som en videre strategi for samarbeid med andre fremragende utenlandske universitet. Videre ser vi på deltakelse i masterprogrammer innen samarbeidet *Nordic Five Tech* og Erasmus Mundus som kvalitetsfremmende både for utdanning og forskning. De internasjonale 2-årige masterprogrammene som vi tilbyr ansees også som viktige internasjonaliseringstiltak, ikke minst for de lokale fagmiljøene. Det savnes imidlertid en synlig sentral overordnet strategi for det antall studenter som skal prioriteres innenfor de ulike kategorier av utdanningstilbud.

Studietilbud i tilknytning til tverrfaglige forskningsområder

Utdanning av kandidater på masternivå med ulike kompetanseprofiler innenfor nåværende og fremtidige tverrfaglige forskningsområder ved NTNU er viktig, ikke minst for fremtidens næringsutvikling. Her er vi opptatt av at vi får etablert gode modeller for studietilbud som ikke krever at vi må etablere nye studieprogram, men snarere kombinerer bolker av emnetilbud fra eksisterende masterprogram inkludert gode disiplinemner. Samhørigheten mellom kandidatene innen ulike kompetanseprofiler sikres med fellesemner og med betydelig eksponering for og deltakelse i den tverrfaglige forskningen.

NTNU

Fakultet for ingeniørvitenskap og teknologi

Dato 28.04.2011 Referanse 2011/474

Notat

Til:	Studieavdelingen v/ Jon Inge Resell
Kopi til:	Ingvald Strømmen, Hilde N Lysne
Fra:	Fakultet for ingeniørvitenskap og teknologi
Signatur:	Svein Remseth

Studieprogramporteføljeendringer IVT 2012/2013

Eksisterende studieprogram:

Ved Fakultet for ingeniørvitenskap og teknologi er det følgende studieprogram:

Master i teknologi/sivilingeniør:

Bygg- og miljøteknikk, 5 og 2-årig masterprogram
Industriell design, 5 og 2-årig masterprogram
Ingeniørvitenskap og IKT, 5-årig masterprogram
Petroleumsfag, 5 og 2-årig masterprogram
Produktutvikling og produksjon, 5 og 2-årig masterprogram
Marin teknikk, 5 og 2-årig masterprogram
Tekniske geofag, 5-årig masterprogram
Energi og miljø, 5 og 2-årig masterprogram innen Energibruk og energiplanlegging, IME er vertsfakultet
Geofag og petroleumsteknologi, 5-årig masterprogram, programmet utgår i fra 2012 (erstattet av Petroleumsfag og Tekniske geofag).
Undervannsteknologi, 2-årig masterprogram

Realfag:

Geologi, 3-årig bachelorprogram
Geologi, 2-årig masterprogram

Internasjonale masterprogram, 2-årig:

Hydropower Development

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Petroleum Engineering
Petroleum Geosciences
Marine Technology
Coastal and Marine Civil Engineering (vil evt. utgå fra 2012/2013)
Geotechnics and Geohazards
Industrial Ecology
Reliability, Availability, Maintanabilty and Safety
Coastal and Marine Engineering and Management, Erasmus Mundus
Marine Coastal Deveopment
Natural Gas Technology
Innovative Sustainable Energy
MSc in Natural Resources Management (NT er vertsfakultet)
Nordic Master Programme in Maritime Engineering (nytt fra 2011)

Mulige endringer i studieprogramporteføljen 2012/2013:
Viser også til notat av 18.09.2010 (ePhorte-saksnr. 2010/642).

Søknad om opprettelse av Nordic Master Program in Environmental Engineering
Oppstart for dette programmet ønskes fra 2012/2013. Programmet vil ha to foci:

i) Understanding and sustainable management of impacts on the environment caused by human activities.
ii) The development of new technologies to address environmental challenges.

Opplegget vil imidlertid bli mye det samme som for studentene oppholder seg ett år ved hvert av to valgte universiteter og det siste av årene vil være ved det universitetet som tilbyr masteroppgaven innenfor aktuell studieretning:

- Urban Water and Water Resources (NTNU/Chalmers)
- Residual Resources Engineering (DTU/NTNU)
- Environmental Informatics (Aalto/KTH)
- Risk Assessment (Chalmers/DTU)
- Environmental management (KTH/Aalto)

Ved IVT-fakultetet er det Institutt for vann og miljøteknikk som vil være vårt primære fagmiljø. Instituttet har god kompetanse innenfor området og vil i et slikt samarbeid ytterligere kunne heve sin kompetanse. Det legges blant annet opp til tosidige evalueringer mellom de deltakende universitetene. DTU vil være koordinator for programmet.

IVT-fakultetet går inn for at vi deltar i en N5T-søknad innenfor dette området forutsatt at det bevilges utviklingsmidler fra Nordisk Ministerråd.

Søknad om fornyelse av Erasmus Mundus 2-årig masterprogram innen Coastal and Marine Engineering and Management

Inneværende periode går nå mot slutten for dette programmet hvor vi deltar sammen med TU Delft (koordinator), University of Southampton, City University London og The Technical University of Catalunia Barcelona. Programmet har ved siden av et godt samarbeid om utdanning også bidratt til forskningssamarbeid spesielt med TU Delft.

Studenttallet for den inneværende periode har vært i underkant av 20 studenter pr år og med omtrent lik fordeling mellom universitetene i forhold til avsluttende studiested.

Hvis det blir en ny periode med dette Erasmus Mundus-programmet ønsker fakultetet å legge ned det internasjonale 2-årige masterprogrammet Coastal and Marine Civil Engineering.

Søknaden fremmes med NTNU som koordinator ved førsteamanuensis Øivind Arntsen. Anbefalingsbrev fra dekan og prodekan ved IVT-fakultetet vedlegges.

Søknad om deltakelse i Erasmus Mundus 2-årigmasterprogram innen Advanced Supply Chain Management

De deltakende universitetene i konsortiet anses å ha høy kompetanse på området, ikke minst gjelder det Ecole des Mines de Nantes (EMN) i Frankrike som er koordinator. Professor Heidi Dreyer, fakultetet for ingeniørvitenskap og teknologi er lokal koordinator ved NTNU.

Vårt Institutt for produksjons- og kvalitetsteknikk har høy kompetanse på den delen de skal bidra med innen produksjon og globale produksjonsnettverk. Fagområdet har stor fremtidig interesse.

Utdanningsfaglig og i forhold til utsikter til forskningssamarbeid med de andre universitetene i konsortiet anses programmet som verdifullt for fakultet og institutt. Anslaget på 10 studenter som tar emner ved NTNU i 2.semester og 5 masterstudenter i 4.semester bør være rimelig. At en så ikke regner noe særlige ekstra utgifter til undervisning når det benyttes emner som også gis til de øvrige studentene ved IPK -instituttet, gjør at de økonomiske usikkerhetene vil være akseptable. Anbefalingsbrev fra dekan og prodekan ved IVT-fakultetet vedlegges.

Bekreftelse på samarbeid med IME -fakultetet om Erasmus Mundus program innen Wind Energy

IVT-fakultet har tidligere sendt bekreftelse på at vi samarbeider med IME på deres søknad om å etablert et Erasmus Mundus program for 2-årig masterutdanning inne Wind Energy. IME-fakultetet være vertsfakultet for programmet.

Vedlegg:

Søknad om Nordic Master Program in Environmental Engineering.

Søknad om fornyelse Erasmus Mundus-programmet Coastal and Marine Engineering and Management, samt anbefalingsbrev fra dekan og prodekan ved IVT.

Søknad om deltakelse i Erasmus Mundus 2-årig masterprogram innen Advanced Supply Chain Management, samt anbefalingsbrev fra dekan og prodekan ved IVT.

Jon Inge Resell

Fra: Svein Remseth [svein.remseth@ntnu.no]
Sendt: 19. mai 2011 14:41
Til: jon.resell@ntnu.no
Kopi: Hilde Lysne; Marit Støre Valen; Stein Mjøen; Svein Remseth
Emne: Erfaringsbasert master i ingeniørfag
Viktighet: Høy

Jon Inge,
Viser til hyggelig telefonsamtale tidligere i dag.

Fakultet for ingeniørvitenskap og teknologi arbeider med å legge grunnlaget for etablering av et erfaringsbasert masterprogram med arbeidstittel "Erfaringsbasert master i ingeniørfag". Foreløpig har vi arbeidet med emnetilbud og undersøkelse av markedet innenfor området samferdsel. Tilbakemeldingene fra hovedaktørene på forvaltningssiden er meget positiv, slik at vi kan ta sikte på en endelig søknad om etablering av en studieretning i samferdsel med hovedprofiler innen jernbaneteknikk og innen vegteknikk innen medio oktober 2011 for oppstart av program fra studieåret 2012/2013.

Hvis det er behov for noe nærmere i denne omgang kommer jeg raskt tilbake etter forespørsel fra deg. Til så lenge mange takk for velvillig behandling.

Svein

Svein Remseth
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NTNU

Fakultet for ingeniørvitenskap og teknologi

Dato 26.04.2011 Referanse 2011/47[illegible]/SR

Notat

Til:	NTNU, Studieavdelingen
Kopi til:	Øivind Arntsen, Institutt for bygg, anlegg og transport
Fra:	Fakultet for ingeniørvitenskap og teknologi v/ dekanus
Signatur:	Ingvald Strømmen

Anbefaling av søknad om videreføring av Erasmus Mundus 2-årig masterprogram CoMEM med NTNU som koordinator

Viser til vårt notat av 07.03.2011 i denne saken. Vi bekrefter hermed vår støtte til at det fremmes søknad om videreføring av masterprogrammet "Coastal and Marine Engineering and Management" og nå med NTNU som koordinator v/ førsteamanuensis Øivind Arntsen

Ingvald Strømmen, dekan

Svein Remseth, prodekan utdanning

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NTNU
Norwegian University of Science and Technology
Faculty of Engineering Science and Technology
Department of Civil and Transport Engineering

Date 2011-04-15 | Our reference
Your letter dated | Your reference

To whom it may concern

Recommendation of application for continuation of the Erasmus Mundus 2-year Master CoMEM with NTNU as coordinator

The Department of Civil and Transport Engineering is supporting and endorsing the renewed application for the Erasmus Mundus master programme in Coastal and Marine Engineering and Management (CoMEM).

This master programme is considered an important and integrated part of our international activities and continued collaboration and development of joint activities between the partner European universities.

The programme is a continuation of the already running CoMEM (2007-2013) where TU-Delft is the coordinating university.

The proposed programme will be coordinated by NTNU. Coordinator will be Associate Professor Øivind A. Arntsen at the Division of Marine Civil Engineering. This division will be carrying out the majority of the project, however, in close and active cooperation with the department, the faculty and the international section of NTNU. Sonja Ekran Hammer at the department is appointed for administrative support to the programme.

Marit S. Valen

Marit Støre Valen, Head of Department
Department of Civil and Transport Engineering

Address	Org. no. 974 767 880	Location	Phone	Contact person
NO-7491	Email:	Høgskoleringen 7A	+ 47 73 59 46 40	Øivind A. Arntsen
Trondheim	bat-info@ivt.ntnu.no	Gløshaugen	Fax	
Norway	http://www.ivt.ntnu.no/bat/		+ 47 73 59 70 21	Phone: + 47 73594625

Declaration on Honour by legal representative of applicant organisation

To be completed by the person legally authorised to sign on behalf of the applicant organisation, as defined in Part A.3 of the Application Form.

I, the undersigned, certify that all information contained in the Erasmus Mundus 2009-2103 Action - Joint programme application named "EMMC Coastal and Marine Engineering and Management (CoMEM)" , including the description of the project, is correct to the best of my knowledge and that I am aware of the content of the annexes to the application form.

I confirm that my institution/organisation has the financial and operational capacity to carry out the proposed project.

I take note that under the provisions of the Financial Regulation applicable to the general budget of the European Union, grants([1]) may not be awarded to applicants who are in any of the following situations:

a) are bankrupt or being wound up, are having their affairs administered by the courts, have entered into an arrangement with creditors, have suspended business activities, are the subject of proceedings concerning those matters, or are in any analogous situation arising from a similar procedure provided for in national legislation or regulations;

b) have been convicted of an offence concerning their professional conduct by a judgment which has the force of *res judicata*;

c) have been guilty of grave professional misconduct proven by any means which the contracting authority can justify;

d) have not fulfilled obligations relating to the payment of social security contributions or the payment of taxes in accordance with the legal provisions of the country in which they are established or with those of the country of the contracting authority or those of the country where the contract is to be performed;

e) have been the subject of a judgment which has the force of *res judicata* for fraud, corruption, involvement in a criminal organisation or any other illegal activity detrimental to the Communities' financial interests;

f) following another procurement procedure or grant award procedure financed by the EU budget, have been declared to be in serious breach of contract for failure to comply with their contractual obligations;

g) in their grant application, are subject to a conflict of interest;

h) in their grant application, are guilty of misrepresentation in supplying the information required by the contracting authority as a condition of participation in the grant award procedure, or fail to supply this information.

I confirm that neither I nor the institution for which I am acting as legal representative are in any of the situations described above, and that I am aware that the penalties set out in the Financial Regulation may be applied in the case of a false declaration.

In the event that my application is successful, I am aware that the Education, Audiovisual and Culture Executive Agency / European Commission will publish on its website or in any other appropriate medium the name and address of the beneficiary of the grant, the subject of the project, the future grant awards;

I declare that the organisation I represent is (please tick as appropriate):

☐ a public body ([2])

☐ a private body which has financial and operational capacity to carry out the proposed action or work programme and is able to provide a Bank Guarantee for the amount of the 1st (and 2nd, if applicable) pre-financing payment(s), should the Education, Audiovisual and Culture Executive Agency request so.

By signing this application form, I accept all the conditions set out in the Erasmus Mundus 2009-2013 Programme Guide and the Call for proposals EACEA 41/10, including the general conditions published on the Education, Audiovisual and Culture Executive Agency's website. I also declare that all the partners participating in this project have agreed with the content of the application and have confirmed their intention to carry out the tasks described accordingly.

Done at:	Date / / (day/month/year)
Signature:	Stamp of the applicant organisation
Name and position in capitals:	

1 Council Regulation (EC, Euratom) No 1605/2002 (OJ L 248 of 16.09.2002), amended by Regulations (EC, Euratom) No 1995/2006 (OJ L 390 of 30.12.2006) and (EC) No 1525/2007 (OJ L 343 of 27.12.2007). These can be consulted in the Official Journal online at: http://europa.eu.int/eur-lex/lex/en/index.htm.

2 For the Erasmus Mundus Programme, considered to be public bodies are all higher education institutions specified by Member States (participating countries), and all institutions or organisations which have received over 50 % of their annual revenues from public sources over the last two years, or which are controlled by public bodies or their representatives.

Annex 1. Award criteria.
Erasmus Mundus call for Proposals EACEA /41/10 - application form
Erasmus Mundus MSc Coastal and Marine Engineering and Management (CoMEM)

A.1 Academic Quality Course Content (30%)

A.1.1 Objectives

Erasmus Mundus Objectives:
The overall objectives of the European Commission in its implementation of Erasmus Mundus 2009-2013 are "To promote European higher education, to improve and enhance career prospects of students and to promote intercultural understanding through cooperation with third countries and —to contribute to the sustainable development of third countries in the field of higher education" (Office Journal of the European Union 16.12.2010). These objectives are incorporated in the implementation of the Erasmus Mundus MC in Coastal and Marine Engineering and Management (CoMEM).

The overarching objectives of the proposed Erasmus Mundus CoMEM are:

- to foster cooperation and harmonisation between eligible European HEI partners to support academic excellence and to deliver highly trained professionals within the framework of a shared and integrated curriculum;
- to contribute to the mutual enrichment of selected students and scholars within the Erasmus Mundus MSc programme CoMEM, aiming at internationally experienced, open-minded and well qualified professionals to participate in an increasingly globally oriented academic atmosphere and labour market;
- to promote and sustain international cooperation on institutional and professional levels worldwide within the field of Civil Engineering, specifically in the socio-economic application of Coastal and Marine Engineering and Management.

Motivation and importance of CoMEM education:
The very recent natural disasters the intense tropical storm affecting Queensland, Australia (27-30 December 2010)[1] and the earthquake followed by a tsunami in Japan (11 March 2011), bear testimony to the massive socio-economic impacts of present day coastal hazards. With latest IPCC (2007)[2] findings indicating that global sea level rise during the 21st century could potentially be 4 to 8 times higher than that during the last century; similar hazards superimposed on an elevated mean sea level are not unlikely to result in unprecedented losses in the coming decades. The potential losses along the highly developed and inhabited coastlines of Northern Europe, North Eastern America, South Eastern Australia, and South Asia will be particularly high. Unprecedented growth of coastal communities over the last 50 years inevitably means that any future coastal hazards are likely to result in massive socio-economic and environmental impacts (Stive et al., 2010; Kabat et al., 2009; Nicholls et al., 2007)[3]. To prevent such impacts, it is

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1 "Isolated flooding started in early December 2010. The first major flooding occurred as a result of a monsoon trough (23rd Dec) and a cyclone (25th Dec). Most of 'first round' of flooding in central and southern Queensland flooding occurred between 27th and 30th December. The flooding increased with consistent rainfall during January. Different parts of Queensland were 're-flooded' throughout early January with the flooding of Brisbane City around the 11th / 12th January." (stated by CoMEM 2009-2011 student A. Pomeroy)
2 IPCC. 2007. Climate Change 2007: The Physical Science Basis. Summary for Policy Makers. Fourth Assessment Report of the IPCC. Cambridge University Press, Cambridge, UK

3 Kabat, P., Fresco, L.O., Stive, M.J.F., Veerman, C.P., van Alphen, J.S.L.J., Parmet, B.W.A.M., Hazeleger, W, and Katsman, C.A. 2009 Dutch coasts in transition. Nature Geoscience, 2(7): 450–452

Nicholls, R. J., Wong, P. P., Burkett, V. R., Codignotto, J. O., Hay, J. E., McLean, R. F., Ragoonaden, S. and Woodroffe, C. D. 2007 Coastal systems and low-lying areas. In Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, UK.

imperative that informed and sustainable coastal planning/management strategies are developed and implemented immediately. To this effect, the state-of-the-art education of coastal engineers in the EMMC Coastal and Marine Engineering and Management, is as socially relevant and urgent as ever before.

The last decade has seen an increasing public and commercial focus on the Arctic regions. Politically, Norway, UK and the Netherlands and other countries bordering the Arctic are demonstrating their interests and needs for a presence which will result in increased activities relating to industry, population and transport in a vulnerable area. The United States Geological Survey has assessed the area north of the Arctic Circle and concluded that about 30% of the world's undiscovered gas and 13% of the world's undiscovered oil may be found there, mostly offshore at water depths less than 500 m. Undiscovered natural gas is three times more abundant than oil in the Arctic. An example is the planned development of the Shtokman Gas Condensate Field at 340 m water depth in the Barents Sea with field reserves estimated to be 3700 GS. Exploration and exploitation of these resources pose significant challenges for industry, especially in the assessment and management of risks along the whole production chain, avoidance of disruptions arising from potentially manageable accidents, and the need to minimise costs arising from adverse environmental impacts. Presently the level of knowledge about physical Arctic environment loads (mostly sea ice and permafrost) is insufficient to adequately address these challenges, and the education of Arctic engineers in the CoMEM programme will contribute to a sustainable exploration and exploitation of the valuable and vulnerable Arctic region.

<u>CoMEM specific objectives</u>:
The EMMC CoMEM programme, proposed by a consortium of five European universities with strong programmes in civil engineering, is designed for excellent students from Non-European and European countries. These selected students, female and male, will be educated and trained in the essential technical elements of coastal, marine and environmental engineering in geographical areas ranging from the Northern arctic to marine systems in Asia to integrated coastal zone management in Northern and Southern hemispheres. The programme, lasting 2 academic years (120 ECTS) during which all partners are able to act as host institution to deliver part of the curriculum, proposes:

- To offer high quality and innovative education in the field of civil engineering;
- To add distinctive value of each of the European partner institutions' expertise;
- To educate students in fundamental and specialized knowledge in the field of coastal and marine civil engineering /science;
- To offer the most advanced tools and research techniques available within the field;
- To build on existing fundamental knowledge and to offer comprehensive perspectives and specializations as present among the CoMEM partners;
- To create awareness and educate students in the ethical and integral dimensions of their future profession;
- To develop an informed understanding of a social, ethical and professional responsibility in coastal management strategies;
- To prepare students for employment in challenging academic careers, research or a wide range of career opportunities in the field of coastal and marine engineering in Europe and worldwide;
- To provide examples in water directives as important tools for analysis and policy globally in a newly developing professional field.

A.1.2 EMMC CoMEM Added value

The Erasmus Mundus Master Course in Coastal and Marine Engineering and Management (CoMEM) is an integrated programme within civil engineering, offered by five internationally leading European universities, and includes mandatory study in 3 EU countries. The participating universities are located in strategic locations in relation to their subject matter (coastal engineering) and have developed special areas with links and visibility on national, European and International levels. As described below, the curricular and research activities add significant value to education and to the exchange of professional expertise:

- NTNU, Trondheim: marine physical environment, coastal, port and marine engineering with a tidal and high-wave energy emphasis (applicable also to rocky coast conditions), spreading of pollution in the coastal zone, coastal structures design and Arctic civil and infrastructural development, offshore as well as in the coastal zone (UNIS, Spitsbergen).
- TU Delft: integrated coastal zone management, shore protection, project work, ethics and philosophy, port engineering with a meso-tidal and medium to high-wave energy emphasis. Research and consultancies in Asia, especially in China and Vietnam.
- UPC, Barcelona: coastal engineering and oceanography with a Mediterranean "emphasis" (micro tidal conditions, torrential climatic conditions, intense tourist development).
- University of Southampton: environmental coastal engineering with an emphasis on new approaches to shoreline (flood and erosion) management, including beaches, cliffs, and estuaries and management tools such as GIS and EIA, cooperation with HR Wallingford research.
- City University London: maritime environmental management, maritime operations, maritime law and insurance, maritime technology, finance, accounting and economics.

The curriculum and academic content of CoMEM are designed to provide EMMC students with a foundation of knowledge, to expose them to a variety of environments on which to build and in which to specialize. The consortium partners have selected the most appropriate modules for each itinerary from the existing curricula of each partner institution, complemented with introductory and "Summer- and Winter Schools" to offer a distinctive and integrated MSc in Coastal and Marine Engineering and Management. The programme includes a strong environmental approach with an emphasis on ethics and sustainability to elicit professionalization in a global context. Students will benefit from the particular expertise and unique laboratories available within the consortium and from the closely associated partnerships and international cooperative initiatives in the field. Moreover, the diverse and complementary nature of the existing programmes will ensure that different subject specializations can be followed. **The individual universities alone are not able to offer the flexibility and level of specialization.** The structure of the programme is further outlined below.

A.1.3 Structure, Content and Mobility

The course structure:
The programme is a two year MSc study of 120 ECTS, divided into four (4) semesters of 30 ECTS each. The first year acts as a foundation, providing academic and social coherence through compulsory and optional modules, project work and fieldtrips. The second year is focused on specialization and the final thesis project through three relevant and focused mobility routes in engineering/environmental - , environmental/management - or a management/business/maritime law emphasis.

- Year 1:

Semester 1 will be spent at NTNU, Trondheim; semester 2 at Delft University of Technology, consisting of core courses aiming to establish a common foundation. Introductions, orientations and excursions are organized for purposes of social cohesion of students and staff and informative introductions to the field.
Semester 1 starts with a "Summer School" at NTNU, during which students are welcomed to the programme with an excursion along the Norwegian coast, guided by the Norwegian Coastal Administration; semester 2 at TU Delft starts with a "Winterschool", an introduction to TU Delft and to Dutch hydraulic engineering, with an excursion to the Port of Rotterdam.

- Year 2:
  Year 2 is the defining year, with a specialization in semester 3; semester 4 to work on final thesis project, resulting in the MSc degree.

The Erasmus Mundus MSc CoMEM Course Content and Mandatory Mobility Itineraries:
The MSc CoMEM has 3 specialisations and mobility paths:
- Engineering/ Environmental specialisation
- Environmental / Management specialisation
- Management / Business/ Maritime Law specialisation

We note that we use the compulsory and optional courses in the first year as a mechanism to construct a solid basis for the different mobility itineraries in the second year. An outline of the main subjects and mobility is seen in Figure 1 and in the summary of mobility and the subjects per semester/university below.

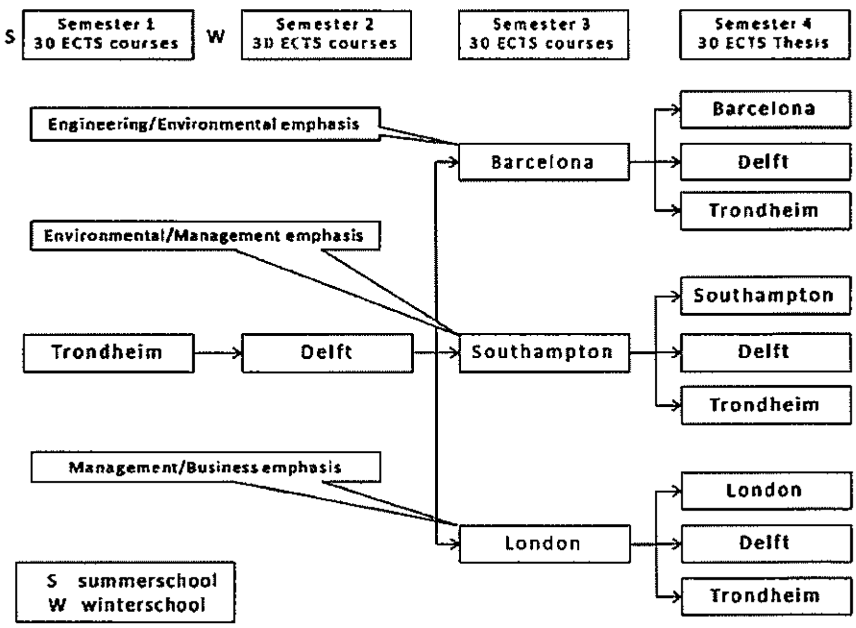

Fig. 1 EMMC CoMEM itineraries and mobility in Coastal and Marine Engineering and Management

Summerschool

Country and place:	Norway, Trondheim
University:	Norwegian University of Science and Technology

Date:	mid August (duration: one week for all foreign students)
Programme:	introductory programme for CoMEM students, excursion (*Appendix Summerschool)
Topics:	information about the educational programme, the university, brief introduction to Norwegian culture and social activities
Semester 1	**Core 1**
Country and place:	Norway, Trondheim
University:	Norwegian University of Science and Technology
Start date:	mid August
End date:	Christmas
Programme:	compulsory and optional courses (total of 4 courses, ECTS: 30)
Topics:	Compulsory: Marine physical environment, Spreading of pollution Optional: Dynamic Response to Irregular Loadings, Theoretical Soil Mechanics, Port and Coastal Facilities, Safety and Reliability Analysis, Sustainable Utilization of Marine Resources, Arctic Offshore Engineering, (UNIS, Svalbard)
Winterschool	
Country and place:	Netherlands, Delft
University:	Delft University of Technology
Date:	last week of January
Programme:	introductory programme for CoMEM students, excursion (*Annex Winterschool)
Topics:	information about the educational programme, field and laboratory visits, introductions preparing for Barcelona, London and Southampton
Semester 2	**Core 2**
Country and place:	Netherlands, Delft
University:	Delft University of Technology
Start date:	mid January
End date:	end of July
Programme:	project, compulsory and optional courses (ECTS: 30)
Topics:	Compulsory: Coastal Dynamics 1, Multidisciplinary project, Philosophy and ethics, Optional choices amongst others: Bed, bank and shore protection, Ports and waterways, Computational modeling, Structural dynamics, Integrated coastal zone management, Probabilistic design, Arctic Off-Shore Engineering- Fieldwork (UNIS, Svalbard)
Semester 3 –option 1	**Engineering/ Environmental specialisation**
Country and place:	Spain, Barcelona
University:	Technical University of Catalonia
Start date:	September
End date:	January
Programme:	compulsory and optional courses and minor thesis (ECTS: 30)
Topics:	Compulsory: Impacts, conflicts and risks, Coastal protection, Numerical and hydraulic modeling Optional: Marine climate, Coastal Morphodynamic, Minor thesis
Semester 3 –option 2	**Environmental/Management specialisation**
Country and place:	UK, Southampton

University:	University of Southampton
Start date:	October
End Date:	January
Programme:	compulsory set of four modules (ECTS: 30)
Topics:	Coastal and maritime engineering, Geographic information systems, Environmental audit and risk assessment, Coastal Morphodynamic

Semester 3 –option 3	**Management/ Business/ Maritime Law specialisation**
Country and place:	UK, London
University:	City University
Start date:	October
End date:	January
Programme:	Four modules to be selected from a set of five (ECTS: 30)
Topics:	Maritime Operations, Maritime Law, Maritime Technology, Maritime Economics and Accounting, Maritime Management

Semester 4	**CoMEM MSc Thesis project** NTNU, TUD, UPC, City, or SOTON

A.1.4 Learning Outcomes

CoMEM students will develop both general and interdisciplinary skills (Ethics, philosophy, integrated approaches, and multidisciplinary projects), and specific engineering skills in coastal and marine engineering. The students will be able to specialize and further develop those skills in areas of engineering /environmental education (UPC, Barcelona), environment / management education (Southampton) or management/ business/ maritime law education (City, London) at each partner institution offering these specialized pathways. The final master's thesis project is completed during the last semester at one of the three previously attended universities (see fig. 1 above).
The qualification of the Erasmus Mundus CoMEM programme will enable the student who has successfully completed the Master Course to pursue an academic career in doctorate / PhD research programme and /or to search employment as engineer in the governmental, public or private sector.

A.1.5 Consortium composition and academic staff expertise per university*
***see part D –technical capacity**

- NTNU, Trondheim

The Erasmus Mundus programme is expanded from the international master programme at NTNU in Coastal and Marine Civil Engineering. This programme started in 2003. Courses at NTNU are fully integrated with international and Norwegian students in the NTNU study programme "Civil and Transport Engineering" with approx. 200 MSc graduates each year. Curriculum at NTNU include course offers not only from our Division of Marine Civil Engineering (MCE), but also from other parts of the study programme in Civil and Environmental Engineering as well as from other study programmes. This enhances the scope of the studies, and with the combination of compulsory and optional courses provides a good and adequate basis for the continued studies in this programme. In addition to the basic parts given in this proposal for semester 1, one of our main specialisations is directed towards arctic offshore and coastal engineering, preparing graduates for the extensive coming activities in the northern-

most areas such as the Barents Sea. PhD study programmes are important and significant parts of our activities. This is often carried out in close cooperation with - and partly financed by – the industry. Through cooperation with the research organisation SINTEF, access is available to, and use can be made of extensive laboratory facilities related to testing of various port and coastal conditions. MCE has close collaboration within both teaching and research with the University Centre on Svalbard (UNIS), located centrally in the Arctic. Also very good relationship and cooperation exist with industry, through an Industrial Network, with individual companies as STATOIL, the Norwegian Coastal Administration , larger consultancy companies like OlavOlsen AS, Multiconsult, Barlindhaug Consult, Norconsult, and with foreign universities through exchange of students and research cooperation. NTNU by the MCE division is also hosting the new 'Centre for Research-based Innovation' SACME (Sustainable Arctic Coastal and Marine Engineering), a long-term research with 8 years of funding from the Research Council of Norway and industry. SACME has an annual budget of NOK 25 million, where the Research Council of Norway covers up to NOK 10 million. The MCE division also chairs the scientific committee in Nowitech[4] and represents NTNU in EAWE[5].

- TU, Delft

The proposed programme is tailored to CoMEM students. A specific introductory "Winterschool" has been developed, and a selection of courses is offered from the existing international master programme at Delft University of Technology in Civil Engineering, specialisation Hydraulic Engineering. This course started in the academic year 2003-2004, and is fully integrated with international and Dutch students. The selected courses include course offers from the Department of Hydraulic Engineering, from other parts of the study programme in Civil Engineering as well as from other study programmes and faculties, including IHE-UNESCO. Delft has a hydraulic laboratory with state-of-the-art equipment (e.g. second-order wave generation and active reflection compensation) and instrumentation (e.g. PIV). The facilities are used both by MSc and PhD students. Delft has developed the international standard near shore wave propagation model SWAN. Through cooperation with the research institute Delft Hydraulics, access and use of advanced hydraulic and morphodynamic software is possible. Very good relationships and cooperation exist with governmental organisations such as Rijkswaterstaat, the Port of Rotterdam, consultants, DHV and Royal Haskoning, with industry, such as Van Oord and Bos Kalis, and with foreign universities through exchange of students and research cooperation etc. Currently, two professors are working part-time and come respectively from a large, specialised engineering company and from Delft Hydraulics.

- City University London

The proposed programme will be integrated into the existing Master's degree in Marine Operations and Management, which is available at City University. This is a unique international programme, which has been developed in cooperation with industry and commerce, to fulfil the requirements of the many sectors of, and occupations in coastal and marine engineering and management. The course offers prospective students the opportunity for professional development relating to technical, financial and management issues and those of a more economic and strategic nature. It is generally recognised that London is the global centre for the organisation and management of marine activities and the existing Master's programme benefits from the input of external specialist who are involved in the delivery of the course. The modules that are being offered to the Erasmus Mundus MSc are compatible with and will enhance the technical nature of the courses being proposed by other members of the consortium.

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[4] Nowitech: The Norwegian centre for offshore wind technology
[5] EAWE: European Academy of Wind Engineering

- University of Southampton

The Erasmus MUNDUS programme will be integrated with the Master programme "Engineering in the Coastal Environment" (ECE). The ECE degree has been offered at Southampton since 1998 and has trained a large number of the coastal engineering professionals in the UK. The ECE programme is unique within the UK as it is jointly offered by the School of Civil Engineering and the Environment, and the School and Ocean and Earth Science; the latter School is located within the UK National Oceanographic Centre (NOC). Hence, there is a coastal oceanography component and a strong environmental focus, such as environmental impact assessment, and geographic information assessment methods, as well as emerging areas such as marine renewables. The student body is diverse; comprising British, EU and international students, and the University has in place robust systems to support Masters Students from this wide range of backgrounds. MSc theses are normally placement-based with coastal institutes, consultants or government sponsors providing extensive real world and practical input to the programme. It also ensures high employment rates for graduates with the placements leading directly to jobs in many cases. There are especially close links to the research institute HR Wallingford, the consultants ABPmer, and the Channel Coastal Observatory (who take the leadership role in coastal monitoring around England) via visiting professorships, contributions to teaching and regular MSc placements. The University of Southampton recognises the importance of coastal and maritime education and research and a proposal for a university-wide "Maritime Institute" is advanced and expected to be established in the near future. This will significantly strengthen the education and research environment within which the Erasmus Mundus programme is offered.

- UPC, Barcelona

The proposed Erasmus Mundus programme will be coherently integrated into the two (Coastal and Harbour) masters, which now exist at UPC. The Harbour Engineering and Management Master was officially approved in 1997 and has been running since then with students from throughout Spain and Latin America. The International Master on Integrated Coastal/Estuarine Engineering and Management was officially approved in 2002 and has been running since then with students from various countries, particularly South and Central America. The selected courses are in the hands of professors from UPC with some extra classes by experts from other institutions in Spain. The UPC Department responsible has worldwide contacts in this field and recognized numerical, experimental and lab expertise. The hydraulic wave flume (third in the EU) is also part of the experimental facilities, which also include various other flumes and basins. The Department is responsible as well for managing the observational network XIOM collecting wave and meteo ocean data on-line along the Catalan coast, and for the associated operational forecasts. The Department is also responsible for a PhD programme in Marine Sciences where all the Catalan research centres dealing with the sea participate. It is one of the most recognized PhD programmes in Spain in this field, with long standing links with many other Spanish research and administration groups.

To conclude: The Erasmus Mundus MC COMEM consortium will support the competitiveness of Europe as an educational medium in the field by the particular combination of partners with international recognition in academic teaching, research and consultancies.

CoMEM scholars

CoMEM scholars are selected and invited for a minimum of six weeks to a maximum of three months to contribute and support the CoMEM curriculum and to collaborate in research, conference presentation and publications with staff of the partner institutions. Scholars represent the geographical diversity and student representation in CoMEM; the consortium strongly recommends scholars' participation in teaching and research at the time when students are present

at partner institutions. The CoMEM partners also select scholars to participate at each university. CoMEM scholars will submit a report of activities during the scholarship period.

A.1.6 Interaction with the professional sector

Associations exist with, amongst others, the following non-educational institutions and which may in the future develop into associated partnerships:

Norwegian Coastal Administration, Norway
SINTEF, Norway
SEPYC, Spain
HR. Wallingford, UK
ABPmer, UK
Channel Coastal Observatory, UK
Lloyds' Register, UK
Institution of Marine Engineering, Science and Technology, UK
Royal Institution of Naval Architects, UK
Building Research Establishment, UK
Honorable Company of Master Mariners, UK
The Port of Rotterdam, NL
Deltares, NL
Rijkswaterstaat, NL
Bos Kalis, NL
Van Oord, NL

The involvement of these partners may vary, depending on the arrangements with each CoMEM partner's institution. Students will be able to do MSc thesis project work and research in cooperation with various sponsors; sponsors will participate in the evaluation of project work and presentations, and if successful, these sponsors will offer employment perspectives to future graduates. The commitment to the EMMC CoMEM of these sponsors varies with the professional interactions, developments and initiatives.
Further it needs to be mentioned that students will benefit from these professional interactions in view of further research and possible PhD study.

A.2 COURSE INTEGRATION (25%)

A.2.1 Course Integration and recognition

Following the Bologna Process the involved partner institutions have introduced and successfully established the principles of the Bachelor - Master structure to create a common degree level, to facilitate the mobility of students in European institutions of higher education, and to promote high quality inter-institutional cooperation. The Erasmus Mundus MC CoMEM is fully recognized by the governing boards of the partner institutions.

The CoMEM curriculum is a truly integrated curriculum. As indicated in A.1.3 (structure and content of EMMC) existing components of the curricula at each partner institution have been reviewed, adapted and extended to form a coherent and integrated programme. The consortium partners mutually accept and certify the integrated CoMEM curriculum and the specializations at each partner institution as one unique CoMEM MSc degree programme. The performing of the EMMC CoMEM is a joint responsibility of the consortium partners. The partners will continuously review and adapt the curriculum as internal changes occur or if new topics and

possibilities emerge. The partners have established, and will continue to aim at, transparency of the student workload, the awarding and understanding of credits, internal institutional policies and recognition of national accreditation procedures, thus formalizing and committing to inter-institutional degree recognition on the European level.

A.2.2 EMMC CoMEM Degree recognition by partner institutions

The consortium partners have formulated an agreement on common CoMEM Academic Guidelines and Regulations. The CoMEM degree is subject to these 'Guidelines' consisting of: a. 'Education and Examination Guidelines' and b. 'Implementation Regulations for the CoMEM MSc Degree in Civil Engineering'. The partners have agreed upon the following acquired and subject specific skills, competencies and learning outcomes to result in multiple degrees.

- **Intellectual skills**
  Upon completion of the degree programme a student will be able to:
  a) Develop, model and analyze complex coastal and marine engineering and management systems, processes and products using scientific principles;
  b) Demonstrate innovation in the design of new coastal and marine systems including new processes and products;
  c) Understand the capabilities of computer based and experimental methods for problem solving;
  d) Understand the limitations of the range of methods employed in coastal and marine engineering and management;
  e) Integrate knowledge of mathematics, science, information technology, design, business context and engineering practice to solve a wide range of problems in the subject applying understanding to novel and challenging solutions;
  f) Evaluate technical and financial risks, through an understanding of the basis of such risks;
  g) Have an extensive knowledge and understanding of management and business practices and their limitations;
  h) Have an understanding of the ethical issues in coastal and marine engineering and management.

- **Discipline-specific skills**
  Upon completion of the COMEM scheme a student will be able to:
  i) Use appropriate mathematical and computational techniques (supplemented by hydraulic models if required) for simulating and analyzing coastal and marine specific problems;
  j) Design sustainable coastal or marine systems, components or processes, with technical analysis and critical evaluation of results;
  k) Use learning resources effectively for independent research;
  l) Conduct independent analysis of the economic, technical, environmental and managerial factors influencing the decision making process surrounding a coastal or marine problem.

  Note: The depth to which these skills will be developed is dependent on the itinerary taken.

- **Transferable skills**
  Upon completion of the CoMEM scheme a student will be able to:
  a) Communicate confidently and effectively in oral and written forms with the aid of standard information technology systems;
  b) Manage their time and resources;
  c) Work effectively as an individual, as a group member and undertake leadership roles;

d) Employ a systematic approach to gathering, analyzing and communicating knowledge;
e) Undertake lifelong learning, particularly for continuing professional development;
f) Generate new ideas and develop and evaluate a range of new solutions;
g) Acquire an EU dimension in approach, scope and education (including additional linguistic capabilities).

A.2.3 Joint student application, selection and admission procedure

The joint student application is centrally administered by the coordinating university and follows existing application procedures. The consortium aims to attract and select top class students and applies a three step application process following:

1. the shared admission criteria of the institutions,
2. followed by the specific CoMEM selection criteria,
3. with a final CoMEM Board Selection meeting following Erasmus Mundus criteria.

The admitted and selected candidates are placed in an absolute ranking. This ranking is objectified by a CoMEM Selection form which all partners review and discuss, including consideration of gender and geographical balance, i.e. students with special needs. The joint application, selection and admission procedure guarantees a fair and transparent selection of the best possible CoMEM candidates.

A.2.4 Joint examination methods and mechanisms

The CoMEM consortium partners recognize joint CoMEM examination methods and mechanisms at large. These are stated in the "CoMEM Education and Examination Guidelines". In addition to the overall "CoMEM Guidelines", it is agreed that "local rules" count in regard to each location. Deviation of these common and local rules is only possible with the consent of the CoMEM Board i.e. all consortium partners.
Recognition of workload and accumulation of credits is expressed in ECTS (European Credit Transfer and Accumulation System).
Performance assessment is noted in existing mark or grading scales. A translation of these is provided in the Diploma Supplement.
A Diploma Supplement (D.S.) is issued by each consortium partner, using the model that was developed by the European Commission, Council of Europe and UNESCO/CEPES. The D.S. provides a description of the nature, level, context, content and status of the studies that were successfully completed by the individual student named on the original qualification. The CoMEM D.S. will describe the CoMEM course as a whole and will list the modules taken with the number of credits and grades received. The D.S. is accompanied by a description of the national higher education system. (*Annex DS)

A.2.5 Students' participation costs

The consortium has agreed to calculate the cost for students as follows:
Participation costs/ tuition fees for Category A: Euro 4000 per semester
Participation costs/ tuition fees for Category B: Euro 2000 per semester
Category A and B students receiving scholarships will receive a set amount of 3000 Euro at the start of the programme and a set amount at the termination of the programme of 4000 Euro for category A and 2000 Euro for category B students, to cover travel and personal expenses. In December of the first year also a fixed amount of € 1000 will be paid. The remainder of the individual scholarship will be divided into equal monthly amounts (22 months) and deposited each moth into the student bank account. The grant will be paid, provided the student complies with article 2 of the Student Contract. (* see student contract annex)

A.3 COURSE MANAGEMENT, VISIBILITY AND SUSTAINABILITY MEASURES (20%)

A.3.1 Cooperation mechanisms within the consortium

The coordinating university, NTNU, Trondheim, will be responsible for the overall management of the programme. This will include financial management including assistance in establish student bank accounts, the central student administration (i.e. application and selection, student admission and registration, student support (visa, accommodation, insurance, welcome and introduction programmes, international student networks, activities and excursions), student records, evaluation and quality assurance, promotion and marketing) and the government of the CoMEM Board and associated meetings.
The main mechanism of cooperation is the CoMEM Board, composed of the coordinators of each partner institution. The CoMEM Board ensures cooperation on the educational level and the institutional level:

a) CoMEM Board reviews admission and is in charge of selection procedures
b) CoMEM Board reviews and evaluates course content and educational quality (per semester, year and cohort)
c) CoMEM Board will be instrumental in external quality review, addressing academic standards and learning outcome objectives
d) CoMEM Board ensures and solicits support from university's governing boards.

To implement efficient communication, staff is appointed at each partner institution to support the Erasmus Mundus programme. The overall cooperation is defined and endorsed as laid down in the Memorandum of Agreement (*Annex MoU). Further cooperation mechanisms exist in regard to the mobility of the students and related administrative procedures, mediated by the Erasmus Mundus staff, with the International Offices at the universities.

A.3.2 Partner institutions' financial contribution and management

Funds received from the European Commission are deposited into the official account of the coordinating university, NTNU, Trondheim, Norway (Annex 1 Legal Entity). Students and scholars will be paid from this account.

The flat fee of 30000 Euro per course, received by the coordinating university, will be distributed among the partners and will be used for the organization and travel costs of the two annual Board meetings (in January and August). The coordinating university will receive 10 000 Euro and each partner 5000 Euro. The participation costs/tuition fees will be distributed to the different partner Universities according to the location of students in each semester for partial fulfilment of the local tuition fees and administrative costs.

NTNU will not charge tuition fee from the students. However students staying at NTNU will pay the fixed nominal participation cost (of 2000 Euro or 4000 Euro category B and A respectively) to the Consortium. This will be used for the benefit of the programme to cover extra costs related to social activities for the students, group excursions, insurance premiums, and partly support to the additional costs in running and administer the programme.

The individual partner institutions contribute to the course by funding all components of the EMMC CoMEM and the modules out of their own resources, as part of the integrated costs of education, administration, staff, organization and coordination. Due to the different funding and organizational conditions at the different partner universities it is not easy to determine exact the level of financial contribution from each of them. To indicate the level of this contribution to the programme the local condition at TU-Delft is taken as an example where the following applies:

Normally a Non-EU student will pay TU-Delft 6000 Euro per semester or 12000 Euro per year (insurance not included). This we assume indicates the cost of hosting a student at our universities. The maximum allowable fee chargeable to the Non-EU EM student is Euro 4 000 Euro per semester or 8 000 Euro per year, resulting in a deficit of 4 000 0 Euro per year per student. Assuming 15 EU-funded students enrolled the partner universities contribution to the EM-programme is thereby estimated to 60 000 Euros pr year.

NTNU as the coordinating university will have additional costs. It is estimated that the administrative additional cost running the programme is linked to a 50 % administrative position equivalent to 36 000 Euro per year plus a 40 % academic position equivalent to 42 000 Euro per year.

The presence of funded scholars (3 per year) will give added value to the programme and the universities visited. In-kind value of their support to the programme is assumed to be 45 000 Euro.

So as a total the Universities contributions to the programme add up to: 93 000 Euro pr year.

A. 3.3 Consortium development and sustainability plan

To enable our plan we focus on: academic strengths, student employment potential, financing opportunities and marketing. The collective global perspective offered and up-to-date vital knowledge exchanged between the institutions and partner networks both within and outside Europe is recognized as a catalyst and a high ongoing added value to the CoMEM program partners. The consortium aims to further develop the exchange of expertise not only by knowledge transmission but also through mobility of academic resources. We plan to increase the level of research collaboration between the partners, explore collaboration opportunities with other study programs and contemplate a joint PhD program. An example of development within the departments is at NTNU will enlarge the arctic research theme in close collaboration with the newly started Research based innovation center *Sustainable Arctic Coastal and Marine Technology*, funded by the Norwegian Research Council. We aim also increase the number of and to obtain a greater commitment from associated partners.

CoMEM aims to be self- sustainable. Worldwide economic factors and visible effects on higher education are elements we have taken into consideration in our plan. CoMEM aims at sustainability, with an enrollment of 15-25 students per cohort. Our plan envisions a shift from a majority of students receiving EMMC scholarships to private funding. We plan to implement an ongoing process during the 5 year period of the COMEM award.

Academic strengths. CoMEM will continuously endeavor to strengthen and be in the lead with reference to the academic level of excellence in its teaching and research area. We will seek to achieve this target by: taking measures to ensure high quality and innovative education, providing access to outstanding research groups and internationally targeted themes; collecting expertise evaluations and alumni feedback; offer a global dimension through access to network, mobility, cross-institutional cooperation and resource sharing. Our plan includes also collaboration with associated partners and/or industry in education and MSc thesis co-supervision giving access to up-to-date industry knowledge.

Students potential attractiveness. The experience gained from the CoMEM programme will be a benefit to research institutions and industrial employers. Our plan includes events for network

transmission to and amongst students. We will promote the students as attractive for the industry not only with regards to their acquired academic knowledge but also acquired global dimensions such as language, culture and personal development. We will also promote the students for career opportunities, summer jobs, internships and PhD positions. We envision establishing these opportunities in both EU and Non-EU arenas through: consortium institutions, collaborating partners, network, target institutions and industry; alumni institutions and employers; scholar institutions.

Financing opportunities. We foresee the ongoing need for the majority of students to continue to have financing and will seek to promote possibilities through: scholarships to be gained through local, national and international levels; research area based scholarships; grants both public and private; government aid; alternative funding through network of consortium: sponsoring and scholarships through associated partners, industrial relations and research institutions. We will also seek out synergies i.e. collaboration opportunities with other programs. Associated partners

Marketing. Our promotion of the CoMEM program includes a marketing plan. Arenas and areas we foresee as beneficial are: consortium; partner network; science journals; alumni institutions; alumni testimonials; student recruiting offices and fairs; target universities; social media; industry websites; international recruitment market partners.

A.3.4 Course promotion measures

CoMEM will have several promotion tools, of which the Erasmus Mundus site is of course of great importance, being visible on the site of the EACEA.
CoMEM will have a website which with its keywords will have a direct search result. The site is linked to the EACEA and other sites, such as Erasmus Mundus Alumni Association (EMA), Study in Europe, and the National Structure(s).
CoMEM is promoted at educational fairs and conferences, and via mailings to professional colleagues and Listservs. (i.e. Coastal List). CoMEM students can create a Facebook site and it can be foreseen that other social media may be used for PR purposes to EU and Non-EU students.

A.4 STUDENTS' SERVICES AND FACILITIES (15%)

A.4.1 Information / Support provided to students

The CoMEM website will be the primary source of information for the students about the consortium partners and the programme. The site further provides links to Erasmus Mundus / EACEA, EMA (Alumni) and a FAQ link and CoMEM news archive.
The website provides detailed information on the structure of the study programme, its mobility scheme and possible itineraries within the CoMEM consortium. The CoMEM website is the responsibility of the coordinating university, with links to the partner universities.
The aim is to provide clear and concise information regarding:

- Application and Admission: online application and information for admitted students
- Course layout and structure
- Course content
- Specialisations
- Learning outcomes
- Final Degrees
- Career opportunities

After students have been admitted and selection confirmed by the Agency, the student receives the "CoMEM International Student handbook" with the details and logistics of the programme (*Annex T.o.C).
Once when the students are registered as CoMEM students, the information- and communication media of the universities are the main instrument of communication (Email accounts, Blackboard or local network).

A.4.2 Student Agreement

The two parties, the CoMEM Consortium and the Student, sign the Erasmus Mundus Scholarship Contract in which mutual rights, obligations and responsibilities are stated. The Contract further defines the financial aspects/ cost of scholarship, academic requirements and the legally binding aspects of the student participation in the EMMC CoMEM. The student contract also includes a clause on housing arrangements and dispute settlement. (*Annex agreement).
Students are sent the contract with the official confirmation of selection and agreement of EACEA. It is important to note that the Student contract includes a statement that the scholarship is not a full scholarship. Because the nature of the programme and its mobility, students should be aware of the cost of travel, visa and residence fees, and high cost of living in the countries of the consortium partnership.

A.4.3 Student and scholar services

Central services are provided by the coordinating university, starting with the information via website, online application and admission procedures. The coordinating university will have staff to be the primary contact with EMMC COMEM students and other university offices. The International Office (i.e. Office of External Relations) of coordinating university support formalities of visa application, accommodation services and insurance scheme.
Depending on the mobility, each partner institution and administrative offices will be involved in support (such as visa, accommodation and financial arrangements) with students attending the respective universities.
The insurance scheme is centrally managed and implemented (*Annex insurance policy IPS)

A.4.4 CoMEM Language policy

The consortium is in strong support of language learning. The students are encouraged to enroll in language courses for international students.

- NTNU:
  At NTNU a short course in the Norwegian language is offered at no cost. The short course is the half of a complete beginner's course and corresponds.7.5 ECTS. (3 hrs of lectures per week + additional homework for 13 weeks). After completion, students may advance to a level 2 course.
- TU Delft:
  At TU Delft, the students participate in an introductory 1 day Dutch language workshop at no cost to the student, after which they can enroll for a more intense language course for international students for which the students can also earn credit.
- UPC: students will take Catalan or Spanish courses

As for the implementation of at least two European languages, this largely depends on the mobility of the student. It is not the imperative objective of the consortium to implement the use of more than one foreign, in the CoMEM case the English, language. The learning of other language is supported and encouraged, but participation in extra language classes is voluntary.

Further care is taken that students have sufficient abilities to express themselves in academic writing and presenting in the English language. If it is necessary, extra support will be provided to improve these abilities.

A.4.5 Networking and integration.

CoMEM staff facilitates the socio-cultural integration of each cohort, as well as inter-cohort integration as much as possible. A cohort of CoMEM students spends one year together in the foundational year of the programme. With the start of each semester during the first year a Welcome and Introduction are organized, which further stimulate cohort interaction and group cohesion.
During the Welcome/ Introduction weeks students from past cohorts are invited to participate in selected events and excursions if they are present in the same location.
In the course of the programme, students from current and previous years may overlap in the second and fourth semesters. Students from both cohorts are invited at academic (such as MSc presentations), social and cultural events. In the CoMEM Student Handbook, all past and present students and their contact information are listed. Information and CoMEM news are available on the CoMEM website and in the CoMEM Newsletter.
The EM Alumni Association is another excellent tool to stay connected.
To conclude: CoMEM stimulates student interaction and hopes that students take the lead from there.

A.5. QUALITY ASSURANCE AND EVALUATION (10%)

Quality assurance and evaluation strategies are considered of great importance to the consortium. Both an internal monitoring and an external review will be in place to evaluate the content and the format of the EMMC CoMEM. The protocol is described below.

A.5.1 Internal evaluation monitor

Within the five partner consortium there will be two levels of evaluation after each semester; a university and semester specific evaluation, and an 'overall CoMEM programme evaluation:'

1. after each semester an evaluation is performed through a questionnaire and a group interview by the individual university when students are present, as part of the integrated (following local practice) evaluation mechanism and procedure of the particular partner institution,
2. after each semester an online questionnaire is sent out to all students through an integrated online mechanism by the coordinating university (Annex Evasys). The coordinating university's aim is to guarantee a coherent and uniform approach among the participating universities for all aspects of the joint programme. The online questionnaire, designed for CoMEM purposes, consists of a uniform set of CoMEM specific questions and is sent only to CoMEM participants during their studies at the five partner universities.

The following elements are addressed in the internal evaluation:

- the CoMEM process in terms of management/ administration, student support/monitoring, student services, student communication,
- the academic content and components, course coherence and consistence within the curriculum,
- course objectives and results,
- assessment and examination, grading, graduation process.

Further, whenever possible (meaning when > 3 students is present) interviews are held with a group of students to discuss the semester's/ year's experience. The feedback through interviews is interactive and subjective, but will be much valued by both the interviewer and the students.
All results, individual student reviews, group interviews and the online survey results will be communicated to, and discussed with, the consortium partners during the bi-annual Board meetings. The sum of these practices will result in a comprehensive assessment outcome, which will be used to monitor, upgrade and improve upon the quality of the course and the services.

A.5.2 External quality assurance

External quality assurance is envisaged to be implemented by an independent External Board of Examiners, consisting of representatives (but not involved with the programme) of each partner university.
External Board members will be experts in the field of Coastal and Marine Engineering and management or in closely related fields. The External Board will evaluate the programme, addressing issues with an emphasis on academic quality and standards, continuity and consistency of the course, and address the course objectives related to the expected learning outcomes. The methodological approach will be to review the curriculum and to review a random sample of MSc thesis documents together with a review of supporting materials of the course, such as syllabi, Student handbook, grade information and the Rules and Regulations of the CoMEM course.
It is a given that all participating partner universities have their own internal and external quality assessments in place and have received national (and possibly international) accreditation.

Addenda to Annex I.

Addendum 1	NTNU Summerschool
Addendum 2	TU Delft Winterschool
Addendum 3	Education and Examination Guidelines CoMEM
Addendum 4	Diploma Supplement CoMEM
Addendum 5	Memorandum of Agreement
Addendum 6	CoMEM Student Contract
Addendum 7	CoMEM Student Handbook - Table of Content
Addendum 8	IPS Insurance Policy
Addendum 9	Internal Evaluation (EVAsys)

NTNU

Fakultet for ingeniørvitenskap og teknologi

Dato 28.04.2011 Referanse 2011/474/SR

Notat

Til:	Studieavdelingen
Kopi til:	Geir Walsø, Institutt for vann- og miljøteknikk
Fra:	Fakultet for ingeniørvitenskap og teknologi
Signatur:	Ingvald Strømmen

Anbefaling av søknad om etablering av Nordic Master Program in Environmental Engineering (eNviro5Tech)

Fakultetet anser deltakelse i masterprogrammer innenfor Nordic Five Tech generelt som strategisk riktig. Det programmet som det her søkes om deltakelse i er samfunnsmessig viktig og vårt fagmiljø ved Institutt for vann- og miljøteknikk har utmerket kompetanse innenfor området.

Utdanningsfaglig og i forhold til utsikter til forskningssamarbeid med de andre universitetene i konsortiet ansees også programmet som verdifullt for fakultet og institutt.

Med bakgrunn i den fyldige faglige beskrivelsen i søknaden og vurdert behov for kandidater med disse kompetanseprofilene anbefaler Fakultet for ingeniørvitenskap og teknologi denne søknaden.

Ingvald Strømmen, dekan

Svein Remseth, prodekan utdanning

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NTNU

Fakultet for ingeniørvitenskap og teknologi
Institutt for vann- og miljøteknikk

Dato 27.04.2011

Referanse 2011/474/GW

Notat

Til:	Studieavdelingen
Kopi til:	IVM v/instituttleder
Fra:	Fakultet for ingeniørvitenskap og teknologi v/ Institutt for vann- og miljøteknikk
Signatur:	Instituttleder Geir Walsø

Søknad om etablering av Nordic Master Program in Environmental Engineering (eNviro5Tech)

Som en konsekvens av etablering av den strategiske alliansen Nordic Five Tech, ble etter initiativ fra DTU søknad om etablering av ovennevnte masterprogram som innsendt i september 2010. Søknaden ble innfridd med en bevilgning på DKK 1 million.

Strategisamsvar

Dette eNviro5Tech-programmet er i fagområdet miljøteknologi med to foci i) Forståelse og bærekraftig forvaltning av virkninger på miljøet som skyldes menneskelige aktiviteter ii) Utvikling av nye teknologier for å møte miljøutfordringene. Det adresserer noen av dagens mest presserende aktuelle politiske tema som klimaendringer, bærekraftig produksjon av energi, ledelse og fornyelse av (gammel) urban infrastruktur, leveranse av trygt drikkevann, forurensing av jordsmonn og avfallshåndtering. Dette er sentrale tema også for NTNUs og IVT-fakultetets strategiutvikling.

Oppfylling av forskrifter til masterprogram

Gradsstruktur er designet med følgende egenskaper:

- Et *double degree* program på 120 studiepoeng, der studentene tar 60 studiepoeng fra hvert av to universiteter i eNviro5tech-konsortiet.
- Masteroppgaven gjennomføres med felles veiledning og bedømmelse ved de to universitetene involvert i studentenes studieløp.
- Mastergraden tildeles ved begge involverte institusjoner.
- Alle emner innenfor programmet undervises på engelsk.

Programmet tilbyr et sett med forhåndsdefinerte studieløp fra et sett av veletablerte masterprogrammer ispedd aktuelle problemstillinger for å møte dagens miljøutfordringer.

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Instituttleder
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Kompetanseprofiler for disse programmene er for tiden under utvikling for å sikre god programintegrasjon og læringsprogresjon. Hver av de fem partnerne fått ansvar for å definere et studieløp. Fordelingen av leder- og partneruniversitet for hvert studieløp er pt:

Study Track	Lead institution	Partner institution(s)
A. Urban water and water resources	NTNU	Chalmers; Aalto (?)
B. Residual resources engineering	DTU	NTNU; Aalto (?)
C. Environmental systems analysis	KTH	DTU(?)
D. Environmental informatics	Aalto	DTU; KTH(?)
E. Risk assessment	Chalmers	DTU

NTNU ved Institutt for vann- og miljøteknikk (IVM) skal altså delta aktivt i to studieløp (A og B). Det vil bli vurdert om også Alto-universitetet kan bli partner i de to studieløpene.

Alle emnebeskrivelser fra partnerinstitusjonen er pt ikke på plass (klargjøres i fastlagt konsortiemøte i Stockholm 17. juni), men for NTNUs vedkommende er studieplanene som angitt nedenfor. Etterfølgende læringsmål for hovedprofil og enkeltemner der IVM er ansvarlig institutt er beskrevet ut fra foreløpig status. Læringsmål for alle emner vil bli etablert.

Norges teknisk-naturvitenskapelige universitet

Dato 27.04.2011 Referanse 2011/474/GW

NORDIC FIVE TECH DTU KTH A" NTNU

eNviro5Tech

A Nordic Masters Program in Environmental Engineering

eNviro5Tech study track in Residual Resources Engineering

Two options are available:

Start at NTNU, thesis at DTU

Semester 1	Semester 2	Summer School	Semester 4	Semester 5
NTNU	NTNU		DTU	DTU
TVM4162 Industrial Ecology (7.5 ECTS)	TVM4160 Material flow analysis (7.5 ECTS)		12104 Modelling of Environmental Processes and Technologies (10 ECTS)	Thesis
TEP4223 Life cycle assessment (7.5 ECTS)	Experts in Team, cross-disciplinary project (7.5 ECTS)		Elective	
TIØ4195 Environmental management and corporate social responsibility (7.5 ECTS)	Elective		12130 Solid Waste Technology and Management (10 ECTS)	
Elective (7.5 ECTS)	Elective		12132 LCA-Modeling of Waste Management Systems (5 ECTS)	

Start at DTU, thesis at NTNU

Semester 1	Semester 2	Summer School	Semester 4	Semester 5
DTU	DTU		NTNU	NTNU
12104 Modelling of Environmental Processes and Technologies (10 ECTS)	12135 LCA Modelling of Waste Management (5 ECTS)		TVM4162 Industrial Ecology (7.5 ECTS)	Thesis
42372 Life cycle assessment of products and systems (10 ECTS)	12230 Chemicals in the Environment (10 ECTS)		TIØ4195 Environmental management and corporate social responsibility (7.5 ECTS)	
12130 Solid Waste Technology and Management (10 ECTS)	Elective		Elective (7.5 ECTS)	
	Elective		Elective (7.5 ECTS)	

Hovedprofil Industriell økologi – læringsmål
Studieretning Vann og Miljø, BM-studiet

Kunnskaper

Sivilingeniøren skal ha:

- Grundig og god kunnskap om hovedutfordringer og strategier innen viktige deler av miljøteknologifeltet, med basis i helhetlig industriell økologi forståelse og forskning.
- Tilsvarende kunnskap om fremtidsrettede tekniske og organisatoriske løsninger, med vekt på feltene avfall, materialkretsløp, energi, bygninger og infrastruktur.
- Grunnleggende kunnskap om metoder og verktøy for å analysere, vurdere og implementere løsninger, spesielt ut fra systemanalytiske prinsipper.

Ferdigheter

Sivilingeniøren skal kunne:

- Anvende denne kunnskapen for identifikasjon, utvelgelse og utforming av løsninger som er bærekraftige, spesielt i miljømessig og økonomisk perspektiv.
- Løse miljøteknologiske problemstillinger basert på strukturert analyse, spesielt ved bruk av materialstrømsanalyse, livsløpsanalyse og livsløpskostnadsanalyse.
- Bidra til utvikling og implementering av nye miljøteknologiske løsninger som møter samfunnets utfordringer innen avfall, materialkretsløp, energi, bygninger og infrastruktur.

Generell kompetanse

Sivilingeniøren skal:

- Ha en profesjonell forståelse og holdning mht kunnskap, planlegging og utførende forskning, tilpasset skiftende omstendigheter og ny kunnskap, med vekt på hvordan møte komplekse og krevende miljøutfordringer i dag og fremover.
- Kunne kommunisere og samarbeide godt med spesialister i flerfaglige team, spesielt innen bredden av kompetansefeltet industriell økologi, for å kunne utøve et helhetsorientert og profesjonelt arbeid på miljøområdet.
- Kunne gjenkjenne eller forstå nødvendigheten av å evaluere og vurdere miljøteknologiske i en teknologisk, etisk og sosial sammenheng, samt ta ansvar relatert til bærekraftighet, miljø, økonomi og sosial velferd.
- Ha en holdning til å vedlikeholde profesjonskompetansen gjennom livslang læring

TVM 4160 Materialstrømanalyse

Kunnskaper

Studenten skal ha kunnskaper om:

- Hovedutfordringer og strategier innen samfunnets metabolisme knyttet til de viktigste menneskelige aktiviter (næringstilgang, rengjøring, transport og kommunikasjon, husholdning og arbeid).
- Teori og anvendelse av materialstrømanalyse for å evaluere metaboliske systemer som er definert i rom og tid.

Ferdigheter

Studenten skal kunne:

- Forklare rollene til de viktigste stoffer og materialer i dagens samfunns metabolisme og mulige interaksjoner med miljøet.
- Definere systemer for materialstrømsanalyse som egner seg til å reflektere over praktiske problemstillinger og mulige løsninger (inklusive potensielle bivirkninger)
- Reflektere over viktige drivere av systemer for materialstrømsanalyse og beskrive et system ved hjelp av en matematisk modell for å teste virkninger av usikkerhet i data og for å utvikle enkle scenarier ("forecasting", "backcasting", analysere konsekvenser av mulige intervensjoner)
- Peke på og reflektere over styrker, begrensninger og adekvate anvendelser av ulike modeller for materialstrømsanalyse (inkludert andre verktøy i industriell økologi som bygger på dem) og å tolke resultatene i forhold til vurdering av forskjellige virkemidler.

Generell kompetanse

Studenten skal:

- Kunne bruke en systemtilnæring til å løse komplekse problemer.
- Se sammenheng mellom materialstrømsanalyse og andre verktøy som brukes i industriell økologi.
- Kunne kommunisere effektivt med spesialister og beslutningstakere.

TVM 4162 Industriell økologi

Kunnskaper

Studenten skal ha kunnskaper om:

- Sentrale industriell økologi livsløps- og systemtilnærminger for å møte viktige miljøutfordringer i industri og samfunn.
- Aktuelle analytiske metoder for å vurdere tekniske systemers miljømessige og økonomiske egenskaper og forbedringsmuligheter.
- Teorigrunnlag for slike metoder.

Ferdigheter

Studenten skal kunne:

- Redegjøre for hovedtrekk i samfunnets material- og energiomsetning og tilhørende miljøpåvirkning.
- Forklare (forenklet) teori og metodikk for materialstrømsanalyse, energianalyse. miljørisikoanalyse, livsløpsanalyse, livsløpskostnadsanalyse og input-output analyse.
- Forstå hvordan slike metoder kan anvendes for forbedring av tekniske systemers øko-effektivitet, og reflektere over metodenes ulikheter, styrker og svakheter.
- Skissere enkle modeller, utføre enkle beregninger og tolke resultater fra slike analyser, med eksempler fra utvalgte tekniske systemer (industriell produksjon, energibruk, avfallshåndtering, bygninger og infrastruktur).
- Redegjøre for forutsetninger for vellykket implementering i praksis.

Generell kompetanse

Studenten kan:

- Forstå betydningen av systemtilnærming for å analysere og forbedre bærekraft i tekniske systemer.
- Kunne kommunisere med spesialister og beslutningstakere vedrørende bruk av industriell økologi tilnærming i praksis.

- Ha et godt faglig grunnlag for å kunne velge og gjennomføre øvrige mer spesialiserte emner innen industriell økologi og for å inkludere slik teori og metodikk på en god måte i sin fremtidige prosjektoppgave og masteroppgave.

eNviron5Tech study track Urban water and water resources:

Start at NTNU, thesis at Chalmers

Semester 1	Semester 2	Summer School	Semester 4	Semester 5
NTNU	NTNU		Chalmers	Chalmers
TVM4110 Water Chemistry (7,5 ECTS)	TVM4145 Unit Processes in Water and Wastewater Treatment (7,5 ECTS)			Thesis
TVM4130 Urban Water Systems (7,5 ECTS)	TBT4130 Environmental Biotechnology (7,5 ECTS)			
TVM4105 Hydrology (7,5 ECTS)	TVM4155 - Numerical Models and Hydraulics (7,5 ECTS)			
Complementation subject (electable, 7,5 ECTS)	Experts in team (7,5 ECTS)			

eNviron5Tech study track Urban water and water resources:

Urban water and water resources: Start at Chalmers, thesis at NTNU

Semester 1	Semester 2	Summer School	Semester 4	Semester 5
Chalmers	Chalmers		NTNU	NTNU
			Electable technology subject, related to profile (7,5 ECTS)	Thesis
			Thesis preparation: Specialization subject – project (7,5 ECTS)	
			Specialization subject – Theory (7,5 ECTS)	
			Complementation subject (7,5 ECTS)	

Hovedprofil vann og avløp – læringsmål
Studieretning Vann og Miljø, BM-studiet

Kunnskaper

Sivilingeniøren skal ha:

- Grundig og god kunnskap om hovedutfordringer og strategier innen viktige deler av vann og avløpsfeltet, med basis i helhetlig forståelse av det urbane vannkretsløpet.
- Grunnleggende kunnskap om metoder og verktøy for å analysere, vurdere og implementere løsninger med hensyn til behandling og distribusjon av drikkevann, henholdsvis oppsamling og rensing av avløpsvann, samt avrenning av overvann fra regn og snøsmelting.

Ferdigheter

Sivilingeniøren skal kunne:

- Anvende denne kunnskapen for identifikasjon, utvelgelse og utforming av løsninger som er bærekraftige i helse- miljø- og økonomisk perspektiv.
- Bidra til utvikling og implementering av nye miljøteknologiske løsninger som møter samfunnets utfordringer innen vann og avløp, med vekt på virkning av urbanisering, klimaendring og aldring av infrastrukturen

Generell kompetanse

Sivilingeniøren skal:

- Ha en profesjonell forståelse og holdning mht kunnskap, planlegging og utførende forskning, tilpasset skiftende omstendigheter og ny kunnskap, med vekt på hvordan møte komplekse og krevende miljøutfordringer i dag og fremover.
- Kunne kommunisere og samarbeide godt med spesialister i flerfaglige team, spesielt innen bredden av kompetansefeltet vann og avløp, for å kunne utøve et helhetsorientert og profesjonelt arbeid på miljøområdet.
- Kunne gjenkjenne eller forstå nødvendigheten av å evaluere og vurdere vann og avløp i en teknologisk, etisk og sosial sammenheng, samt ta ansvar relatert til bærekraftighet, miljø, økonomi og sosial velferd.
- Ha en holdning til å vedlikeholde profesjonskompetansen gjennom livslang læring

TVM4105 Hydrologi

Kunnskap

Kandidaten skal ha kunnskap om:

- Det hydrologiske krinslaupet og vassbalansen
- Grunnleggande kunnskap om hydrologiske prosessar sentrale for vassbalansen
- Grunnleggande rekne og målemetoder, samt kjennskap til datakjelder og dataanalyse.

Ferdigheter

Kandidaten skal kunne:

- Bruke hydrologiske data for analyse av tilsig og flom
- Målemetoder for å finne vassføring og snømagasin
- Rekne på vassbalansen og tilhøyrande prosessar

Generell kompetanse

Kandidaten kan:

- Identifisere hydrologiske problemstillingar relevante for andre fag

TVM4110 Vannkjemi

Kunnskaper

Studenten skal ha kunnskap om:

- Hvordan grunnleggende kjemiske prinsipper kan brukes til å beregne konsentrasjoner av kjemiske forbindelser i vann.
- Hvordan grunnleggende kjemiske prinsipper kan brukes til å endre vannkvalitet/behandle vann.

Ferdigheter

Studenten skal kunne:

- Bruke ulike beregningsmetoder for beregning av konsentrasjoner i vann ved likevekt.
- Utføre kjemiske likevektsberegninger relatert til praktisk anvendelse i forbindelse med transport og behandling av forsyningsvann og avløpsvann, samt bruk av naturlige vannforekomster.
- Vurdere vannkvalitetsdata angående vannets korrosivitet i VA-systemer.
- Utføre enkle vannanalyser (måling av pH, alkalitet, bufferintensitet, fosforinnhold)

Generell kompetanse

Studenten kan:

- Forstå betydning av Vannkjemi innen Vann- og Miljøteknologi feltet
- Kunne kommunisere og samarbeide godt med spesialister i flerfaglige team, angående felt relatert til vannkjemi

TVM 4130 Urbane vannsystemer

Kunnskaper

Studenten skal ha kunnskap om:

- Forståelse for prinsippene for bygging og drift av urbane transportsystemer for vann og avløp.
- Forståelse for prinsipper for teknologi og håndtering av avrenning fra regn og snøsmelting
- Kjennskap til teknologier for bygging, rehabilitering og vedlikehold av ledningsnett for vann og avløp
- Kjennskap til prinsippene for tilstandsovervåkning og for måling av funksjon for urbane ledningsnett

Ferdigheter

Studenten kan:

- Beregne vannføring og trykk i vannforsyningsnett
- Beregne vannføring i avløpsnett inklusive avskjærende ledninger
- Utføre databaserte analyser av vann og avløpsnett

Generell kompetanse

Studenten kan:

- Ha kjennskap til utfordringer og muligheter ved håndtering av vannforsyning og avløpstjenester I byer.
- Ha kjennskap til dataprogrammer som er tilgjengelige for beregning av vann og avløpsnett
- Ha kjennskap til generelle prinsipper for kostnadseffektiv håndtering av vann og avløpsnett.

TVM 4145 Vannreneseprosesser

Kunnskaper

Studentene har kunnskaper om:

- Hvordan renseprosesser kan beskrives matematisk; reaksjoner, kinetikk, reaktorhydraulikk.
- Fysiske, kjemiske og mikrobiologiske enhetsprosesser som brukes i vann og avløpsrensing.
- Sammenbygging av enhetsprosesser.
- Modellering av vannbehandlingsanlegg og avløpsrenseanlegg.
- Kjemiske og biologiske omsetningsprosesser i vann- og avløpsnett.

Ferdigheter

Studentene kan:

- Bruke matematiske modeller for vannrenseprosesser.

Generell kompetanse

Studentene kan:

- Ha innsikt i og forståelse for vannrensetekniske enhetsprosesser.
- Ha forståelse med hensyn til internasjonale trender og metoder for forvaltning av ledningsnett.

TVM4155 Numerisk modellering og hydraulikk

Kunnskaper

Studenten skal ha kunnskap om:

- Hvordan følgende ligninger løses numerisk ved hjelp av en kontroll-volum metode: St. Venands ligning, Konveksjons-Diffusjons ligningen og Navier-Stokes ligninger.
- Kvalitet på løsningen av ligningene: nøyaktighet, stabilitet og feilkilder
- Stratifisert strømning, innsjøhydraulikk, utslipp til resipienter, sedimenttransport, turbulensmodeller og modeller for vannkvalitet

Ferdigheter

Studenten skal kunne:

- Bruke regneark, SSIIM og HEC-RAS til å beregne stasjonær og ikke stasjonær strømning.
- Lage grid for flerdimensjonale numeriske beregninger
- Bruke forenklede formler for flombølger, utslipp i resipienter, forurensningsspredning og sedimenttransport

Generell kompetanse

Studenten kan:

- Ha kjennskap til dataprogrammer som eksisterer for løsning av forskjellige strømningsproblemer
- Vurdere kvaliteten av resultatene fra 1D, 2D og 3D numeriske beregninger, og gi krav til kvalitetstester

Finansiering

Emnene som skal tilbys i hvert studieløp er eksisterende emner i etablerte studieprogrammer og vil således ikke bidra til økt undervisningsinnsats utover det som vil resultere i forhåpentlig et økt antall studenter, gjennom et attraktivt studietilbud på nordisk basis. Det påløper således ingen ekstra kostnader ved å etablere dette *double degree* programmet.

Fra og med 2011 har både Danmark og Sverige innført skolepenger for ikke-EU/EØS-borgere. Konsortiet har pt ikke besluttet hvordan dette skal håndteres mht mobilitet for norske studenter.

Antall studenter

Det er vanskelig å estimere antall studenter, men programmets målsetning og suksesskriterium er å kunne tiltrekke seg 30 studenter årlig til dette konkrete masterprogrammet.

Opptakskrav

Masterprogrammet vil anvende de respektive universiteters opptakssystemer og –kriteria i kombinasjon med felles ditto. Studenter må således søke direkte til den institusjonen der de ønsker å tilbringe sitt første studieår.

Forskningskopling og tverrfaglighet

eNviro5Tech-programmet vil være nært koblet til forskningsaktiviteter ved de deltakende universitetene. Et av hovedmålene med programmet er å bidra til utvikling av et *Nordic Center of Excellence in Environmental Engineering* basert på aktiv forskningsutveksling og et internasjonalt konkurransedyktig undervisningstilbud. Programmet vil kunne bidra til å utdanne masterkandidater som via studiene har fått kontakt med forskning på høyt internasjonalt nivå og således vil være godt kvalifiserte for en ph.d.-utdanning. I mange tilfeller vil industrielle partnere bli involvert i utvikling av MSc prosjekter for å sikre samfunnsmessig relevans.

NTNU

Fakultet for ingeniørvitenskap og teknologi

Dato 26.04.2011 Referanse 2011/474/SR

Notat

Til:	NTNU, Studieavdelingen
Kopi til:	Heidi Dreyer, Institutt for produksjons- og kvalitetsteknikk
Fra:	Fakultet for ingeniørvitenskap og teknologi v/ dekanus
Signatur:	Ingvald Strømmen

Anbefaling av søknad om deltakelse i Erasmus Mundus 2-årig masterprogram innen Advanced Supply Chain Management

Viser til vårt notat av 07.03.2011 i denne saken. Vi bekrefter hermed vår støtte til at det fremmes søknad om etablering av Erasmus Mundus masterprogram "Supply Chain Excellence in Management and Engineering" koordinert av Ecole des Mines de Nantes (EMN) og med professor Heidi Dreyer, fakultet for ingeniørvitenskap og teknologi som lokal koordinator ved NTNU.

Ingvald Strømmen, dekan

Svein Remseth, prodekan utdanning

Postadresse 7491 Trondheim

Org.nr. 974 767 880
E-post: postmottak@ivt.ntnu.no
http://www.ivt.ntnu.no/

Besøksadresse Høgskoleringen 6 Gløshaugen

Telefon + 47 73 59 45 01
Telefaks + 47 73 59 45 06

Pro-dekan Svein Remseth
Tlf: + 47 +47 73594678

Application Form

ERASMUS MUNDUS 2011 Call for proposals

Joint Master Courses / Joint Doctorate Programmes

Before you begin completing this eform:

- Try the test eForm. This is a very brief eForm to help you become familiar with how the fields and tables work and to test that your software and internet connection allow an application to be submitted.
- Check that you have the latest available version of the eForm. In the event of a significant eForm problem arising, the Agency may decide to publish an updated i.e. corrected version of the eForm. Please check to see if a later version is available and to see details of any problems that have arisen and their impact.

Click on the following link to go to the webpage to try the test eForm and to check for the latest version of the eForm:

http://eacea.ec.europa.eu/eforms/index_en.php

Programme	ERASMUS MUNDUS
Sub-programme * :	Action 1 Erasmus Mundus Joint Programmes
Programme guide / Call for proposals	EACEA 41/10
Action * :	EMMC
Sub-action * :	N/A
Deadline for submission	29/04/2011 12:00 midday CET
Project title * :	Supply CHain Excellence in Management and Engineering
Project acronym * :	SCHEME
Language used to complete the form * :	English

YOU MUST COMPLETE ALL FIELDS ON THIS FIRST PAGE BEFORE COMPLETING ANY OTHER PARTS OF THE FORM. SELECTIONS YOU MAKE ON THIS FIRST PAGE, DICTATE THE APPEARANCE AND BEHAVIOUR OF THE REST OF THE FORM.

Part A. Identification of the applicant and if applicable other organisation(s) participating in the project.

Parts A and B must be completed separately by each organisation participating in the project.

A.1 Organisation

Partner number	P1
Role in the application	Applicant Organisation
Full name of the organisation * :	Ecole des Mines de Nantes
Full name of the organisation in latin characters	
Acronym * :	EMNantes
Erasmus University Charter number	47384-IC-1-2007-1-FR-ERASMUS-EUCX-1
Department / Faculty	Automatic Control & Industrial Engineer

Registered address

Street * :	*Number*
Alfred Kastler	4

Post code * :	Town * :
44000	Nantes

Country * :	Region * :
FRANCE	Pays de la Loire

Internet address:	http://www.mines-nantes.fr

Telephone 1 * :	*Telephone 2*	*Fax*
+33 (0) 2 51 85 81 00		

A.2 Person responsible for the management of the application (contact person)

Title * :	Family name * :	First name * :
Dr	Yeung	Thomas

Role in the organisation * :	E-mail address * :
Associate Professor	thomas.yeung@mines-nantes.fr

Check this box if the address is different from the address provided in section A.1 ☐

Address

Street * :	*Number*
Alfred Kastler	4

Post code * :	Town * :
44000	Nantes

Country * :	Region * :
FRANCE	Pays de la Loire

Telephone 1 * :	*Telephone 2*	*Fax*
+33.2.51.85.86.45		

Check this box if the legal representative is different from the person responsible for the management ☒

A.3 Person authorised to represent the organisation in legally binding agreements (legal representative)

Title * :	Family name * :	First name * :
Mr	Cassereau	Stéphane

E-mail * :

stephane.Cassereau@mines-nantes.fr

Role in the organisation * :

Director

Check this box if the address is different from the address provided in section A.1 ☐

Address:

Street * : *Number*

Alfred Kastler 4

Post code * : Town * :

44000 Nantes

Country * : Region * :

FRANCE Pays de la Loire

Part B. Organisation and activities

B.1 Structure

Status * :	Public
Type of organisation	University or higher education institution (tertiary level)

B.2 Aims and activities of the organisation*

Please provide a short presentation of your organisation (key activities, affiliations etc.) relating to the domain covered by the project. (Max. 1000 characters)

Ecole des Mines de Nantes (EMN) is a multidisciplinary graduate engineering school (French 'Grande Ecole') belonging to the GEM network of seven Ecoles des Mines. It features 5 departments with a campus of about 850 students, 120 permanent faculty members and 225 adjunct faculty. The Department of Industrial Engineering comprises 20 permanent faculty and 25 Ph.D. students and is responsible for three engineering major teaching options and for the MLPS International Master's degree that has won the National Master's recognition (DNM). Research and industrial cooperation is conducted within IRCCyN, a joint Research Institute associated with CNRS, the French National Scientific Research Center. The research group is involved in several large projects associating industrial firms in supply chain management and optimization, transport planning for sustainable development, production planning, port logistics and reactive vehicle routing at the regional, national and international levels.

Please describe the role of the organisation in the project. (Max. 1000 characters)

As coordinator, EMNantes is responsible for the overall management of the project with the help of the Consortium Committee. Moreover, EMN will managethe usage of the funds allocated to the project, including tuition fees. This management and coordination is defined in the SCHEME Consortium Agreement. As coordinator toward the Erasmus Mundus label, EMN will sign the grant agreement on behalfof the consortium. EMN will have the primary legal responsibility from the European Agency for the proper execution of the agreement. As the starting institution for all students, EMN is also responsible for the initiation and welcoming of students into the program. Furthermore, EMN will host students during second year, host Master's theses with the help of its industrial partners, co-supervise Master'stheses at other sites, and contribute to the evolution of the programme (through quality andsustainability actions). It will also host the SCHEME website and virtual learning environment.

B.3 Other EU grants

Please list the projects for which the organisation, or the department responsible for the management of this application, has received financial support from the EU Programme during the last three years.

Programme or initiative	Reference number	Beneficiary Organisation	Title of the Project

Programme or initiative	Reference number	Beneficiary Organisation	Title of the Project	
PCRDT7	231845	CCE Bruxelles	ANGELS	X
PCRDT7	238808	UNIVERSITAET PADERB	SCALUS	X
PCDRT7	269892	Nuclear research and Cons	ARCHER	X
PCRDT7	269688	CCE Bruxelles	SKIN	X
PCRDT7	211333	Forschungszentrum Jueli.	CARBOWASTE	X
PCRDT7	212287	Forschungszentrum Karls.	RECOSY	X
PCRDT7	227017	CNRS	CLEANWATER	X
RFCS	RFSP-CT-2009-00028	CCE Bruxelles	SLASORB	X
ERASUS MUNDUS EMMC	2007-0079	EMN	ME3	X

Add a project

Please list other grant applications submitted by your organisation, or the department responsible, for this project proposal. For each grant application, please mention the EU Programme concerned and the amount requested.

Programme concerned	Amount requested
Add a project	

Part A. Identification of the applicant and if applicable other organisation(s) participating in the project.

Parts A and B must be completed separately by each organisation participating in the project.

A.1 Organisation

Partner number	P2 X
Role in the application * :	Partner
Full name of the organisation * :	Norwegian University of Science and Technology
Full name of the organisation in latin characters	
Acronym * :	NTNU
Erasmus University Charter number	29704-IC-1-2007-1-NO-ERASMUS-EUCX-1 N TRONDHE01
Department / Faculty	Production and Quality Engineering

Registered address

Street * :	*Number*
NTNU, Faculty of Engineering Science and Technology	

Post code * :	Town * :
NO-7491	Trondheim

Country * :	Region * :
NORWAY	Trøndelag

Internet address:

Telephone 1 * :	*Telephone 2*	*Fax*
+47 73593800		+47 73597117

A.2 Person responsible for the management of the application (contact person)

Title * :	Family name * :	First name * :
Mrs	Dreyer	Heidi Carin

Role in the organisation * :	E-mail address * :
Professor / Head of Department	heidi.c.dreyer@sintef.no

Check this box if the address is different from the address provided in section A.1 ☐

Address

Street * :	*Number*
NTNU, Faculty of Engineering Science and Technology	

Post code * :	Town * :
NO-7491	Trondheim

Country * :	Region * :
NORWAY	Trøndelag

Telephone 1 * :	*Telephone 2*	*Fax*
+47 73593800		

Part B. Organisation and activities

B.1 Structure

Status * :	Public
Type of organisation * :	University or higher education institution (tertiary level)

B.2 Aims and activities of the organisation*

Please provide a short presentation of your organisation (key activities, affiliations etc.) relating to the domain covered by the project. (Max. 1000 characters)

NTNU is Norway's second largest university with 20000 students, seven faculties and 4800 employees. Its main focus is on technology and natural science and it holds the national responsibility for graduate engineering education. NTNU has extensive cooperation with SINTEF, Scandinavia's largest independent research organization.
The department of Production & Quality Engineering provides education and carries out research within industrial management, manufacturing systems, and reliability, availability, maintainability and safety. The domain of SCHEME is within industrial management, which has the following core areas:
• Manufacturing logistics: Next-generation control principles for demand-driven production based on real-time information.
• Value chain research: Theory and methods to gain a better balance between demand and supply in the supply chain by developing demand driven control models
• Manufacturing strategy: Improvement of competitiveness in global manufacturing companies.

Please describe the role of the organisation in the project. (Max. 1000 characters)

NTNU is a partner organization providing courses in the second and third semester of the proposed programme (second cycle level). NTNU provides specialization in manufacturing, including operations, strategy as well as the use of ICT in manufacturing. The courses included in the programme will equip the students with theoretical and practical as well as quantitative and qualitative knowledge and skills related to technology and management in manufacturing operations and their supply chains.
Students will also be able to carry out their final project at NTNU (fourth semester). NTNU has a large network of industrial partners, including numerous global manufacturing companies. Final projects are normally carried out in close contact with industry.

B.3 Other EU grants

Please list the projects for which the organisation, or the department responsible for the management of this application, has received financial support from the EU Programme during the last three years.

Programme or initiative	Reference number	Beneficiary Organisation	Title of the Project

Programme or initiative	Reference number	Beneficiary Organisation	Title of the Project
		Add a project	

Please list other grant applications submitted by your organisation, or the department responsible, for this project proposal. For each grant application, please mention the EU Programme concerned and the amount requested.

Programme concerned	Amount requested
Add a project	

Part A. Identification of the applicant and if applicable other organisation(s) participating in the project.

Parts A and B must be completed separately by each organisation participating in the project.

A.1 Organisation

Partner number	P3 X
Role in the application * :	Partner
Full name of the organisation * :	University of Liverpool
Full name of the organisation in latin characters	
Acronym * :	ULMS
Erasmus University Charter number	28944-IC-1-2007-UK-ERASMUS-EUC-1
Department / Faculty	Management School

Registered address

Street * :	*Number*
Chatham Street	

Post code * :	Town * :
L69 7ZH	Liverpoool

Country * :	Region * :
UNITED KINGDOM	Merseyside

Internet address: www.liv.ac.uk

Telephone 1 * :	*Telephone 2*	*Fax*
+44 1517953603		+44 1517953120

A.2 Person responsible for the management of the application (contact person)

Title * :	Family name * :	First name * :
Dr	Drake	Paul

Role in the organisation * :	E-mail address * :
Head of Operations Management gr	drake@liv.ac.uk

Check this box if the address is different from the address provided in section A.1 ☐

Address

Street * :	*Number*
Chatham Street	

Post code * :	Town * :
L69 7ZH	Liverpoool

Country * :	Region * :
UNITED KINGDOM	Merseyside

Telephone 1 * :	*Telephone 2*	*Fax*
+44 1517953603		

Part B. Organisation and activities

B.1 Structure

Status * :	Public
Type of organisation * :	University or higher education institution (tertiary level)

B.2 Aims and activities of the organisation*

Please provide a short presentation of your organisation (key activities, affiliations etc.) relating to the domain covered by the project. (Max. 1000 characters)

The University of Liverpool is a research-based university with 27,000 students, 400 programmes on 54 subject areas, 3 faculties (Health & Life Sciences; Humanities & Social Sciences; Science & Engineering) and 5,000 employees. Its new purpose built Management School opened in 2002 bringing together over 100 academic and support staff from existing departments and via new appointments. The School has 6 subject groups: Economics; Finance and Accounting; Marketing & Service Management, Organisational Learning, Behaviour & Change; Strategy, Organisation & Policy; Operations Management & e-Business. The Operations Management & e-Business Group researches, develops and applies in industry supply chain management practices that exploit the opportunity of contemporary information and communication technologies. It is unusual in having proven expertise across e-Business technology and systems, as well as the new emergent e-Business strategies enabled by this technology.

Please describe the role of the organisation in the project. (Max. 1000 characters)

The University of Liverpool will provide taught modules and supervised projects in the specialist area of e-Business applied to logistics and supply chain management. The University has expertise in e-Business technology, complete systems and the new business and competitive strategies enabled by new Internet based information technologies. This expertise is developed continuously through research and knowledge exchange projects with industry and the public sector. The University works closely with many businesses, including several logistics businesses. It will offer the students the opportunity to conduct projects aimed at helping these businesses to develop their efficiency and effectiveness.

B.3 Other EU grants

Please list the projects for which the organisation, or the department responsible for the management of this application, has received financial support from the EU Programme during the last three years.

Programme or initiative	Reference number	Beneficiary Organisation	Title of the Project
		Add a project	

Please list other grant applications submitted by your organisation, or the department responsible, for this project proposal. For each grant application, please mention the EU Programme concerned and the amount requested.

Programme concerned	Amount requested
Add a project	

Part A. Identification of the applicant and if applicable other organisation(s) participating in the project.

Parts A and B must be completed separately by each organisation participating in the project.

A.1 Organisation

Partner number	P4 X
Role in the application * :	Partner
Full name of the organisation * :	Alma Mater Studiorum – Università di Bologna
Full name of the organisation in latin characters	
Acronym * :	UNIBO
Erasmus University Charter number	29342 – IC – 1 – 2007 – 1 – IT – ERASMUS – EUCX – 1
Department / Faculty	Faculty of Engineering

Registered address

Street * :	*Number*
Viale Risorgimento	2

Post code * :	Town * :
40136	Bologna

Country * :	Region * :
ITALY	Emilia-Romagna

Internet address:	www.ing.unibo.it

Telephone 1 * :	*Telephone 2*	*Fax*
+39.051.2093605		+39.051.2093604

A.2 Person responsible for the management of the application (contact person)

Title * :	Family name * :	First name * :
Pr	Grandi	Alessandro

Role in the organisation * :	E-mail address * :
Professor / Dean Management Eng.	alessandro.grandi@unibo.it

Check this box if the address is different from the address provided in section A.1 ☐

Address

Street * :	*Number*
Viale Risorgimento	2

Post code * :	Town * :
40136	Bologna

Country * :	Region * :
ITALY	Emilia-Romagna

Telephone 1 * :	*Telephone 2*	*Fax*
+39.051.2093605		

Part B. Organisation and activities

B.1 Structure

Status * : Public

Type of organisation * : University or higher education institution (tertiary level)

B.2 Aims and activities of the organisation*

Please provide a short presentation of your organisation (key activities, affiliations etc.) relating to the domain covered by the project. (Max. 1000 characters)

The University of Bologna, is one of the most important institutions of higher education across Europe with more then 90.000 enrolled students, 23 faculties, 69 departments, 3200 academics and 3000 administrative staff located in a Multicampus structure. Unibo offers a vast array of programmes, both at the first, second and third cycle of studies and is fully committed to the implementation of the Bologna process action lines.
Internationalisation, both for teaching and research is one of the political priorities of the University of Bologna, which is today the most internationalised of all the Italian universities. Unibo results respectively the first and the fourth European university according the numbers of outgoing and incoming students participating in the Erasmus programme and it is largely involved in International programme design. UNIBO is currently running 9 EM programmes (8 EMMC and 3 EMJD) and 7 EM Action 2 projects.

Please describe the role of the organisation in the project. (Max. 1000 characters)

The University of Bologna will provide taught modules in the areas of methods and techniques for Technology and Innovation Management (TIM) applied to logistics and supply chain management and Optimization in Transport. It will also provide supervision to thesis and projects in the same areas. The University has expertise in TIM and operations research methods and techniques relevant for the design and management of complex transport systems. This expertise is developed continuously through research and knowledge exchange projects with industry and the public sector. The University works closely with many businesses, including several logistics businesses.

B.3 Other EU grants

Please list the projects for which the organisation, or the department responsible for the management of this application, has received financial support from the EU Programme during the last three years.

Programme or initiative	Reference number	Beneficiary Organisation	Title of the Project

Add a project

Please list other grant applications submitted by your organisation, or the department responsible, for this project proposal. For each grant application, please mention the EU Programme concerned and the amount requested.

Programme concerned	Amount requested
Add a project	

Part A. Identification of the applicant and if applicable other organisation(s) participating in the project.

Parts A and B must be completed separately by each organisation participating in the project.

A.1 Organisation

Partner number P5 X

Role in the application * : Partner

Full name of the organisation * : Clemson University

Full name of the organisation in latin characters

Acronym * : CU

Erasmus University Charter number

Department / Faculty Industrial Engineering

Registered address

Street * : *Number*

Freeman Hall 110

Post code * : Town * :

SC 29634 Clemson

Country * : Region * :

United States N/A

Internet address:

Telephone 1 * : *Telephone 2* *Fax*

1-864-656-5645 1-864-656-0795

A.2 Person responsible for the management of the application (contact person)

Title * :	Family name * :	First name * :
Dr	Mason	Scott

Role in the organisation * :	E-mail address * :
Endowed Chair and Professor	mason@clemson.edu

Check this box if the address is different from the address provided in section A.1 ☐

Address

Street * :	*Number*
Freeman Hall	110

Post code * :	Town * :
SC 29634	Clemson

Country * :	Region * :
United States	N/A

Telephone 1 * :	*Telephone 2*	*Fax*
1-864-656-5645		

Part B. Organisation and activities

B.1 Structure

Status * : Public

Type of organisation * : Public authority (national)

B.2 Aims and activities of the organisation*

Please provide a short presentation of your organisation (key activities, affiliations etc.) relating to the domain covered by the project. (Max. 1000 characters)

CU is a member of the National Science Foundation's Center for Excellence in Logistics and Distribution (CELDi) and the Department of Industrial Engineering houses the Clemson Institute for Supply Chain Optimization and Logistics (CISCOL). Professor Mason is the Fluor Endowed Chair in Supply Chain Optimization and Logistics and directs the state of South Carolina's Center of Economic Excellence in Supply Chain Optimization and Logistics. Professor Ferrell serves CU as both the CELDi Site Director and the Director of CISCOL. Finally, the Department of Industrial Engineering offers a Masters of Engineering degree in Industrial Engineering with emphasis in capital project supply chains.

Please describe the role of the organisation in the project. (Max. 1000 characters)

CU will deliver graduate level courses pertaining to capital project supply chains and will be available to supervise thesis research for Erasmus Mundus students interested in this important, growing area of supply chain and logistics research. In addition, CU faculty will participate as graduate committee members for Erasmus Mundus students completing their degree requirements at a partner institution as the need arises.

B.3 Other EU grants

Please list the projects for which the organisation, or the department responsible for the management of this application, has received financial support from the EU Programme during the last three years.

Programme or initiative	Reference number	Beneficiary Organisation	Title of the Project
		Add a project	

Please list other grant applications submitted by your organisation, or the department responsible, for this project proposal. For each grant application, please mention the EU Programme concerned and the amount requested.

Programme concerned	Amount requested
Add a project	

Number of organisations to add *: 1 **Add organisation(s)**

List of partner organisations

Partner no	Role	Organisation Name	City	Country
P1	Applicant Organisation	Ecole des Mines de Nantes	Nantes	FRANCE
P2	Partner	Norwegian University of Science and Technology	Trondheim	NORWAY
P3	Partner	University of Liverpool	Liverpoool	UNITED KINGDOM
P4	Partner	Alma Mater Studiorum – Università di Bologna	Bologna	ITALY
P5	Partner	Clemson University	Clemson	United States

Part C. Description of the project

C.1 STATISTICAL DATA

The EMMC joint programme corresponds to the equivalent of * : 120 ECTS

Is the proposal a continuation of an existing EMMC ? * : No

Has this application been the subject of a proposal under previous EM calls for proposals? * : No

Does the joint programme include an internship/placement period? * : Yes

Does the joint programme include study period(s) outside Europe? * : Yes

Joint Programme Duration and Mobility :

The joint programme will start in month * : Sep of year "n".

and will end in month * : Jul of year " n + " * : 2

During their EMMC period, the students will study in at least * : 2 different countries.

The EMMC tuition language(s) will be * :

Language to add

Add >> | EN | Clear All | Clear Last

The EMMC student participation costs PER SEMESTER will be :

2 000€	4 000€
per semester (30 ECTS) for European students*	per semester (30 ECTS) for Third-country students*

Estimated number of students planned to be enrolled PER EDITION of the Joint programme

applies to all students, with or without EM scholarship

EU Students * :	Third Country Students * :
10	25

C.2 THEMATIC FIELD

Main Area :

Level 1 * :	Code
Engineering, Manufacturing and Construction	5
Level 2	*Code*
Engineering and engineering trades (others)	529

Please specify * :

production, logistics, supply chain, operations research

Clear Main Area

Second Area :

Level 1	*Code*
Services	8
Level 2	*Code*
Transport services	84

Clear Second Area

Third Area :

Level 1	*Code*
Social sciences, Business and Law	3
Level 2	*Code*
Management and administration	345

Clear Third Area

C.3 SUMMARY DESCRIPTION OF THE PROJECT * (Max. 3000 characters)

The SCHEME program seeks to provide students with an international education experience provided by a consortium of five international higher education institutions to study sustainable supply chain management (SCM) for technology, innovation and emerging issues. The consortium is led by the Ecole des Mines de Nantes (EMN, France) in collaboration with partner institutions Norwegian University of Science & Technology (NTNU, Norway), University of Liverpool (ULMS, England), University of Bologna (UNIBO, Italy) and Clemson University (CU, USA).

In an increasingly global economy, rapid advances in technology must be brought to market quickly and efficiently. Oftentimes the technological advances themselves enhance the ability of new innovations to be produced and distributed. Today's supply chain managers must be able to understand innovation, the global production network and technology, and apply them to the emerging industrial issues. Furthermore, these elements are managed with a vision for a sustainable planet. This unique program addresses management issues simultaneously with quantitative rigor.

The program lasts two years (four semesters) utilizing the unique expertise of each of the consortium members. Successful completion of the program results in the delivery of double and/or multiple Master of Science degrees.

Students begin their studies with a common semester at the EMN. This provides students with an overview of SCM concepts and applications and advanced optimisation and decision support methodologies in SCM. Having all students begin with a common location and curriculum instills a strong bond among all students of the cohort as well as ensure a uniform foundation for the remainder of the program.

In the second semester, students have the option of moving either to NTNU or UNIBO in order to learn manufacturing technology or the management of innovation, respectively laying the foundation of our technology and innovation theme in SCM. These themes are complemented with global production at NTNU and transportation optimization at UNIBO.

The third semester constitutes one of four emerging application specialties of the students choosing. ULMS offers a specialty in e-Business Logistics to address SCM in a world dominated by the internet. CU offers Capital Project SCM to address large-scale, one-of-kind projects such as nuclear power plants, bridges and tunnels where a single product is considered rather than the traditional high-volume production and distribution. Students may also return to the EMN to pursue a specialty in advanced production and transportation applications such as reverse logistics. NTNU offers applications of advanced manufacturing operations and information and communication technologies (ICT).

The final semester consists of a 6-month industrial or research internship that maybe carried out in a company or research laboratory at one of the partner institutions or elsewhere culminating in the writing of a thesis.

Part D. Technical Capacity

D.1 Consortium experience of the area of joint programmes and the specific discipline(s) of the project

Provide a list of projects/activities implemented by the consortium organisations in relation with the proposal

Title	Duration	Funding	Programme	Partners involved	
SFI Norman	2008-2016		develop new and multi-disciplinary research on next-generation manufacturing,	NTNU	X
IMS2020 (EUFP7 NMP)	until 2020		Aim: create roadmaps towards Intelligent Manufacturing Systems (IMS)	NTNU	X
Supply Chain Risk Study	2011	6 732,00 €	Research (Funding by Boeing)	CU	X
How Do We Use Industrial Eng./ Manufacturing Techniques for Enhancing Construction Project Performanc	2008-2010	156 715,00 €	Research (Funding by Construction Industry Institute)	CU	X
Improving Visibility of Residual Material	2008-2009	50 488,00 €	Research (Funding by Lockheed Martin)	CU	X
Inventory Systems Analysis of Lead Time Variability	2007-2008	50 488,00 €	Research (Funding by Lockheed Martin)	CU	X
Continuous Quality Improvement Testing in Virtual Environments	2007-2010	117 805,00 €	Research (Funding by BMW)	CU	X
Ensuring Continuity of Care: A Quantication of Risk in the Healthcare Supply Chain	2009-2010	100 976,00 €	Research (Funding by NSF)	CU	X
Development of materials costing and management systems	2003-05	111 056,00 €	Knowledge Transfer Partnership with Millbrook Scientific Instruments plc	ULMS	X

Title	Duration	Funding	Programme	Partners involved	
Operations strategy development in a fabrication-free environment	2007-10	148 075,00 €	Knowledge Transfer Partnership with King and Fowler Ltd	ULMS	X
Implementation of lean and agile manufacturing strategies, and project management process improvemen	2009-11	132 370,00 €	Knowledge Transfer Partnership with Laker-Vent Engineering Ltd	ULMS	X
Development of e-Business systems	2010-2012	132 370,00 €	Knowledge Transfer Partnership with T. J. Morris Ltd	ULMS	X
The introduction of mobile working and dynamic scheduling for the building maintenance unit	2010-2012	140 222,00 €	Knowledge Transfer Partnership with Cartrefi Conwy	ULMS	X
Resilient Multi-Plant Networks (REMPLANET)	2009-2012	3 028 798,00 €	European Commission Seventh Framework (FP7) research grant	ULMS	X
Agile Growth & Supply Chain Strategies in SMEs	2011-14	797 741,00 €	ERDF – North West England	ULMS	X
Amadeus	2009- 2010		PHC France-Austria : Periodic and dial a ride transportation of elderly and disabled persons.	EMN	X
Optimization of Personnel and Vehicle Routing on the NTIC	2009-2010		programme Samuel-De Champlain France-Québec / Véolia eau	EMN	X
Robust Supply Chain Optimization	2009-2012	80 000,00 €	Ph.D Thesis with Air Liquide	EMN	X
MILES Project	2007-2011		Atlanstic Federation project for transport optimization in logistic networks	EMN	X
LIGERO (Groupement Ligerien en Recherche Operationelle)	2009-2013		Grouping of research teams in operations research specializing in logistics problems	EMN	X

Add Project / Activity

D.2 Skills and expertise of key staff involved in the project

Summary of the relevant skills and experience, including where relevant a list of the (main) publications related to the domain of the project (Maximum 750 characters). Maximum 3 CV's per partner institution.

Organisation number	Organisation name
P1	Ecole des Mines de Nantes

Name of Key Person*	Summary of relevant skills and experience*	
Thomas G. Yeung, Ph.D.	T.Yeung received his B.S.I.E., M.S.I.E., and Ph.D. all in industrial engineering from the University of Arkansas (USA). After completing his education he spent one year as an independent consultant to the semi-conductor industry. His area of expertise is in stochastic optimization applied to logistics and production systems, maintenance, health care, and finance. He has published numerous peer-reviewed articles appearing in such international journals as IIE Transactions and Naval Research Logistics. He is co-director of a joint master program with Virginia Tech (USA). His funded research includes a grant for road network optimization as well as collaboration with Air Liquide, a world leader in liquid gas production and distribution.	X
Pierre Dejax, Ph.D.	He graduated from the Ecole Centrale de Paris (engineer) and obtained his Ph.D. from Cornell University (USA) in Operations Research and Industrial Engineering. He worked with consulting firms, and was appointed Professor at the Ecole Centrale de Paris. He then joined the Ecole des Mines de Nantes and created the MLPS Master's degree in management of logistic and production systems. His teaching, research and international and industrial cooperations focus on the planning and optimization of supply chain and transport systems. He is the author of many publications, has held leading positions in several professional or scientific organizations and serves as an expert for project evaluation for several national and international organizations	X
John Miller-Jones	is in charge of International relations at the Ecole des Mines de Nantes. Holder of a Bachelor degree in Social Anthropology, a Post-Graduate Certificate in Education and a Diplome d'Etudes Approfondies from the university of Bordeaux in Langue Anglaise des Spécialités Scientifiques et Techniques, he was initially in charge of setting up and running the language department at the Ecole des Mines de Nantes, John Miller-Jones is now exclusively involved in developing partnerships and cooperation in teaching and research with university partners worldwide, In 2010, he co-chaired the steering committtee for the organisation of the European Association for International Education conference that took place in Nantes.	X

Organisation number	*Organisation name*
P2	***Norwegian University of Science and Technology***

*Name of Key Person**	*Summary of relevant skills and experience**	
Heidi C. Dreyer, Ph.D	Dreyer's research fields are logistic in supply chain management. Her current research focuses is on supply chain demand planning and control and real time control models. Dreyer has initiated and managed a number of large-scale multi-disciplinary research and innovation projects in collaboration with industrial partners. Through her position as senior researcher at SINTEF she has a significant role in the establishment of a SINTEF department within the field of logistics and supply chain management. Dreyer's professional experience includes establishment of the business area of transport and logistics in Trafikon (1990-1993). She is currently a professor and the Deputy Head of the Department of Production and Quality Engineering.	X
Jan Ola Strandhagen, Ph.D	Strandhagen has extensive experience in managing national and international industrial research projects through positions at SINTEF since 1986. He had a significant role in the establishment of a SINTEF department within logistics and SCM, and acted as research director until 2010. Since June 2010 he is Centre Director for a large scale research centre NORMAN. Through a professorate at NTNU he has extensive experience with research and education within logistics (40 master student, 5 PhDs graduated, 2 annual master courses). He has a strong industry network, gained also from positions at Esso Norge A/S and Logistics Manager at Raufoss Technology AS. He has received several awards for outstanding efforts in logistics.	X
Anja Linge Valberg	Higher Executive Officer, Office of International Relations, Norwegian University of Science and Technology (NTNU), Trondheim, Norway. MA in French (awarded in 2006 from NTNU). Work experience: October 2009 till present: Higher Executive Officer (Office of International Relations). 2008-2009: Executive Officer (Office of International Relations). Current responsabilities: Erasmus Mundus programme :Advise and support of academic staff in the process of submitting Erasmus Mundus applications. Erasmus Programme: Bilateral agreements and student counselling. Santander Group Liaison Officer.	X

Organisation number	*Organisation name*
P3	***University of Liverpool***

*Name of Key Person**	*Summary of relevant skills and experience**	
Dr Paul Drake	Head of Operations Management & e-Business Group and Chartered Engineer through the Institution of Engineering Technology. Prior to his academic career, he gained several years experience in industry developing information systems. He supervised several Knowledge Transfer Partnerships (KTPs) with manufacturing enterprises, which lead him to SCM, logistics and purchasing strategy. He has worked with over 50 businesses through employment and grant funded research; nearly 100 publications; taught on, managed and designed a wide range of degree programmes from undergraduate programmes in integrated engineering, manufacturing and e-business to postgraduate programmes in systems and electronics engineering, e-business, SCM and general management.	X
Zenon Michaelides	Zenon Michaelides is lecturer and director of studies for the MSc e-Business Systems and Strategy programme at the University of Liverpool Management School. He studied Aeronautical Engineering at Chelsea College London in 1981 and completed his PhD from the Department of Engineering at the University of Liverpool in 2003. He specialises in Aviation Management and conducts research and teaching in operations management and related areas including enterprise systems, supply chain integration, planning and control systems and logistics. He is a very active member of the SAP UAP-Universities Alliance Program. He is a Chartered Engineer with the Engineering Council and a Member of the Royal Aeronautical Society.	X
Ms Stephanie Readey	Administrative manager of the Management School. She has worked in the public sector in a variety of business management roles,ranging from managing the delivery of training programmes for young people to working within Human . CIPD qualified, she is also an "Investor in People Internal Reviewer and Coach". More recently she led on a number of key projects for Liverpool City Council, delivering organisational improvements through good business planning and project management, leading a team to provide advice and support to business units across the whole of the Council, including business process re-engineering and service reviews.	X

Organisation number	*Organisation name*
P4	***Alma Mater Studiorum – Università di Bologna***

*Name of Key Person**	*Summary of relevant skills and experience**	
Alessandro Grandi	Alessandro Grandi is professor of Economics and organization theory at the School of Engineering of the University of Bologna where is also dean of the Engineering management program. Before joining the University of Bologna in 1991, he served as associate professor at the University of Udine and as lecturer at the University of Ancona, Prof. Grandi's current research interests include: technology strategy, management of new product development, organizational design and management of R&D. He is author or co-author of about 80 publications. He is president of Almacube (the technology based start-up incubator of the University of Bologna), member of the Board of directors of CRIT Research (a private technology brokerage company).	X
Francesco Girotti	Graduated in International Politics and awarded by a Master in European Policies, he has been working in the management of EU Programmes of Education for 9 year and since 2004 he works at the EU Unit within the IRO office at UNIBO. His main expertise is the management of HE international projects focusing on student mobility, joint degree development and structural and policy measures. In the last years he has been working on the promotion and implementation of HE European Programmes within UNIBO, with a particular focus on Erasmus Mundus Programme. He is the project coordinator of the JOIMAN Structural Network on Joint Degree Management and Administration. He chairs the Utrecht Network Task Force on Joint Degrees	X
Paolo Toth	Paolo Toth is Professor of "Combinatorial Optimization" at the School of Engineering of the University of Bologna. He is the Director of the PhD School in "Information Sciences and Engineering" (with about150 PhD students) of the University of Bologna. His main research interests include Operational Research and Mathematical Programming methodologies and, in particular, the design and implementation of effective exact and heuristic algorithms for Combinatorial Optimization and Graph Theory problems, and their application to Transportation and Logistics, He is author of more than 130 papers published in international journals and author or editor of several books. He is also Associated Editor of several scientific international journals.	X

Organisation number	*Organisation name*
P5	***Clemson University***

*Name of Key Person**	*Summary of relevant skills and experience**	
Scott J. Mason, Ph.D.	Dr. Mason is the Fluor Endowed Chair in Supply Chain Optimization and Logistics and a Professor of Industrial Engineering at Clemson University. Prior to joining Clemson, Dr. Mason spent 10 years in the Department of Industrial Engineering at the University of Arkansas. He received his Ph. D. in Industrial Engineering from Arizona State University. Dr. Mason's areas of focus include operations planning, scheduling, and control of capital project supply chains and large-scale systems modeling, optimization, and algorithms, with domain expertise in semiconductor manufacturing. He is a senior member of the Institute for Industrial Engineers and a member of INFORMS.	X
William G. Ferrell, Ph.D.	Dr. Ferrell is a Professor of Industrial Engineering at Clemson University and an Associate Dean of the Graduate School. He serves as the Clemson Site Director for the NSF-funded Center for Excellence in Logistics and Distribution and is the Director of the Clemson Institute of Supply Chain Optimization and Logistics. Prior to receiving his Ph.D. in Operations Research from North Carolina State, Dr. Ferrell worked as an engineering and project manager for Babcock and Wilcox in the Nuclear Power Generation Division. His research focus is supply chain logistics.	X
J. Bruce Rafert, Ph.D.	Dr. Rafert is Professor of Physics and Astronomy and Dean of Clemson's Graduate School. He received his PhD in Astronomy from the University of Florida in 1978. Dr. Rafert has received the Council of Southern Graduate Schools "Outstanding Contribution to Graduate Education" award in 2010, and was honored as both Teacher (1986-87) and Researcher (1988-89) of the Year while serving as Professor of Physics and Space Sciences at the Florida Institute of Technology. Dr. Rafert also received the Isle Royale Institute Founders Award in 2002 for his contributions to the development of the Isle Royale Institute. Dr. Rafert currently serves as Chairman of the Board for the Virtual World Consortium.	X

PART E. Degree(s) awarded

The joint programme will result in the award of a* :

- ☒ *Double degree (i.e. more than one official degree)*
- ☐ *Multiple degree (i.e. more than two official degrees)*
- ☐ *Joint degree i.e. a single diploma officialy recognised in at least two of the European consortium countries*

Organisation number	*Name of the Degree Awarding Organisation*
P1	*Ecole des Mines de Nantes*

Official name of the degree in		*Type**	*Recognition status*			
*National language**	*English*		*Already recognised?**	*Expected recognition date OR validity end date (/ next review date) if applicable*	*Function of the degree signatory*	
Master in Logistics and Production Systems Management	Master in Logistics and Production Systems Management	National degree	Yes	2012	Director	X

Add a Degree

Organisation number	*Name of the Degree Awarding Organisation*
P2	*Norwegian University of Science and Technology*

Official name of the degree in		*Type**	*Recognition status*			
*National language**	*English*		*Already recognised?**	*Expected recognition date OR validity end date (/ next review date) if applicable*	*Function of the degree signatory*	
Master in Logistics and Production Systems Management	Master in Logistics and Production Systems Management	National degree	Yes	unlimited	Rector	X

Add a Degree

Organisation number	*Name of the Degree Awarding Organisation*
P3	*University of Liverpool*

Official name of the degree in		*Type**	*Recognition status*			

National language*	English		Already recognised?*	Expected recognition date OR validity end date (/ next review date) if applicable	Function of the degree signatory	
MSc Supply Chain Management: e-Business and Optimization		National degree	Yes	2012	Chancellor of the University	X

Add a Degree

Organisation number	Name of the Degree Awarding Organisation
P4	Alma Mater Studiorum – Università di Bologna

Official name of the degree in		Type*	Recognition status		Function of the degree signatory	
National language*	English		Already recognised?*	Expected recognition date OR validity end date (/ next review date) if applicable		
Laurea Magistrale in Ingegneria Gestionale	Master in Management Engineering	National degree	Yes	Unlimlited duration	Rector	X

Add a Degree

Organisation number	Name of the Degree Awarding Organisation
P5	Clemson University

Official name of the degree in		Type*	Recognition status		Function of the degree signatory	
National language*	English		Already recognised?*	Expected recognition date OR validity end date (/ next review date) if applicable		
Master of Science in Industrial Engineering		National degree	Yes	Unlimited duration	President	X

Add a Degree

Attachments

Declaration of Honour. JPEG document (jpeg, jpg) or PDF document(pdf).

Document: EMMC_FR_SCHEME_DecHon.pdf

Award Criteria. Word document (doc,docx), PDF document (pdf) or RTF document (rtf).(maximum 25 pages - Times New Roman - Font 11)

Document: EMMC_FR_SCHEME_Award.pdf

520198-EM-1-2011-1-FR-ERA MUNDUS-EMMC	***Submission number***

EM MASTER SCHEME consortium agreement and financial agreement

Education and Culture DG

ERASMUS MUNDUS

CONSORTIUM AGREEMENT AND FINANCIAL FRAMEWORK

ERASMUS MUNDUS MASTERS COURSE

EUROPEAN JOINT MASTERS IN Supply Chain Excellence in Management and Engineering

(EM MASTER SCHEME)

BETWEEN

Ecole Nationale Supérieure des Techniques Industrielles et des Mines de Nantes

4 Rue Alfred Kastler - BP 20722 - 44307 Nantes Cedex 3 - FRANCE

Represented by the Director, Stephane Cassereau

of the one part, coordinating Institution of the Consortium, hereafter referred to as "The coordinator", or hereafter referred to as "EMN"

AND

Norwegian University of Science and Technology

NO-7491, Trondheim, Norway

Represented by the Rector, Torborn Digernes hereafter referred to as "NTNU"

AND

University of Liverpool

Chatham Street, L69 7ZH Liverpool, United Kingdom

Represented by the Vice Chancellor Kelvin Everest hereafter referred to as "ULMS"

AND

Alma Mater Studiorum – Università di Bologna

Viale Risorgimento, 40136 Bologna, Italy

Represented by the Rector, Ivano Dionigi hereafter referred to as "UNIBO"

AND

Clemson University

Freeman Hall, Clemson, SC 29634, USA

Represented by the Dead of the Graduate School, J. Bruce Rafert, hereafter referred to as "CU"

of the other part, recognized partner institutions of the consortium hereafter referred to as "The Partners".

HAVE AGREED to the following terms and conditions, including those in the annexes which form an integral part of this Consortium Agreement.

#1 Purpose of the agreement

The purpose of the Agreement is to agree on the implementation and management of the Erasmus Mundus Masters Course Supply Chain Excellence in Management and Engineering (SCHEME). This Agreement shall specify the respective rights and obligations of the parties with regard to the running of the joint program.

All parties are subject to the rules and regulations set up by the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA) in the agreements mentioned above regarding both the responsibilities towards the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA) and towards other parties to this Agreement.

#2. Validity and amendments

This Agreement shall come into force on the day when it has been signed by each of the parties but shall have retroactive effect from the date of decision of acceptance from the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA). The validity of this Agreement expires when the support from the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA) is withdrawn. This Agreement shall be reviewed each academic year. Amendments to this Agreement shall be made only by supplementary agreements signed on behalf of each of the parties by legal representatives.

#3. Obligations of the Coordinator

The Coordinator manages the administrative, legal and financial matters of SCHEME EUROPEAN JOINT MASTERS IN SUPPLY CHAIN EXCELLENCE IN MANAGEMENT AND ENGINEERING Master's Course towards the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA). The Coordinator is responsible for all contacts with the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA). The Coordinator shall report to the SCHEME Consortium in such a way that these have full understanding of the administrative, legal and financial matters.

The Coordinator shall undertake:

- To take all the steps necessary to prepare for, perform and correctly manage the programme set out in this contract and its annexes, in accordance with the objectives of the project as set out by the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA).

- To send the Partners copies of the Agreements signed with the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA) together with annexes and any other official document concerning the project.

- To notify and provide the Partners with any amendments made to this Agreement. Ecole des Mines de Nantes, EMN is the University Coordinating the Consortium. It shall undertake:

- To comply with all the provisions binding the Coordinator to the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA).

- To nominate the Programme Director and the Administrative Coordinator of the Programme.

#4. Obligations of the Partners

The Contractors are subject to the rules and regulations set up in the Framework Agreement.

The Partners shall undertake:

- To take all the steps necessary to prepare for, perform and correctly manage the programme set out in this contract and its annexes, in accordance with the objectives of the project as set out in the Agreements concluded between the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA) and the Coordinator of the EM MASTER X Consortium.

- To comply with all the provisions of Agreements binding the Coordinator to the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA).

- To communicate to the Coordinator any information or document required by the latter that is necessary for the management of the project.

- To accept responsibility for all information communicated to the Coordinator, including details of costs claimed and, where appropriate, expenses difficult to justify.

- To nominate at least one local coordinator of the SCHEME programme to the Consortium Committee.

The Partners also undertake:

- To promptly notify any delay in performance or any event that may impact the joint master programme to the SCHEME Consortium Committee.

- To inform the SCHEME Consortium Committee of relevant information received from third parties as regards the joint master course.

- To act at all times in good faith and in a manner that reflects the good name, goodwill and reputation of the other Partners and in accordance with scientific and academic ethics.

- To participate in a cooperative manner at the meetings of the different bodies under this Consortium Agreement.

#5. The SCHEME Consortium Committee

Appointed representatives from each of the parties to this Agreement form the SCHEME Consortium Committee. The SCHEME Consortium Committee shall support the Coordinator in managing the programme. The Consortium Committee shall meet at least twice a year. In addition, at least one selection meeting is organised annually by the Consortium Coordinator in January.

The SCHEME Consortium Committee shall undertake:

- To annually decide on the registration fees of the programme in accordance with the current legislation in each of the countries of the Partners.

- To review and amend the scholarship conditions, if necessary.

- To annually decide on the distribution of the fees among the parties.

- To ensure quality assurance of the programme.

- To agree on the adaptation and update of the joint curriculum to recent developments.

- To define common standards for admission, a common application procedure and to organise a joint student and scholar selection process.

Concerning the selection of the students and scholars the Consortium Committee shall:

- Review admission criteria annually and make necessary changes.

- Define student quota for the programme.

- Agree on the selection procedure and methods.

- Agree on the allocation of evaluation tasks between partners.

- Select the students and establish the proposed list of scholarships holders to be sent to the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA).

- Decide on the student study tracks.

- Select the scholars to be invited and establish the proposed list of scholars to be sent to the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA).

#6. SCHEME- EUROPEAN JOINT MASTERS IN SUPPLY CHAIN EXCELLENCE IN MANAGEMENT AND ENGINEERING

#6.1 Use of ECTS and grading of studies

Performance assessment will be performed based on both the local grading scales of the partners and the ECTS system for jointly assessed activities (projects and master thesis).

The ECTS system will be used to transfer local grades between the partners using the local mechanisms already in place for credit transfer and to establish degree diploma supplements.

#6.2 Degree certificates + diploma supplements

The five (5) academic partners (EMNantes, NTNU, UNIBO, ULMS and CU) deliver a nationally recognized degree and a joint diploma supplement. The joint diploma supplement will signed by the coordinators of the institutions visited by the student and will attest the different courses received by the students during the SCHEME program.

#6.3 Joint supervision of the end of master thesis

The topic of the end of master project must be agreed by the SCHEME Consortium Committee. The master's thesis will be (co-)supervised and evaluated by the SCHEME Consortium Committee.

#7 Study programme

The partner institutions formulate and approve through their respective academic bodies all active study programmes, which are organised into semesters, modules and ECTS credits. The European Joint Masters in Supply Chain Excellence in Management and Engineering , has a duration of 2 academic years, beginning on September 2012. Students will study in at least two (2) and possible three of the different partner institutions. The first semester takes place at EMN and is common to all the students entering the program. In the second semester, students have a choose between an emphasis on manufacturing technology at NTNU or the management of innovation at UNIBO. For the third semester, students have the option of one of four different applications specialities: 1. E-business Logistics (ULMS), 2. Capital Project Supply Chain (CU), 3. Advanced Manufacturing Operations on ICT (NTNU), and 4. Advanced Optimization and Decision Support Closed Loop Logistics (EMN). An industrial or research Master's thesis covers the fourth semester in accordance with the programme of studies supported by the European Commission.

#8. Registration fees and other financial matters

Fee amounts will be agreed upon by the Partners and approved by their academic bodies. The Coordinator will allot the fees amongst partner Universities and will manage them according to the criteria agreed upon by the Contractors as described in the attached financial annex (Annex 1) respecting the agreements signed by the legal representative of the University Coordinating the Consortium and the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA).

#9. Quality assurance in the SCHEME programme

- Short term quality insurance

Two mechanisms are implemented to assess the quality of the programme. The first one consists in giving students a file in which several criteria are presented. Thus each course is evaluated by the student according to criteria including the quality of the lecture organization, the competences of the lecturer and the evaluation of the course. Based on those data and on individual meetings with students the global quality of each semester is evaluated within each hosting institution (EMN, NTNU, UNIBO, ULMS, and CU).

- Long term external quality insurance

As suggested by the European Commission an external audition board will meet periodically to assess the overall quality of the SCHEME program to ensure the consistency between the professional objectives of our students, the pedagogical content of the courses and the expectations of the market in terms of experts having a master degree in the field of supply chain management. The external audit board will be composed of representatives from other academic institutions and the corporate world.

#10. Marketing of the programme

The general marketing policy will be discussed and approved by the Consortium Committee at their meetings. The Coordinator will organise the common marketing efforts (marketing letters through mail and internet). A dedicated website with on-line applications and social networks will contribute to providing high visibility to the program. Each partner will disseminate information for applicants through their own marketing channels and integrate information on the program on their local website

Marketing will not only target potential students but companies with a view to student sponsorship and long-term sustainability.

#11. Student matters

According to the Erasmus Mundus Masters Course regulations set up by the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA), the SCHEME Consortium selects and admits students to the programme. Students involved in the mobility programme shall enjoy the

benefits and shall be likewise subject to the regulations and norms which are in force in the Universities/Institutions concerned by the programme.

The Consortium Coordinator will receive all scholarships awarded by the EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA). The Consortium Coordinator will distribute the scholarships to the scholarship holders without delay. The SCHEME Consortium will use a specific student agreement for the students eligible under the FRAMEWORK PARTNERSHIP AGREEMENT, which has to be signed by the students applying for an Erasmus Mundus scholarship to facilitate the administrative and financial relations between the Consortium and the student. The programme fees will be deducted directly from the Erasmus Mundus scholarship with prior consent from the student. The student will sign the "Erasmus Mundus scholarship conditions" prior to receiving any payment. The Erasmus Mundus scholarship payments will be transferred to a bank account only. The students' rights and responsibilities are the same as those valid for any other student at the institution where the student is studying at the specific moment. The student must comply with the requirements of the institution in question as regards documentation for registration procedures and documentation for visa purposes.

ANNEX 1. Financial Annex

AGREEMENT 1

FINANCIAL AGREEMENT REGARDING FLATE RATE FOR MANAGEMENT OF JOINT MASTER IN ACTION 1

AGREEMENT 2

FINANCIAL AGREEMENT REGARDING ACADEMIC TUITION FEES

AGREEMENT 3

FINANCIAL AGREEMENT SETTING FORTH THE DISTRIBUTION OF THE TUITION FEES FOR THE JOINT MASTER EM MASTER SCHEME (ACTION 1)

AGREEMENT 1

FINANCIAL AGREEMENT REGARDING THE ANNUAL AMOUNT OF MONEY ALLOCATED BY THE EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA) FOR ACTION 1 (FLATE RATE FOR MANAGEMENT OF JOINT MASTER)

The EDUCATION, AUDIOVISUAL AND CULTURE EXECUTIVE AGENCY (EACEA) will pay 30,000 € to the Ecole des Mines de Nantes as Consortium Coordinator. The SCHEME Consortium Committee has decided to allot:

Ecole des Mines de Nantes (Coordinating Institution)	France	14,000 €
NTNU	Norway	4,000 €
ULMS	United Kingdom	4,000 €
UNIBO	Italy	4,000 €
CU	United States of America	4,000 €

AGREEMENT 2. FINANCIAL AGREEMENT REGARDING ACADEMIC FEES

The SCHEME Consortium Committee has decided to set the current registration fee for third-country students to 8,000 € for one academic year. For students from the UE the registration fee will be 4,000 € per academic year.

Those fees cover all the academic, management, marketing and university coordination expenses. With regard to third-country students, those fees cover special management expenses such as visa arrangements and the incorporation of the student into the host university. Registration fees will be paid to the Consortium Coordinator.

NTNU is a public funded university, and publicly funded Universities in Norway are not allowed to charge tuition fees. This is due to the Act relating to universities and university colleges, Section 7-1. "Fees:

(1) State universities and university colleges may not claim fees from students for ordinary courses leading to a degree or for professional training courses. "

NTNU will invoice the consortia for costs that are related to administrative expenses only; related to the employment of one administrative staff at the Faculty and to travel expenses due to our participation in the consortia.

AGREEMENT 3. FINANCIAL AGREEMENT REGARDING THE DISTRIBUTION OF THE TUITION FEES FOR THE JOINT MASTER EM MASTER SCHEME (ACTION 1)

Article 1: Purpose

The purpose of this agreement is to set forth the criteria for distributing the tuition fees for the Joint Masters SCHEME among the members of the Consortium.

The members of the Consortium are the academic institutions of higher education who have signed this agreement.

Article 2: Criteria for the distribution of the tuition fees

The distribution of the tuition fees paid by each student enrolled in the Joint Masters SCHEME is based on the involvement of the partners according to the following criteria:

➢ **Criterion 1**: Involvement in the teaching activities for the academic portion of the program, evaluated based on the number of ECTS credits taught out of a total of 90 ECTS (3 semesters).

- Method for calculating the amount to be distributed:

(Tuition fees attributed to the criterion / 90) X Number of ECTS taught by the partner.

Note : NTNU can't charge student's for tuition fees.

At the request of any partner institution, the amounts computed under Criterion 1 may be reallocated in whole or in part to Criterion 7.

➢ **Criterion 2**: Involvement in the hosting and academic management of the students at the partner institutions during the 3 academic semesters.

According to the agreement drawn up under action 1 of Erasmus Mundus, the hosting and academic management of the students is performed:

➢ During the first semester, by EMN

➢ During the second semester, by NTNU and Bologna

➢ During the third semester, by EMN, Liverpool, NTNU and Clemson

- Method for calculating the amount to be distributed:

(Tuition fees attributed to the criterion / 3 semesters) = amount per semester to be re-distributed to every hosting institution. Payment for semester 3 is prorated based on the number of students in each option.

➢ **Criterion 3**: Program coordination, done by the Ecole des Mines de Nantes.

- Method for calculating the amount to be distributed:

100% of the tuition fees attributed to this criterion shall be paid to the Ecole des Mines de Nantes.

➢ **Criterion 4**: Support provided to students for visa claiming and entrance into the program

- Method for calculating the amount to be distributed:

Shared between the first hosting institution (EMN), and extra European countries (Liverpool and Clemson), prorated to the number of students.

➢ **Criterion 5**: Preparation and production of communication materials (website, brochures, posters, etc.).

- Method for calculating the amount to be distributed:

This task and the related expenses are handled by the Ecole des Mines de Nantes.

➢ **Criterion 6**: Supervision and mentoring of the graduate project (semester 4).

- Method for calculating the amount to be distributed:

(Tuition fees attributed to the criterion / number of students) X Number of students supervised.

At the request of any partner institution, the amounts computed under Criterion 6 may be reallocated in whole or in part to Criterion 7.

➢ **Criterion 7**: Actions undertaken during the two years of the session with a view to improving the quality and sustainability of the program. The possible actions to be considered are those engaged in order to set up a joint Master degree, to obtain official accreditation of a European Master degree, to increase financial funds, to develop industrial sponsorships and student grants, to set up and carry out external quality audits, to improve the quality of selection of students and scholars, to attract European students, to constitute an active alumni network , to develop cooperation with third country institutions.

- Method for calculating the amount to be distributed:

The tuition fees attributed to this criterion are prorated and distributed according to the actions undertaken by each partner.

In the case of merit scholarships granted by the ME3 Consortium to European students, the percentage of tuition fees paid by the student to the Consortium is equal to the balance due after deduction of the scholarship amount.

By joint agreement, the SCHEME Consortium partners have decided to attribute the following percentages of tuition fees to each criterion, defined :

Criterion	1	2	3	4	5	6	7	Total
Percentage paid	40,0	18,0	10,0	1,5	2,0	13,5	15,0	100,0

Article 3: Payment Methods

At the beginning of each semester, 80% of the funds for criteria 1 and 2 shall be paid to the partners hosting the students. The 20% of the funds left shall be paid at the end of each semester, after having incurred expenses, based on the actions actually performed.

A final report on income and expenses for the Joint Masters EM MASTER SCHEME shall be drawn up no later than three months after the end of the last semester. Based on this report, the Ecole des Mines de Nantes will pay the balance of the tuition fees to each partner.

The payments mentioned above shall be made after the partners send the corresponding payment instruction document to the coordinating institution.

SIU

Norges teknisk-naturvitenskapelige universitet

7491 Trondheim

Saksbehandler:
Frank Moe
frank.moe@siu.no
+47 55 30 38 48

Vår ref: 3742/2011 Deres ref: Dato: 16.03.2011

Statement concerning national recognition of degrees

The Norwegian Centre for International Cooperation in Higher Education, which is a public agency under the auspices of the Norwegian Ministry of Education and Research and Erasmus Mundus National Structure, hereby confirms that according to the Norwegian act relating to universities and university colleges, an accredited university may establish courses and study programmes at all levels and may also freely enter into agreements about joint degrees, without prior assessment of the Ministry. Thus, the universities are autonomous in deciding what programmes to establish and are themselves responsible for the quality assurance procedures.

The degree proposed by the University of NTNU for an Erasmus Mundus application is thus recognized nationally.

Vennlig hilsen

Vidar Pedersen
Seksjonssjef

Frank Moe
Seniorrådgiver

CLEMSON
UNIVERSITY

E-105 Martin Hall
Clemson, SC 29634-5713
April 28, 2011

Dear Dr. Mason,

I am happy to offer my support for the Supply Chain Excellence in Management and Engineering (SCHEME) joint Master's program proposal to Erasmus Mundus. The Graduate School has experience with a number of international partnerships and we recognize the value of an Erasmus Mundus program award, both to Clemson University and the student participants. This program also has the potential to strengthen Clemson's ties to our local industrial partners as well.

I am committed to supporting your efforts in this SCHEME Master's program, should it be selected for funding by Erasmus Mundus. I am available to help with student matriculation, enrollment, and any other programmatic issues that are within my purview. Best of luck on your proposal submission!

Sincerely,

J. Bruce Rafert, Ph.D.
Dean of the Graduate School
Professor of Physics

GRADUATE SCHOOL
E-106 Martin Hall Box 345713 Clemson, SC 29634-5713
864.656.4172 FAX 864.656.5344

Student agreement

ERASMUS MUNDUS MASTERS COURSE "SCHEME"

European joint Masters in Supply CHain Excellence in Management and Engineering

YEAR 2012-2014

The present student agreement is signed by

The Ecole des Mines de Nantes, established in 4, rue A. Kastler BP 20722 44307 Nantes cedex 3, France, Coordinating Institution of the Erasmus Mundus Master course SCHEME master, European joint Masters in Supply CHain Excellence in Management and Engineering and, hereafter referred to as "the Institution"represented by Stéphane Cassereau, Director.

on the one part,

and

Name: _____

First name: _____

Date of birth: _____

Place of birth: _____

Nationality: _____

Passport number: _____

hereafter referred to as "the Student", on the other part,

The agreement is applicable for all partner institutions where students complete a module or gain ECTS credits.

General principles

The student has been admitted to attend the European joint Masters SCHEME, "Supply CHain Excellence in Management and Engineering", having a duration of 2 academic years, beginning on September 2012. According to his/her choice of specialities, the student will study in at least two of the five institutions of the SCHEME consortium: Ecole des Mines de Nantes (France), Norwegian University of Science and Technology (Norway), University of Liverpool (UK), University of Bologna (Italy) and Clemson University (USA). A co-supervised industrial or research project (Master thesis) takes place during the second year of the Master in accordance with the programme of studies supported by the European Commission.

Degree awards

On successful completion of the whole programme the student will receive the Master degrees from the two institutions in which he/she has studied. In addition the student will receive a Diploma Supplement. This aims to improve international "transparency" and facilitate fair academic and professional recognition of qualifications (degrees, certificates, academic knowledge and skills, etc.) It will provide a description of the nature, level, context, content and status of the studies that were successfully completed by the student. The final decision on

awarding the degrees is taken by the academic board of each institution concerned in consultation with the academic board of the consortium. Their decision is final.

Obligations of the student

#1. In order to participate in the Masters programme, the Student is required to pay tuition fees as follows :

- Category A scholarship holders : 16 000€
- Category B scholarship holders : 8 000€
- Third country non-scholarship holders : 16 000€
- European student non-scholarship holders : 8 000€

Scholarships may be granted to selected students according to the terms mentioned in Annex 1.

The scholarship does not create or entitle an employer-employee relation between the University and the Student, and therefore is not subject to direct taxation.

#2. Under the present contract, the Student is obliged

▪ To comply with the regulations of the host institution where he/she is studying

• To comply with the overall SCHEME regulations with regard to:

- the rules of progression from semester to semester
- organisation of the Master thesis work

• To attend assiduously, and with the objective of successfully passing, the modules, and the thesis inherent in the programme of studies. Attendance will be recognised by the respective institutions as integral parts of the qualification for which the Student is preparing, provided the Student is successful in the respective examinations and/or assessments.

• To participate in one of the language courses offered in the host institutions if applicable.

• Not to receive any other scholarship or grant financed by the European Commission under other Community programmes

#3. The student is not entitled to embark on any vocational occupation with a regular salary in parallel to the studies under the ERASMUS MUNDUS European Masters.

#4. Any alteration to the present Contract or respective Annexes must be communicated in writing. All alterations to the initial situation must be immediately communicated by the Student to the Institution. Upon mutual agreement of contractual modifications, the Institution will issue an agenda to the present contract.

#5. Any deliberate failure on the part of the Student to fulfil the conditions expected in terms of attendance at the ERASMUS MUNDUS European Masters, in particular non-fulfilment of the conditions stipulated in the present Contract, constitutes sufficient reason for action to be taken towards resolving the issue and could led to reimbursement of the scholarship awarded. In the case of reimbursement, the Institution will determine the amount to be reimbursed.

#6. Without prejudice to the general consequences laid down in national law applicable in the present Contract, the Institution reserves the right to cease the effects of the present Contract, without recourse to any juridical procedure apart from adequate communication to the student. Failing agreement by both parts, the French courts are designated as the only competent authorities to resolve any legal dispute

between the Institution and the Student emerging from the Contract. The present Contract will be governed by French Law.

#7. The Institution is exonerated from any responsibility for accidents, illnesses, injuries, losses or damages to persons or goods resulting from or in any way related to the activities that are the object of the present Contract. The Student is obliged to accept the necessary insurance related to the activities for the full duration of the study period.

#8. The following annexes constitute an integral part of the present Contract:

The signatories declare that they have read and accept the conditions laid down in the present Contract.

Signed in _____, on _____

The student, _____,

Signed in _____, on _____

Director of the SCHEME Coordinating Institution: Stéphane Cassereau.

ANNEX 1

SCHEME

SCHOLARSHIP AWARD AGREEMENTS

- Category A. scholarship agreement

EUROPEAN JOINT MASTERS IN SUPPLY CHAIN EXCELLENCE IN MANAGEMENT AND ENGINEERING(SCHEME) : PAYMENT TERMS FOR TUITION FEES

For the academic period 2010 – 2012, the tuition for the European joint Masters SCHEME is 16,000 €.

Students who have a scholarship from the European Commission under the Erasmus Mundus programme must pay the tuition by authorising the consortium coordinator institute (Ecole des Mines de Nantes) to debit the tuition from the scholarship. The scholarship instalment payment schedule will be determined based on the tuition fees debited at the beginning of the programme.

To set up this debit system, scholarship students must sign the form below authorising the consortium coordinator (Ecole des Mines de Nantes) to debit the tuition fees from their scholarships.

I the undersigned,_____, a student enrolled in the European Joint Masters SCHEME programme and having a scholarship from the European Commission under action 1 of the Erasmus Mundus programme, hereby authorise the Ecole des Mines de Nantes, SCHEME consortium coordinator, to debit the tuition fees, namely 16,000 €, from my scholarship.

I confirm that I have read the scholarship instalment payment calendar printed below, from which the tuition fees have been debited.

The respect of this calendar is dependent upon the payment of the funds by the European Commission.

Scholarship amount: **48,000 €** Scholarship balance paid to student: **32,000 €**

Tuition fees: **16,000 €**

	Lump sum payment to student (beginning of semester)	**Monthly payments to student (except in August)**		**Total per year**
		Monthly payment	**Total per semester**	
Semester 1 (Sep - Jan)	4,000	1,000	5,000	**18,000**
Semester 2 (Feb - Jul)	3,000	1,000	6,000	
Semester 3 (Sep - Jan)	3,000	1,000	5,000	**14,000**
Semester 4 (Feb - Jul)	3,000	500	3,000	
TOTAL	13,000		19,000	**32,000**

Signed in _____, on _____

The student, _____

Category B Student scholarship agreement

EUROPEAN JOINT MASTERS IN SUPPLY CHAIN EXCELLENCE IN MANAGEMENT AND ENGINEERING(SCHEME) : PAYMENT TERMS FOR TUITION FEES

For the academic period 2012 – 2014, the amount of the tuition fees for EM scholarship European holders is 8,000 € (insurance included) for the 2-year duration of the SCHEME program.

Students who have a scholarship from the European Commission under the Erasmus Mundus programme must pay the tuition by authorising the consortium coordinator institute (Ecole des Mines de Nantes) to debit the tuition from the scholarship. The scholarship instalment payment schedule will be determined based on the tuition fees debited at the beginning of the programme.

To set up this debit system, scholarship students must sign the form below authorising the consortium coordinator (Ecole des Mines de Nantes) to debit the tuition fees from their scholarships.

I the undersigned,_____, a student enrolled in the European Joint Masters SCHEME programme and having a scholarship from the European Commission under action 1 of the Erasmus Mundus programme, hereby authorise the Ecole des Mines de Nantes, SCHEME consortium coordinator, to debit the tuition fees, namely 8,000 €, from my scholarship.

I confirm that I have read the scholarship instalment payment calendar printed below, from which the tuition fees have been debited.

The respect of this calendar is dependent upon the payment of the funds by the European Commission.

Scholarship amount: **20,000 €** Scholarship balance paid to student: **12,000 €**

Tuition fees: **8,000 €**

	Lump sum payment to student (beginning of semester)	**Total per year**
Semester 1 (Sep - Jan)	4,000	**7,000**
Semester 2 (Feb - Jul)	3,000	
Semester 3 (Sep - Jan)	3,000	**5,000**
Semester 4 (Feb - Jul)	2,000	
TOTAL	12,000	**12,000**

Signed in _____, on _____

The student, _____,

NTNU
Norwegian University of Science and Technology
Rector

Date 2011-04-26 | Our reference
Your letter dated | Your reference

LETTER OF ENDORSEMENT

TO WHOM IT MAY CONCERN

With this letter the Norwegian University of Science and Technology (NTNU) confirms its support to the joint application for an Erasmus Mundus Master's programme. The title for the project is Supply Chain Excellence in Management and Engineering, acronym SCHEME.

The application has been presented to and approved by the Board of NTNU. The coordinator of the academic programme at NTNU is Professor/ Dept. Head of Department Mrs. Heidi Carin Dreyer, Department of Production and Quality Engineering.

We agree with the submission of this application by the project coordinator Mr. Thomas Yeung, Associate Professor, Ecole des Mines de Nantes (EMN), and we look forward to participate in the programme.

In keeping with these, we will provide all the necessary support and services as outlined in the application and its annexes. In particular reference is made to the consortium agreement and the financial agreement.

Yours sincerely,

Torbjørn Digernes

Rector

Address	Org. no. 974 767 880	Location	Phone	Contact person
NO-7491	Email:	Høgskoleringen	+ 47 73 59 80 11	
Trondheim	postmottak@adm.ntnu.no	Hovedbygget	Fax	
Norway	http://www.ntnu.no/administrasjon	Gløshaugen	+ 47 73 59 80 90	Phone: + 47

UNIVERSITY OF LIVERPOOL

Professor Kelvin Everest
Bradley Professor of Modern Literature
and Pro-Vice-Chancellor

Office of the Deputy Vice-Chancellor
The Foundation Building
765 Brownlow Hill
Liverpool
L69 7ZX

T +44 (0)151 794 2220
F +44 (0)151 794 2929
E K.D.Everest@liv.ac.uk

www.liv.ac.uk

27 April 2011

To whom it may concern

The University of Liverpool has internationalisation as one of the cornerstones of its strategy, and this is very much being achieved by the Management School. One of the core research and teaching groups in the School is the Operations Management and e-Business Group that has extensive expertise in conducting research and running programmes in e-Business applied to supply chain management and logistics. The School's MSc programmes aim to produce practitioners that can improve the efficiency and effectiveness of enterprises - a goal shared by the other partners in the proposed consortium. The proposed MSc will enable us to develop our MSc e-Business portfolio further into areas of application and expertise that our partners offer. Furthermore, the pan-European nature of the programme will help us develop the European aspect of our internationalisation in particular.

I have no hesitation in stating that the proposed MSc has the emphatic backing of the University and the Management School as it implements most clearly our strategies for developing our teaching, research and internationalisation strategies.

Yours Sincerely

Professor Kelvin Everest
Pro-Vice-Chancellor for Student Experience

ALMA MATER STUDIORUM - UNIVERSITA' DI BOLOGNA

LETTER OF ENDORSEMENT FOR THE PARTICIPATION IN THE PROPOSAL OF THE ERASMUS MUNDUS MASTER "SCHEME - Supply CHain Excellence in Management and Engineering"

Alma Mater Studiorum – University of Bologna, as a member of the Consortium established for the delivery of the Erasmus Mundus Master "SCHEME - Supply CHain Excellence in Management and Engineering", expresses its full endorsement to the application submitted by the Ecole des Mines de Nantes on behalf of the Universities forming the Consortium.

International scientific and educational cooperation is one of the core target established by the Strategic Plan of our University. University of Bologna is a leading institution in Italy for internationalization: 2004-2008 comparative data show f.i. that the rate of foreign students enrolled in Masters has been between 1.5 and 2 times the average of the Italian higher education system.

As for the Faculty of Engineering (which will deliver master Course), it has all the human and financial resources to contribute to the master programme. In particular, the Faculty has already developed 5 international programmes at master level (Civil Engineering, Engineering of Automation, Electronic Engineering and Engineering of Telecommunications, Materials and Sensor System for Environmental Technologies) and the SCHEME Master will be the 6th International Programme of the Faculty.

The role of the University of Bologna in the project consists in implementing the programme according to the design developed in the application submitted, in particular in delivering highly qualified teaching, and in supporting the project implementation, drawing from its experience in the field of joint programmes and in particularly Erasmus Mundus programmes. Erasmus Mundus students will be offered courses entirely taught in English and high quality services both from the Faculty and from the international relations office and the central administration of the University of Bologna.

The degree which will be awarded to successful students will be "Laurea Magistrale in Ingegneria Gestionale" and the SCHEME will be a new curriculum activated within the existing programme. The Programme Laurea Magistrale in Ingegneria Gestionale is a highly successful programme which is able to enrol every year more than 200 students coming from different Bachelor programmes. The programme is already recognised by the Ministry of Education and, according to national rules, its validity period is unlimited.

As Rector of the University of Bologna I confirm that we have read and approved the proposal as submitted in the application addressed to the EACEA. We are prepared to provide support to the Master Programme and we are committed to implement a joint programme and to award the degree according with the procedures described in the application, following rules and guidelines established by EACEA for Erasmus Mundus Master Courses.

Prof. Ivano Dionigi
Rector of the Alma Mater Studiorum - Università di Bologna

Signature

Bologna, 19/04/2011

AIR LIQUIDE

DIRECTION RECHERCHE
ET DEVELOPPEMENT

CENTRE DE RECHERCHE CLAUDE-DELORME
1 chemin de la Porte des Loges
BP 126 - LES LOGES-EN-JOSAS
78354 JOUY - EN - JOSAS CEDEX
☎ +33 (0)1 39 07 62 62
Télécopie +33 (0)1 39 56 11 22

M. Thomas YEUNG
Coordinator of the SCHEME Master
Ecole des Mines de Nantes
4 rue Alfred Kastler - la Chantrerie
BP 20722
44307 Nantes Cedex 03

Les Loges, the 26nd of April, 2011

SUBJECT : Letter of Intent for Erasmus Mundus Joint Master's programme: SCHEME Supply CHain Excellence in Management and Engineering

Dear M. Yeung,

Excellence in the management of supply chain management is critical for Air Liquide. In 2008, Supply chain efficiency was identified as a key driver for Air Liquide competitiveness and part of the company strategic program.

At Air Liquide, most supply chain managers and supply chain software developers acquires their skills through experience. Globalization of infrastructure and plentiful flows of information circulating from customers to production have increased potential and complexity of supply chain management.

The Erasmus Mundus Joint Master's programme: SCHEME Supply CHain Excellence in Management and Engineering answers to this growing demand.

On behalf of Air Liquide, I herewith confirm our intent to participate in the enclosed Erasmus Mundus Joint Master's programme: SCHEME Supply CHain Excellence in Management and Engineering, submitted by the co-ordinating institution Ecoles des Mines de Nantes, France, covering the role of associate partner, under conditions to be defined.

Air Liquide could welcome interns for projects or internships, to share to the student's industrial applications, to be confirmed in relation with the conditions of the internships.

We wish you success in the implementation of this attractive Master.

Yours Sincerely

Dominique Gruson
Director of the
CLAUDE-DELORME Research Center

AIRBUS
AN EADS COMPANY

Nantes, April 25th, 2011

Ecole des Mines de Nantes

Pr Thomas YEUNG
SCHEME Programme coordinator

Sir,

You plan to extend your Master of Logistic and Production Systems (MLPS) and create a new international master in Supply Chain Management and Engineering named SCHEME, offering the opportunity to your students to develop their supply chain know-how and skills in several cultural environments across Europe and the USA.

Airbus Operations SAS and especially the Nantes factory has been collaborating for years with the MLPS and will clearly renew its support to the Ecole des Mines de Nantes in the frame of SCHEME creation, through :

- Participating to industry awareness courses or seminars on demand,
- Selecting trainees for various internships in Airbus Nantes,
- Enabling the visit of our supply chain installations,
- And other case-by-case support on demand

In the context of growing internationalisation of our activities and increasing pressure on supply chain to face production ramp-up and A350 XWB development, Airbus Nantes considers the creation of SCHEME as a very good opportunity to get highly skilled people in supply chain in its close environment.
We wish you best success in the implementation of this Master.

Benoît LEMONNIER
Head of Supply Chain & Logistics
Airbus Nantes

AIRBUS
Établissement de NANTES
B.P. 81925
44019 NANTES CEDEX 1

BENTELER
Automotive

PO Box 15, 2831 Raufoss, Norway
Company
Name
Street

ZIP City
Country

Date:	Our Dept./Ref.:	Contact Person:	Telephone:
27.04.11	Logistics	Roy Jakobsen	+4791117260
		E-Mail:	Fax:
		Roy.jakobsen@benteler-alu.com	

Dear Sir/Madam

On behalf of Benteler Aluminium Systems AS, I hereby express my support of the proposed Erasmus Mundus programme "Supply Chain Excellence in Management and Engineering" (SCHEME). The programme is of high relevance for industry. It will provide its students with the qualitative as well as quantitative knowledge and skills necessary to manage the complexity of today's logistics systems and supply chains of goods and services. The international experience and the collaboration with industry constitute an excellent preparation of the students' professional careers.

I express my company's interest in participation in the programme as a pedagogical partner. Possible forms of collaboration include guest lectures, visits at our industrial facilities, and supervision of final projects. For us, the hosting of final projects provides an opportunity to get help in studying issues of relevance for our operations.

Regards

Roy Jakobsen
Roy Jakobsen
SCM Manager

EY Advisory
Tour Ernst&Young
Faubourg de l'arche
La defense 92037 France
Tel: +33 (0)6 87 27 19 16
www.ey.com

To: Professor Thomas YEUNG

cc: Pierre Dejax

From: Antoine Tokplo, Manager Ernst&Young Advisory

April 27th 2011

Ref: EMN Scheme project

"Support to the EMN SCHEME International Master Project"

To whom it may concern

This letter is to express my full support to the Ecole des Mines de Nantes Supply CHain Excellence in Management and Engineering international Master Project.

I graduated from the "Ecole des Mines de Nantes" in 1998 and thanks to its worldwide exposure, could start an international career that led me to work in North and Latin America and all over Europe.

Over the last 12 years I have worked as a Supply Chain Management consultant, being engaged with High-Tech, Consumer Goods and Process industries worldwide leaders. I have helped deploy improvement initiatives aimed at optimizing the overall demand and supply chain business processes. The "Ecole des Mines de Nantes" gave me the necessary background to comprehend the major functional flows and challenges that international corporations have to face in today's global economy. In my opinion and as a general comment, the Engineering school curriculum is a well-balanced combination of theoretical courses and very practical applications. It allows students to develop a solid foundation of core competencies as well as softer skills to generate a well-rounded overall expertise.

I have kept in touch with the professors of the "Ecole des Mines de Nantes" and alumni, making them key elements of my professional network. I have paid special attention to maintain close links with the program and have participated in several occasions to projects involving the students and faculty members. For several years now, I have been given the opportunity to lead seminars on Supply Chain Management challenges. As a member of the jury, I have also participated in the presentation of the students' final internship, which concludes the training at the engineering school.

I recently joined Ernst&Young, one of the world major consulting firms, to develop the advisory branch dedicated to improving performance for companies around the globe; dealing in particular with supply chain and operations. I intend to continue my involvement with the "Ecole des Mines de Nantes" and to the best of my ability, knowledge and experience on the domain contribute to the school's quest for education excellence. My objective is to keep on providing feedback to the students and help them prepare their transitioning to the early days of their professional careers. This commitment may take several forms; some along the lines of what I have already done (seminars, jury…) or new shapes via the coaching/mentoring of students and interns, partnerships on some industrial projects…

As it is aiming at training the engineers of tomorrow, with very diverse highly demanded profiles, the Supply CHain Excellence in Management and Engineering international Master Project is, in my point of view, full of promises.

Yours Sincerely,

Antoine Tokplo

Manager, Ernst&Young France

Advisory, Performance Improvement, Supply Chain&Operations

EURODECISION
OPERATIONAL RESEARCH

TO WHOM MAY BE CONCERNED

Ecole des Mines de Nantes
Nantes, France

Versailles, April, 27th, 2011

SUBJECT : SCHEME Erasmus Mundus Master project

EURODECISION provides organisations with an end-to-end offer (consulting, software, services) to create decision-support solutions for Supply Chain, Production, Human Resources, and Product Design applications, by means of advanced technologies in Operational Research and Applied Mathematics. The company is an independent SME with 60 engineers and consultants. It operates mainly for major industrial companies such as TOTAL, RENAULT, FAURECIA, ALSTOM, EDF, AIR LIQUIDE, ALCAN, DANONE, AVIS, EUROPCAR to mention here some among several for which we conducted OR based Logistics and Supply Chain projects.

Our cooperation with EMN has a long history, and started actively with Professor Pierre Dejax, more than 20 years ago. Several EMN graduates have been hired by the company, and some of our consultants deliver courses in the Logistics master program (MLPS). One of our Directors, Benoît Rottembourg is also member of an EMN scientific board.

The SCHEME project seems exciting and will provide a great opportunity to extend the MLPS Master in a European and American framework thus offering the students a much broader curriculum. So we are looking forward to reinforce our cooperation through this new instrument. Indeed, most of logistics projects require both high level OR and Logistics specialists and consultants with a strong international experience, English being often the common working language. From this perspective, SCHEME goals and educational program perfectly meets our requirements in hiring new consultants enabling our growth beyond the French area.

For these reasons, we fully support the SCHEME Erasmus Mundus Master project.

Denis MONTAUT (CEO)

Eric JACQUET-LAGREZE (co- Founder)

GE Healthcare

283, rue de la Minière
BP 34
78533 Buc Cedex

T +33 (0)1 30 70 40 40

Professor Thomas YEUNG
Ecole des Mines de Nantes
44000 Nantes ;
France

Le, 20 Avril 2011

MLPS – Erasmus Mundus – SCHEME program

Professor,

Please find enclosed a letter of support to the establishment of an European Master "Erasmus Mundus" SCHEME program as an extension of the Master of Science MLPS (Management of Logistics and Production Systems) of the Ecole des Mines de Nantes.

As Global Manager of the GE Healthcare EMEA Global Parts and Repair Solution Organization (After Sales Supply Chain and Logistics), I have been working in collaboration with Professor Pierre Dejax leading the Master MLPS. As part of this collaboration we are putting in place a specific training for the leaders of my organization and we are also running network improvement projects with Master Students.

As expertise and improvement projects, are important element of our competitiveness. I would be interested to further develop the collaboration with your Laboratory as part of the SCHEME program. The exact content of this additional collaboration is still to be defined but could include our participation to the student education, projects for Master internship and further training opportunities.

With the hope that this letter will be useful for the establishment of the SCHEME program.

Best Regards,

Robert Heidsieck
GPRS EMEA Global Manager
GE Healthcare

HYDRO

NTNU Valgrinda
Inst. for produksjons- og kvalitetstek.
7491 Trondeim

Our date: 2011-04-27
Our contact: .Sindre Bolseth
Page: 1 of 1

Letter of support

Dear Sir/Madam,

On behalf of my company, Norsk Hydro ASA, I hereby express my support of the proposed Erasmus Mundus programme "Supply Chain Excellence in Management and Engineering" (SCHEME). The programme is of high relevance for industry. It will provide its students with the qualitative as well as quantitative knowledge and skills necessary to manage the complexity of today's logistics systems and supply chains of goods and services. The international experience and the collaboration with industry constitute an excellent preparation of the students' professional careers.

I express my company's interest in participation in the programme as a pedagogical partner. Possible forms of collaboration include guest lectures, visits at our industrial facilities, and supervision of final projects. For us, the hosting of final projects provides an opportunity to have studied issues of relevance for our operations.

Yours faithfully,
for Norsk Hydro ASA

istituto sui trasporti
e la logistica
fondazione

Fondazione Istituto sul Trasporti e la Logistica (I.T.L.)
Sede Legale Bologna, viale A. Moro, 38 - 40127 Bologna
P. IVA e C.F 02446681203

Professor Pierre DEJAX
Director of the MLPS Master Program
Ecole des Mines de Nantes, France

Bologna, 19/04/2011

Subject: letter of support to the International SCHEME (Supply CHain Excellence in Management and Engineering) consortium

ITL (Institute for Transport and Logistics) is a non-for-profit organisation based in Emilia-Romagna region (Italy), created by regional Government and other local public entities, devoted to support innovation processes in freight transport and logistics.

The objective of the SCHEME programme to train future managers in technologies which provide decision support and optimization of complex logistics systems and to prepare them to meet the challenges of emerging issues is in line with ITL strategy and correspond to the needs of the main national logistics chains at both demand and supply side.

We hereby express our interest and commitment in sustaining Erasmus Mundus Joint Master's programme SCHEME.

It is hereby agreed that this letter of support does not constitute any financial and/or contractual obligations for our organisation.

ITL President
Ing. Carlo Merli

KONGSBERG

To whom it may concern

Deres ref/Your ref	*Vår ref/Our ref*	*Dato/Date*
	110426 odm	110426

Letter of support

Dear Sir/Madam

On behalf of my company, Kongsberg Maritime, I hereby express my support of the proposed Erasmus Mundus programme "Supply Chain Excellence in Management and Engineering" (SCHEME). The programme is of high relevance for industry. It will provide its students with the qualitative as well as quantitative knowledge and skills necessary to manage the complexity of today's logistics systems and supply chains of goods and services. The international experience and the collaboration with industry constitute an excellent preparation of the students' professional careers.

I express my company's interest in participation in the programme as a pedagogical partner. Possible forms of collaboration include guest lectures, visits at our industrial facilities, and supervision of final projects. For us, the hosting of final projects provides an opportunity to get help in studying issues of relevance for our operations.

Best regards

Oddbjørn Malmo

General Manager Technology
Merchant Marine Division, Trondheim
KONGSBERG MARITIME AS

L'ORÉAL

To,

Pierre DEJAX
Professor in-charge of Master MLPS
Pedagogical Responsible for Master SCHEME
Ecole des Mines de Nantes, Nantes – France

28th April, 2011

Dear Mr. Dejax

This letter is in reference to your request for supporting your new SCHEME program covering Supply Chain Management.
L'Oréal's supply chain is a truly transversal & international organization that aims to serve our customers, and that gives young graduates the chance to express their talent and creativity throughout the Group, in our manufacturing plants, distribution centers, key regions, divisions and subsidiaries.

The organization focuses on three key areas (Manufacturing Supply Chain, Market Supply Chain and Customer Supply Chain) and gives everyone the chance to play an active part in L'Oréal's business, day in, day out. Supply-chain positions naturally involve jobs that require effective interpersonal relations and enhanced understanding of demand and supply planning and physical distribution processes. In a global environment where customers' expectations are increasingly complex, the supply chain is a real service organization which represents a major asset in the bid to maintain a competitive edge in our markets.

Considering the importance of supply chain in our Organisation, we esteem it is important to develop relations with Universities offering specialization programs in Supply Chain Management. The new initiative of Ecole des Mines de Nantes to convert their existing MLPS program to a new Erasmus Mundus –SCHEME program is an ambitious, innovative and interesting project that includes :

- Curriculum covering global logistics and supply chain management and transport of consumer goods and services
- Innovation and state-of-the-art optimization and decision support technologies
- Complementary skills of 4 European and 1 American renowned partner universities
- Partnership between academia and industry at international level
- Very high-quality education of students from European and other countries

We support this initiative and depending on our internal requirements and availability , would like to offer the following benefits of collaboration:

- Participation in Conferences related to Supply Chain Management
- Internship Opportunities, Plant and Warehouse visits

We wish Ecole des Mines de Nantes all the very best in successful completion of this project.

Best regards,

Jean-Louis ROUSSEL
HR Director, Supply Chain, Corporate Operations

SUTTONS GROUP

Gorsey Lane, Widnes, Cheshire, WA8 0GG
Tel: 0151 420 2020 • Fax: 0151 420 0199 • Fax (transport) 0151 420 6159
Email info@suttons-group.co.uk

www.suttonsgroup.com

18th April 2011

To whom it may concern,

Suttons Group is one of the UK's largest, privately owned, specialist logistics companies and it operates globally. It has three divisions - Suttons Tankers, Suttons International and Suttons Distribution.

We very much endorse the Erasmus Mundus SCHEME MSc designed by the University of Liverpool and its partners at Ecole des Mines de Nantes, Norwegian University of Technology, University of Bologna and the University of Clemson (USA).

As an international business, we particularly like the multi-national nature of the programme and the experience it will give to students.

We are generally happy with the syllabus with its quantitative analysis, technology, innovation and e-business elements.

We would be willing to provide projects for students that will give them the opportunity to apply what they have learnt to solve real-world problems. These projects may have a truly international perspective.

Yours faithfully,

Michael Cundy
Human Resources Director

TCI Tire Centers
Centered On Service™

April 28, 2011

Dear Dr. Mason,

I am writing to strongly support Clemson University's participation in the Supply Chain Excellence in Management and Engineering (SCHEME) joint Master's program proposal to Erasmus Mundus. While we at TCI TireCenters, LLC have supported Clemson's industrial engineering efforts in the past, the opportunity for Clemson to partner with four outstanding European universities in this supply chain-focused degree program is very appealing to TCI TireCenters, LLC.

We at TCI TireCenters, LLC value an international perspective and experience in our work force. The proposed SCHEME program will undoubtedly provide its students with this valued perspective, in addition to a world class, theoretical foundation in supply chain and logistics. We are particularly happy that real world experience will be encouraged in SCHEME via internships with companies around the globe in a student's fourth semester in SCHEME.

We are committed to supporting your efforts in this SCHEME Master's program, should it be selected for funding by Erasmus Mundus. The SCHEME students will undoubtedly be a very select group of outstanding scholars who will benefit both Clemson and our company. I look forward to hearing a favorable outcome from your Erasmus Mundus proposal and wish you all our best in your efforts.

Best regards,

Cara Cornelius

Cara Cornelius
Senior Director of Supply Chain & Logistics
TCI TireCenters, LLC

THALES

THALES AVIONICS SA
18 avenue du Maréchal Juin - BP 49
92362 Meudon-la-Forêt Cedex
France
Tél. : +33 (0)1 39 45 50 00
Fax : +33 (0)1 39 45 50 30
www.thalesgroup.com

Meudon, April 26th 2011

Thales is a global company with 68,000 employees and €13.1 billion in revenues
We help our customers to:

- Provide reliable and secure solutions
- Monitor and control
- Protect and defend

In two major sectors: Aerospace and transport, Defence and security

in Aerospace, we are Serving aircraft manufacturers, airlines and civil aviation authorities, addressing the need for continuous improvement in air transport safety and efficiency.

Supply Chain is key in our value Chain. We need to continuously improve our performances of Quality and On Time Delivery. Airlines are very demanding and play in an international environment.

We are strongly supporting the Supply CHain Excellence in Management and Engineering Master, through internships, testimonies, Best Practices sharing, case studies and we are already involved in the training definition and execution.

This initiative will reinforce Thales Presence on all types of civil and military aircraft and all major new aircraft programmes.

Michel Baujard
Continuous Improvement Leadership Team

TOLLPOST GLOBE

Professor Heidi C. Dreyer
Department of Production and Quality Engineering
Norwegian University of Technology and Science, NTNU
SINTEF Technology and Society
NO-7491 Trondheim, Norway

Oslo, 27th of April 2011

SCHEME "Supply Chain Excellence in Management and Engineering"

Dear Sir/Madam

On behalf of Tollpost Globe, I hereby express my support of the proposed Erasmus Mundus programme "Supply Chain Excellence in Management and Engineering" (SCHEME). The programme is of high relevance for industry. It will provide its students with the qualitative as well as quantitative knowledge and skills necessary to manage the complexity of today's logistics systems and supply chains of goods and services. The international experience and the collaboration with industry constitute an excellent preparation of the students' professional careers.

I express my company's interest in supporting the programme as a pedagogical partner. Possible forms of collaboration include guest lectures, visits at our industrial facilities, and supervision of final projects. For us, the hosting of master projects provides an opportunity to have studied issues of relevance for our operations.

Best regards,

TOLLPOST GLOBE AS

Ole A. Hagen
Director

Wynright
Intralogistics

April 29, 2011

Scott J. Mason, PhD | Clemson University | www.clemson.edu
Fluor Endowed Chair in Supply Chain Optimization and Logistics
Chair, South Carolina Center of Economic Excellence in Supply Chain Optimization and Logistics

Dear Dr. Mason,

Wynright Intralogistics supports SCHEME (Supply Chain Excellence in Management and Engineering) and the program's goals which are to provide students with the unique opportunity to develop their fields of competence and to enlarge the scientific scope of the program through the internationalization of the logistics curriculum. As leaders in providing material handling solutions that support our customer's Supply Chains, Wynright is very interested in participating in this international consortium of academic and industrial partners and contributing to the goal of educational excellence for future students in this prestigious program.

Wynright Intralogistics has provided high-end integrated material handling solutions for both US and international customers for over 40 years. Our headquarters are in Elk Grove, IL and we have offices in 11 states throughout the United States. We provide an array of design, engineering, products, technology, and implementation services that transform the Intralogistics operations of our customers into highly efficient systems and networks. Wynright's mission is to create unsurpassed value in the growing Intralogistics marketplace. We believe that the benefits realized from our association with SCHEME will support this mission.

I would like name Chris Graver, PE, Director of Design Services, as Wynright's designated point of contact for this program. We look forward to working with you to determine the appropriate level of contribution to SHEME and to working with Clemson University and the other renowned institutions to enhance educational opportunities in the field of Supply Chain Optimization and Logistics.

Sincerely,

Clint Lasher

President
Wynright –Oak Lawn

11000 South Lavergne Avenue Oak Lawn, Illinois 60453-5500
Phone: 708-636-4200 Fax: 708-636-4209
www.WynRight.com

POUR AMELIORER VOS PERFORMANCES AVEC SERENITE

Professor Thomas YEUNG
SCHEME International Master
Project coordinator
Ecole des Mines de Nantes
BP 20722
44307 Nantes Cedex 3, France

Sir,

B & D is a Consulting Company specializing in Strategy and Organization for more than 15 years.

We work also on collaborative programs in the region of "Les Pays de Loire", in France on topics such as innovation in the aerospace companies and partnership on international programs with different departments of the industries and SMEs.

B & D is a partner of the school of Mines for more than 10 years and wish to continue its participation in the teachings of strategy and Management quality students, organize visits in regional companies, allow trainees study project or research internship.

But B & D can also offer conferences, develop research on the subjects of the Master collaborations, propose candidates engineers for training or hire or get hired graduates, also the program SCHEME represents an opportunity not only for students but also for companies in international collaborative projects.
Programs such as: "Dinamic" "Acamas" together more than 700 companies each.

To date more than half have projects internationally but without there be prepared both the "international relationship" that logistically, so we see the importance of supply chain management and technology optimization and decision at the European and international level for these companies.

After examining the program without its entirety and details of the various modules we are convinced that it meets a strong request of the companies in their development at the international and the rapprochement of countries between them, the sharing of culture, the knowledge and economic exchanges.
We hope that the SCHEME program can see agenda and develop up to the challenges it represents.
We give our full support for this program and confirm our agreement to participate

Wishing you good receipt of this mail,
Best regards

DELPLACE Laurent

Dirigeant de B&D Consulting

25, la Grellerie - 44140 Le Bignon - France -http://www.b-et-d.com
Tel. +33 (0)2 40 26 14 55 - Fax. +33 (0)2 40 32 39 05 - E-mail : contact@b-et-d.com

Student agreement

ERASMUS MUNDUS MASTERS COURSE "SCHEME"

European joint Masters in Supply CHain Excellence in Management and Engineering

YEAR 2012-2014

The present student agreement is signed by

The Ecole des Mines de Nantes, established in 4, rue A. Kastler BP 20722 44307 Nantes cedex 3, France, Coordinating Institution of the Erasmus Mundus Master course SCHEME master, European joint Masters in Supply CHain Excellence in Management and Engineering and, hereafter referred to as "the Institution"represented by Stéphane Cassereau, Director.

on the one part,

and

Name: _____

First name: _____

Date of birth: _____

Place of birth: _____

Nationality: _____

Passport number: _____

hereafter referred to as "the Student", on the other part,

The agreement is applicable for all partner institutions where students complete a module or gain ECTS credits.

General principles

The student has been admitted to attend the European joint Masters SCHEME, "Supply CHain Excellence in Management and Engineering", having a duration of 2 academic years, beginning on September 2012. According to his/her choice of specialities, the student will study in at least two of the five institutions of the SCHEME consortium: Ecole des Mines de Nantes (France), Norwegian University of Science and Technology (Norway), University of Liverpool (UK), University of Bologna (Italy) and Clemson University (USA). A co-supervised industrial or research project (Master thesis) takes place during the second year of the Master in accordance with the programme of studies supported by the European Commission.

Degree awards

On successful completion of the whole programme the student will receive the Master degrees from the two institutions in which he/she has studied. In addition the student will receive a Diploma Supplement. This aims to improve international "transparency" and facilitate fair academic and professional recognition of qualifications (degrees, certificates, academic knowledge and skills, etc.) It will provide a description of the nature, level, context, content and status of the studies that were successfully completed by the student. The final decision on

awarding the degrees is taken by the academic board of each institution concerned in consultation with the academic board of the consortium. Their decision is final.

Obligations of the student

#1. In order to participate in the Masters programme, the Student is required to pay tuition fees as follows :

- Category A scholarship holders : 16 000€
- Category B scholarship holders : 8 000€
- Third country non-scholarship holders : 16 000€
- European student non-scholarship holders : 8 000€

Scholarships may be granted to selected students according to the terms mentioned in Annex 1.

The scholarship does not create or entitle an employer-employee relation between the University and the Student, and therefore is not subject to direct taxation.

#2. Under the present contract, the Student is obliged

• To comply with the regulations of the host institution where he/she is studying

• To comply with the overall SCHEME regulations with regard to:

- the rules of progression from semester to semester
- organisation of the Master thesis work

• To attend assiduously, and with the objective of successfully passing, the modules, and the thesis inherent in the programme of studies. Attendance will be recognised by the respective institutions as integral parts of the qualification for which the Student is preparing, provided the Student is successful in the respective examinations and/or assessments.

• To participate in one of the language courses offered in the host institutions if applicable.

• Not to receive any other scholarship or grant financed by the European Commission under other Community programmes

#3. The student is not entitled to embark on any vocational occupation with a regular salary in parallel to the studies under the ERASMUS MUNDUS European Masters.

#4. Any alteration to the present Contract or respective Annexes must be communicated in writing. All alterations to the initial situation must be immediately communicated by the Student to the Institution. Upon mutual agreement of contractual modifications, the Institution will issue an agenda to the present contract.

#5. Any deliberate failure on the part of the Student to fulfil the conditions expected in terms of attendance at the ERASMUS MUNDUS European Masters, in particular non-fulfilment of the conditions stipulated in the present Contract, constitutes sufficient reason for action to be taken towards resolving the issue and could led to reimbursement of the scholarship awarded. In the case of reimbursement, the Institution will determine the amount to be reimbursed.

#6. Without prejudice to the general consequences laid down in national law applicable in the present Contract, the Institution reserves the right to cease the effects of the present Contract, without recourse to any juridical procedure apart from adequate communication to the student. Failing agreement by both parts, the French courts are designated as the only competent authorities to resolve any legal dispute

between the Institution and the Student emerging from the Contract. The present Contract will be governed by French Law.

#7. The Institution is exonerated from any responsibility for accidents, illnesses, injuries, losses or damages to persons or goods resulting from or in any way related to the activities that are the object of the present Contract. The Student is obliged to accept the necessary insurance related to the activities for the full duration of the study period.

#8. The following annexes constitute an integral part of the present Contract:

The signatories declare that they have read and accept the conditions laid down in the present Contract.

Signed in _____, on _____

The student, _____,

Signed in _____, on _____

Director of the SCHEME Coordinating Institution: Stéphane Cassereau.

ANNEX 1

SCHEME

SCHOLARSHIP AWARD AGREEMENTS

- Category A. scholarship agreement

EUROPEAN JOINT MASTERS IN SUPPLY CHAIN EXCELLENCE IN MANAGEMENT AND ENGINEERING(SCHEME) : PAYMENT TERMS FOR TUITION FEES

For the academic period 2010 – 2012, the tuition for the European joint Masters SCHEME is 16,000 €.

Students who have a scholarship from the European Commission under the Erasmus Mundus programme must pay the tuition by authorising the consortium coordinator institute (Ecole des Mines de Nantes) to debit the tuition from the scholarship. The scholarship instalment payment schedule will be determined based on the tuition fees debited at the beginning of the programme.

To set up this debit system, scholarship students must sign the form below authorising the consortium coordinator (Ecole des Mines de Nantes) to debit the tuition fees from their scholarships.

I the undersigned,_____, a student enrolled in the European Joint Masters SCHEME programme and having a scholarship from the European Commission under action 1 of the Erasmus Mundus programme, hereby authorise the Ecole des Mines de Nantes, SCHEME consortium coordinator, to debit the tuition fees, namely 16,000 €, from my scholarship.

I confirm that I have read the scholarship instalment payment calendar printed below, from which the tuition fees have been debited.

The respect of this calendar is dependent upon the payment of the funds by the European Commission.

Scholarship amount: **48,000 €** Scholarship balance paid to student: **32,000 €**

Tuition fees: **16,000 €**

	Lump sum payment to student (beginning of semester)	**Monthly payments to student (except in August)**		**Total per year**
		Monthly payment	**Total per semester**	
Semester 1 (Sep - Jan)	4,000	1,000	5,000	**18,000**
Semester 2 (Feb - Jul)	3,000	1,000	6,000	
Semester 3 (Sep - Jan)	3,000	1,000	5,000	**14,000**
Semester 4 (Feb - Jul)	3,000	500	3,000	
TOTAL	13,000		19,000	**32,000**

Signed in _____, on _____

The student, _____,

Category B Student scholarship agreement

EUROPEAN JOINT MASTERS IN SUPPLY CHAIN EXCELLENCE IN MANAGEMENT AND ENGINEERING(SCHEME) : PAYMENT TERMS FOR TUITION FEES

For the academic period 2012 – 2014, the amount of the tuition fees for EM scholarship European holders is 8,000 € (insurance included) for the 2-year duration of the SCHEME program.

Students who have a scholarship from the European Commission under the Erasmus Mundus programme must pay the tuition by authorising the consortium coordinator institute (Ecole des Mines de Nantes) to debit the tuition from the scholarship. The scholarship instalment payment schedule will be determined based on the tuition fees debited at the beginning of the programme.

To set up this debit system, scholarship students must sign the form below authorising the consortium coordinator (Ecole des Mines de Nantes) to debit the tuition fees from their scholarships.

I the undersigned,_____, a student enrolled in the European Joint Masters SCHEME programme and having a scholarship from the European Commission under action 1 of the Erasmus Mundus programme, hereby authorise the Ecole des Mines de Nantes, SCHEME consortium coordinator, to debit the tuition fees, namely 8,000 €, from my scholarship.

I confirm that I have read the scholarship instalment payment calendar printed below, from which the tuition fees have been debited.

The respect of this calendar is dependent upon the payment of the funds by the European Commission.

Scholarship amount: **20,000 €** Scholarship balance paid to student: **12,000 €**

Tuition fees: **8,000 €**

	Lump sum payment to student (beginning of semester)	**Total per year**
Semester 1 (Sep - Jan)	4,000	**7,000**
Semester 2 (Feb - Jul)	3,000	
Semester 3 (Sep - Jan)	3,000	**5,000**
Semester 4 (Feb - Jul)	2,000	
TOTAL	12,000	**12,000**

Signed in _____, on _____

The student, _____,

Award Criteria
A – Erasmus Mundus Masters Courses (EMMCs)

A.1 Academic Quality – Course Content

A.1.1 Describe the EMMC **objectives** (including in socio-economic terms) in relation to the **needs analysis** in the field(s) concerned.

The objectives of our Supply Chain Excellence in Management and Engineering (SCHEME) program may be summarized as follows:

Objective 1: Our consortium seeks to offer an international program of the highest level specialized in Supply Chain Management (SCM) that provides both a managerial and quantitative perspective and dedicated semesters focusing on emerging applications for today's and tomorrow's challenges in industry and research.

Need: There is a very large and growing demand for supply chain managers. In 2010, "The 8th Annual Global Survey of Supply Chain Progress" noted that supply chain management (SCM) is now perceived by the vast majority (82%) of respondents as being of core business importance." Furthermore, 78% of companies reported that their emphasis on SCM has increased in the last 12 to 24 months of the global economic downturn. This demonstrates that having efficient and effective supply chains becomes even more important in critical times. Within Europe, 67% of organizations reported SCM as having a great deal of influence in running the business. Moreover, half of all companies also have an executive officer, reporting directly to the chief executive officer (CEO), who manages all supply chain functions. In the global economy, the performance of supply chains in terms of productivity and quality of service is a strategic asset to provide a competitive edge to leading companies. These issues have to be addressed within the framework of sustainable development. In the 2011 report on "Key Technologies for 2015" that was recently published by the French Ministry of Industry, the "Optimization of Supply Chains" has been recognized as one of the key technologies for the future. The needs analysis with respect to existing programs in the field is provided below in Section A.1.2.

Objective 2: Address the inter-disciplinary field of innovation management in the context of SCM. We provide a dedicated semester, given by the University of Bologna, focused on the management of innovation. This inter-disciplinary field will expose our students to a concept that most SCM students will never see. No other program in the world provides a dedicated semester to innovation and this will give students of SCHEME a competitive advantage as rapid advances in technology must be implemented quickly and effectively.

Need: The Global Commerce Initiative (GCI) in association with Capgemini consultants published "Future Supply Chain 2016." In this report, they note new technology trends and the explosion of information will play a big role in the future, specifically the adoption and use of new technologies.

Objective 3: Offer specialty applications of emerging issues in SCM in the third semester of our program. While providing comprehensive training on the global aspects of SCM in the first two semesters, the SCHEME program will also offer specific focuses on key components such as manufacturing, procurement, distribution transport and service logistics.

Need: Unlike any other SCM program, our consortium offers a third semester dedicated to specialty applications in emerging issues of SCM. Among these is a semester dedicated to E-business offered by the University of Liverpool. This semester will address SCM in a world dominated by the internet. The

"Future Supply Chain 2016" notes that there will be an "explosion of information" and information flow and "open information sharing will be an important foundation to help companies anticipate demands." The United Kingdom has the largest e-commerce market in the world when measured by the amount spent per capita, even higher than the USA. It is fitting that our UK partner will deliver this specialty. Furthermore, the internet economy in the UK is likely to grow by 10% between 2010 and 2015. Similar increases are expected worldwide as US eCommerce and online retail sales are projected to reach US $197 billion in 2011, a 12% increase over 2010. Amongst emerging economies, eBusiness presence continues to expand. For example, with 384 million internet users, China's online shopping sales rose to US $36.6 billion in 2009.

This information sharing dynamic is integrated into other specialty semesters such as the NTNU's emphasis on information and communication technologies (ICT) in their 3rd semester offering on advanced manufacturing operations. NTNU will also address the latest manufacturing technology as well as its implementation. The Future Supply Chain 2016 notes that the implementation of new manufacturing technology will be key in future competitiveness.

The EMN will offer an emphasis on the global optimization of complex supply chains in a closed-loop framework, including reverse logistics. Reverse logistics focuses on building a sustainable supply chain by addressing product recycling, packaging recycling, and returnable assets. Reverse logistics is noted as one of the seven key solution areas for the Future Supply Chain 2016. The Future Supply Chain of 2016 will also see a dramatic redesign in order to address collaborative transport from collaborative warehouses with new key performance indicators (KPI) such as CO_2 reduction. The renowned expertise in transport optimization of the University of Bologna will provide students with the methods to meet these new challenges in the second semester that will also be addressed by EMN in the third semester, with a strong focus on the various aspects of vehicle routing in a reactive environment. Finally, almost all SCM programs are from the sole perspective of bringing large quantities of consumer goods to market. However, supply chains serve other dimensions such as the unique features of large-scale, one-of-kind projects such as bridges, damns, and nuclear power plants. This unique perspective looks at a supply chain for a single product, rather than the multiple-product point of view of traditional consumer goods supply chains. Clemson University will provide a specialty semester on these capital project supply chains to help students understand the particular needs of such large-scale projects.

Objective 4: Provide the students with an international, multi-cultural, multi-disciplinary experience.

Need: As the Future Supply Chain 2016 will be a global affair, it is important that future supply chain managers understand how to operate in an international context with the ability to respect and appreciate different cultures and systems of working. Through the mobility and inter-disciplinary components of SCHEME, students will receive the necessary skills to prosper in the global marketplace.

A.1.2 Explain the EMMC's **added value** compared with existing masters courses in the same field at national, European, and international level.

Managing supply chains and manufacturing networks is one of the most important and challenging issues addressed by today's industry. Due to the significant globalization and outsourcing wave in the industrial sector, companies have chosen to strengthen their competitiveness through strategies as global sourcing and outsourcing non-core activities. This broadens the supply chain structure and makes it more complex. As the complexity of the supply chain and network structure increases there is a need for multidisciplinary and specialized knowledge, competence and methods, as well as how to apply and utilize advanced technology. Education and training of the next generation supply chain managers should provide students with in-depth knowledge of the problems and complexity in the supply chain, as well as methodology and tools for problem solving and improvements.

The European industry is one of the world's most advanced and fast changing industrial sectors. Thus the SCHEME partners have decided to develop a joint master program which will support the industrial sector with highly specialized knowledge in supply chain management. It is motivated by:

The increasing level of qualification and specialization in supply chain management: education in SCM usually makes up only a small part of much larger, more general MBA or Industrial Engineering (IE) programs. Only a few programs focused specifically on SCM exists and they tend to be short, compressed programs lasting one year or less. Even though these programs claim to specialize in SCM, they are only able to provide an overview of the domain and they have a limited emphasis on optimization and decision technologies. Thus, top managers are not fully aware of the availability of advanced optimization methods that are necessary for addressing the complex challenges faced by the optimization of supply chains to reach a leading edge in performance and competitiveness. Similarly, engineers are not equipped with sufficient management skills to balance theory and application. The SCHEME consortium addresses these shortcomings by providing a set of SCM master courses which is fully integrated and designed to achieve a focused specialized education. The students receive a first joint semester, rather than the traditional parallel framework. This ensures students understand core concepts of SCM and its various applications before delving into advanced quantitative methods. Then the students can choose between four directions within SCM. Furthermore, the close collaboration with industrial partners and the project and internship activities will increase both the specialization and applicability of the education.

- **Supply chain management is a multinational and interdisciplinary field:** Currently, courses in SCM are provided in detached university programs where courses are provided by one single university. Additionally most programs are offered by either business schools as a part of an MBA program or engineering schools at the master's level of a degree in industrial engineering (IE) or operations research (OR). Thus, SCM tends to be delivered either purely from a management (business schools) or quantitative and theoretical (engineering schools) point of view. By recruiting students from European and non- European countries, involving industrial companies from two continents and joining educational resources from five different countries SCHEME focuses strongly on the global and interdisciplinary core of SCM. The program will provide students with required skills and knowledge, and the industrial and educational sector will contribute from the partner network which is established. The moving among different institutions provides students not only diversity of curriculum, but also of language, culture and experience. This mobility component echoes today's global supply chain where a product may be produced, assembled and delivered on three different continents.
- **Only the five partners combined can offer the range of specialization:** The SCHEME consortium is carefully joined based on the profile of each partner. Each partner offers a specialization within its field and brings in industrial partners representing this specialization. The partners profile is closely connected in a unified program which offers the students several alternatives and creates flexibility.
- **Critical mass to teach more and better content and quality:** The number of partners and courses and the core team of lecturers involved increases the quality of the program. We offer four distinct specialty semesters on emerging issues in SCM based on the expertise of our consortium partners. These emerging issues (e-business, capital project chain, manufacturing technology and reverse logistics) are highly relevant in today's world (see references to the Future Supply Chain 2016 above) and specialties that cannot be found in any other program. The program distinct from others in the field, requires a 6-month internship which may be industrial or research based. This provides our students with the practical application and experience to directly engage in their field upon graduation whether that may be industry or research.
- **Preferred MSc in supply chain management:** SCHEME will attract and recruit top-rated students. The industrial consortium which is involved in the program will contribute with

strategic important problems and challenges which both will attract students. Together with the quality of the education this will secure that SCHEME will become the preferred education in SCM *.

(*) *U.S. News and World Report* ranks the Massachusetts Institute of Technology's (MIT) Supply Chain Management Master's degree as the #1 degree in the nation provided by a business school. This program only provides 4 courses with a specific focus on SCM and all in a general context. Similarly, *Business Week* ranks INSEAD (Fontainebleau, France) as the #1 business school in Europe. INSEAD does not offer a specific master's degree in SCM, or even an SCM emphasis in their full-time MBA program. They only offer a one-year program targeted for executives. On the engineering side, top engineering programs around the world such as Cambridge University, MIT, and Stanford University do not offer specific programs in supply chain methodologies only a few courses within their IE/OR curriculums and their courses tend to be highly theoretical with little practical application.

A.1.3 Present the **structure and content** of the EMMC and justify the added value and relevance of the **mandatory mobility** component.

The joint master program is a two-year experience comprised of four semesters of at least 30 ECTS each (semesters at EMN are 32 ECTS as they include credit for French language courses). A summary of SCHEME can be found in Figure 1. The detailed course list of each semester can be found in Table 1. All students will have a common starting point, and then presented with two thematic choices in the second semester. This is followed by a third semester with a choice of four parallel tracks of specialty applications in emerging fields. The fourth semester consists of either an industrial or research-based internship that may be managed by any of the consortium members, depending on the subject. As a consequence of the structure, students will be required to visit at least two different institutions; however, almost all of the tracks involve visiting three of the five institutions.

The first two semesters provide a multi-disciplinary framework combining technology and innovation and supply chain management (SCM). All students will commence their studies at the EMN in Nantes, France. This original semester will be divided into two parts conducted in series rather than the traditional parallel framework. The first part of the semester will cover core supply chain management (SCM) concepts and applications, while the second part will draw upon the expertise of the EMN in the area of mathematical modeling and optimization and decision support techniques for SCM. The motivation behind this approach is that students will have a better understanding of these techniques after they have been given an overview of SCM and its applications. This semester also provides a combination of management and quantitative aspects rarely seen in supply chain programs. The motivation for having a common first semester at EMN is three-fold: 1) All students will have the identical foundation to ensure uniform preparation for the future semesters, 2) A common starting point will serve to build a social foundation and rapport among the cohort, and 3) EMN is the only partner with an existing master focused on SCM who can provide the necessary foundation courses both in management and optimization technologies. In addition EMN will offer all the students a specific program called CEPO (Competency evaluation and professional objectives) aimed at providing them with the professional support to determine their future goals, including for specialty and internship preparation. A number of conferences and on-site visits to industrial firms will also be organized to highlight current challenges and supplement the academic courses.

The second semester allows the students to choose a theme in manufacturing technology at NTNU in Trondheim, Norway or a multidisciplinary experience to incorporate innovation management into SCM at the University of Bologna. These concepts will prepare students to deal with ever emerging new technologies in a global economy. At NTNU, students will also be exposed to the management of global production in addition to the technology emphasis. Similarly, 25% of the semester content in Bologna will enrich the optimization knowledge initiated at EMN with a transportation optimization focus provided by their world-renowned faculty in this area. This semester continues one of our themes of combining management and quantitative aspects of SCM. We feel that that these two themes are highly important, however, students will obviously not be able to have both semesters. Therefore, we are providing common knowledge within the curriculum. Students going to Bologna will receive a flavor of the manufacturing technology provided by NTNU, and similarly students attending NTNU will receive a flavor of the innovation and transport provided by Bologna. This will be accomplished through the mutual course design as well as some professor exchanges.

For the third semester, students will have a choice of one of four different specialty applications of SCM that address emerging issues in today's modern economy as well as for the future. Each specialty is provided by a different partner in the consortium based on their expertise and therefore a different location. Note that students may follow all paths in Figure 1 as the program is designed such that students will receive the necessary prerequisites for any specialty in Semester 3 from Semester 2 whether they choose NTNU or Bologna. The four specialties include (1) e-Business logistics from the University of Liverpool which details how SCM is integrated into a world dominated by the internet and e-commerce. Clemson University in the USA will provide an application of SCM to (2) large-scale capital projects. These are large-scale, one-of-a-kind projects such as nuclear power plants, bridges and tunnels where a single product is considered rather than the traditional high-volume production and distribution. It will also be possible to visit NTNU in the third semester for their specialty in (3) advanced manufacturing operations and information and communications technology. Finally, students have the option of returning to the EMN to pursue a more quantitative focus in (4) Optimization and Decision Support for the design of complex supply chains and transportation systems with the study of challenging problems such as reverse logistics, facility location, port logistics and vehicle routing in a real-time reactive environment. Reverse logistics is an emerging area that seeks to make supply chains more sustainable by closing the loop and dealing with products after their normal useful life through proper repair, recycling, or disposal. Furthermore, the recent developments of Information and Communication technologies provide incentives for companies to operate in a real-time, reactive environment, thus pushing forward the utilization of adavanced reactive tools especially for transport optimization.

The final semester is a 6-month internship that may be industry- or research-oriented, which is also a unique feature of SCHEME. Students have the option of choosing to carry out an internship within a company in order to apply the skills they have learned on a real-world project, or they may choose to perform research with a professor in one of the member institutions. In either option, the students will deliver a written Master's thesis that will detail the work and accomplishments of the internship that must be defended orally in front of an academic committee. These two options can prepare students for either a career in academia (research internship) or industry (industrial internship). The research internship will give students valuable research experience and the opportunity to publish in order to prepare them for a doctoral program. Similarly, an industrial internship provides the students with real-world experience prior to entering the field.

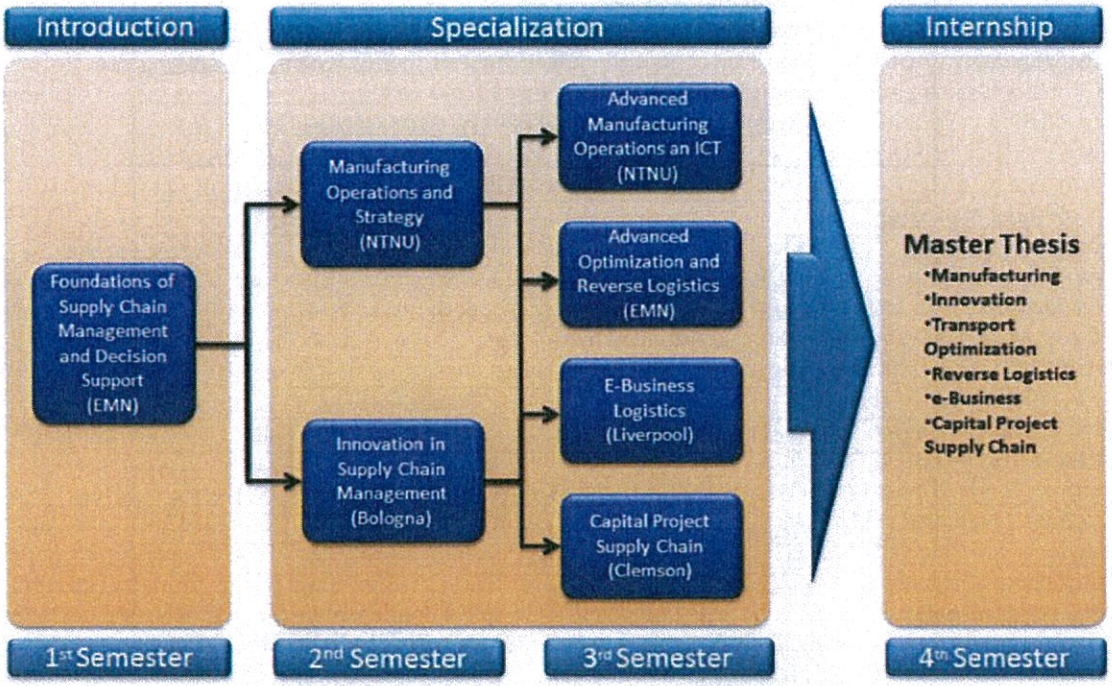

Figure 1. Overall Structure of the SCHEME Program

Table 1. Program Detail: Courses and Content

Location	Period	
SEMESTER 1 (Fall)		
EMN	Fundamentals of SCM & Optimization/Decision Support Technologies	
	Course	*ECTS*
	Fundamentals of SCM	6
	Production & Operations Management	5
	Operations Research	6
	Decision Making Under Uncertainty	6
	Management Technology	6
	Seminars/Field Visits	1
	CEPO (Competency evaluation and professional goals)	
	French Language and Culture (extra credit)	2
	Total	*32*
SEMESTER 2 (Spring)		
NTNU	Manufacturing Operations and Strategy	
	Course	*ECTS*
	Manufacturing Strategy	7.5
	Logistics & Production Management	7.5
	Industrial Systems Engineering	7.5
	Robot Technology & Automatic Assembly	7.5
	Total	*30*
UNIBO	Innovation in SCM & Advanced Optimization in Transport	
	Course	*ECTS*

	Resources optimization	6
	Decision support systems - Transport	6
	Economics and management of innovation	6
	Entrepreneurship and new venture in high tech	6
	Integrated manufacturing and logistic systems simulation lab	6
	Total	*30*
SEMESTER 3 (Fall)		
NTNU	Advanced Manufacturing Operations and ICT	
	Course	*ECTS*
	ICT-Based Production Management	7.5
	Advanced Manufacturing Operations: Specialization Project	7.5
	ERP and PLM Systems	7.5
	Applied Computational Intelligence in Intelligent Manufacturing	7.5
	Total	*30*
EMN	Advanced Optimization and Reverse Logistics	
	Course	*ECTS*
	SC/Transport Optimization & Special Topics	6
	Production Planning & Scheduling	5
	Advanced Operations Research	6
	Information Systems for SCM	5
	Project on selected topics	7
	Seminars/Field Visits	1
	CEPO /internship preparation	
	French Language & Culture (extra credit)	2
	Total	*32*
ULMS	e-Business	
	Course	*ECTS*
	e-Business Tools & Technology	10
	e-Business Systems	10
	e-Business Strategy	10
	Total	*30*
CU	Capital Project Supply Chain Management	
	Course	*ECTS*
	Capital Project Supply Chain	7.5
	Supply Chain Design and Control	7.5
	Manufacturing Systems Planning and Design	7.5
	Capital Projects Supply Chain Case Studies	7.5
	Total	*30*
SEMESTER 4 (Spring)		
Any partner	Master Thesis (Research- or Industry- based internship)	30

A.1.4 Justify the **learning outcomes** relevance in view of the students' **future academic opportunities** (e.g. at doctoral level) and **employability**.

As noted in the needs analysis, the integration of management and quantitative methods is not normally found in SCM programs. Moreover, SCHEME provides a balance between the study of global supply

chains and more detailed analysis of specific components. We seek to prepare students for careers in both industry and academia by offering a program that balances management with quantitative aspects of supply chain operations. Students who choose to work in industry will have the management skills to function at the highest level as well as the quantitative rigor to understand complex mathematical models and optimization techniques presented to them. Our courses will be given from many different perspectives from academic and industry professors as well as consultants. Lectures are also supplemented by conferences on specific topics and field visits to industrial or logistic sites to illustrate key challenges and achievements. Furthermore, guest lecturers from industry will keep students up to date with the latest best practices. Employers will find these experiences to be highly valuable as they seek new recruits. The knowledge on manufacturing technology and innovation will be highly valued by employers who look for managers who can adapt and adjust in today's rapidly changing field. Furthermore, the distinct specialty applications offered by our program will expose students to the cutting edge practices in emerging fields of the Future Supply Chain 2016 that employers will be looking for. Finally, the 6-month industrial internship conducted in a company will give the student valuable work experience in applying the supply chain principles and concepts learned in the classroom in a real-world setting. The industrial internships often lead to full-time employment for the students.

Students who plan to further their education at the doctoral level will be well-prepared for a career in research by our program. Our program offers strong quantitative theory and optimization in addition to management. The curriculum will also cover research methods and include research projects. Moreover, the specialty applications in emerging issues will expose to the students to the latest research questions through faculty who actively work in these areas and bolstered by guest-lecturers from academia. These emerging issues have a wealth of problems that need to be addressed by research and can be done so through a Master's thesis under the supervision of our faculty. Our program will seek to produce high-level research at the Master's level that will be published in international peer-reviewed journals. With the theory and quantitative rigor obtained in our program, students will be strongly prepared for doctoral course work and will have valuable research experience for their doctoral thesis which may be performed within the partner institutions or elsewhere.

These global competencies may be summarized in the following list. Students will be able to:

A. Understand the operations of global supply chains along with detailed knowledge of its specific components
B. Manage supply chains at the executive level while understanding complex quantitative methods for decision support and optimization
C. Understand the management of innovation and the use of technology in SCM
D. Specialize in a cutting-edge, emerging issue in SCM.
E. Have significant real-world industrial or research experience through the 6-month internship
F. Able to pursued a career in both academia (research) and industry
G. Have an interdisciplinary education in an international and intercultural context

The learning outcomes for each semester course can be found in detail in Table 2 below.

Table 2. Learning Outcomes

	Course	Targeted Skills		Targeted Knowledge
		Field	Specific competencies	
SEMESTER 1 (Fall)				
Sem. 1 (EMN)	Fundamentals of (SCM)	Management	Able to understand and master the context, goals , organization and methodologies of SCM's in a competitive environment	Fundamental concepts of supply chain management, production, distribution and transport systems : goals, physical and information flows, planning methods, performance evaluation
	Production & Operations Mgmt.	Operations Management	Able to master the concepts and methods of production, procurement and inventory management	Production management & planning concepts and methods (planning, MRP method), procurement and inventory management goals and methods
	Operations Research	Quantitative methods / Optimization	Able to practice the fundamental tool of Operations Research	Operations Research methods, models and algorithms (linear and integer programming, graphs and network flows) - theory and applications with solvers
	Decision making with uncertainties	Quantitative methods	Able to master the concepts and tools of decision making with uncertainties	Industrial probability and statistics, forecasting methods, discrete event simulation : theory and applications with software
	Management techniques	Management	Able to understand and practice the goals and methodologies of the strategy of the firm applied to SCM and the techniques of project management. Able to work in teams in an	Strategy of the firm, project management techniques and in an intercultural environment, communication and team working
	Seminars & Field visits	Corporate World	Able to understand the differentiation of SCM concepts depending of the particular sector and context of a firm and be exposed to real life applications and tools	seminar on selected topics and field visits to companies on topics relevant to the program
	CEPO	Social sciences	Able to determine one's goals and potentials in preparation to internship and future career	methods and tool for determining individual objectives and goals
	French Language and Culture	Foreign Language	Able to understand and practice French and understand the French culture	French language and culture with specific level groups
SEMESTER 2 (Spring)				
Sem. 2 (NTNU)	Module 1	Operations management	Able to establish, structure, and manage global manufacturing enterprises in such a way that the overall competitiveness is improved.	Development of manufacturing strategies for global enterprises.
	Module 2	Operations management	Able to analyze, develop and perform logistics and control processes in manufacturing companies	Principles, tools and systems for planning and control of logistics and production
	Module 3 - e-Business Strategy	Systems engineering	Able to understand, analyze, plan, and design products, services, and processes in modern production enterprises.	Concepts, principles and tools from systems engineering and systems thinking.
	Module 4	Production engineering	Able to understand, design and control manufacturing equipment and methods in industrial and consumer goods manufacturing	Manufacturing equipment, machines and methods in industrial and consumer goods manufacturing
Sem. 2 (Bologna)	Module 1 Resources optimization	Operations research and optimization	Able to analyze complex decisional problems using advanced optimization methods and techniques	Most effective techniques for the solution of complex decisional problems arising in the optimal planning and management of large scale systems
	Module 2 Decision support systems	Operations research and optimization	Able to apply advanced optimization methods, techniques and software applications to complex transportation systems	General methods and mathematical models applied to the management of complex systems in the transportation sectors. Outline of the solution methods generally available as commercial or
	Module 3 Economics and management of	Innovation management	Able to develop the analysis of innovation opportunities of operations and logistics systems, integrating economic, managerial and technological perspectives	Technology and innovation management methods, techniques and experiences in operations and logistics
	Module 4 Entrepreneurship and	Innovation management	Able to identify and value entrepreneurial opportunities which have the potential to be exploited commercially; able to develop a business plan for an innovative new venture.	Structure, phases and key roles of the entrepreneurial process. Integration of technical, functional and managerial knowledge to new venture creation and growth.
	Module 5 Integrated manufacturing and logistics systems	Operations management and Logistics	Able to understand the concepts underlying process simulation; Know the range and capabilities of simulation; Create a simulation of a complex production system; Produce and interpret a simulation report; Realize and analyze What-If scenarios.	Methods and tools for the design and simulation of the most important aspects of integrated production and logistic processes

SEMESTER 3 (Fall)				
Sem. 3 (EMN)	Module 1- Supply Chain & Transport Planning and Optimization	Quantitative methods / Optimization	Able to analyze, model and solve complex innovative problems of supply chain network design and transport problems	Supply Chain network design and optimization models and techniques, facility location: applications on new challenges (collaborative networks, closed loop/ reverse logistics, sustainable development, reactive vehicle and technician routing..)
	Module 2 - Production planning and scheduling optimization	Quantitative methods / Optimization	Able to model and solve complex production planning and scheduling problems	advanced models and algorithms of production planning and scheduling : multiple production site, uncertainties, reactive environment
	Module 3 - Advanced optimization techniques	Quantitative methods / Optimization	Able to master advanced optimization techniques necessary for modeling and solving complex innovative problems studied in the other modules	Advanced optimization techniques for modules 1,2,3 : Algorithms - Meta Heuristics - Math Programming and Branch and Price methods
	Module 4 Supply Chain Information and decision Systems	Information Systems	Able to understand the various types and components of Information Systems used in SCM for data management and decision making.	Information Systems for SCM : design methodology and softwares (ERP -SAP, APS...), decision support systems, Geographical information systems, study of a specific ERP like SAP.
	Module 5 - LPS Projects on selected topics	Supply chain management	Able to study a innovative problem of SCM, conduct a state of art survey and develop specific solutions and proposals. Able toi write a report and defend it in public.	tutored projects in small groups on specific innovative topics leading to a project report and possible implementation
	Module 6 - seminars and field visits	Corporate world	Able to understand the differentiation of SCM concepts depending of the particular sector and context of a firm and be exposed to real life applications and tools	methods and tool for determining individual objectives and goals
	Module 7 - CEPO	Social sciences	Able to determine one's goals and potentials in preparation to internship and future career	methods and tool for determining individual objectives and goals
	Module 8- French language and culture	Foreign Language	Able to understand and practice French and understand the French culture	French language and culture with specific level groups
Sem. 3 (NTNU)	Module 1	Operations management	Able to run modern production plants	Deeper understanding in selected topics within operations management
	Module 2	Depends on the topic selected for the semester assignment		
	Module 3	Information systems	Able to work as a consultant or IT leader in the company's acquisition, implementation, and optimisation of ERP- and PLM-systems	Architecture, functionally and modification of ERP- and PLM systems; needs analysis and strategic assessments in the implementation of such systems.
	Module 4	Production engineering	Able to analyze safety and reliability issues in industrial systems and production/distribution of energy.	Concepts and approaches related to reliability and risk analysis in industrial systems
Sem.3 (Liverpool)	Module 1	e-Business	Able to program Internet based ICT applications.	e-Business Tools and Technologies
	Module 2	e-Business	Able to design e-Business systems using formal system design techniques and apply risk analysis to systems implementation.	e-Business systems design and implementation
	Module 3 - e-Business Strategy	e-Business	Able to analyse, understand, critique and formulate e-business strategy.	e-business strategy to support competitive business strategy
Sem. 3 (Clemson)	Module 1	Capital Project Supply Chain	Introduces the phases of capital projects; design and control of the capital projects supply chain	Challenges associated with each of the primary supply chain entities—owners, contractors and suppliers
	Module 2	Supply Chain Design and Control	Industrial engineering aspects of supply chains including design and control of material and information systems	Ability to analyze, design, and implement systems that manage and control production processes
	Module 3	Manufacturing Systems Planning and Design	Concepts and principles associated with the design of manufacturing systems	Modeling and integration methodologies; group technology, process planning, manufacturing modeling and design for manufacturing
	Module 4	Capital Projects Supply Chain Case Studies	Quantitative and qualitative tools and techniques to the design, control, management and optimization of the capital projects supply chain	Application of appropriate tools and techniques to practical capital projects supply chain problems
SEMESTER 4 (Spring)				
Sem. 4 (all partners)	Master Thesis research or industrial internship	Supply Chain Management	Able to conduct a comprehensive research project or an industrial project on a novative topic of SCM. Ability to write a report and defend it in front of a scientific and professional jury.	Research project within a laboratory on an advanced topic or industrial internship within a company in any country. Supervision by one of the partner institution or co-supervision. Projects lead to thesis writing and oral presentation

A.1.5 Justify the relevance of the **consortium composition** and the expertise of the key **academic staff** involved to achieve the EMMC objectives.

Each partner in our consortium provides a distinct specialty that integrates into our common theme of technology and innovation for emerging issues in SCM. The lead institution, EMN, provides the fundamental concepts of SCM as well as expertise in quantitative optimization in production and transport in addition to specialty applications in semester 3. EMN will deliver the first semester, common to all students, that covers the fundamentals of SCM as well as advanced optimization and decision support techniques. EMN is the only institution that is able to provide both the foundation of SCM as well as advanced quantitative methods with the flexibility to offer them in series. The second semester provides the first part of our interdisciplinary theme: technology and innovation. This is represented by the expertise of NTNU (manufacturing technology) and the University of Bologna (innovation in SCM); these expertises are not available from any other partners. These are conceptual themes in the context of SCM that will expose students to the latest technologies and how to manage and implement new innovations. The third semester of our program ties together the four distinct specialty applications of our partners in emerging issues: 1. E-business (University of Liverpool), 2. Capital Project SCM (Clemson University), 3. Advanced Supply Chain and Transport System Design and Optimization (EMN), and 4. Advanced Manufacturing Operations and ICT (NTNU).

A third-country partner from the USA (Clemson University) has been included because of their ability to offer a distinct and highly relevant specialty application in today's global economy: capital project supply chain management. This specialty addresses large-scale one-of-a-kind projects such as nuclear power plants, bridges and tunnels where a single product is considered rather than the traditional high-volume production and distribution. This expertise cannot be found in any other SCM program in the world. Moreover, the cultural and educational differences of a third-country partner further enrich the educational experiences of the students. The United States is also one of the world-leaders in supply-chain management, and exposure to these best practices in industry and academia will be a valuable resource for the students.

The key academic and administrative staff of our program is summarized in Table 3. Of course, the majority of our staff is academic; however, administrative staff is also well-represented to provide alternative and complementary expertise and points of view. There are a large number of people at each institution who will contribute greatly to this program, however due to space constraints we limit the table to two academic and one administrative staff from each partner.

Table 3. Key Academic and Administrative Staff

Institution	Staff	Title	Expertise	Role
EMN	Thomas G. Yeung, Ph.D.	Associate Professor	Stochastic optimization in logistics, maintenance, and health care	International Coordinator for SCHEME, lecturer
	Pierre Dejax, Ph.D.	Professor, Director of Master in Logistics & Production Systems Management	Supply chain design and transport optimization	Coordinator of the academic content of the program, lecturer
	John Miller-Jones	Head of International Relations	International administrative affairs	Administrative support for international affairs
NTNU	Heidi C. Dreyer, Ph.D.	Professor	Logistics and supply chain design, planning and control.	Coordinator of academic content, lecturer
	Jan Ola Strandhagen, Ph.D.	Professor	Production logistics and decision support	Lecturer

	Marco Semini	Ph.D. Candidate	Quantitative supply chain analysis and decision support	NTNU Program Coordinator
University of Liverpool	Paul R. Drake, Ph.D.	Professor	Operations management and e-business	Liverpool Program Coordinator
	Zenon Michaelides, Ph.D.	Professor, Director of MSc in e-business	e-Business and Enterprise Information Systems	Lecturer
	Stephanie Readey	Management School Administrative Manager	Administration	Administration
University of Bologna	Alessandro Grandi, Ph.D.	Professor	Technology & Innovation Management	Bologna Program Coordinator, lecturer
	Paolo Toth, Ph.D.	Professor	Operations Research	Lecturer
	Francesco Girotti	International Relations Officer	EU Programs	Administration, multi-university coordination, student admission, processing, and acclimation
Clemson University	Scott J. Mason, Ph.D.	Professor, Fluor Endowed Chair in Supply Chain Optimization and Logistics	Large-scale optimization in scheduling and logistics	Clemson Program Coordinator, lecturer
	William G. Ferrell, Ph.D.	Professor, Director of Logistics & Distribution Center with Industry Focus	Capital project supply chain & facility logistics	Lecturer
	J. Bruce Rafert, Ph.D.	Dean of the Graduate School	Administration, multi-university coordination, international affairs, student services	Administrative support

Invited scholars and professionals from industry (selected based on their scientific or managerial expertise) will also play a large part in our curriculum. At the EMN, 30% of courses are already given by invited professors or consultants from industry. Each institution also has their own network of collaborators with other academic institutions as well as industry. As each of the consortium partners are also research institutions, there are weekly seminars given by resident faculty, invited professors, and students on the latest, cutting edge research.

A.1.6 Explain the EMMC **interaction with the professional socio-economic/scientific/cultural sectors** concerned.

Due to the long standing tradition of academic-industry cooperation of the partner insitutions, SCHEME has a strong interaction with industrial companies that have a strong dependency on their supply chain. We have obtained industrial support from many large, international companies including Airbus, General Electric (GE) Healthcare, B&D Consulting, Thales Avionics, L'Oréal,Valliant Supply Chain Direction for Europe, Institute for Transport and Logistics (ITL, Italy), Ernst & Young Consulting, EuroDecision, Suttons (UK), TollpostGlobe (Norway), Benteler Automotive (Norway), Kongsberg Maritime (KM, Norway), and Hydro (Norway). Their letters of support may be found in Appendix A. These companies have endorsed our SCM program and curriculum as well as pledged to provide internships for our students and provide conferences, field visits and research topics. Future commitment may also include allocation of scholarships to students as well as hiring our graduates.

Many of these companies already cooperate with SCHEME partners' Master's degrees or research laboratories and will continue to do so in our proposed Erasmus Mundus program. As an example, a subset of the teaching partners include for the MLPS Master of EMN:

- Michael Baujard and André Lever (Thales Avionics) – Project Management
- Sebastien Crouhan (Graveleau-Dascher Group) – Distribution and Warehousing
- Laurent Delplace (B&D Consulting) – Management of Quality
- Michel Moinet (consultant, former IBM executive) – Logistics Systems
- Bertrand Vuignier (consultant, formerly with Oracle) Information Systems Design
- Pauline Leclerc (Eurodecision Optimisation) – Optimisation in Logistics and Transport
- Si Mohamed Said (Product Market Director, SAP) – ERP in Logistics and SAP
- BNP Paribas Bank – Six-Sigma Methodology at BNP Paribas

We also have ongoing research collaborations with Air Liquide, Fluor, and GE Healthcare on supply chain optimization. Furthermore, industrial partners will have direct participation in our program through the creation of an industrial board of advisors. This five-member board will meet once per year to discuss the current curriculum of the program and make recommendations to ensure we are keeping pace with the needs and advancements of industry.

A.2 Course Integration

A.2.1 Justify the extent to which the EMMC is organized **in a truly integrated way**.

Each partner in our consortium provides a distinct specialty that integrates into our common theme of technology and innovation for emerging issues in SCM. This program was born from the idea that we wanted to create a truly interdisciplinary program in SCM with themes not normally included in such programs as well as unique specialty applications. As these themes and specialties represent such unique expertise, it required the integration of five institutions to deliver such a diverse and comprehensive program. Each institution provides a unique and valuable contribution to the program that no other partner can offer alone and can hardly be found at any other institution worldwide. Therefore our program is a jointly developed program based on existing courses at each institution.

The lead institution, EMN, provides an overview of SCM as well expertise in quantitative optimization in production and transport as well as a specialty application in reverse logistics. The EMN will deliver the first semester, common to all students, that covers the fundamentals of SCM as well as advanced optimization and decision support techniques. The second semester provides the first part of our theme: technology and innovation. This is represented by the expertise of NTNU (manufacturing technology) and the University of Bologna (innovation in SCM). These are conceptual themes in the context of SCM that will expose students to the latest technologies and how to manage and implement new innovation. As these two concepts are highly important in the program, but a student may choose only one, there is integration of these two semesters in order to deliver some core content. Bologna will offer a flavor of the manufacturing technology presented by NTNU, and similarly, NTNU will offer a flavor of the innovation and transport provided by Bologna. This will be accomplished by distance courses and professor exchanges. Joint projects will also be conducted between students of Bologna and NTNU. The third semester of our program ties together the 4 distinct and unique specialty applications of our partners in emerging issues. Finally, the fourth semester internship will provide a unique opportunity to apply the academic know-how and carry on an industrial internship or research project on innovative and challenging topics under the supervision of the professors. The internships will often be co-supervised by two SCHEME partners in order to enhance the integration.

Each member of the consortium if a full-partner and offers its full commitment to the program in terms of academic, research and administrative resources.

A2.2 Justify the extent to which the EMMC is **recognized in participating countries** and leads to the award of an official degree by each of the partner institutions. Describe the type of degree(s) that will be awarded to successful students.

All of the courses proposed in our program correspond to existing Master's courses at each institution. We currently propose to deliver multiple degrees to graduates of our program. We plan to move towards a joint degree in the near future. The regulations in France just recently made possible the award of a joint degree however the precise details of the process have not yet been finalized. Once this process has been clarified by the French Ministry of Education our consortium will begin immediately working on the construction of a joint degree. The other partner institutions have already the capability of issuing a joint degree and are ready and willing to begin the process. Table 4 describes the degree each institution will be awarding as well as the requirements for awarding the degree. These degrees are already accredited by the respective institutions/national ministries and available to be awarded immediately.

Table 4. Institutional Degrees and Requirements

Institution	**Degree**	**Requirements in the Erasmus Mundus framework**
EMN	MLPS – Master in Production and Logistics Systems, (National Master's Diploma – DNM – label awarded by the French Ministry of Education)	1 semester of coursework + co-supervision of Master's Thesis or 2 semesters of coursework
NTNU	Master in Logistic & Production Systems Management	1 semester of coursework
Bologna	Master in Engineering Management	1 semester of coursework
Liverpool	MSc. In Supply Chain Management: E-business	1 semester of coursework
Clemson	Master of Engineering (M.Eng.)	1 semester of coursework + research Master's Thesis at Clemson

From Figure 1 above in section A.1.3, all students will begin their studies at the EMN. Therefore as long as EMN has a co-supervisorial role in the Master's thesis (or the student revisits EMN in the third semester) they will be able to receive the DNM from EMN. Moreover, as all students will visit either NTNU or Bologna in the second semester, they will also receive one of these degrees as NTNU and Bologna only require one semester of coursework to issue their degree in an Erasmus Mundus context. Thus, students in our program will be able to receive at least two European diplomas. The possibility of receiving a third degree exists if the student visits Liverpool or Clemson in the third semester. Validating 30 ECTS credits at Liverpool alone would be sufficient to also receive their MSc. A student who visited Clemson in the third semester and also wished to have Clemson's M. Eng, would need to continue at Clemson and validate a research Master's thesis.

A joint diploma supplement will be issued to all graduates of our program to give employers/institutions information on our program curriculum and the degree requirements.

A.2.3 Describe the consortium **joint student application, selection and admission procedure.**

In order select only the best candidates and to ensure a fair and comprehensive process, we have developed the following standard procedure.

1. **The applicant completes the online application form for the program.**

The application for our program will be a single online platform available on the program website (https://campus.mines-nantes.fr/emundus/). This will serve to consolidate all applications to a single source. The consortium has set the following components of the application to be uploaded to the online application available on the program website

1. 3-page basic information form
2. Erasmus Mundus scholarship application form (if applicable)
3. Europass CV
4. Statement of interest letter
5. 1st, 2nd, and 3rd choice program options
6. Copies of degrees received and transcripts
7. 2 letters of recommendation
8. Optional information provided by the applicant

The online tool will automatically compile all of the candidates' information into a single PDF document.

2. **Applications will be evaluated to ensure they are complete and meet the minimum requirements of the program.**

As the lead institution, the EMN will be responsible for the first round of selection. This will be done by administrative staff at the EMN and will serve to eliminate those applications that have incomplete applications or do not meet the profile or minimum requirements stipulated by the consortium. Currently, the only fixed requirements for the program are 1) at least a 3-year degree (European-L, Bachelors, or equivalent), and 2) IELTS score of 6.5 or above. Any applications that do not meet the above requirements or lack any required component of the application will automatically be rejected.

3. **Applications will be reduced to 200 potential candidates.**

Academic and administrative staff from the EMN will then reduce the number of candidates down to 200. This will be done by ranking on the objective evaluation scoring sheet found Table 5. The applications of the top 200 candidates will be sent to all of the partners for independent evaluation prior to the meeting of the admissions board.

Table 5. Candidate Evaluation Grid

Name			
Origin Institution			
Criterion (% final evaluation)	**Assessment Guidelines**		Score
Academic Excellence (30%)	Education background & university quality (max 2 points)	Well-related to the SCM domain (2/2) Slightly related to the SCM domain (1/2) Unrelated to the SCM domain (0/2)	
	Undergraduate grades & ranking (max 1.5 points)	Top 10% of class – (1.5/1.5) (eq US A avg) Top 50% of class – (0.5/1.5) (eq US B avg) Bottom 50% of class – (0/1.5) (eq US C avg)	
	Quality of the university of origin (max 1.5 points)	Ranked top 100 in the world (1.5/1.5) Ranked top 500 in the world (1.0/1.5) Not ranked (0/1.5)	
Professional/academic experience, extra-curricular activities (20%)	Professional experience in the SCM field in industry or research (max 3 points)	Employed in a SCM-related job for more than a year (3/3) Academic experience for more than a year (at least 1 paper published) (3/3) Academic/industrial experience <6 months (2/3) None (0)	

	Professional experience not related to the domain, social or extra-curricular activities (max 2 points)	Demonstration of organization, communication skills (2/2) Demonstration of leadership, team management (2/2) Other skills (1/2)	
Professional objectives & career project (15%)	Targeted jobs and career project presented in the motivation letter (max 3 points)	Can be identified with precision & clarity (3/3) Are evocated (2/3) Not mentioned (0/3)	
	Objectives of learning or acquisition of complementary skills from the Master (max 2 points)	Are precisely mentioned (2/2) Are barely presented (1/2) Not mentioned (0/2)	
Motivation for intercultural experience, interest in European countries and cultures (10%)	Intercultural experience and international mobility (max 3 points)	Significant previous international/multi-cultural experiences and intercultural dimension of the class mentioned (3/3) Significant previous international/multi-cultural experiences or intercultural dimension of the class mentioned (1.5/3)	
	Particular interest for Europe or SCHEME country (max 2 points)	Clearly presented (2/2) Not mentioned (0/2)	
Language skills (15%)	English (max 3 points)	Native speaker or studies pursued in English or Score >= 100 ibt TOEFL-7.5 IELTS-A Cambridge (3/3) Score >= 80 ibt TOEFL-6.5 IELTS – B Cambridge (2/3)	
	French, Italian, or Norwegian (max 1 point)	Native speaker or advanced knowledge (1/1) Basic knowledge (0.5/1)	
	Other European languages (max 1 point)	Native speaker or advanced knowledge (1/1) Basic knowledge (0.5/1)	
Recommendation letters, quality of the references (10%)	Quality of the references (max 2 points)	Academic or industrial in a senior position (2/2) Professor or engineer who knows the student well (1/2) Other barely related to the student (0/2)	
	Quality of the letters (max 2 points)	Very good (2/2) Good (1/2) Poor (short, lack of elements (0/2)	
	Content well-related to the SCHEME Program (max 1 point)	Good understanding of the SCM content (1/1) Bad understanding of the SCM content (0/1)	
Total Grade (max 5 points)			

4. **The final selection of candidates for admission will be made by a physical meeting of the admissions board.**

The admissions board of the consortium will be comprised by one member from each institution in the consortium. Administrative support stuff may be present to the meeting, but there will be only one vote from each institution and each vote is weighted equally. It is desired to have approximately 30 students in the program so the goal of the admissions board will be to reduce the remaining 200 candidates down to 60 who will actually be offered admission (assuming 50% will accept the admission offer). The final selection will be based on the score sheet and extra subjective factors that will be raised in the meeting based on candidates' profile and experience.

During the final selection process every effort will be made to ensure a gender balance in the class. Students with special needs will be evaluated based only on their ability to succeed in the program. The admissions board will also seek to ensure a balance within the program options based on the options preferences given by the students on their applications forms. Students admitted to the program will be

accepted to a specific program option. Acceptance letters at a welcome packet will be sent to all accepted applicants.

A.2.4 Describe the **joint examination methods and mechanisms** in place between the consortium partners to assess the student's achievements.

As all of the modules in our program are existing modules at each institution, students from outside our Erasmus Mundus program will also be enrolled in the courses. Therefore, we must respect the grading scales and examinations methods already in place at each institution. Each institution will evaluate students according to both an absolute grading system (Table 6) and a relative grading system (Bologna process) for every ECTS earned.

Table 6. Grading Scale

ECTS	A	B	C	D	E	FX	F
Level	Excellent	Very good	Good, satisfactory	Quite good	The minimum acceptable level has just been reached	The minimum acceptable level has not been reached	Not even close to the minimum acceptable level
GPA	4	3.5	3	2.5	2	0	0

To be awarded the EMN degree, after having receieved credit transfer from the partner universities, each student must earn an overall GPA greater than 2.75 for the 120 ECTS as followsThe overall GPA is calculated as follows:

$$GPA = \frac{\sum_c CoefficientGPA_c * Credits_c}{\sum_c Credits_c}$$

To be awarded a degree from Bologna, NTNU, Liverpool or Clemson, after credit transfer from the partner institutions, each student must have passed all the credits and met the minimum GPA requirements for their overall performance in the program.

Joint Diploma Supplement
In addition to double or multiple degrees awarded to the students, a joint diploma supplement will be issued to all SCHEME graduates to provide information on our program curriculum and the degree requirements. It will include all the details of the student pathway and credits obtained within the SCHEME program.

Organisation of the thesis work
All students are required to write and orally defend a master's thesis. The thesis may be industrial (performed within a company) or research-based (performed in an academic institution) under the supervision of one or more consortium partners. It is the responsibility of the student to find his/her placement in a company or research lab and the subject must be directly related to supply chain management. However, the partner institutions provide the students with industrial internship offers received from participating companies or research topics of their research groups. In addition the CEPO program proposed by EMN will provide training to the students to help them determine their professional goals and find their internship. Once the student has found their internship, the student must submit their topic and relevant details online for approval by the consortium. The student may also suggest an advisor/institution for the thesis, if an advisor is not suggested or unavailable, then an advisor/institution will be assigned to him by the consortium. Note that the thesis work may be co-advised by two

consortium partners. The thesis must then be validated by the academic board of the consortium. The student will be notified by email if his thesis has been accepted by the committee. Once their thesis subject has been approved and advisor has been assigned, the student may begin to carry out their internship. A written thesis summarizing the work carried out over the internship must be submitted to the advisor upon completion of the internship. Once validated by the advisor it will be sent to at least two other faculty members of the advisors institution at least two weeks in advance of a scheduled oral defense date. During the defense the student must present their work to the committee and defend it during a question and answer session. The committee will provide an overall grade to the thesis based on the written work and defense according the grading scale given in Table 5. In the case where a thesis is co-advised by two institutions, there may be two advisors and the rest of the committee will be comprised of one member from each institution.

A.2.5 Explain how the **students' participation costs** to the EMMC have been calculated and agreed upon by the consortium.

The amount of the tuition fees for third country students has been set at 16,000€ for the 2-year duration of the SCHEME program. The amount of the tuition fees for European students has been set at 8,000 € for the 2-year duration of the program. These amounts include the cost of health insurance. These amounts have been determined according to the expenses observed in the different institutions (Table 7) and based on the scholarship amounts given by the European Commission. From Table 7, the consortium costs are calculated as 18,000€ and 9000€ for third country and European students, respectively. This justifies the tuition we are charging. We are charging less than the calculated cost to correspond with the scholarships given by the European commission with the excess costs being covered by the partners as dictated in the financial agreement. calculated as higher than we will be chargingThe large difference between Third country and European students is mostly related to the fact that 4/5 SCHEME partners are members of the EU and provide reduced academic tuition to students from EU countries. The administrative costs (visa support, cultural integration, basic needs-bank accounts, etc) are also significantly higher for non-EU students. Reduced tuition for EU students provides additional incentive for European students to participate in our program. Students who have a scholarship from the European Commission under the Erasmus Mundus program must pay the tuition by authorising the consortium coordinator institute (EMN) to debit the tuition from the scholarship. The scholarship instalment payment schedule will be determined based on the tuition fees debited at the beginning of the program.

Table 7. Cost Estimates of the SCHEME Program

Third country student					European student			
TASK	RATE (%)	AMOUNT	BASE (EUR)		RATE (%)	AMOUNT	BASE (EUR)	
ADMISSION FEES SELECTED FILES	3%	500 €			6%	500 €		
HOSTING (ACADEMIC PERIOD)	58%	*10 500 €*	3500	Per academic semester	19%	*1 750 €*	583	Per academic semester
VISA SUPPORT & PROGRAM ENTRANCE	1%	250 €			0%	- €		
MASTER THESIS ORGANIZATION AND SUPERVISION	14%	2 500 €	2500	Per Master thesis	28%	2 500 €	2500	Per Master thesis
COORDINATION	8%	1 500 €			17%	1 500 €		
INSURANCE COVERAGE	6%	1 000 €		max/student for the program	11%	1 000 €		max/student for thr program
COMMUNICATION SUPPORTS	1%	250 €			3%	250 €		
PROGRAM QUALITY ENHANCEMENT AND SUSTAINABILITY	8%	1 500 €			17%	1 500 €		
Total		18 000 €				9 000 €		

Non-Erasmus Mundus scholarship holders are required to pay the tuition fees in two instalments: -First instalment for the first academic year: 50% 1st September (deadline); -Second instalment for the second academic year: 50% 1st September n+1 (deadline).

A.3 Course management, visibility and sustainability measures

A.3.1 Describe the organization of **the cooperation mechanisms within the consortium.**

The management of the consortium is centralized at the coordinating institution, EMN. The management team at EMN will handle matters related to organizational, finance/accounting, institutional relations with the European Commission. All of these actions will made under the direction and supervision of four primary boards:

1. Academic Board
The academic board is comprised of one faculty member from each partner institution as well as one industrial partner and second-year student. It is the responsibility of the academic board to oversee the curriculum and any changes to it. The academic board will also oversee the grading policy. The board will have a physical meeting twice per year. We feel that it is essential to have student representation in the academic board to give the students' perspective on the curriculum, teachers, and grading policies of the program. Further details may be found in the consortium agreement in Appendix B.

2. Admission and Examination Board
The admission and examination board is essentially the same composition of the academic board except without the industrial and student representatives. This board is responsible for selecting students for admission (see A.2.3), validating thesis subjects, and resolving any grading/credit disputes that may arise. This board will have a physical meeting twice per year coinciding with the meetings of the academic board. One of the meetings will be scheduled to coincide with the admissions process.

3. Administrative Board

The administrative board is comprised of one administrative representative from each partner institution in order to hande all administrative matters unrelated to academic policy such as student support, promotion/marketing and financial aspects.

4. Industrial Advisor Board
This five-member industrial advisory board will have conference call meeting once per year in order to discuss the current curriculum of the program and any adjustments that should be made in order to keep pace with the needs of industry.

A.3.2 Provide information on the **partner institutions' financial contribution** to the EMMC and describe the way the EMMC will be managed from a **financial** point of view.

As the curriculum of this program is built upon already existing courses within each institution, there will be no additional implementation costs for courses. Additional costs/expenses will come in the form of administrative support for students and travel for consortium meetings. It is anticipated that the tuition fees and the administrative lump sum provided by the EC will be sufficient to cover all necessary expenses.

All the tuition fees and the lump sum administration grant provided by the European Commission will be collected by the EMN and redistributed to the partners according the distribution in Table 8. Each time a sum of money is transferred from the EMN to a partner institution, a financial decision is made by the EMN accountant and is signed by the EMMC coordinator along with the legal representative of the EMN (Stephane Cassereau, Director). At the end of each semester, a summary of financial expenditures will be documented. Details of the financial agreement may be found in Appendix C.

Table 8. Income Distribution

Teaching	40%
Hosting & Management	18%
Coordination	10%
Visa Support	1.5%
Communication	2%
Master Thesis	13.5%
Quality and Sustainability	15%
TOTAL	100%

A.3.3 Describe the consortium **development and sustainability** plan designed to ensure the proper implementation and continuity of the EMMC beyond the period of Community funding.

The initial enrollment size of the program is expected to be approximately 30 students, but we plan to increase this to 48 within the first 5 years as the program gain in visibility due to the European Union label. Industrial associated members of the consortium will also begin to provide scholarships to students for the program after having positive results from interns and new hires. This will help to offset the diminishing scholarships provided by the Community.

We will work to ensure the curriculum is up to date and serving the needs of industry as well as academia. Our industrial advisor board (see section A.3.1) will provide an annual review of our curriculum and inform us of new or emerging trends in SCM that should be incorporated into the program in order to adequately prepare future managers in SCM as well as any aspects of the outdated. We will also maintain contact with all alumni through annual surveys in order to know how well their experience in our program has benefitted them in their career and what aspects may be lacking.

Our consortium partners should benefit tremendously from this program. They should see increased revenues due to tuition fees with no increased teaching expenses due to the fact that the courses already exist. Furthermore, enrollment in their traditional programs should see an increase due to the visibility of the institution and traditional program from the European Union label. The quality of the research should also increase due to the ability to recruit higher quality students for research thesis and doctoral programs from the SCHEME program.

A3.4 Describe the course **promotion measures** taken by the consortium to increase the course's (and EM programme's) visibility and attractiveness.

The program along with its dedicated website will promoted through several different avenues. The dedicated website will highlight all of the benefits of our programs and will be directly promoted through the purchase of internet advertising on popular search engines such as Google, Yahoo!, and Bing. In this way, prospective students searching for such key words as supply chain, logistics, production, or manufacturing masters will see links to our program website. A Facebook page will also be set up that provides similar content to the website. A similar page on the Linked-In social network site will be set up. Social networking will dramatically increase the visibility of our program without any cost. As we begin to develop graduates, future alumni through social networking will be able to dramatically increase the visibility of our program. We will encourage alumni to publicize our program in their home countries as well as the companies they work for as a continued education opportunity for colleagues. We will first rely on the alumni networks of the support Master's degrees. We will also ensure the promotion of the program by participating as we already do to international graduate studies exhibits worldwide and through the scientific consulates of the partner's countries.

A detailed program brochure will also be developed that will be distributed at academic fairs around the world through the marketing services we hire to promote the program. Our program will also be promoted by the participation in conferences of the organizations in the field including the Production & Operations Management Society (POMS), European Operations Mangement Association (EUROMA), European Logistics Association (ELA), Association of European Operational Research Societies (EURO), Institute for Operations Research and Management Science (INFORMS), Institute for Industrial Engineers (IIE), and the Chartered Institute of Logistics and Transport (CILT). The respective embassies and consulates of our partner institutions' countries will also be solicited to help promote the program.

Concerning recruitment of students, special attention will be given to the recruitment of European students to the program. The strategies for doing so are the following:
Selection of strategically important student fairs in Europe such as Study World in Berlin, and similar events in Paris and the Netherlands where the program will promoted. The consortium will use its already existing Erasmus network for promotion by sending tailor-made information to Erasmus partner institutions. The consortium will cooperate with recruitment units for national students at each partner institution to make first year students aware of the possibilities of joining the program. In addition, Erasmus Teacher and Staff Mobility will be actively used by the consortia in order to ensure promotion of the program. The program will also be promoted at the EAIE conference on a yearly basis.

A.4 Students' services and facilities

A.4.1 Describe the nature of the information (/support) provided to students prior to their enrollment and the way the information will be delivered.

The consortium's dedicated website will provide all necessary information for students as well as the online application form (see section A.2.3). The website will contain information about all of the consortium's partners including a link to their website. Partner information will include area of expertise, type of facilities, courses offered, faculty profiles, student services, as well as cultural and way of life information.

The website will detail the curriculum of the program and all possible options in the program as well as details of their themes, specialties and degrees awarded. The specific course list and learning outcomes will also be posted.

The entire application and selection procedure will be also be posted on the website. This will give candidates a clear understanding of the requirements, process, and profile of student we are looking for. We will even provide statistics on each admitted class to give applicants an idea of where they stand in relation to previously accepted students.

Profiles on current students and alumni will be given as well as in order to give prospective students a first-hand perspective of the program and opportunities upon graduation.

A.4.2 Describe the content (and, if available, provide a model) of the Student Agreement defining the rights and obligations of the two signing parties.

The full detail of the proposed student agreement may be found in Appendix D. The key points are outlined below:

1.The Student is obliged to attend the European joint Masters in Management and Engineering of Environment and Energy, having a duration of 2 academic years.
2. The attendance referred to will be recognised by the respective institutions as integral parts of the qualification for which the Student is preparing, as long as the Student is successful in the respective examinations and/or assessments.
3. The scholarship will be paid to the Student according to terms mentioned in Annex 1.
4. Under the present contract, the Student is obliged
• To attend assiduously, and with the objective of successfully passing, the modules, and the thesis inherent in the programme of studies.
• To participate in the national language course in the host countries (a minimum of two languages);
• Not to receive any other scholarship or subvention financed by the European Commission under other Community programmes
5. The scholarship does not create or entitle an employer-employee relation between the University and the Student, and therefore is not subject to direct taxation.
6. The student is not entitled to embark on any vocational occupation with a regular salary in parallel to the studies under the ERASMUS MUNDUS European Masters.
7. Any alteration to the present Contract or respective Annexes must be communicated in writing. All alterations to the initial situation must be immediately communicated by the Student to the Institution. Upon mutual agreement of contractual modifications, the Institution will issue an agenda to the present contract.
8. Any deliberate failure on the part of the Student to fulfil the conditions expected in terms of attendance at the ERASMUS MUNDUS European Masters, in particular non-fulfilment of the conditions stipulated in the present Contract, constitutes sufficient reason for action to be taken towards resolving the issue and could led to reimbursement of the scholarship awarded. In the case of reimbursement, the Institution will determine the amount to be reimbursed.
9. Without prejudice to the general consequences laid down in national law applicable in the present Contract, the Institution reserves the right to cease the effects of the present Contract, without recourse to

any juridical procedure apart from adequate communication to the student. Failing agreement by both parts, the French courts are designated as the only competent authorities to resolve any legal dispute between the Institution and the Student emerging from the Contract. The present Contract will be governed by French Law.
10. The Institution is exonerated from any responsibility for accidents, illnesses, injuries, losses or damages to persons or goods resulting from or in any way related to the activities that are the object of the present Contract. The Student is obliged to accept the necessary insurance related to the activities for the full duration of the study period.

A.4.3 Present the services that will be provided by the partner institutions to host students/scholars, including the nature and coverage of the mandatory insurance scheme.

The international offices of each institution will work to welcome students of our Erasmus Mundus program. This process will begin with the EMN, the coordinating institution, as all students will begin at the EMN. From the moment the student has accepted our offer of admission into the program, the international office will work to ensure all administrative needs are taken care of and all questions are answered. The international office of the EMN will provide a " Welcome Guide" specifically tailored for the SCHEME Erasmus Mundus students providing all information concerning visas (and related documents required for the application), accommodation, communication facilities (phone, internet), opening a bank account, health insurance coverage, student identification card, and administrative formalities when arriving in the countries of the consortium. This process will continue as students move to other partners in the consortium. As part of the tuition of the program, this includes health insurance and social security for each of the respective institutions. An insurance policy has been established for the SCHEME Erasmus Mundus program ACE European Group Limited (Brussels, Belgium) underwritten by Marsh, SA (www.marsh.be/sip). This program offers a complete cover for students who study abroad and for incoming students, and it covers students worldwide. It also covers students for a temporary stay in their home country (maximum period of 4 consecutive weeks).

An Orientation week will be organized by the local international office just before the beginning of semester courses in order to help students familiarize themselves with the new environment. Visits of the campus, library, and research laboratories of the university, as well as tourist city trips are scheduled. The SCHEME program offers a living experience within an international, multi-racial, multi-cultural group in four European countries as well as the United States.

Welfare services: At the Student Welfare Office (or equivalent name), students can get counselling and help for personal problems. It is possible to meet a doctor, nurse or a social counsellor. The office can also direct students to other health services. Moreover a mandatory complementary insurance is given to each student entering the master programs.
Accommodation: In each institution, it is possible for all international students and scholars to have access to lodging especially reserved for students and invited professors. In Nantes, they can be housed in furnished studios in "La Maison des Elèves" on the campus. In Italy, England, Norway, and the U.S., a certain amount of off-campus rented flats will be available for SCHEME students and scholars.
Facilities: During the whole programme, students have an e-mail account, access to Internet and virtual campus so as to facilitate communication with the staff and faculty. Students have access to the library of the five universities where books and e-publications can be read and borrowed. Students have also free access to computer rooms and Wifi area available in each building institution.
Sport activities and activities aiming at social integration: In all institutions, all students and scholars are treated as full members of the student population or as local professors, with a clear objective of fast and pleasant integration into the campus community. The international offices have the responsibility to follow up on this process, and to assist those students who experience difficulties. All European and third-country students are thus invited to actively participate in all social activities that are organised on each

campus, such as: theatre club, music club, students' newspaper, investment club, chess club, etc... Also, local initiatives aim at facilitating access to art and culture through cultural heritage and museum visits, concerts and theatre seats at reduced rates. All these activities are open to all students.

The administrative support will be funded from students' tuition as well as the lump sum received from the European commission and distributed according to Table 8 in A.3.2.

A.4.4 Describe the consortium **language policy.**

The official language of the consortium is English. All consortium documents as well as those provided to the students are/will be in English. The consortium is comprised of 5 partners and 4 different languages. Language and cultural courses in all non-English speaking classes will be provided by the partner institutions as part of the curriculum and are mandatory for all students not native to that country. The EMN will be offering 2 ECTS for the language and culture courses, while NTNU and Bologna do not offer actual credit for their Norwegian and Italian courses, respectively.

A.4.5. Indicate the measures taken to facilitate **networking** among the Erasmus Mundus students and between these students and other students from the partner institutions.

As all students will begin the Erasmus Mundus at the same location, this will help to ensure that all students of the cohort will have chance to meeting in the beginning and build relationships that they can sustain throughout the program. Moreover, as our program is based on existing courses at each institution, the Erasmus Mundus students will have the opportunity to interact with traditional students of the respective countries on a daily basis.

Networking among current students and alumni will be facilitated through the Facebook and Linked-In pages of the program. This will allow students to exchange in real-time and keep up to date with all of the latest social events. Through social networking, students will have the opportunity to discuss with students of other cohorts as well as alumni.
To bring all of the students together after they leave the EMN, there will be some web conferences for distinguished lecturers so that all students in the program may benefit. These lectures, along with the discussions that follow will allow the integration of both institutions and cohorts. Furthermore, several of the projects in the curriculum may be performed as a group with students at other institutions. Specifically, this will be the case in the second semester where students can have the inter-disciplinary opportunity to work together between NTNU and the University of Bologna.

A.5 Quality assurance and evaluation

A.5.1 Describe the **internal evaluation** stategy and mechanisms in place

Many internal quality evaluation procedures will be put in place in the program to ensure we are delivering the best possible educational experience. Beginning with the conclusion of every module in the program, the students will receive a survey on the quality/relevance of the course and its content as well as a teacher evaluation. These surveys will be performed online via the consortium website so as to allow the easy calculation of statistics and aggregation of information. An additional survey will be given to the student at the conclusion of each semester to monitor the overall quality of the course and experience at each institution. Finally, after completing the program, the student will be asked to complete a survey on the overall quality of the program and an exit interview will be performed with the student in order to have feedback on the program. These evaluations will be maintained on an annual

basis with alumni in order to understand how their experience in our program is benefitting them in their careers. Furthermore, invited professors will be asked to evaluate the quality and knowledge of the students after giving their courses.

The results of these surveys will be reviewed by the Academic and Administrative boards (see section A.3.1) in order to implement any changes necessary on a biannual basis corresponding with the meeting of these boards. Our external advisory board made up of industrials and external academics will oversee our program and make recommendations on its improvement.

A.5.2 Describe **the external quality** assurance envisaged.

Each individual institution has their own external evaluation measures in place that evaluate the quality of educational programs at the national level in order to validate degrees. For example, the EMN must renew its master's degree from the Ministry of Education every 4 years. There are similar external examiner systems in place in the UK, Norway, and Italy, and the U.S. for the validation of degrees awarded.

Furthermore we plan to implement two mechanisms related to external quality assurance: an external examiner and an external Audit Board.

External Examiner - The external examiner will be expected to comment on the content, balance and structure of the SCHEME program and its component courses in addition to participating in, and commenting on the following assessment processes as performed by the SCHEME Consortium (i.e., some of these points will only apply to the jointly assessed activities):

- academic achievements by individual students,
- academic standards within a cohort of students,
- the scope and appropriateness of learning opportunities available to students,
- the comparability of standards of programs within the international context,
- the organisation and arrangements for student selection and assessment, in particular with respect to quality and fairness.

The activity of the external reviewer will lead to a yearly report available to the Academic and Administrative boards.

The external examiner will be appointed for three years. It is then possible to change examiners to get different point of views while a given examiners has the opportunity to see whether his/her recommendations are taken into account as well as their effects. He/she will typically be a senior academic person with experience in joint programs.

The External Audit Board - The role of this board is to give an external perspective on the whole program, including pedagogy, quality and sustainability in order to drive longer-term evolutions of SCHEME. As a result, we feel three years to be, again, an appropriate frequency The Audit Board is composed of representatives from other academic institutions, the corporate world, and members of the Erasmus Mundus alumni (provided the Professional Network of Erasmus Mundus alumni inScience, Mathematics and Computing is strong enough to find interested participants).

NTNU
Fakultet for naturvitenskap og teknologi

Dato 06.05.2011
Referanse 2011/474/LHN

Notat

Til:	Rektor ved prorektor for utdanning og læringskvalitet
Kopi til:	FUS
Fra:	Fakultet for naturvitenskap og teknologi

Signatur:

Studieprogramportefølje – Endringer for 2012-2013 og utvikling av NT-fakultetets programportefølje på lengre sikt

Om prosessen ved Fakultet for naturvitenskap og teknologi

Fakultet for naturvitenskap og teknologi har som målsetning å forenkle sin studieprogramportefølje innen 2014. I handlingsplanen for 2011 ligger gjennomgang av studietilbudet innenfor bioteknologiområdet, og en utredning om muligheten for omgjøring av 2-årige masterprogram til engelskspråklige program (internasjonale masterprogram).

Alle institutt og programråd er i notat av 02.02.11 (ePhorte 2011/474) invitert til å komme med innspill til endringer av studieprogramporteføljen for 2012-2013 og på lengre sikt, med svarfrist 11.04.11. I forbindelse med dette arbeidet er det våren 2011 foretatt en spørreundersøkelse blant studentene, og en høring ved instituttene og de berørte programrådene angående eventuell innføring av kun internasjonale 2-årige masterprogram ved fakultetet.

Med utgangspunkt i arbeidet og sluttdokumentet fra komiteen for gjennomgang av programporteføljen i bioteknologi innenfor teknologi- og realfagstudiet (ePhorte 2010/2911) fra våren 2010, ble Institutt for biologi (IBI) og Institutt for bioteknologi (IBT) våren 2011 bedt om å utarbeide forslag til ny programstruktur innenfor bioteknologiområdet innen 15.04.11. En undergruppe utredet systembiologiens plass i den eksisterende programporteføljen innenfor bioteknologiområdet.

Alle innspill er behandlet i møte i fakultetets utdanningsutvalg 27.04.11 og ledergruppen 05.05.11.

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Telefon
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Telefaks
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Seksjonsleder
Lillian Hanssen
Tlf: + 47 73596020

Studieprogramportefølje for 2012-2013

AQFood

Institutt for bioteknologi (IBT) er involvert i det nordiske masterprogrammet Aquatic Food Production – Safety and Quality (AQFood) via professor Turid Rustad. Danmarks tekniske universitet (DTU) vil koordinere tilbudet via et konsortium. Programmet er planlagt med oppstart studieåret 2012-2013, jfr. S-sak 63/10. Utgifter til opprettelsen av programmet vil bli dekket gjennom bevilgning fra Nordisk ministerråd. Eksisterende emnetilbud ved NTNU vil benyttes i det nye programmet. Det er på det nåværende tidspunkt ikke avklart om dette programmet blir et realfags- eller teknologiprogram, eventuelt en kombinasjon. Det er samarbeidspartnere som gir begge typer grader. Type program blir avklart i løpet av sommeren 2011. De administrative kostnadene vil i hovedsak dekkes av DTU. IBT har fra 2012 fått utvidet studieadministrativ støtte gjennom opprettelsen av en ny studiekonsulent stilling. Eventuelle administrative kostnader ved NT-fakultetet dekkes av denne stillingen. Se vedlegg 1-3 for nærmere opplysninger om og beskrivelse av programmet.

MSLIMETAL og MSSILFER

Institutt for materialteknologi (IMT) tilbyr i dag to 2-årige internasjonale masterprogram (teknologiprogram): MSc in Light Metals Production (MSLIMETAL) og MSc in Silicon and Ferroalloy Production (MSSILFER). Disse to studieprogrammene slås sammen til et studieprogram med samme faglig innhold totalt sett fra og med 2012-2013. Kun eksisterende emner vil benyttet i det nye programmet, se vedlegg 4 for foreløpig skisse for oppbygningen av det nye programmet. Nytt navn for det foreslåtte programmet er ikke avklart ennå, men blir avklart til fristen 10.09.2011 for studieprogramporteføljesaken.

MSc in Science in Biotechnology (ePhorte 2010/2911)

Det 2-årige masterprogrammet Cellebiologi for medisinsk teknisk personell (MCBIO) og det 2-årige masterprogrammet i Bioteknologi (MBIOT) har svært lik målgruppe, samt innhold og struktur. Det internasjonale masterprogrammet Medical Technology (MSMEDTEK) er blitt vurdert nedlagt, men skal opprettholdes tom. 2013. Fortsatt eksistens for programmet avhenger av antall søkere. Målet er 20 studenter tatt opp i 2013. Studieretningen Medical Biotechnology i MSMEDTEK har stor faglig overlapp med tilbudet gitt i MBIOT, og det har blitt tatt opp svært få studenter til denne studieretningen. Av den grunn vurderes det som lite hensiktsmessig å opprettholde denne studieretningen. Disse tre tilbudene foreslås samlet i et nytt 2-årig internasjonalt masterprogram: MSc in Science in Biotechnology (realfagsprogram). Når det gjelder nedlegging av studieretningen Medical Biotechnology vil dette bli tatt opp med studieprogramrådet for MSMEDTEK.

Systembiologi (ePhorte 2010/2911)

NT-fakultetet ønsker å legge til rette for at studenter ved utvalgte studieprogram der NT er vertsfakultet kan velge en spesialisering innenfor systembiologi. Dette kan gjøres gjennom en systembiologiprofil mot matematisk modellering innenfor teknologistudiene og mot biologisk modellering innenfor realfagstudiene. Av den grunn vil studieretningen Beregningsbasert biologi i

det 5-årige masterprogrammet i bioteknologi (MBIOT5) skifte navn til Systembiologi. Denne endringen forutsetter at det foretas noen mindre endringer i programstrukturen i MBIOT5.

Studieprogramportefølje på lengre sikt

MSMACODEV og AQFood

Tilbudet i det foreslåtte nye nordiske masterprogrammet AQFood kan komme til å overlappe med det internasjonale masterprogrammet MSc in Marine Coastal Development (MSMACODEV), og da spesielt med studieretningen Fisheries and Marine Resourses. Denne studieretningen har så langt hatt få søkere. Mange studenter med en bachelorgrad i biologi fra NTNU søker seg inn på MSMACODEV da dette er det eneste tilbudet innenfor marinbiologi og akvakultur ved NTNU. En eventuell samordning av disse to studietilbudene kan først vurderes når strukturen i det nye AQFood er klar.

Internasjonale 2-årige masterprogram (ePhorte 2011/474)

Utredningen om innføring av kun 2-årige internasjonale masterprogram er i prosess og vil ikke gi noen endringer i studieprogramporteføljen ved NT-fakultetet for studieåret 2012-2013. Dette er en sak fakultetet vil arbeide videre med og som på sikt kan gi en overgang fra norske til internasjonale masterprogram innenfor deler av NT-fakultetets studieprogramportefølje.

Med vennlig hilsen

Anne Borg
Prodekanus for utdanning

Lillian Hanssen
Seksjonssjef

Vedlegg:

1. Notat 07.09.10: Nordisk master i sjømatkvalitet
2. Beskrivelse av AQFood iht. kravspesifikasjonen
3. Søknad til Nordisk Ministerråd
4. Skisse til programstruktur etter sammenslåing av MSLIMETAL og MSSILFER

NTNU
Fakultet for naturvitenskap og teknologi
Institutt for bioteknologi

Dato 7.09.10

Referanse

Notat

Til: Fakultet for Naturvitenskap og teknologi

Kopi til:

Fra: Turid Rustad, Institutt for bioteknologi

Signatur:

Nordisk master i sjømatkvalitet

Danmarks tekniske universitet (DTU) planlegger å koordinere en søknad om støtte fra Nordisk forskningsråd for å initierere en felles nordisk masterutdanning med fokus på sjømatkvalitet – tittel "Aquatic Food Production - Safety and Quality". Utlysningen spesifiserer at minst tre universiteter fra de nordiske land danner et konsortium og søker om støtte for å etablere masterutdanningen. Støtten kan bare brukes til å opprette studiet, ikke til å drive undervisningen. Det er et krav at universitetene som inngår i konsortiet i dag tilbyr en master i et beslektet område og er i stand til å tilby 20 ECTS til denne masteren.

Ulike fag/moduler vil settes sammen for å dekke hele verdikjeden og vil dekke både trygghets- og kvalitetspektet knyttet til mat fra havet. Deltagerene i konsortiet vil ha ansvaret for å organisere undervisningen, basert på eksisterende – og ved behov/ønske – nye emner. Masterutdanningen vil bli unik ved at den bygger på ekspertise fra hver enkelt partner.

Konsortiet består av Danmarks tekniske universitet DTU: (Paw Dalgaard, Michael Engelbrecht, Caroline Baron)
Sveriges lantbruksuniversitet SLU: (Anders Kiessling)
Universitetet for miljø- og biovitenskap: (Odd Ivar Lekang)
Norges Teknisk Naturvitenskapelige Universitet NTNU (Turid Rustad)
University of Iceland (Gudrun Olafsdottir)

Masteren skal være klar til å ta imot studenter studieåret 2012/2013.

Det er satt opp et utkast til innhold/struktur i masterutdanningen.

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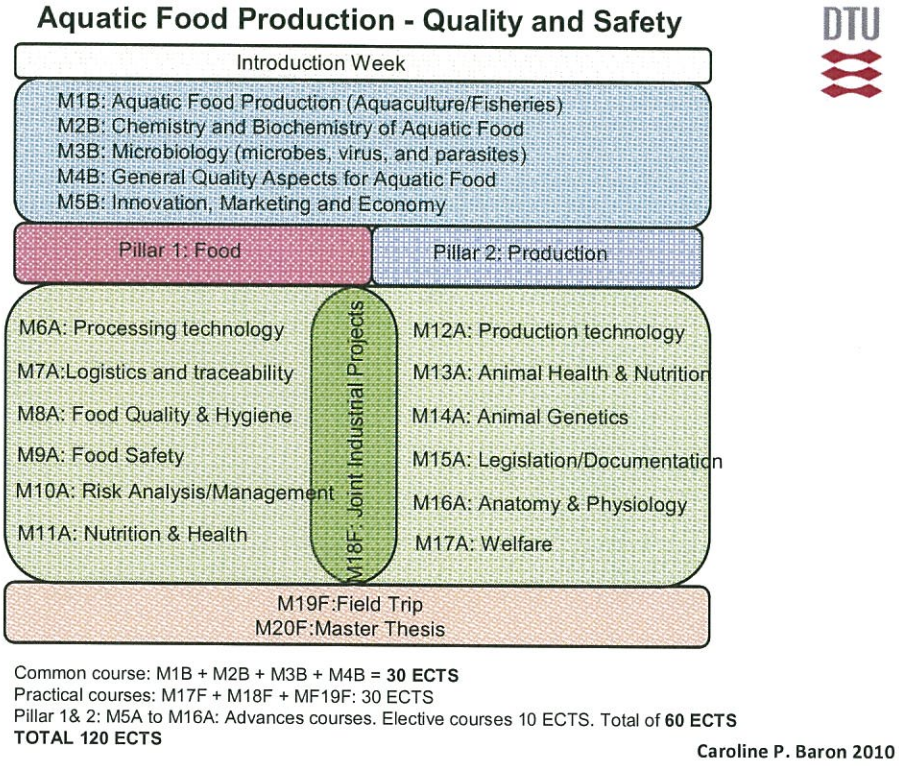


Common course: M1B + M2B + M3B + M4B = **30 ECTS**
Practical courses: M17F + M18F + MF19F: 30 ECTS
Pillar 1& 2: M5A to M16A: Advances courses. Elective courses 10 ECTS. Total of **60 ECTS**
TOTAL 120 ECTS

Caroline P. Baron 2010

NTNU utdanner idag mastere i teknologi innenfor industriell kjemi og bioteknologi. Innenfor studieretningen i bioteknologi er det mulig å fordype seg innen næringsmiddelkjemi med fag som bla næringsmiddelkjemi og næringsmiddelteknologi (undervises ved IVT), i tillegg til basisfag i biokjemi, mikrobiologi, molekylærgenetikk, biopolymerkjemi og biokjemiteknikk. Det er også mulig å ta enkelte PhDemner som marine lipider med mer. I tillegg kommer prosjekt- og masteroppgaver innen dette feltet.

NTNU tilbyr også master i bioteknologi (realfag). Også innen denne masteren er det mulig å spesialisere seg innen næringsmiddelfag ved å ta fagene som er beskrevet over.

NTNU utdanner også mastere i teknologi innenfor "Produktutvikling og Produksjon" og "Energi og miljø". Studenter fra begge disse studieprogrammene kan ta fordypning innen prosessering av mat. Typiske fag vil være "Varmepumpede prosesser og systemer", "Næringsmiddelteknologi" med etterfølgende fordypning innen "Industrielle prosesser-spesialisering", med fordypningsmoduler som "Varmepumpende prosesser i næringmiddelindustrien" og "Avvanning og tørking" er sentrale tema. Det er også mulighet for å ta PhD innen prosessering av mat.

Det er også opprettet en internasjonal master (Master i marin kystutvikling/Master in marine coastal development) som har som mål å gi studentene en bred forståelse av de komplekse interaksjonene i marin sektor. Studentene kan velge tre ulike spesialiseringer: Akvakultur, fiskeri og marine ressurser og marin biologi og biokjemi. Innenfor denne masteren tilbys emner som også kan tilbys i den

foreslåtte nordiske masteren slik som Bærekraftig utnyttelse av marine ressurser, Fiskens tidlige livshistorie m fl. i tillegg til flere av emnene som er nevnt over.

Marine og maritime industrier er en av hjørnesteinene i norsk økonomi og produksjon av sjømat er en viktig del av dette. Mer enn 60 % av verdien av norsk eksport kommer fra marin sektor og Norge har også en sterk posisjon i marin forskning. Videre utvikling av marin sektor er viktig både for nasjonen og for kystsamfunnene.

Marin kystutvikling er et av NTNUs satsningsområder og er organisert i 3 hovedområder og der fiskeri og havbruk og prosessering av marine ressurser er områder som har tilknytning til den foreslåtte masteren. NTNU tar sikte på å tilby 30 ECTs til den foreslåtte masteren i tillegg til masteroppgaver.

NTNU's styrke inn mot den foreslåtte masteren er at vi har sterkt fokus på teknologi rettet mot matrpoduksjon, dette gjelder også undervisning og forskning innen næringsmiddelkjemi der vi har fokus på prosessinduserte endringer i råstoffer. NTNU har god infrastruktur når det gjelder undervisning og forskning knyttet til avvanning og har også god tilgang på og ekspertise på analytiske metoder som NMR, LC/MS. Innen marine lipider har SINTEF bygget opp pilotanlegg for rensing bla. NTNU har også god kontakt med industri og mange master og prosjektoppgaver utføres i samarbeide med industri og/eller SINTEF. Det er imidlertid få studenter som ønsker å spesialisere seg innenfor næringsmiddelteknologi og et slikt samarbeid vil derfor kunne styrke denne undervisningen også hos oss. Antall personer som arbeider innen prosessering av marine ressurser er relativt få ved NTNU og ved å delta i dette samarbeidet vil det gi studentene mulighet til et bredere utvalg av emner. NTNU har ikke egen sterk kompetanse innen mikrobiologi knyttet til sjømat og dette vil være noe studentene kan få anledning til å fordype seg i i den foreslåtte masteren.

Samarbeide med de institusjonene som er med i konsortiet er også av strategisk betydning for videre utvikling av undervisning og forskning på sjømat ved NTNU. Det er allerede samarbeid på forskning (EU-prosjekter, nordiske prosjekter) med flere av universitetene som er med i konsortiet og det er ønske om å videreføre og videreutvikle dette samarbeidet til også å omfatte PhD utdanning bla.

Hva slags industrier og institusjoner kan være avtagere av mastere:

Næringsmiddelindustri knyttet til sjømat slik som bla. Marine harvest, Salmar, flere bedrifter innen marine lipider slik som EPAX, Maritex, andre næringsmiddelprodusenter slik som bla Mills, TINE, Nortura, Grilstad.

Forskningsinstitusjoner: NOFIMA, SINTEF er eksempler på store forskningsinsitutter som arbeider i dette feltet

Forvaltning slik som Mattilsynet, annen offentlig forvaltning

Søknadsfrist: **15. september**

Rektor må signere brev som når Nordisk forskningsråd senest 3 uker etter søknadsfristen.

Opprettelse av nytt masterprogram "Aquatic food production- Safety and Quality"

Felles nordisk masterprogram

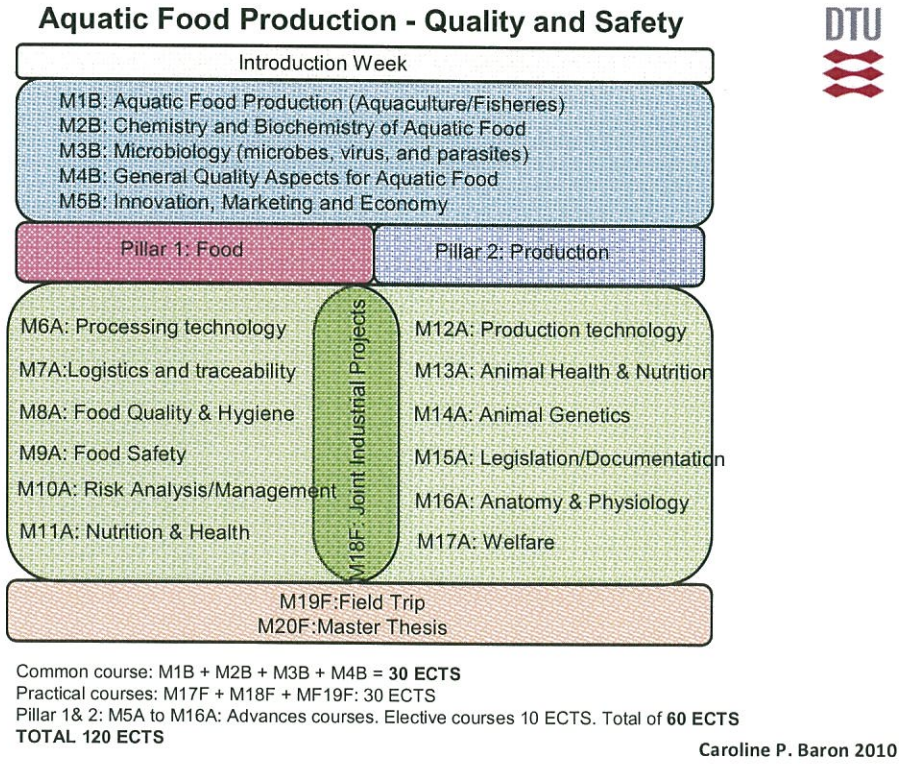
Internasjonale samarbeidspartnere:
Danmarks tekniske universitet DTU
Sveriges lantbruksuniversitet SLU
Universitetet for miljø- og biovitenskap
Norges Teknisk Naturvitenskapelige Universitet NTNU
University of Iceland

Masterprogrammet koordineres av DTU

Finansiering: Opprettelsen av masteren er støttet av Nordisk ministerråd. Utgifter til opprettelse vil bli dekket gjennom bevilgning fra Nordisk ministerråd. Drift vil måtte dekkes av studiepoeng produksjon ved institusjonene. Det tas sikte på å i stor grad å bygge på eksisterende studietilbud

Strategisk forankring på NTNU:
Denne hører hjemme under det Marine satsningsområdet på NTNU. Næringsmiddelkjemi er også et av fokusområdene ved institutt for bioteknologi.

Innhold



Opptak høst 2012

Antall studenter: Det tas sikte på minimum 15 studenter i første år (2012) og 30 i andre år (15+15). Det er også et mål å tiltrekke seg internasjonale studenter.

Opptakskrav: Bachelor med relevant bakgrunn - dette er under diskusjon – vil bli nærmere definert samtidig som innholdet i kjernen (i figuren over beskrevet som introductory week) blir nærmere definert. Krav til språk (engelsk) – der sammenlignes kravene ved de ulike institusjonene og man vil finne frem til felles krav.

Betaling: Dette må også utredes da Norge og Island pr i dag ikke tar studiepenger.

Studieplan: En nærmere gjennomgang av aktuelle fag ved de ulike samarbeidspartnerene er i gang og mer detaljert oppsett av innhold både i kjernen (felles for alle studentene) og i de to pillarene rettet mot hhv oppdrett/fiskeri og produksjon/prosessering er i gang.

Undervisning: Samlinger/ekskursjon – mye av undervisningen vil være web-basert.

Samarbeidende fakulteter: Fakultet for ingeniørvitenskap og teknologi – her tilbys bla. emnet Næringsmiddelteknologi. Professor Trygve Eikevik er orientert og positiv til prosessen mot opprettelse av nordisk master.

Forskningskobling og tverrfaglighet: Det legges opp til tett kontakt med industri og sjømatnæring – både ved ekskursjoner og ved at studentene gjør oppgave i/for industrien.

Fellesgrader/doble grader: Dette er under utredning/diskusjon – alle institusjoner har erfaring med doble grader, slik at dette er en modell som er fullt mulig, det utredes nærmere rundt fellesgrad.

Nordic Master Program 2010
Application

Project information

Title of the Nordic Master Program
Aquatic Food Production-Safety and Quality (AQFood)

Project number
NMP-2010/10018

A - Project partners

A.1 Co-ordinating institution

A.1.1 Co-ordinating institution

Name of institution:	DK-Technical University of Denmark

A.1.2 Project coordinator

Name:	Baron, Caroline
Gender:	Female
Title:	Ph.D
Position:	Senior Scientist
E-mail address:	cba@aqua.dtu.dk
Correspondence address:	Søltoft Plads, Building 221 DK-2800 Kgs Lyngby
Phone (including country and area code):	+45 45254919
Mobile number:	+45 31159161
Fax (including country and area code):	+45 45884774
Institution:	DK-Technical University of Denmark
Department:	National Food institute

A.1.3 Administrative contact person

Name:	Holt, Anne Mette
Gender:	Female
Position:	Special Advisor
E-mail:	amh@admi.dtu.dk
Address:	Anker Engelundsvej 1, Building 101 2800 Kgs Lyngby
Phone number:	+45 45251017
Mobile number:	+45 23674413
Fax number:	+45 45870216
Institution:	DK-Technical University of Denmark
Department:	Study Division

A.1.4 Person in charge of finance on behalf of the Consortium

Name:	Donovan Jensen, Jette
Gender:	Female
Title:	-
Position:	Deputy head of division

E-mail address:	jej@aqua.dtu.dk
Correspondence address:	Søltofts Plads, Building 221 Dk-2800 Kgs Lyngby
Phone (including country and area code):	+45 45252575
Mobile number:	+45 23688291
Fax (including country and area code):	+45 45254919
Institution:	DK-Technical University of Denmark
Department:	National Food institute

A.1.5 Legal representative (Rector or equivalent)

Name:	Bendsoe, Martin
Gender:	Male
Position:	Dean
E-mail:	gdekan@adm.dtu.dk
Address:	Anker Engelundsvej 1, Building 101A, 2800 Kgs. Lyngby
Phone number:	+45 45251013
Mobile number:	
Fax number:	
Institution:	DK-Technical University of Denmark
Department:	Rektoratet

A.2 Partner institutions providing Master's degrees

Partner institution

Name of institution:	NO-Norwegian University of Science and Technology
Name of department:	Department of Biotechnology
Contact person:	Rustad, Turid
Gender:	Female
E-mail address:	turid.rustad@biotech.ntnu.no
Correspondence address:	Institutt for bioteknologi, NTNU, 7491 Trondheim
Phone (including country and area code):	+47 73594066
Fax (including country and area code):	

Name of institution:	IS-University of Iceland
Name of department:	Laboratory of Applied Supply Chain Systems
Contact person:	Olafsdottir, Gudrun
Gender:	Female
E-mail address:	go@hi.is
Correspondence address:	University of Iceland Tæknigarður, Dunhagi 5, 107 Reykjavík, Iceland
Phone (including country and area code):	+354 5255430
Fax (including country and area code):	

Name of institution:	SE-Swedish University of Agricultural Sciences
Name of department:	Department of Wildlife, Fish and Environmental Studies
Contact person:	Kiessling, Anders
Gender:	Male
E-mail address:	anders.kiessling@vfm.slu.se
Correspondence address:	Institutionen för vilt, fisk och miljö, SLU, 901 83 Umeå
Phone (including country and area code):	+46 90-7868483
Fax (including country and area code):	

Name of institution:	NO-Norwegian University of Life Sciences
Name of department:	Department of mathematical sciences and technology
Contact person:	Lekang, Odd-Ivar
Gender:	Male
E-mail address:	odd-ivar.lekang@umb.no
Correspondence address:	Department of mathematical science and technology P.Box 5003 1430 Aas
Phone (including country and area code):	+47645400
Fax (including country and area code):	

A.3 Other partners

A.3 Other partners

B - Content of the master programme

B.1

B.1 Subject area of the master programme

Subject area

The master programme focuses on production of aquatic food, subsequent processing and distribution and more precisely on safety and quality aspects. As such the proposed programme is interdisciplinary as it combines aquatic production (including fisheries) with food processing and with focus on safety and quality. The proposed master is unique, being to our knowledge, the only one in the world to link pre-harvest, post-harvest, processing and distribution to general quality aspects and safety of the final product and that is solely dedicated to aquatic resources. A sucessful master programme will be obtained by combining the expertise of the five partners in the consortium (i.e. fisheries and aquacultures and expertise in foods processing technology and distribution as well as quality aspects and safety). The programme underpins the cause and effect relationship between the different steps along the production chain and focus on quality and safety of aquatic food until consumption.

B.2

B.2.1 Description of the master programme

Description

Global production of aquatic resources continues to increase in order to meet market demands for healthy food and palliate to over exploitation of fish stocks. Global capture production is reasonably stable whilst aquaculture production is rising steadily by 6.5% a year on average. At the same time we have a historic shift in labour from traditional fisheries to aquaculture. At a global scale this is still 1:1, but in high technology farming, problems are related to recruitment of skilled labour in rural areas (FAO, 2009). In 2007, aquatic resource production reached more than 140 million tonnes and the Nordic countries produce approximately 7 million tonnes (FAO, 2009). Therefore, the Nordic countries, in parity with other areas with intensive aquaculture and fisheries, need to develop education in aquaculture and fisheries production to ensure safety and quality as well as enhance awareness of environment impact of the production. Considering that it is possible to tailor the product pre-harvest and affect its quality and safety, it is a prerequisite to integrate education allowing specialisation in production and processing and highlights important factors influencing the safety and quality of the products. In total 80% of the production is used for direct human consumption. European consumption of aquatic foods represents 12 million tonnes a year and is rising significantly due to consumer awareness that seafood is contributing to health and well being as well as the general promotion by public bodies for healthy diet and lifestyle. Together with the increase in aquatic food products consumption, the increase in trade volumes, the expanding market, and the diversification of the food items such as ready-to-eat and convenience food, quality and safety of aquatic foods is very much in focus. This results in a demand to educate people in this area that will be able to deliver high quality and safe products taking all aspects from the living resource to the final aquatic food product into account and to underpin strategies for sustainable resource management.

Indeed, safety and quality are major issues for aquatic food due to their highly perishable nature and this can results in severe economic losses for primary producers, processing industries, and also results in consumer rejection. In addition, aquatic food is often responsible for food-borne disease outbreak. 8-9% of all recorded food-borne outbreaks of human disease within the EU are due to aquatic food (EFSA, 2009) while in developing countries it represents approx 20% of the food-borne disease outbreaks. Moreover, bad handling practices of aquatic food can result in severe economical loss and results in a huge amount of resources wasted. Aquatic resources are limited and are valuable food items and ensuring their quality and safety with a holistic approach will not only result in a better exploitation of the available resources but also contribute to an improved sustainability and contribute to improve

the health and well being of the Nordic and European population. Combining the expertises of the different countries in their respective areas of excellence will result in educating people that will be able to address the challenges of producing nutritious, safe and healthy aquatic food for the global market in an economically and environmental sustainable way.

• Strategically: It is important to strengthen the link between the primary production, processing and the final food product quality and safety not only in the Nordic countries but also globally. Pre-harvest conditions and impact of processing technologies on post-harvest safety and quality is an area that needs to be further strengthened for a better optimisation of our resources, reduce down grading and waste as well as nurture a healthy food markets but also to prevent outbreaks of food-borne diseases, and reduce contamination and exposure to unhealthy chemicals.

• The growing market: China stands for 60% of the world aquaculture and is, together with Norway, the main aquatic food exporting country in the world. The expanding market means that products produced in one area of the globe reach the consumers in another area, which is a challenge for quality and safety standards. It is important to promote exchange of knowledge between countries for the production of high quality and safe aquatic food. An understanding of primary production conditions will support the aquatic food processing student to better understand food safety and environmental impacts of imported products arising as a consequence of production conditions.

• International standardisation: The code of conduct of fisheries and best practices of production and safety practices, are well established in Europe according to recommendations of international organisations (FAO/WHO, Codex Alimentarius and ISO standards). These support the global regulatory framework for food hygiene, contaminants, food technology, food import and export, and microbiology of fishery products.

• Academically: Most academic educations are discipline oriented, and in contrast to the usual schemes the proposed master programme is product and process oriented. In addition, the education will gather experts in the Nordic countries and will contribute to the exchange of knowledge and of good practice. Moreover, this will also result in promotion of the Nordic countries as a leader in the education of highly qualified fellows in the field of aquatic food. The education aims to be very exclusive and to generate highly specialized professionals with knowledge that will fit the demands and needs of the rapidly evolving aquatic food supply and business sector.

• Industrially: Another important objective of the education is that it aims at being driven by a strong industry partnership not only linking primary production to processors and distributors but also tailoring the education to the industrial and market needs. Therefore, the master programme will contribute to educating people that will match the labour market demands. The program will thus pay attention to the current emphasis of international NGO´s and the retail sector to raise the profile of the environment, sustainable development and food safety in their trade agendas.

The proposed master programme involves 4 semesters of studies over 2 years and will be as much as possible web and video conference based to limit travelling of students from one country to the other. First, a field trip is planned to gather the students, to introduce the programme and to initiate contacts and exchange between students. This is considered to be an important step to build the team spirit of the group and a key to a successful and dynamic team and at the same time facilitate contacts across the two sub-programs during the period of specialisation.

The master programme is built with a core consisting of a fundamental block of general competence courses, which is divided in 5 modules which includes: Chemistry and biochemistry (M1B), and microbiology (M2B). In addition, introduction to production (M3B) and to quality and safety (M4B) will be given as well as some basic principles of marketing, innovation, value chain requirements, logistics and economy (M5B). This will represent at total of 30 ECTS and be running for 1 semester. Subsequently, the master programme will be divided into 2 sub-programmes, one with focus on primary production of aquatic food material (Sub-programme 1) and the other with focus on aquatic foods quality and safety through processing, and distribution to the consumer (Sub-programme 2). Obligatory modules will be offered in each sub-programme together with some joint field projects. However, students will as much as possible be able to tone their master into one area or the other. The proposed modules in the different sub-programmes are given below:

Sub-programme (1): Production
M8A Production technologies (aquaculture/fisheries) including waste
M9A Environment and sustainable resource management
M10A Animal health, water quality and welfare

M11A Nutrition, feed technology and feed resources
M12A Animal genetics
M 13A Anatomy and physiology,
M14A: Documentation/legislation
M15A: Emerging resources and globalisation: Innovation, production & distribution

Sub-programme (2): Food
M16A: Processing technologies including waste
M17A Environment and sustainable resource management
M18A: Logistics, traceability and supply chain management
M19A: Aquatic food quality and shelf life
M20A: Aquatic food safety and risk management
M21A: Documentation/legislation
M22A: Aquatic products and human health
M23A: Emerging resources and globalisation: Innovation, safety & quality

Students will be able to choose modules from sub-programme 1 and 2 and organise their studies in order to obtain 60 ECTS within a period of 2 semesters. If necessary summer school or intensive course will be offered between semesters in order to palliate at eventual disparity between the students background knowledge and to provide "hands on" support if needed. During the studies joint field projects will be planned as well to enhance exchanges of knowledge and discussion between the participants. Finally, a 3 week field trip in the Nordic countries involved will be done in order to have an overview of the seafood sector. As a final exam the student will deliver a master thesis (30 ECTS) based on studies carried out in collaboration with industries or branch/consumer organizations.

Non exhaustive list of industrial partners contacted for support to the proposed master programme: field trips, practical placement, and advisory board is given below:
HB Grandi (IS), Brim Seafood (IS), Skagerak Pelagic A/S (DK), Biomar A/S (DK), Rabbekfisk A/S (DK), Musholm (DK), NOFIMA (NO), SINTEF (NO).Abba Seafood A/S (SE), Fram Food A/S (IS) Lykkeberg A/S (DK), Saeby Fisk Industry (DK), Skagerak Salmon A/S (DK), Royal Greenland Seafood A/S (DK), Hyttels salmon (DK), MATIS (IS).

B.2.2 Summary

Summary

The general objective of the master programme "Aquatic Food Production-Safety and Quality" (AQFood) is to deliver a unique education in aquatic food production and processing in order to support a continuous and prosperous growth of Nordic fisheries, aquaculture and fish processing industries aiming at delivering safe and high quality products. Link between the primary production, the processing and distribution steps to the consumers in term of quality and safety. The product will be followed using a holistic approach and focus on methods to monitor technologies to maintain quality and safety aspects of these healthy food items throughout the entire production and food supply chain. Norway and Iceland are the main producers of aquatic food in the Nordic countries whilst Denmark and Sweden have well established aquatic food processing industries. In addition the different Nordic countries involved are leaders in their respective area in the academic world and have different and complementary expertise in the different themes. Combining the expertises of the different countries in their respective areas of excellence will result in educating people that will be able to address the challenges of producing nutritious, safe and healthy aquatic food for the global market in an economically and environmentally sustainable way.

B.3 Contribution of each partner

B.3.1 Contribution of each partner

Contribution

SLU: SLU has academic strength in sustainable food production and management of natural resources. The department of Aquaculture was established in 1985 and is now integrated with management of wild populations and environmental studies (VFM) at SLU. SLU offers MSc in management of fish and wildlife population and aquaculture and fish behaviour and they will be able to deliver teaching in aquaculture, including production, health, welfare, environment and food science. SLU will significantly contribute to

sub-programme 1 and has been identified as the obvious coordinator of this sub-programme, however this will be confirmed at a later stage.

UMB: UMB offers a MSc in Aquaculture, and is the department in Norway with the highest number of Aquaculture MSc awarded degrees. The speciality of UMB is production technology, fish nutrition and fish breeding. In addition to competence in relevant coldwater species, UMB also perform work, including a breeding program, on tilapia which would be important in general for the internationalisation of the programme. UMB will significantly contribute to sub-programme 1.

Both UMB and SLU are part of the NOVA University Network, and they will represent the network, which is a platform for efficient and innovative Nordic cooperation. Both UMB and SLU are involved in the joint education programme in Nordic Aquaculture and Fresh water management platform and they will with their expertises significantly contribute to the sub-programme 1.

NTNU: NTNU educates masters in technology with different profiles and the relevant faculties and departments contribute to give the students a good knowledge in engineering and technology. Marine and Maritime research is one of NTNU's six thematic interdisciplinary strategic areas. In addition, NTNU Centre of Fisheries and Aquaculture (SeaLab) provides a common arena and building blocks for research groups with focus on aquaculture, fisheries and the processing of marine resources and a common node for workshops and projects with SINTEF (an independent research organisation). NTNU at present deliver a master in Technology with a specialisation in Food Science and a master in Marine Coastal Development and will with their expertise significantly contribute to the core teaching and both sub-programmes 1 and 2.

DTU: DTU offers MSC programmes both in Food Technology and in Aquatic Science and Technology. These programmes will be able to provide teaching for the proposed master programme. DTU has internationally recognized research platforms for fish technology, quality and safety that generate understanding of food during processing and distribution. Areas of expertise where DTU will be able to deliver courses include biological quality, pre-harvest impact on post harvest quality, sensory evaluation, shelf-life and spoilage reactions including oxidative modification and microbial changes, hygiene and prediction of safety together with optimisation of processing. DTU will significantly contribute to the core teaching and to the sub-programme 2 and has been identified as the obvious leader of sub-programme 2, however this will be confirmed at a later stage.

UoI:The recently established ASCS (Applied Supply Chain Systems) research group (www.ascs.is) within the School of Engineering and Natural Sciences, focuses on interdisciplinary applied science in the area of aquatic foods and supply chain management for enhanced safety, quality and transparency of products in the value chain. UoI will be able to deliver courses dealing with logistics and supply chain management, real time monitoring devices for quality, safety and traceability and evaluation of environmental impacts by Life Cycle Analysis (CLA) and carbon footprint for the whole fish supply chain, focusing on the production and transport of fish as an area where research activities are growing. They will significantly contribute to sub programme 2.

B.3.2 Application and admission procedures

Application and admission

Application: A central application procedures will be coordinated by DTU. Each application will be handled through a local contact point at each core partner to underline that the student is registered at the partner university as a full member of that university. The application procedure will be integrated in the national application system to make it visible. Both Sweden and Norway are now using a central application system with BSc, MSc and free courses at all higher education institutions. However, each partner will advertise and promote the HEI with a common deadline for final admission. All HEI in the consortium will provide support to applicants/students both during the application procedure and throughout the MSc. via a national contact point. Support will be provided via email and telephone and during the start up face an online application form will be filled out by the applicant. The student will provide information regarding their mobility track and their study plan as part of their application. Depending on the HEI application origin, their proposed study plan and motivation, and their mobility track the student will be affiliated to one university in particular, which normally is the applicants university but may change due to specially expressed interest by the applicant (see below).

Admission: The students will be admitted in the first instance to HEI where they submit their application and refer to the legislation of that country for admission. However, common criteria for admission procedure will be pre-defined in the consortium and an admission panel will be in place to address the disparity between the different HEI admission criteria. In all HEI in the consortium, there are strict rules against discriminations and equal opportunities will be given to all applicants irrespective of disabilities, religious belief, sex and race.

Tuition fee: EU/EEA citizens are not required to pay tuition fees to enrol in master programmes in any Nordic countries as their tuition fees are financed by the government. This includes the following countries: Denmark, Sweden, Norway and Iceland (the consortium countries) as well as Belgium, Finland, France, Greece, Netherlands, Ireland, Italy, Luxembourg, Portugal, Spain, UK, Germany, Austria, Cypress, Estonia, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Czech Republic, Hungary, Bulgaria, Romania and Liechtenstein. All other countries are defined as non-EU/EEA countries, and as of August 1st 2006, their citizens will have to pay a tuition fees to HEI in Denmark and Sweden while there is no tuition fee in Iceland and Norway. The tuition fee in DK for students enrolled in a DTU study programme is DKK 102,500 (EUR 13,500) per academic year. The tuition fee in Sweden (SLU) as of 2011 is still awaiting a final decision. Affiliation of non-EU students to one of the 5 HEI involved in the consortium will be discussed within the consortium but it is expected that students will be under the national regulation of the country where they have submitted their application.

B.3.3 Joint study programmes and relation to national legislation

Study programmes and relations
Not all countries in the consortium are presently able to issue a joint degree, however the consortium is aiming at a joint degree and will work to achieve the joint degree. In case this is not manageable in the first years a degrees will be awarded according to a double degree framework. The consortium will, depending on the university of origin, the mobility track, the study plan as well as the physical location of the master thesis project work, agree on where the joint degree should be issued. It is anticipated that a 60 ECTS model will be the basis for the joint diploma agreement with 60 ECTS qualifying the 2 Universtities delivering the joint degree. Rules will be established in agreement with legislations in the different countries before the master is launched and reevaluated every year as legislation evolve in order to aim at a joint diploma. The content and the type of layout of the diploma and eventually diploma supplement(s) will be agreed upon at least one semester before the first cohort of students are expected to complete the programme.

B.3.4 PhD requirement

PhD requirement
All participating HEI provide a third cycle degrees within closely related subjects and the successful students, providing that they have completed their master education with success and that PhD position are available, will have the possibility to be enrolled as Ph.D. students in the different HEI.

B.3.5 Number of ECTS (Study credits)

Number of ECTS
120 ECTS
All participating HEI will be able to deliver a minimum of 20 ECTS each to the proposed master programme.

B. 3.6 Language

Language
All courses will be taught in English and the final master thesis/dissertation will also be written in English. Students are expected to have a level in English sufficient to follow the different course and applicants needs to submit TOEFL or IELTS scores.

For admission all applicants should submit IELTS or TOEFL test results score reports which will be sent directly to HEI where they will be enrolled from the test centres.
The requirements are different for the different partners in the consortium and the scored will be compared and agreed upon but will most likely depend on which HEI the applicant is affiliated to.

Only the following applicants are exempted: 1) Applicants who earned their B.Sc.-degree in a country in the European Union or in one of the following countries: Australia, Bahamas, Canada, Guyana, Iceland, Jamaica, Norway, New Zealand, Switzerland, Trinidad and Tobago, or the United States of America. 2) Applicants who are currently completing or have previously completed at least six months of English taught studies in a university of a Nordic country applying to a minimum of 20 ECTS credit points.

B.4 Nordic added value

B.4.1 Academic quality

Academic quality

Academic quality

To date no master programme relates the primary production to the final aquatic product quality, safety, distribution. In that respect the proposed master programme is unique as it links the production and distribution parameters to quality and safety parameters of the final food products using the expertise from the different HEI in the Nordic countries. This allows for synergy and combination of expertise. Several master programmes exist in the Nordic countries dealing with aquaculture (SLU, UMB) but they do not address quality and safety of the final aquatic product as food. In addition masters in Food Science/Technology, Biotechnologies and Engineering exist at NTNU, UoI and DTU but they do not focus on aquatic food chains.

DTU: DTU includes several divisions that will contribute to the proposed master programme. Particularly, the newly establish Division of Industrial Food Research (includes the former Department of Seafood Research originally started in 1931) is an internationally recognized research platform for fish technology, quality and safety that generates understanding of food during processing and distribution. Areas of expertise include aquatic food quality and safety together with optimisation of processing. Other divisions are also expected to contribute to the proposed master programme for example: Division Microbiology and Risk Assessment. Research based teaching will e.g. be provided by associate professor Michael Engelbrecht (Aquatic production quality) and Senior Scientist Paw Dalgaard (Aquatic and predictive food microbiology).

SLU: Has since 25 years included all relevant faculties and departments related to sustainable food production and management of natural resources. The department of Aquaculture was established 1985 and is now integrated with management of wild populations and environmental studies (VFM) at SLU. SLU initiated at the beginning of 2010 establishment of a cross faculty national centre of excellence in aquaculture, including production, health, welfare, environment and food science. This 5 year initiative is supported by economic means from SLUs internal budget with the intent that this will be a permanent part of SLU's portfolio. The proposed Nordic MSc fits perfectly in to this work and has obviously the support of the university as well as the Swedish aquaculture industry.

UMB: This University was the first in Norway to offer a MSc in Aquaculture (1972), and is the department in Norway with the highest number of Aquaculture MSc awarded degrees. The speciality of UMB is production technology, fish nutrition and fish breeding. UMB was also the origin of "Akvaforsk" (now a part of Nofima Marine and Nofima Food) which is one of the underlying reasons for the close connection between the aquaculture MSc at UMB and the Norwegian aquaculture industry. In addition to competence in relevant coldwater species, UMB also perform work, including a breeding program, on tilapia. Because of this UMB receives many aquaculture MSc students from China, other South East countries and Africa. The present application support s the request of the Norwegian aquaculture industry to increase recruitment of students with the intent to join Nordic industries.

NTNU: specializes in technology and natural sciences and has educated masters in technology for 100 years. More than half the degrees awarded are within technology and natural science. University of Trondheim was founded 1968, based on the Norwegian Institute of Technology and Norwegian Teachers College. NTNU has a close cooperation with SINTEF, one of the largest independent research organisations. Both masters in technology in Chemical engineering and biotechnology with a study profile of Biotechnology and masters in natural science in biotechnology can specialize in food science. Masters in technology in mechanical engineering can specialize in food processing. Marine coastal development is a two-year international multidisciplinary master of science programme. It is especially designed to give the students a broad understanding of the complex interactions in the marine sector.

UoI: The recently established ASCS (Applied Supply Chain Systems) research group (www.ascs.is) within the School of Engineering and Natural Sciences, focuses on interdisciplinary applied science in the area of aquatic foods and supply chain management for enhanced safety, quality and transparency of products in the value chain. The priority is on the integration of food science, engineering, and natural sciences with active industrial and private company collaboration. Implementation of Information and Communication Technologies (ICT) in the value chain, including real time monitoring devices for quality, safety and traceability and evaluation of environmental impacts by LCA and carbon footprint for the whole fish supply chain, focusing on the transport of fish as an area where research activities are growing Collaboration with the Environment and Natural Resources Interdisciplinary masters program at the UoI and programs within the School of Engineering and Natural Sciences in addition to the Faculty of Food Science and Nutrition and Matis Icelandic Food Research, the University of Akureyri and Holar University College will ensure a dynamic environment for the masters programme and further the recruiting of international students from the United Nations University - Fisheries Training Programme in Iceland.

The different universities involved have complementary expertise in related fields and the proposed master programme will link the two areas and will enhance significantly the academic quality as it will be dedicated and focussed on aquatic foods quality and safety.

B.4.2 Contribution to excellence and competitiveness

Contribution
The proposed master programme will contribute to excellence and competiveness via:

1) Unique education: The master programme proposed is unique as it gathers excellence and expertise from each Nordic country involved in the consortium and it delivers an exclusive education within the field of aquatic foods.

2) Excellence: Complementary strength of the Nordic partners involved, each bringing their area of excellence will result in a master of exceptional quality with synergy and effect based on this unique combination.

3) Teaching model: The Nordic teaching model is well recognised as being very successful. Tendency to move from the individualised teaching toward the teaching of individuals will prevail. The education will also take starting point in individual choices where students are entrepreneurs and make individual choice for their own education. Integrated learning system using modern technologies will contribute to develop lifelong learners. This will contribute to the education of independent and competitively individuals to the labour market that will be able to adapt and embrace changes in our fast changing world.

4) Interaction with industries: Strong links between the master programme and the Nordic aquatic food industries i.e. producers, processors, retailers will be provided through field trip, research project, consultancy, sponsor etc... This will result in an education closely linked to the needs of the market that will be able to fulfil the demands of this fast growing sector.

B.5 Quality assurance

B.5.1 Measures to assure the quality of the master programme

Measures to assure the quality of the master programme
Measures to assure the quality of the master programme:

1) Quality of teaching: On completion of each module an evaluation will be in place and this will be reviewed by internal evaluation panels (including both student, university pedagogic). This will ensure that the delivered teaching match the requirements of the core partners universities as well as the industry. It is important that we deliver educated individuals that have a profile necessary for the labour market. In addition, feedback from students will be encouraged as being part of the policy of the different HEI engaged in the consortium to deliver excellence and to match expectation with delivery and this will results in a high quality of teaching. In term of learning methods, bloom's taxonomy moving toward the

highest order of the taxonomy will be a goal in itself with "analyse, evaluate and create" as the way of learning will be engaged.
2) Accreditation: Accreditation is done in accordance with the rules and procedures of the participating universities and their national legislation.The standards and guidelines for quality ensurance in the European higher education area, central to the Bologna process have been fully embraced by the consortium as well as the international network of quality assurance agencies in higher education (INQAHE).
3) External International Advisory Board: An external international advisory board consisting of academics and industrial partners external to the master programme will be established for the development part. During the running phase of the programme, the board will consist of industries involved and supporting the programme in order for them to be able to address specific issues related to the quality of the education delivered in relation to expectations and demand of the market.

B.5.2 Connection to research

Connection to research
Connections to research in the proposed programme are evident as all teachers are involved in their professional career not only in teaching but also in research. It is a goal in itself that the master programme has to be well connected to ongoing research activities so that the latest findings will be incorporated in the teaching element provided in the master. The concept of research driven education will be put in practice. This will also allow future players in the aquatic food industries to relate to research in a much more accessible way. For example in the aquaculture and fisheries (production/Sub-programme 1) new elements and findings related to improvement of feeding regime/nutrient resources and quality/environmental impact using modelling, including LCA, and knowledge of the latest technical innovations to support the development of practical and science based tools to foster sustainable trade of aquatic products. Other examples are implementation of welfare –health and economic consequences of its violation. Also genetic resources are a rapidly moving field requiring close connections to the latest research. Related to aquatic food products (Sub-programme 2) mathematical predictive microbiology models and computer software, as recently developed by DTU, will be used for teaching with the assessment and management of quality and safety including product development, shelf-life prediction and consumer exposure. Other areas with close links between resent research and teaching include human health and functional food for example. This connection between current research findings and the future actors in the sectors will benefit dissemination, exploitation and will result in valorisation of university based research by the aquatic food sector. In addition the master thesis will be linked to ongoing research at the HEI partners and at industry/research institutes.

B.5.3 Evaluation of the master programme

Evaluation of the master programme
The master programme will be evaluated based on constructive feedback from the student and teachers and this will be done for every module. In addition at the end of each module and at the end of each year the programme will be evaluated based on student tests and results according to expectations, which will have been determined using Bloom's taxonomy and intended learning outcome (ILO). Results of the evaluation will be used to further improve the teaching delivered as well as the teaching methods and to reach a high quality master programme. Evaluation scheme and questionnaires will be elaborated and defined by the consortium before launching of the master to ensure that evaluations are identical in the different HEI. The industrial partners will, as part of the advisory board, also be able to evaluate the master and an evaluation sheets will be also issued and filled out by the industries after completion of the master thesis work. Feedback from our industrial advisory board will be taken into consideration as the master programme aims at serving the seafood industries sectors by delivering highly qualified workers.
Evaluation in term of enrolment will be done according to a goal of a minimum of 15 students in the first enrolment year and 30 student in total (15 + 15) in the second running year. However, the master aims at attracting international students and this number is expected to grow also due to the intended international recognition of excellence for the proposed master programme.

B.6 Innovation

B.6.1 Innovative aspects regarding the content of the master programme

Regarding content

The proposed programme is innovative as it is exclusively focussed on aquatic foods. Most master programmes today are discipline oriented or combine several disciplines in an innovative way. The proposed master is unique as it encompasses all elements, from the primary production to the retail, which are necessary to deliver safe and healthy aquatic food of premium quality. The master is dedicated to aquatic food and no comparable master programme exists in the Nordic countries, within the EU or to the best of our knowledge world wide.

B.6.2 Innovative aspects regarding the teaching methods of the master programme

Regarding teaching methods

Teaching provided at the blackboard in plenum will be minimised as much as possible in the master programme as this has been proved to not always be the most efficient method in educating students. Therefore, a variety of teaching methods will be employed. The teacher and student will be both engaged in the teaching in innovative and interactive ways. Modern technologies, including video link, online course, e-learning, interactive teaching elements, podcasting, facebook group, online forum, will be integrated in the teaching methods provided in the master programme. Some HEI in the consortium already have e-learning elements in their teaching activities and this will allow us to be able to reorganise existing courses in new ways. This will results in a dynamic up to date education and this will be done in collaboration with for example the NOVA Pedicnet at Nordic level and with the already established pedagogic and IT departments of each member university. For example in DK the Learning Lab at DTU is an internal consultancy unit aiming at inspiring and supporting DTU teachers, students and management to continuously improve the quality of the teaching and learning at DTU. Through their activities they support innovative education practices focused on student learning and integrating technological tools in teaching and learning.

B.7 Dissemination

B.7.1.Examples of good practice

Good practice

Traditionally primary aquatic production and seafood processing has been two separate worlds with their own set of quality indicators. However, it has long been recognised that some farmers produce prime quality while others do not. It is recognised, in economic terms, with the major aquaculture farming industries being big enough to afford an internal quality control, using among other criteria number of returns from processors and retailers as indicators. The sustainable management of fishery resources the impact of harvesting, manufacturing and global transport on the environment, are factors that are gaining increasing attention and eco-labelling schemes are being introduced in trade. This calls for attention of better transparency in the chain and benchmarking of the environmental impact by development of valid indicators for monitoring i.e. LCA. In aquaculture a very gross criteria of quality of products such as total fat content, pigmentation and outer shape of the fish are applied as on line quality criteria, whereas monitoring of temperature and evaluation of freshness, color, odor and texture attributes and defects such as gaping, are applied in trade of aquatic products. In general processors, retailers and chefs express a general awareness of importance of production conditions, signified by using brand names of specific producers or/and in house brand names tied to production conditions. However, this is often based on personal insights and personal initiatives. No education exists at present to bridge this gap. One outcome of this education is to provide students with the tools to integrate and thereby formulate good practises in quality and safety control systems covering the complete value chain of aquatic food.

Another example of good practice is that this education aims at establishing a strong collaboration with the aquatic food sector/industries in the Nordic countries. An understanding between the education and the aquatic food labour market will be vital. This will be a measurable output via joint project with the seafood industries and considered to be the key to success. By establishing a strong industrial support the proposed master programme will be able to bring out to the labour market highly skilled and valuable students.

B.7.2 Dissemination and exploitation of results

Dissemination and exploitation of results

Several available media will be used to disseminate the results. A blog will be provided as well as an interactive (web) home page will be the core of the master programme. In addition industry and branch associations in the different countries will be vehicles for dissemination of research results and further exploitation of knowledge. A folder dedicated to the master programme will be available this will be a starting point for dissemination of good practice. In addition, presentation of the successful master projects in collaboration with our industrial partners will be done through popular magazines dedicated to fisheries, aquaculture and foods.

B.8 Target groups and recruitment of students

B.8.1 Target groups and marketing within the Nordic region

Within the Nordic region

Students with bachelor degrees in engineering or life science are the target groups and this is a strength of the proposed master programme as it combines elements of life science and technological aspect in a unique way. The master programme is expected to meet the demand of the Nordic labour market for highly specialised and qualified people with both technological and life science qualifications. Recruitment of students will be performed using marketing strategies and publicity. The programme will be announced at several national, Nordic and International meetings, workshops, conferences and seminars. The program will also be included in the EU aquaculture education student portal of Aqua-Tnet, making it easily found by any student searching the net for education in Aquaculture or Aquatic food. All HEI in the consortium will be involved in the recruitment at the Nordic level and the intent is that a link will be included at each members own home page under key words as aquaculture, fish farming, aquatic food, seafood, quality, safety, etc under the search function. A market analysis in order to recruit new students will be performed using the DTU Match (DTU own market analysis performers) who will evaluate and propose strategies to reach out for new students. The master programme will be advertised using paper based material such as flyers and magazines but also using new technologies such as web-based (web pages, emails) and online mass diffusion medias (youtube, linkedin, facebook etc..). In addition the Nordic HEI web pages will be use to advertise the programme as it will also be recognised byt the national HEI involved.

B.8.2 Target groups and marketing outside the Nordic region

Outside the Nordic region

Strategies similar to those used in the Nordic regions will be used in order to market and advertise the master programme at the European and international levels (see B8.1).
With the uniqueness of the programme and the growing market for aquatic resources it is expected that the programme will attract international fellows. Diffusion outside the Nordic region will take place by dissemination of the information via existing cooperation programmes and associated research institutions like Aqua-Tnet. Also several existing international research activities will be used as support such as the SeafoodPlus European platform, EATIP (European Aquaculture Technology and Innovation Platform) etc.., who will play a key role in diffusion and advertising the Nordic master programme.
The popular DTU international workshops on predictive microbiology/seafood safety and quality will also used to advertise the education e.g. by including information on the software homepage (http://sssp.dtuaqua.dk). In addition, existing European portals will be used for advertising such as for example www.masterportal.eu and www.study-in-europe.org and international portals such as for example www.sarnissa.org

B.9 Sustainability

B.9.1 Sustainability of the master programme

Sustainability

It is expected that the master programme will be sustainable due to the strong partners involved in the consortium, the dynamic of the proposed programme and the strong industrial back up of the programme. Existing courses at the participating HEI will form a solid basis for this new master programme. By new combinations and redesign of courses it will be possible to run the proposed master programme at reasonable costs and at the same time with a high probability of being successful.

In this way the programme is expected to be sustainable. In fact, staff in permanent positions within the consortium combine all the necessary expertise and will supplement and support each other in a sustainable way in order to avoid unnecessary expenses.

B.9.2 Financing

Financing

Implementation will be financed by the present funding and will be supported by the consortium HEI partners administrative entities. With respect to the teaching staff, at HEI, staffs are dedicated to teaching and education, this is part of the HEI employment and education system and therefore the programme will be able to run smoothly. In addition, elements of courses from existing master programmes in the HEI will be part of the new master and will be reorganised and implemented for a web based learning keeping the cost for travelling of students and staff down. The programme is also strongly linked to the aquatic food industry and they will support studies and activities e.g. in relation field trips and theses projects. Physical mobility is expected to use already existing forms of financing like NordPlus and NOVA course support for example.

C - Development period of the master programme

C.1 Description of the development period

C.1.1 Goals and achievements during the development period

Goals and achievements

In order to ensure that the goals are reached, the consortium will meet every 6 months. Tasks with deadline will be assigned to each HEI members, tasks will be related to the general organisation, management and implementation of the programme. A status report will be issued after each meeting to make sure that tasks and issues have been dealt with accordingly and unambiguously. This will allow a smooth development period. The goals to achieve during the development period are classified as:

1) To propose a unique education: It is important for the master programme to be recognised as a unique education in the Nordic countries and also internationally. Nordic countries have a very long history and tradition for production of aquatic resources and deliver high quality products. Standards of quality are recognised worldwide and it will be the consortium ultimate goals to be able to deliver a unique and successful education that will disseminate the knowledge and that will be able to attract Nordic and international fellows. This is considered to be necessary for educating professionals with the potential to develop the aquatic food sector successfully, to grasp opportunities and to achieve the goals of delivering safe and healthy aquatic food for the expanding market.

2) To implement a unique Nordic teaching model: As previously mentioned the goal of the master programme is also to further develop and implement the Nordic teaching model. Indeed, this model is proven to be successful and takes its origin in the individualisation of the education. All available material and technology will be used and implemented as much as possible in order to deliver a unique teaching experience. New ways of teaching, linking technology and engineering to life science will be explored.

3) To integrate the education with industrial needs: The education will be very strongly linked to industrial needs and will be therefore driven by a constant dialogue between the teachers and the industries in order to stimulate the learning process and integration of student in the labour market. Close interaction between the master programme and the industries will be part of the master programme by field trip, project and master thesis.

4) To facilitate harmonisation of higher education system: a smooth implementation of all administrative tasks related to for example diploma, ECTS, and national regulations for example. In addition as for the Bologna process make mobility and transfer from one Nordic country to the other one easy as well as in general the European higher education system making them competitive and attractive. The consortium has the advantage that the partners form the NOVA aquaculture education platform already has confronted and also in part solved a number of these issues facilitating progress in this area.

5) To attract international students: One of the goal of the master programme is to attract international students. Due to the fact that the teaching language will be English, and that a lot of the courses will be e-learning or web-based this will give the programme extra flexibility and allow to attract international fellows. The programme will be able to meet the market demand for delivering highly educating and trained international fellows with knowledge of the Nordic and European aquatic sector.

C.1.2 Main activities during the development period

Main activities

In order to ensure a continued activity and on time delivery of tasks a main secretariat will be installed at DTU, coordinating sub secretariats at each HEI core partner. It is expected that SLU will be in charge of coordinating sub-programme 1 whilst DTU will be in charge of coordinating sub-programme 2. For each sub-programme a coordinator will be identified and agreed upon. As soon as the evaluation will be released the consortium will meet for a 2 days kick off meeting at DTU in December or January with a clear agenda and written record in order to track and file decisions. A consortium agreement will be signed between all partners. The following points will then be addressed:

1) Determination of working groups according to the different expertises for each of the proposed modules but under the sub-programme coordinators (after agreement).
2) Determination of content in details of the different modules based on existing courses at the different HEI and participation of the different HEI in the modules. It is evident that the HEI profile will predetermine their implication in the different modules. However, to make sure that no ambiguity arises discussion and decision in plenum with vote if necessary will take place. It will be aimed that a unique education is proposed in the programme with identification of the best possible lecturer and modules. It is aiming at minimizing the opening of new courses but to base as much as possible the teaching experience on already available courses. Guest lecturer as well as industrial lecturer will also be identified to eventually palliate at missing expertise however, this will be kept to a strict minimum.
3) Status of materials and set up available at the different HEI including e-learning and set up for promoting distance education. The aim is as much as possible to deliver a web based and e-learning education and careful investigation of available video materials and resources will need to be performed. Preparation of the material necessary for video and computer based systems for implementations and for a successful delivery of such teaching based methods will be an important part of the debate.
4) Identification of industrial partners that responded positively to support the proposed education and as a core driver for fields trips and placement of student for master thesis. Determination of their involvement and request for the education integrated learning content. Identification of international industries advisory board with respect to the preparation of the programme content, evaluation and objectives.
5) Define the learning objectives for each module based on industrial and market demand as well as preparation of feedback and evaluation forms.
6) Advertising and marketing of the current master programme will be done by preparation of folder and posters for dissemination in order to recruit student at the different Nordic countries but also internationally. Overview and identification of the dissemination channels. In addition a survey will be performed in order to reach out for new students.
7) Design the of homepage as well as content as well as link to HEIs and to national as well as international web sites. This will include preparation of on line application and evaluation sheets and forms.
8) Define the criteria for admission and evaluation of students and affiliation to respective institution based on the student profile and study plan. Establishment of deadline for admission and procedure in details as well as follow the development of the tuition fee in relation to the different national legislations.
9) Clarify the nature of the degree delivered with respect to joint diploma or double diploma but aiming at obtaining a joint diploma for all HEI involved for 2014 which will be the first graduating year.
10) Reporting will be done on a regular basis and a report will be issued every 6 months by all HEIs institutions involved in order to follow the progress of the preparation phase. This will be necessary in order to ensure progress but also identify shortcomings which will require immediate attention in order to result in a smooth implementation phase.
11) Budget will be dealt with as well with expectation of expenses and overview of economy and fund available for full transparency. Again for expenses decisions will be taken in plenum with possibilities to vote.

12). Meeting the frequency of meeting will be very 6 months with several video conferences and telephone meeting on regular basis.

C.1.3 Institutional and national anchorage

Institutional and national anchorage

The anchorage of the proposed master in all HEI within the consortium is strong due reliance on course elements from existing educations. In addition, each partner will have responsibilities for at least one full module related to their key expertise and have the option to collaborate on other modules. In this way all partners are have responsibility and basis to deliver their best. National anchorage will also be improved by the fact that industries from the different countries will actively take part of master programme. Students will be mainly affiliated to one university depending on their study plan, their field trip and their master thesis and this will contribute to national anchorage.
In addition, the proposed master programme will be recognised by all HEI involved and part of the proposed master education in the same way as other national master programme.

C.1.4 Monitoring and evaluation during the development period

Monitoring and evaluation

Progress will be evaluated internally and externally. Internal advisors at each HEI in the consortium will take care of following the progress of the master programme development and monitor is successful development. A diagram with tasks and milestones including date for completion will be issued as this will allow checking for a smooth progression of the developing phase. After each meeting a minutes will be written and distributed to all partners in order to assess progress and it will also be the responsibility of the faculty staff responsible for education and teaching at each HEI to support and advise the consortium during the development phase. In addition, an international external advisory board will be created and this board will follow and monitor the development phase of the master programme. During the running phase supporting industries will play the role of the evaluation board in order to follow the master programme delivering of teaching in accordance with the labour market after implementation and during its running period. This is expected to be free consultancy from the involved industries.

C.2 Partnership

C.2.1 Previous collaboration

Previous collaboration

SLU and UMB in this Nordic MSc have a long and documented history of collaboration within education, and then in particular in aquaculture. Already 5 years ago the partners initiated a network under the umbrella of the NOVA virtual university network (http://www.nova-university.org/networks/aqua/). The primary aim of the network was to formulate a joint Nordic Aquaculture and Fisheries education platform, with the ultimate goal of a joint Nordic Master in aquaculture based on internet teaching, and joint field and laboratory courses. The involved universities formulated a joint intent in the form of a signed document, formalizing the goal of a joint MSc in Aquaculture. This experience will be very valuable for the proposed master programme and some of the teaching will take its origin in the NOVA network. .

NTNU, DTU and UoI, in have successfully collaborated in EU funded Concerted Actions and Integrated Research project SeafoodPlus under different EU framework programmes. This has resulted in a number of highly relevant research projects and scientific efforts. This previous collaboration will strengthen the current research programme as the partners have understood cultural differences and build up a network that will be very valuable for the current master programme and will contribute to a smooth implementation of the teaching activities .

Emails, telephone meetings, as well as face to face meeting will take place in order to prepare the current master programme application. For example a meeting in October 2010 during a seafood technology conference (WEFTA, Izmir October 2010) is planned and some of the HEI representatives (NTUN, DTU and UoI) in the consortium will be able to discuss further the organisation of particular sub-programme 2 of the master programme. Subsequently several meetings will take place on bilateral basis and when given the opportunities.

C.2.2 Division of work between the partners

Division of work between the partners

The core of programme and the central coordination will be located at DTU where Caroline Baron will be reponsible for making sure the programme is running smoothly, according to deadline, according to agreements, and budget. In addition, 2 coordinators, one for each sub-programme activities will be nominated. They will link each sub-programme and coordinate teaching activities in the sub programme but also between sub-programmes. It is anticipated that based on their expertise SLU will lead sub-programme 1 and DTU sub-programme 2. Each partners in the consortium has a very strong profile in respective areas and this will be the base for assigment of responsibilities. The general frame of the master content and assignement of responsabilities in respectives area is clear, however, the tasks and assigment between the partners have not been yet fully determined in details as the overview of the existing possibilities will be fully explored during the kick off meeting.

C.2.13 Division of funds

Division of funds

The funds will be divided in a way that will ensure maximal commitment of the HEI involves. Each HEI will receive an initial 10% to cover their working hours, expect for the master programme coordinator that that will receive 20%. The remaining 40% will be administered through the coordinator and made available to all partners throughout the development phase of the master. Criteria for administration will include travel expenses, cost implemented for organisation of meetings, webpage preparation, marketing of the education, e-learning set up including funding of the external international industrial advisory board during the preparation phase of the master and unforeseen cost and expenses. In this way it will be possible for involved partners to obtain more funding depending on their involvement and commitment to the master programme and will be administered during the course of the implementation phases according to performance, productivities and negotiations. However, the cost will always be budgeted and discussed and decided by committee before any expenses are allocated.

C.3 Work programme

	Activity	Start year	Start date	End year	End date
1	Kick-off Meeting	2010	15/12/10		
2	Consortium agreement	2011	01/01/11		
3	Determination of working group and sub-programme responsibilities	2011	01/01/11		
4	Determination of curriculum content	2011	01/01/11	2011	31/12/11
5	Determination of set up and needs for teaching activities	2011	01/01/11	2012	30/06/12
6	Indentification of industrial partners	2011	01/01/11	2012	31/12/11
7	Definition and determination of teaching objectives	2011	01/01/11		31/12/11
8	Advertising and marketing	2011	30/06/11		
9	Desing of homepage and web content	2011	30/06/11	2012	30/06/12
10	Determination of criteria for admissison & Evaluation of students	2011	01/01/11	2012	01/01/12
11	Degree and Diploma according to legislation	2012	01/01/12	2015	01/01/15

12	Reporting every 6 months (status report + final report)	2011		2012	

C.4 Budget

C.4.1 Budget

	2010 (DKK)	2011 (DKK)	2012 (DKK)	Sum
Development of study programmes/courses				
Salaries / fees /employers' fees / general expenses	0	400 000	0	**400 000**
Travels	25 000	125 000	25 000	**175 000**
Costs for seminars, workshops, etc	25 000	50 000	25 000	**100 000**
Purchase of products and services	0	25 000	0	**25 000**
SUM - Development of study programmes/courses	**50 000**	**600 000**	**50 000**	**700 000**
Dissemination				
Dissemination of results, including printing costs	0	50 000	0	**50 000**
SUM - Dissemination	**0**	**50 000**	**0**	**50 000**
Project management				
Salaries, coordinating institution	25 000	150 000	25 000	**200 000**
Evaluation	0	0	25 000	**25 000**
Other costs	0	25 000	0	**25 000**
SUM - Project management	**25 000**	**175 000**	**50 000**	**250 000**
SUM - Total	**75 000**	**825 000**	**100 000**	**1 000 000**

Comments to the budget

The frequency of bilateral and consortium meeting are based on estimation, why all cost except for salaries to core members will be administered by the coordinator. Thus the coordinator will cover expenses eligible in the planning phase of the Master Programme.

C.4.2 Detailed financial plan

	Title	2010 (DKK)	2011 (DKK)	2012 (DKK)	Sum
1	Salaries for non-cordinators through the whole period		400000		400000
2	Core group/advisory board kick off meeting DTU	50000			50000
3	At least three core group meeting (in 2011/2012)		125000	50000	175000
4	Bilateral meetings between HEI's as well as with industry		125000		125000
5	Dissemination (homepage, flyers, report)		500000		50000
6	Salaries coordinator	25000	150000	25000	200000

Comments to the financial plan

The level of specification in the financial plan reflects the fact that place and time for bilateral meetings will be planned at the first meeting at DTU in December 2010 or January 2011.

NTNU

Fakultet for naturvitenskap og teknologi
Institutt for materialteknologi

Dato 12.04.2011

Referanse

Notat

Til: NT-fak

Kopi til:

Fra: Inst. for materialteknologi (IMT)

Signatur:

Sammenslåing av 2-årige internasjonale masterutdanninger

Ved IMT tilbyr vi nå to 2-årige internasjonale masterutdanninger. Dette er MSc in Light Metals Production og MSc in Silicon and Ferroalloy Production. Disse ønsker vi å slå sammen til ett internasjonalt studieprogram fra skoleåret 2012/2013.

Vi er nesten ferdige med emneporteføljen, og denne ligger vedlagt. Eneste endring vil bli at TMT5505 vil utgå og erstattes med et valgfag. Hvilke de her kan velge mellom er ikke klart, men vi vil jobbe med dette utover våren.

Navnet på den nye masterutdanningen er ikke endelig, men en foreløpig arbeidstittel er: MSc in Light Metals and Ferroalloy Production.

For undervisningsutvalget ved IMT

Hilde Lea Lein

Hilde Lea Lein (leder)

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Forslag til nytt, sammenslått studieprogram utarbeidet av LeivK 2011-04-06:

Ex	Subject no	Subject title	Notes	Cr
		Compulsory cources		
1h	TMT4155	Heterogenous equilibria and phase diagrams		7,5
1h	TMT4280	Extractive metallurgy (Incl. Environmental Metallurgy)		7,5
1h	TMT4253	Electrochemical Process and Energy Technology		7,5
1v	TMT4166	Experimental materials chemistry and electrochemistry (Incl. Module on Microscopy?)		7,5
1v	TMT4850	Experts in teamwork - a light, strong and bright future with materials		7,5
1v	TMT4208	Fluid flow and heat transfer Advanced course		7,5
		Optional cources		
1h	TMT4145	Ceramic Engineering		7,5
1h	TMT4305	Electrometallurgy		7,5
1v	TMT51xx	Electrolysis of Light Metals (Antar sammenslåing av TMT5105 & TMT5100)		7,5
1v	MT8301	Carbon materials technology		7,5
		Compulsory cources		
2h	TMT4325	Refining and recycling of metals		7,5
2h	TMT5500	Process Metallurgy and Electrolysis, Specialization Project		15,0
2h	TMT5505	Process Metallurgy and Electrolysis, Specialization Course		7,5
		Master Thesis		
2v	TMT4905	Materials Technology, Master Thesis		30,0

Oppfordrer til innspill og kommentarer; ikke minst: **Hva skal barnet hete?** Vi må finne en "cool" forkortelse.

NTNU

Fakultet for naturvitenskap og teknologi

Dato 04.05.2011

Referanse 2011/474/LHN

Notat

Til:	Åge Søsveen
Kopi til:	
Fra:	Fakultet for naturvitenskap og teknologi

Endringer for studieåret 2012-2013 i studieprogramporteføljen i teknologistudiet ved NT-fakultetet

Institutt for materialteknologi (IMT) tilbyr i dag to 2-årige internasjonale masterprogram (teknologiprogram): MSc in Light Metals Production (MSLIMETAL) og MSc in Silicon and Ferroalloy Production (MSSILFER). Disse to studieprogrammene foreslås slått sammen til et studieprogram med samme faglig innhold totalt sett fra og med 2012-2013. Kun eksisterende emner vil benyttet i det nye programmet, se vedlegg for foreløpig skisse for oppbygningen av det nye programmet. Nytt navn for det sammeslåtte programmet er ikke klart ennå.

Fakultet for naturvitenskap og teknologi anmoder FUS om å anbefale de foreslåtte endringene for teknologistudiene ved NT-fakultetet for studieåret 2012-2013.

Med vennlig hilsen

Anne Borg
Prodekanus

Lillian Hanssen
Seksjonssjef

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NTNU

Fakultet for samfunnsvitenskap og teknologiledelse

Dato 09.05.2011

Referanse 2011/474/PST

Notat

Til:	Studieavdelingen
Kopi til:	Geografisk institutt, Institutt for bevegelsesvitenskap, Institutt for industriell økonomi og teknologiledelse, Institutt for samfunnsøkonomi, Institutt for sosialt arbeid og helsevitenskap, Institutt for sosiologi og statsvitenskap, Institutt for voksnes læring og rådgivningsvitenskap, Norsk senter for barneforskning, Pedagogisk institutt, Program for lærerutdanning, Psykologisk institutt, Sosialantropologisk institutt
Fra:	Fakultet for samfunnsvitenskap og teknologiledelse

Tillegg - Studieprogramporteføljen 2012/2013 - SVT-fakultetet

Fakultetet har tidligere sendt sine forslag på endringer i studieprogramporteføljen 2012/2013. Et av fakultetets forslag var å opprette en Master i entreprenørskap og samfunn og ansvaret var lagt til Geografisk institutt. Studieprogrammets mål var å gi studentene en forståelse av fenomenet entreprenørskap og entreprenøren som aktør i samfunnet.

IØT ved SVT-fakultetet har i flere år hatt en Master i entreprenørskap – NTNUs Entreprenørskole med en profil myntet på sivilingeniørstudenter og tilsvarende studier. Fra og med høsten 2011 er det også opprettet et tilsvarende studietilbud med realfaglig profil som er beregnet på studenter med realfaglig bakgrunn. IØT ber nå om å få utvide dette tilbudet ytterligere med et studietilbud som har en samfunnsvitenskapelig profil og som tar opp studenter med samfunnsvitenskapelig bakgrunn. Det vises i den forbindelse til vedlagt dokumentasjon.

Master i entreprenørskap – NTNUs Entreprenørskole med samfunnsvitenskapelig profil, har samme oppbygging som studieprogrammet med realfaglig profil. Dette programmet er beregnet på studenter som ønsker å bli entreprenører og vil således ikke være en konkurrent til Master i entreprenørskap og samfunn. Til sammen vil fakultetets studieprogram innenfor entreprenørskap utfylle hverandre og gi et bredt tilbud innenfor området. Fakultetet slutter seg til instituttets forslag og ber om at programmet opprettes fra høsten 2012.

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Saksbehandler
Per Stene

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From: Postmottak SVT
To: Monica Johansen;
Subject: VS: Innspill om nytt studieprogram i entreprenørskap
Date: 9. mai 2011 08:50:16
Attachments: Entreprenørskap master sammfunnsfaglig_050511_rs.doc

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Fra: Per Stene
Sendt: 6. mai 2011 13:55
Til: Dokumentsenteret SVT
Emne: VS: Innspill om nytt studieprogram i entreprenørskap

Hallo

Kunne dere hjelpe meg å legge denne inn i ePhorte. Både e-post og vedlegg. Legges på sak 2011/474.

Mvh Per

Fra: Tim Torvatn
Sendt: 6. mai 2011 13:45
Til: Olav Fagerlid; Per Stene
Kopi: Ann - Charlott Pedersen; Roger Sørheim; Monica Rolfsen
Emne: Innspill om nytt studieprogram i entreprenørskap

Hei!

Vi ønsker med denne mailen å sende dere et innspill på hvordan NTNU's entreprenørskole skal realiseres i forhold til studenter ved SVT og HF som ønsker å bli entreprenører. Modellen for det nye studieprogrammet er velkjent, og bygger på samme lest som realfagsprogrammet. Et foreløpig uavklart spørsmål er hvordan vi skal forholde oss til gradsstrukturen på HF (så vidt vi forstår er det en annen grad for HF enn for SV-delen av SVT), men vi har tro på at dette spørsmålet kan avklares før den endelige avklaringen av studieprogram til styret i september/oktober. Vi dimensjonerer i utgangspunktet programmet for 10 studenter. Dette er et lite program, men siden vi har stordriftsfordeler av å kombinere med realfags- og ingeniør-programmet når det gjelder entreprenørskapsemnene, representerer programmet likevel en solid og økonomisk effektiv blokk. I tillegg er det et pluss at studenter med ulik bakgrunn (ingeniørfag, realfag, samfunnsfag og humaniora) nå vil sitte i samme arbeidsområde og delvis jobbe sammen på nyskapingsprosjekter, noe som strategisk sett vil representere et tverrvitenskapelig bidrag innenfor entreprenørutdanningen som er verdifullt og viktig.

Vi ønsker at dette studieprogrammet skal sees i sammenheng med det fremlagte studieprogrammet fra geografi, slik at disse to programmene til sammen svarer på rektoratets "utfordring" om hvordan entreprenørskap skal

tilrettelegges for studenter på Dragvoll. I tillegg anbefaler vi at fakultetet legger inn TIØ4258 Teknologiledelse som et mulig perspektivemne i Bachelor-utdanningene sine, og TIØ4230 Entreprenørskap og markedsorientert produktutvikling som et mulig perspektivemne i master-utdanningene. Disse to emnene gir perspektiver på entreprenørskap som kan være viktige og interessante for HF- og SVT-studenter som ønsker noe entreprenørskap inn i sin utdanning, men ikke ønsker å gjøre temaet til det sentrale fordypningstemaet i sine grader.

Vi ønsker altså at de to programmene blir presentert sammen som en pakke innenfor entreprenørskap, og er trygge på at dette vil oppfattes som en helhetlig pakke som ivaretar ulike behov, noe som vi tror vil bli positivt oppfattet av rektoratet og styret. Det er viktig å understreke i fremleggingen at programmene ikke konkurrerer med hverandre, men snarere kompletterer og utfyller hverandre. Læringsmålene er svært ulike, og det ene programmet (IØT sitt program) vil først og fremst appellere til de som ønsker å bli entreprenører, mens geografi sitt program først og fremst søker å utdanne saksbehandlere og policypersoner som ønsker å støtte opp under, og styre, entreprenøriell virksomhet.

En annen viktig grunn til å presentere disse to programmene samlet, er at fakultetet og sentralleddet da enklere kan planlegge den samlede ressursinnsatsen som skal gjøres for å støtte igangsetting av virksomheten innen entreprenørskap for studenter på Dragvoll. Vi regner med at det endelige forslaget også vil inneholde et forslag til hvordan fakultetets og sentrale midler best kan brukes til fordel for den totale satsningen.

Denne orienteringen følger også som brev i e-phorte som kan ligge ved selve beskrivelsen av det foreslåtte programmet.

Med vennlig hilsen
Tim Torvatn
Studieleder IØT

Roger Sørheim
Faglig koordinator
NTNUs entreprenørskole

Nytt studieprogram i entreprenørskap med samfunnsvitenskapelig profil

Bakgrunn

I løpet av høsten 2009 ble det gjennomført en dialog mellom instituttledelsen ved IØT og Rektoratet ved NTNU om fullfinansiering av Entreprenørskolen, da deler av aktiviteten ikke dekkes fullt ut av Inntekstfordelingsmodellen (IFM). På møtet med rektoratet 20.01.10 ble det som en del av denne bevilgningen besluttet å starte en prosess med å utvikle to nye masterprogram innen entreprenørskap; ett innen realfag og ett innen samfunnsvitenskap. Det er gjennomført en prosess som har resultert i oppstart av realfagsmasteren høsten 2011, mens dette notatet følger opp bestillingens andre punkt.

Institutt for industriell økonomi og teknologiledelse (IØT) vil med dette søke om å få opprette et nytt studieprogram i entreprenørskap for studenter med samfunnsvitenskapelig profil. Vi foreslår tittelen Master i Entreprenørskap – NTNU's Entreprenørskole.

Nedenfor er hvert enkelt punkt i kravspesifikasjonen for etablering av nye studieprogram kommentert:

1) Strategisamsvar

Et nytt studieprogram på dette området er i samsvar med IØTs planer fremover, der en utvidelse mot realfag og samfunnsvitenskap, samt en generell vekst på entreprenørskapsområdet er sentrale momenter.

2) Krav til bachelorprogram og masterprogram i forskrifter

Det nye studieprogrammet vil være et 2-årig masterprogram på 120sp, med en masteroppgave i fjerde semester med et omfang på 30sp. Eksperter i Team vil være et obligatorisk emne i 2. semester. Programmet bør dermed tilfredsstille de krav som er gjort gjeldende for mastergrader nasjonalt og lokalt.

3) Studieplan, emnebeskrivelser

Studieplanen for studieprogrammet er ikke ferdig detaljert, men vil følge samme mal som det eksisterende siv.ing.studiet i entreprenørskap for studenter med teknologiprofil. Programmet vil dermed bestå av en fagpakke som inneholder:

- Fire obligatoriske emner innenfor entreprenørskap, innovasjon og ledelse gitt av IØT
- Fire samfunnsvitenskapelige emner på masternivå som bygger på studentens Bachelor-grad
- Eksperter i Team (2 semester)
- Fordypningsemne (7,5sp) og –prosjekt (15sp) innenfor entreprenørskap gitt av IØT

- Masteroppgave (30sp) gitt av IØT, eventuelt i samarbeid med eksterne veiledere.

Vår ambisjon er oppstart høsten 2012. Dette vil gi følgende tentative studieplan:

Und.sem	Emnenr	Emnetittel	Anm	Sp
1 – høst	TIØ4265	STRATEGISK LEDELSE		7.5
1 – høst	TIØ4330	IDESØK MARKEDSUND		7.5
1 – høst	XXXX	SAMF.FAGLIG EMNE	1	7.5
1 - høst	XXXX	SAMF.FAGLIG EMNE	1	7.5
1 – vår	TIØ4170	FORRETNINGS UTV		7.5
1 – vår	TIØ4235	IND MARKETING		7.5
1 – vår	TIØ4851	EKSP I TEAM		7.5
1 – vår	XXXX	SAMF.FAGLIG EMNE	1	7.5
2 – høst	TIØ4530	INNOV/ENTREPR FDP		15
2 – høst	TIØ4535	INNOV/ENTREPR FDE		7.5
2 – høst	XXXX	SAMF.FAGLIG EMNE	1	7.5
2 - vår	TIØ4945	INNOV/ENTREPR MASTEROPPGAVE		30

1) Det skal i hovedsak velges samfunnsvitenskapelige emner som representerer fordypning innen det studieprogram studentene kommer fra.

Det forutsettes videre at eventuell revisjon av studieplanen for MTENTRE høsten 2011 med konsekvenser fra 2012/13 også vil få konsekvenser for revisjon av denne samfunnsvitenskapelige masteren. Dette må instituttets besluttende organer ta stilling til innenfor de ordinære rutinene for studieplanrevisjon.

4) Læringsmål

Formålet for NTNUs entreprenørskole er todelt: 1) Skape fremtidens forretningsutviklere som kan kommersialisere kunnskapsbaserte forretningsideer med vekstpotensial, 2) bidra til at innovasjoner og ideer fra NTNU og andre kunnskapsmiljøer blir kommersialisert. For å oppnå dette kreves det følgende kompetanseprofil av kandidatene:

1) Kandidatene skal etter endt utdanning ha utviklet en helhetlig forståelse av fagområdet entreprenørskap og derved være i stand til å kommersialisere kunnskapsbaserte ideer. Dette skjer gjennom å kombinere dyp teoretisk innsikt med praktiske erfaringer gjennom arbeid meg eget kommersialiseringsprosjekt.
2) Kandidatene skal gjennom arbeid med reelle oppstartsprosjekter ha fått unike praktiske erfaringer fra kommersialisering av kunnskap.
3) Kandidatene skal videreutvikle sin samfunnsvitenskapelige kompetanse gjennom å ta 30sp med samfunnsvitenskapelige emner på masternivå for å sikre tilstrekkelig tyngde i den samfunnsvitenskapelige delen av studiet.

5) Fastsettelse av studieplan

Dette studieprogrammet utdanner samfunnsvitere og ikke sivilingeniører, og vil dermed ikke ligge innenfor FUS sitt ansvarsområde. Søknaden går derfor via SVT-fakultetet. I studieplanarbeidet og fremtidig revisjoner vil IØT opprette kontakt med studieprogramledere ved HF- og SVT-fakultetene for å finne frem til relevante samfunnsvitenskapelige emner.

6) Kostnadsberegning og finansiering

Når det gjelder drift, forventer instituttet at det i hovedsak vil være slik at eksisterende emner innenfor entreprenørskap og innovasjon gitt i siv.ing. og realfagsprogrammet i entreprenørskap vil bli benyttet også i dette studieprogrammet. Likeså forventer vi at studentene skal ta eksisterende emner på masternivå ved NTNU innenfor de samfunnsvitenskapelige emner de har i sin Bachelorgrad. Det vil derfor ikke være behov for å utvikle nye emner spesifikt for dette studieprogrammet. Vi antar derfor at driften av emnene vil kunne dekkes av resultatbevilgningen instituttet får for emnene.

Når det gjelder veiledning, kommer denne på toppen av eksisterende veiledning innenfor resten av NTNU's Entreprenørskole. Det kan derfor være behov for ekstraordinære ressurser for å dekke veiledning i en overgangsfase inntil resultatbevilgningen fra den økte veiledningen slår inn.

Det eksisterende siv.ing. programmet og initierte realfagsprogrammet i entreprenørskap har også en betydelig ressursinnsats i form av å tilrettelegge for bedriftsetableringer, et arbeid som ikke skjer som en identifiserbar del av enkeltemner, men inngår i praksisdelen av programmet læringsmål. Denne ressursinnsatsen vil ikke belaste instituttet og må derfor dekkes av en spesialbevilgning, tilsvarende den virksomheten innenfor teknologimasteren og masteren i realfag har.

Endelig forventer vi markedsføringsutgifter i størrelsesorden 50.000 for å markedsføre det nye studieprogrammet.

7) Oppdragsundervisning/egenbetaling

Dette punktet er ikke aktuelt for det nye studieprogrammet vi søker om å få opprette.

8) Antall studenter

Vi forventer stor interesse fra samfunnsvitenskapelige studenter omkring dette programmet, og tror at markedet er til stede. Man har eksempelvis takket nei til søkere med samfunnsvitenskapelig bakgrunn hvert år siden oppstarten i 2003.

Instituttet har som prinsipp at ferdig utviklede studieprogram skal kunne være fullt ut finansiert gjennom inntekstfordelingsmodellen. Dette betinger at studieprogrammet har en viss størrelse, og instituttet ser 10 studenter som et minimum for at dette skal være mulig. Vi ønsker derfor å starte med en kvote på 10 studenter, men ser for oss å øke dette noe på sikt, gitt at markedet viser interesse for studieprogrammet.

Siden studieprogrammet undervises på norsk, vil det i første omgang ikke være aktuelt med internasjonale studenter på programmet.

9) Opptakskrav og rangeringsregler

Opptakskravet vil være 3-årig Bachelor i samfunnsvitenskap med en fagkombinasjon som tilsier at kandidaten kan gå videre med relevante masterkurs som tilbys innenfor samfunnsvitenskap ved NTNU. Dette kravet er nødvendig fordi studieplanen forutsetter at

studenten skal ta fire samfunnsvitenskapelige emner på masternivå innenfor fagområdet studenten hadde i sin Bachelorgrad. Disse emnene skal tas ved NTNU som en del av graden, og vi må da være sikre på at det faktisk finnes aktuelle master-emner studenten kan ta.

I tillegg forutsettes det at studenten skal være motivert for å drive med praktisk entreprenørskap. For å sikre dette, vil studenten måtte stille til intervju. Studenten kan avvises til opptak på bakgrunn av at intervjuet ikke viser tilstrekkelig motivasjon for studieprogrammet.

Masterprogrammet vil ellers følge vanlige regler ved NTNU hva angår opptakskrav og opptaksrangering for de som har bestått intervjuet.

10) Samarbeidende fakulteter

Vi forutsetter at SVT er vertsfakultet for programmet, og at det operative ansvaret ligger hos IØT. IØT vil få ansvar for å tilrettelegge for at studentene skal kunne ta emner på masternivå innenfor det fagområde de har tatt i sin Bachelorgrad, og vil gjøre den nødvendige koordinering med de aktuelle fagmiljøene på HF- og SVT-fakultetene som skal ta imot studentene.

Dette vil dermed være et studieprogram som oppfyller NTNUs målsetninger om tverrfaglig samspill på tvers av fakultetsgrenser.

11) Eksterne samarbeidspartnere

Det er ikke planer om å involvere andre institusjoner enn NTNU i dette studieprogrammet.

12) Fellesgrader og fellesprogram

Det er ikke planer om fellesgrader med utenlandske institusjoner i forhold til dette studieprogrammet.

13) Markedsvurdering

Disse kandidatene vil ha en profil som på enkelte områder er lik den eksiterende profilen til studenter ved NTNUs Entreprenørskole. En evaluering fra 2008 viser at studentene fra NTNUs Entreprenørskole framstår som svært attraktive kandidater i arbeidsmarkedet. Samme evaluering viser også at 100 prosent av respondentene vil anbefale studiet for andre. Dette gir noen indikasjoner på relevans og studiets kvalitet. Det kan nevnes at vi i alle år fra opprettelsen av Entreprenørskolen har måttet takke nei på henvendelser og søknader fra interesserte kandidater med SV eller HF bakgrunn.

Anne Bergfall

§ 1-1. *Lovens formål*

Denne lov har som formål å legge til rette for at universiteter og høyskoler

a) tilbyr høyere utdanning på høyt internasjonalt nivå.

b) utfører forskning og faglig og kunstnerisk utviklingsarbeid på høyt internasjonalt nivå.

c) formidler kunnskap om virksomheten og utbrer forståelse for prinsippet om faglig frihet og anvendelse av vitenskapelige og kunstneriske metoder og resultater, både i undervisningen av studenter, i egen virksomhet for øvrig og i offentlig forvaltning, kulturliv og næringsliv.

virkeområde	scope: ok?
utdanning	Basen har "høyere utdanning"= "higher education", men ikke bare "utdanning"
forskning og faglig og kunstnerisk utviklingsarbeid	I basen finnes pt "Forsknings- og utviklingsarbeid" oversatt med "Research and Development" uten "work", forkortet "R&D". "Faglig og kunstnerisk utviklingsarbeid" er i 2005-oversettelsen av UH-loven oversatt med "academic and artistic development work". Liker vi det? Jf også Maritas homework ("faglig utviklingsarbeid" oversatt med "scientific development work" og "kunstnerisk utviklingsarbeid" oversatt med "artistic development work").
formidler	Formidle= disseminate, jf diskusjon 16. mars og utsendt fra Stewart.
kunnskap	Vi har "forkunnskapskrav", "Kunnskapsløftet" og "norskunnskaper", men ikke bare "kunnskap". Trenger vi det?
virksomheten	Virksomhet i basen pt bare som "bedrift" ("business, firm"). Add "activity", med eksempel?
forståelse	Trenger vi "forståelse" ("understanding")? Pt ikke i basen.
faglig frihet	Jf Maritas homework "faglig" eller "akademisk frihet" = "academic freedom".
anvendelse	Trenger vi "anvendelse" ("application")? Pt ikke i basen.

vitenskapelige og kunstneriske metoder	Trenger vi "vitenskapelig (og kunstnerisk) **metode**" ("scientific, artistic method")? PT har vi vitenskapelig miljø, høgskole, assistent og publisering i basen.
resultater	Tilsvarende med "resultater"?
undervisningen	"Undervisning" har vi pt bare i sammensatte ord. ("Undervisningsplan", "Undervisningsplikt" etc etc. Trenger vi bare "undervisning"?
offentlig forvaltning	"Offentlig forvaltning" ("public administration") trenger vi kanskje? Vi har Forvaltningsloven ("Public administration act")
kulturliv	"Kultur" har vi pt bare som i "Kultur – og kirkedepartementet". ("Dannelse" har vi heller ikke.)
næringsliv[1].	[1] "Næringsliv" har vi. ("Trade and industry" alternative "busines and industry")

Per Gunnar Hillesøy

§ 1-2. *Lovens virkeområde – universiteter og høyskoler*

(1) Loven gjelder for universiteter og høyskoler som gir utdanningstilbud akkreditert etter denne lov eller som har oppnådd akkreditering, jf. § 3-1, som

a) universitet,

b) vitenskapelig høyskole eller

c) høyskole.

(2) Hvilken kategori den enkelte institusjon tilhører avgjøres av Kongen på grunnlag av en faglig vurdering fra Nasjonalt organ for kvalitet i utdanningen (NOKUT).

(3) Kongen kan på grunnlag av en faglig vurdering fra NOKUT bestemme at enkelte av lovens regler skal gjelde tilsvarende for andre institusjoner.

[1] "Næringsliv" har vi. ("Trade and industry" alternative "busines and industry")

(4) Departementet kan, etter innstilling fra styret, vedta at det kan gjøres avvik fra loven og forskriftene til loven i forbindelse med tidsavgrensede pedagogiske eller organisatoriske forsøk.

(5) Loven gjelder for universiteter og høyskoler med virksomhet i riket. Loven gjelder for Svalbard og Jan Mayen for så vidt ikke annet fastsettes av Kongen. Kongen kan fastsette særlige regler under hensyn til de stedlige forhold.

(6) Loven gjelder ikke for virksomhet som utføres utenfor riket. Kongen kan bestemme at slik virksomhet likevel skal omfattes helt eller delvis av lovens bestemmelser.

(7) Etter avtale med fremmed stat eller internasjonal organisasjon kan lovens virkeområde utvides eller innskrenkes på avgrensede saksområder.

Proposed terms

Fastsette	Determine (Might not be adequate for prices, fees, tarrifs etc. For this, "set" is perhaps better: "The fee is set at NOK 500")
Organisatorisk	Organizational
Pedagogisk	Pedagogic(al)
Virksomhet	We have it the base in the sense "business" or "firm", but not in the sense "activity". I don't propose including it now, but still.

Joanna Boddens-Hosang	

§ 1-3. *Institusjonenes virksomhet*

Universiteter og høyskoler skal arbeide for å fremme lovens formål ved å:

a) tilby høyere utdanning som er basert på det fremste innen forskning, faglig og kunstnerisk utviklingsarbeid og erfaringskunnskap.

b) utføre forskning og faglig og kunstnerisk utviklingsarbeid.

c) forvalte tilførte ressurser effektivt og aktivt søke tilføring av eksterne ressurser.

d) bidra til å spre og formidle resultater fra forskning og faglig og kunstnerisk utviklingsarbeid.

e) bidra til innovasjon og verdiskapning basert på resultater fra forskning og faglig og kunstnerisk utviklingsarbeid.

f) legge til rette for at institusjonens ansatte og studenter kan delta i samfunnsdebatten.

g) bidra til at norsk høyere utdanning og forskning følger den internasjonale forskningsfronten og utviklingen av høyere utdanningstilbud.

h) samarbeide med andre universiteter og høyskoler og tilsvarende institusjoner i andre land, lokalt og regionalt samfunns- og arbeidsliv, offentlig forvaltning og internasjonale organisasjoner.

i) tilby etter- og videreutdanning innenfor institusjonens virkeområde.

faglig og kunstnerisk utviklingsarbeid	research, academic and artistic development work
Erfaringskunnskap	empirical knowledge
	c) efficiently managing resources provided and actively seeking provision of external resources[2]. "seeking provision of external resources" =

	fundraising
	d) helping to disseminate the results of research "the results of research" = research results
forskningsfronten	the front line of international research
utdanningstilbud	[1] "Utdanningstilbud" is translated as "higher education provision". I don't find "provision" to be a correct translation of "tilbud". The UMB Dept. of Academic Affairs (yes, 'affairs' again....) recommends "Study options at the university or university college level".
virkeområde	field of operation

Bente Tapuwa Hansen

§ 1-4. *Særlig ansvar for enkelte institusjoner*

(1) Universiteter og høyskoler har et særlig ansvar for grunnforskning og forskerutdanning innenfor de områder der de tildeler doktorgrad.

(2) Universitetet i Bergen, Universitetet i Oslo, Universitetet i Tromsø, Norges teknisk-naturvitenskapelige universitet og Universitetet i Stavanger har et særskilt nasjonalt ansvar for å bygge opp, drive og vedlikeholde museer med vitenskapelige samlinger og publikumsutstillinger. Departementet kan gi nærmere forskrift om samarbeid og arbeidsdeling mellom universitetene på dette området.

(3) Departementet kan gi enkelte institusjoner et særskilt nasjonalt ansvar for forskning eller undervisning på bestemte fagområder. På samme måte kan departementet gi enkelte

institusjoner et særskilt nasjonalt ansvar for å bygge opp, drive og vedlikeholde forskningsbiblioteker, kunnskapsbanker og databaser samt museer med vitenskapelige samlinger og publikumsutstillinger for særskilte fagområder.

(4) Departementet kan i samråd med institusjonen legge driften av en nasjonal fellesoppgave til en bestemt institusjon, uten at institusjonens egne styringsorgan har ansvaret for den faglige virksomheten.

Forskningsbibliotek	
Kunnskapsbank	
Database	
vitenskapelige samlinger	
Publikumsutstilling	

Marita Kristiansen

§ 1-5. *Faglig frihet og ansvar*

(1) Universiteter og høyskoler skal fremme og verne akademisk frihet. Institusjonene har et ansvar for å sikre at undervisning, forskning og faglig og kunstnerisk utviklingsarbeid holder et høyt faglig nivå, og utøves i overensstemmelse med anerkjente vitenskapelige, kunstfaglige, pedagogiske og etiske prinsipper.

(2) Universiteter og høyskoler har ellers rett til å utforme sitt eget faglige og verdimessige grunnlag innenfor de rammer som er fastsatt i eller i medhold av lov.

(3) Universiteter og høyskoler kan ikke gis pålegg eller instrukser om

a) læreinnholdet i undervisningen og innholdet i forskningen eller i det kunstneriske og faglige utviklingsarbeidet

b) individuelle ansettelser eller utnevnelser.

(4) Den som gir undervisning ved institusjon under denne lov har et selvstendig faglig ansvar for innhold og opplegg av denne innenfor de rammer som institusjonen fastsetter eller som følger av lov eller i medhold av lov.

*NEW TERMS / TERMS FOR DISCUSSION:	
faglig frihet → akademisk frihet	academic freedom
kunstnerisk frihet*	artistic freedom*
faglig utviklingsarbeid	scientific development work
kunstnerisk utviklingsarbeid	artistic development work
læreinnhold	learning content
individuell ansettelse	individual appointment
individuell utnevnelse**	→ bruk lenke til *individuell ansettelse*, eller evt. *tilsettelse* om det foretrukkes,
ansettelsesforhold	→ ansettelse - appointment
åpenhet (f.eks. om resultat)	transparency
offentliggjøring* (av resultat)	publication*
god skikk	good practice
beste praksis (f.eks. den teknikken eller metoden som anses å være den beste på et område)	best practice (generally-accepted, informally-standardized techniques, methods or processes considered to accomplish given tasks)

Kommentarer:

* = allerede i basen

** 'utnevnelse' er allerede i basen, i feltet 'tilsetting' med kobling til førstnevnte, men når jeg prøver å klikke på 'utnevnelse' skjer det ikke noe

To av termene er allerede med i den foreslåtte listen knyttet til *etiske retningslinjer*: *akademisk/faglig frihet* og *åpenhet* (nå hos Per Gunnar eller Stewart?)

beste praksis/best practice har jeg tatt med bare for å sammenstille det med *god skikk/good practice* (som er begrepet som forekommer i loven)

Ann Torday Gulden

§ 1-5. *Faglig frihet og ansvar*

(5) Den som er ansatt i stilling hvor forskning eller faglig eller kunstnerisk utviklingsarbeid inngår i arbeidsoppgavene, har rett til å velge emne og metode for sin forskning eller sitt utviklingsarbeid innenfor de rammer som følger av ansettelsesforholdet eller særskilt avtale.

(6) Universiteter og høyskoler skal sørge for åpenhet om resultater fra forskning eller faglig eller kunstnerisk utviklingsarbeid. Den som er ansatt i stilling som nevnt i femte ledd har rett til å offentliggjøre sine resultater og skal sørge for at slik offentliggjøring skjer. Det relevante forskningsgrunnlaget skal stilles til rådighet i overensstemmelse med god skikk på vedkommende fagområde. Styret kan samtykke til utsatt offentliggjøring når legitime hensyn tilsier det. Det kan ikke avtales eller fastsettes varige begrensninger i retten til å offentliggjøre resultater utover det som følger av lov eller i medhold av lov.

kunstnerisk	artistic
offentliggjør	publish, disseminate
overenstemmelse	in agreement, compliance
god skikk	good/best practice OR ethically defensible practice
legitim hensyn	formally acceptable, OR legitimate consideration

Howard Medland

§ 1-6. *Kvalitetssikring*

(1) Universiteter og høyskoler skal ha et tilfredsstillende internt system for kvalitetssikring. Studentevalueringer skal inngå i systemet for kvalitetssikring.

(2) Departementet kan gi nærmere bestemmelser om krav til kvalitetssikringssystem i forskrift.

§ 1-7. *Ansvar for vedlikehold og videreutvikling av norsk fagspråk*

Universiteter og høyskoler har ansvar for vedlikehold og videreutvikling av norsk fagspråk.

§ 2-1. *NOKUTs oppgaver og myndighet*

(1) NOKUT er et faglig uavhengig statlig forvaltningsorgan.

(2) Formålet med NOKUTs virksomhet er å føre tilsyn med kvaliteten i høyere utdanning og fagskoleutdanning, gi generell godkjenning av utenlandsk høyere utdanning, og å stimulere til kvalitetsutvikling som sikrer et høyt internasjonalt nivå i utdanningstilbudene ved institusjonene. NOKUTs arbeid skal bidra til at samfunnet kan ha tillit til kvaliteten i norsk høyere utdanning, fagskoleutdanning og godkjent høyere utenlandsk utdanning.

(3) I NOKUTs tilsynsarbeid etter denne lov skal NOKUT evaluere institusjonenes system for kvalitetssikring, akkreditere institusjoner og studietilbud og revidere gitt akkreditering. NOKUT skal også gi generell godkjenning av høyere utenlandsk utdanning.

(4) NOKUT kan benytte seg av andre virkemidler og gjennomføre andre tiltak enn de som fremgår av tredje ledd, som er i tråd med formålet med NOKUTs virksomhet.

(5) I sitt arbeid skal NOKUT søke å bistå institusjonene i deres utviklingsarbeid.

(6) NOKUT skal gjennomføre evalueringer av betydning for å kunne bedømme kvaliteten i høyere utdanning. Departementet kan pålegge organet å foreta slike evalueringer.

(7) Alle evalueringer som foretas av NOKUT er offentlige, og NOKUT skal bidra til at disse gjøres kjent.

(8) NOKUTs vedtak overfor private institusjoner kan i forskrift unntas fra bestemmelsene om klage i forvaltningsloven kap. VI.

New terms / terms for discussion

I blått = i basen fra før, evt. i en litt annen form

Kvalitetssikring: i basen som kvalitetssikringssystem; burde kanskje stå uten 'system'?

Kvalitetsutvikling i basen har vi 'kvalitetsforbedring' = 'quality enhancement'

I gult = forslag til nye termer som burde inn i basen

Studentevalueringer : student evaluation(s)

????Vedlikehold : maintenance

Fagspråk academic language

faglig uavhengig : academically independent

Forvaltningsorgan : administrative body

føre tilsyn : monitor

utdanningstilbud : course provision??? courses offered???

utenlandsk utdanning: overseas qualifications

høyere utenlandsk utdanning: overseas higher education qualifications

Glenn Ole Hellekjær

§2.1- Subsections 3-8

(3) I NOKUTs tilsynsarbeid etter denne lov skal NOKUT evaluere institusjonenes system for kvalitetssikring, akkreditere institusjoner og studietilbud og revidere gitt akkreditering. NOKUT skal også gi generell godkjenning av høyere utenlandsk utdanning.

(4) NOKUT kan benytte seg av andre virkemidler og gjennomføre andre tiltak enn de som fremgår av tredje ledd, som er i tråd med formålet med NOKUTs virksomhet.

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(7) Alle evalueringer som foretas av NOKUT er offentlige, og NOKUT skal bidra til at disse gjøres kjent.

(8) NOKUTs vedtak overfor private institusjoner kan i forskrift unntas fra bestemmelsene om klage i forvaltningsloven kap. VI.

Endret ved lov 19 juni 2009 nr. 96 (ikr. 1 aug 2009 iflg. res. 19 juni 2009 nr. 676).

Nokuts tilsynsarbeid= supervisory function

Evaluere= evaluate/assess

gitt akkreditering=previously granted accreditations

høyere utenlandsk utdanning=overseas higher educations

tiltak=measures

utviklingsarbeid (på insitusjonsnivå) institutional development

gjennomføre=to carry out, implement

pålegge=instruct

organet=the institution, unit, body in question

private institusjoner=privately owned institutions

unntas=be exempted

bestemmelsene=stipulations, provisions

Grete Gåra Alvern

§ **2-2.** *NOKUTs styre*

(1) NOKUT ledes av et styre som har det overordnede ansvar for virksomheten og de beslutninger som NOKUT treffer.

(2) Styret oppnevnes av Kongen og består av åtte medlemmer. Ett medlem skal være student. Ett medlem skal oppnevnes blant NOKUTs ansatte og skal ha stemmerett i saker som angår de ansattes forhold. Det skal oppnevnes varamedlemmer, herunder personlige varamedlemmer for de ansattes og studentenes medlemmer. Departementet oppnevner styrets leder.

(3) Styrets funksjonstid er fire år. Studentmedlemmer oppnevnes for to år.

(4) Medlemmer av styret kan ikke inneha ledende stilling eller verv ved institusjoner under denne lov.

(5) Styret ansetter daglig leder for NOKUT på åremål. Åremålsperioden skal være seks år.

overordnet ansvar	overall responsibility
treffe en beslutning	make a decision
oppnevne	Appoint
stemmerett	right to vote
ledende stilling	leading position
åremål	term of years
åremålsperiode	a fixed term of years

Jan Hoel (if possible, as you are only an observer)

§ **3-1.** *Akkreditering av studietilbud og institusjoner*

(1) Akkreditering forstås i denne lov som en faglig bedømming av om en høyere utdanningsinstitusjon og de studier denne tilbyr, fyller et gitt sett av standarder. Akkrediteringen skal baseres på evaluering foretatt av eksterne sakkyndige oppnevnt av NOKUT. Akkreditering er en forutsetning for at en institusjon kan tilby utdanninger som er etablert med hjemmel i §§ 3-2 og 3-3.

(2) Departementet kan gi forskrift om saksbehandling og fastsetting av standarder som skal legges til grunn for akkrediteringen.

(3) Hvis NOKUT finner at en institusjon ikke lenger oppfyller vilkårene for akkreditering, skal det gis en frist for å rette forholdene. Hvis vilkårene for akkreditering fortsatt ikke er til stede, skal NOKUT trekke akkrediteringen tilbake.

Jon Inge Resell

Fra: Per Stene [Per.Stene@SVT.NTNU.NO]
Sendt: 9. mai 2011 08:38
Til: jon.resell@ntnu.no
Emne: VS: Innspill om nytt studieprogram i entreprenørskap
Vedlegg: Entreprenørskap master sammfunnsfaglig_050511_rs.doc

Hallo

Studieprogrammet har vært under utredning lenge, men IØT tenkte å vente med igangsetting til neste runde. Det kommer nå en ny master på geografi i entreprenørskap. De ser nå at det er en stor fordel om disse programmene sees i sammenheng og behandles samlet. Programmene har ulik profil og innhold. Denne graden tilsvarer master i entreprenørskap med realfaglig profil, men tar opp søkere med samfunnsvitenskapelig profil. Foreløpig usikker på om HF-studenter kan tas opp, dette må utredes nærmere og koordineres med HF.

Beklager forsinkelsen, men geografene var sent ute og vi var litt bakpå i utredningen. Her vil det være behov for koordinering og nærmere utredninger og vi vil få gjort dette fram til i september.

Mvh Per

Fra: Tim Torvatn
Sendt: 6. mai 2011 13:45
Til: Olav Fagerlid; Per Stene
Kopi: Ann - Charlott Pedersen; Roger Sørheim; Monica Rolfsen
Emne: Innspill om nytt studieprogram i entreprenørskap

Hei!

Vi ønsker med denne mailen å sende dere et innspill på hvordan NTNU's entreprenørskole skal realiseres i forhold til studenter ved SVT og HF som ønsker å bli entreprenører. Modellen for det nye studieprogrammet er velkjent, og bygger på samme lest som realfagsprogrammet. Et foreløpig uavklart spørsmål er hvordan vi skal forholde oss til gradsstrukturen på HF (så vidt vi forstår er det en annen grad for HF enn for SV-delen av SVT), men vi har tro på at dette spørsmålet kan avklares før den endelige avklaringen av studieprogram til styret i september/oktober. Vi dimensjonerer i utgangspunktet programmet for 10 studenter. Dette er et lite program, men siden vi har stordriftsfordeler av å kombinere med realfags- og ingeniør-programmet når det gjelder entreprenørskapsemnene, representerer programmet likevel en solid og økonomisk effektiv blokk. I tillegg er det et pluss at studenter med ulik bakgrunn (ingeniørfag, realfag, samfunnsfag og humaniora) nå vil sitte i samme arbeidsområde og delvis jobbe sammen på nyskapingsprosjekter, noe som strategisk sett vil representere et tverrvitenskapelig bidrag innenfor entreprenørutdanningen som er verdifullt og viktig.

Vi ønsker at dette studieprogrammet skal sees i sammenheng med det fremlagte studieprogrammet fra geografi, slik at disse to programmene til sammen svarer på rektoratets "utfordring" om hvordan entreprenørskap skal tilrettelegges for studenter på Dragvoll. I tillegg anbefaler vi at fakultetet legger inn TIØ4258 Teknologiledelse som et mulig perspektivemne i Bachelor-utdanningene sine, og TIØ4230 Entreprenørskap og markedsorientert produktutvikling som et mulig perspektivemne i master-utdanningene. Disse to emnene gir perspektiver på entreprenørskap som kan være viktige og interessante for HF- og SVT-studenter som ønsker noe entreprenørskap inn i sin utdanning, men ikke ønsker å gjøre temaet til det sentrale fordypningstemaet i sine grader.

Vi ønsker altså at de to programmene blir presentert sammen som en pakke innenfor entreprenørskap, og er trygge på at dette vil oppfattes som en helhetlig pakke som ivaretar ulike behov, noe som vi tror vil bli

positivt oppfattet av rektoratet og styret. Det er viktig å understreke i fremleggingen at programmene ikke konkurrerer med hverandre, men snarere kompletterer og utfyller hverandre. Læringsmålene er svært ulike, og det ene programmet (IØT sitt program) vil først og fremst appellere til de som ønsker å bli entreprenører, mens geografi sitt program først og fremst søker å utdanne saksbehandlere og policypersoner som ønsker å støtte opp under, og styre, entreprenøriell virksomhet.

En annen viktig grunn til å presentere disse to programmene samlet, er at fakultetet og sentralleddet da enklere kan planlegge den samlede ressursinnsatsen som skal gjøres for å støtte igangsetting av virksomheten innen entreprenørskap for studenter på Dragvoll. Vi regner med at det endelige forslaget også vil inneholde et forslag til hvordan fakultetets og sentrale midler best kan brukes til fordel for den totale satsningen.

Denne orienteringen følger også som brev i e-phorte som kan ligge ved selve beskrivelsen av det foreslåtte programmet.

Med vennlig hilsen
Tim Torvatn
Studieleder IØT

Roger Sørheim
Faglig koordinator
NTNUs entreprenørskole

Nytt studieprogram i entreprenørskap med samfunnsvitenskapelig profil

Bakgrunn

I løpet av høsten 2009 ble det gjennomført en dialog mellom instituttledelsen ved IØT og Rektoratet ved NTNU om fullfinansiering av Entreprenørskolen, da deler av aktiviteten ikke dekkes fullt ut av Inntekstfordelingsmodellen (IFM). På møtet med rektoratet 20.01.10 ble det som en del av denne bevilgningen besluttet å starte en prosess med å utvikle to nye masterprogram innen entreprenørskap; ett innen realfag og ett innen samfunnsvitenskap. Det er gjennomført en prosess som har resultert i oppstart av realfagsmasteren høsten 2011, mens dette notatet følger opp bestillingens andre punkt.

Institutt for industriell økonomi og teknologiledelse (IØT) vil med dette søke om å få opprette et nytt studieprogram i entreprenørskap for studenter med samfunnsvitenskapelig profil. Vi foreslår tittelen Master i Entreprenørskap – NTNU's Entreprenørskole.

Nedenfor er hvert enkelt punkt i kravspesifikasjonen for etablering av nye studieprogram kommentert:

1) Strategisamsvar

Et nytt studieprogram på dette området er i samsvar med IØTs planer fremover, der en utvidelse mot realfag og samfunnsvitenskap, samt en generell vekst på entreprenørskapsområdet er sentrale momenter.

2) Krav til bachelorprogram og masterprogram i forskrifter

Det nye studieprogrammet vil være et 2-årig masterprogram på 120sp, med en masteroppgave i fjerde semester med et omfang på 30sp. Eksperter i Team vil være et obligatorisk emne i 2. semester. Programmet bør dermed tilfredsstille de krav som er gjort gjeldende for mastergrader nasjonalt og lokalt.

3) Studieplan, emnebeskrivelser

Studieplanen for studieprogrammet er ikke ferdig detaljert, men vil følge samme mal som det eksisterende siv.ing.studiet i entreprenørskap for studenter med teknologiprofil. Programmet vil dermed bestå av en fagpakke som inneholder:

- Fire obligatoriske emner innenfor entreprenørskap, innovasjon og ledelse gitt av IØT
- Fire samfunnsvitenskapelige emner på masternivå som bygger på studentens Bachelor-grad
- Eksperter i Team (2 semester)
- Fordypningsemne (7,5sp) og –prosjekt (15sp) innenfor entreprenørskap gitt av IØT

- Masteroppgave (30sp) gitt av IØT, eventuelt i samarbeid med eksterne veiledere.

Vår ambisjon er oppstart høsten 2012. Dette vil gi følgende tentative studieplan:

Und.sem	Emnenr	Emnetittel	Anm	Sp
1 – høst	TIØ4265	STRATEGISK LEDELSE		7.5
1 – høst	TIØ4330	IDESØK MARKEDSUND		7.5
1 – høst	XXXX	SAMF.FAGLIG EMNE	1	7.5
1 - høst	XXXX	SAMF.FAGLIG EMNE	1	7.5
1 – vår	TIØ4170	FORRETNINGS UTV		7.5
1 – vår	TIØ4235	IND MARKETING		7.5
1 – vår	TIØ4851	EKSP I TEAM		7.5
1 – vår	XXXX	SAMF.FAGLIG EMNE	1	7.5
2 – høst	TIØ4530	INNOV/ENTREPR FDP		15
2 – høst	TIØ4535	INNOV/ENTREPR FDE		7.5
2 – høst	XXXX	SAMF.FAGLIG EMNE	1	7.5
2 - vår	TIØ4945	INNOV/ENTREPR MASTEROPPGAVE		30

1) Det skal i hovedsak velges samfunnsvitenskapelige emner som representerer fordypning innen det studieprogram studentene kommer fra.

Det forutsettes videre at eventuell revisjon av studieplanen for MTENTRE høsten 2011 med konsekvenser fra 2012/13 også vil få konsekvenser for revisjon av denne samfunnsvitenskapelige masteren. Dette må instituttets besluttende organer ta stilling til innenfor de ordinære rutinene for studieplanrevisjon.

4) Læringsmål

Formålet for NTNUs entreprenørskole er todelt: 1) Skape fremtidens forretningsutviklere som kan kommersialisere kunnskapsbaserte forretningsideer med vekstpotensial, 2) bidra til at innovasjoner og ideer fra NTNU og andre kunnskapsmiljøer blir kommersialisert. For å oppnå dette kreves det følgende kompetanseprofil av kandidatene:

1) Kandidatene skal etter endt utdanning ha utviklet en helhetlig forståelse av fagområdet entreprenørskap og derved være i stand til å kommersialisere kunnskapsbaserte ideer. Dette skjer gjennom å kombinere dyp teoretisk innsikt med praktiske erfaringer gjennom arbeid meg eget kommersialiseringsprosjekt.
2) Kandidatene skal gjennom arbeid med reelle oppstartsprosjekter ha fått unike praktiske erfaringer fra kommersialisering av kunnskap.
3) Kandidatene skal videreutvikle sin samfunnsvitenskapelige kompetanse gjennom å ta 30sp med samfunnsvitenskapelige emner på masternivå for å sikre tilstrekkelig tyngde i den samfunnsvitenskapelige delen av studiet.

5) Fastsettelse av studieplan

Dette studieprogrammet utdanner samfunnsvitere og ikke sivilingeniører, og vil dermed ikke ligge innenfor FUS sitt ansvarsområde. Søknaden går derfor via SVT-fakultetet. I studieplanarbeidet og fremtidig revisjoner vil IØT opprette kontakt med studieprogramledere ved HF- og SVT-fakultetene for å finne frem til relevante samfunnsvitenskapelige emner.

6) Kostnadsberegning og finansiering

Når det gjelder drift, forventer instituttet at det i hovedsak vil være slik at eksisterende emner innenfor entreprenørskap og innovasjon gitt i siv.ing. og realfagsprogrammet i entreprenørskap vil bli benyttet også i dette studieprogrammet. Likeså forventer vi at studentene skal ta eksisterende emner på masternivå ved NTNU innenfor de samfunnsvitenskapelige emner de har i sin Bachelorgrad. Det vil derfor ikke være behov for å utvikle nye emner spesifikt for dette studieprogrammet. Vi antar derfor at driften av emnene vil kunne dekkes av resultatbevilgningen instituttet får for emnene.

Når det gjelder veiledning, kommer denne på toppen av eksisterende veiledning innenfor resten av NTNU's Entreprenørskole. Det kan derfor være behov for ekstraordinære ressurser for å dekke veiledning i en overgangsfase inntil resultatbevilgningen fra den økte veiledningen slår inn.

Det eksisterende siv.ing. programmet og initierte realfagsprogrammet i entreprenørskap har også en betydelig ressursinnsats i form av å tilrettelegge for bedriftsetableringer, et arbeid som ikke skjer som en identifiserbar del av enkeltemner, men inngår i praksisdelen av programmet læringsmål. Denne ressursinnsatsen vil ikke belaste instituttet og må derfor dekkes av en spesialbevilgning, tilsvarende den virksomheten innenfor teknologimasteren og masteren i realfag har.

Endelig forventer vi markedsføringsutgifter i størrelsesorden 50.000 for å markedsføre det nye studieprogrammet.

7) Oppdragsundervisning/egenbetaling

Dette punktet er ikke aktuelt for det nye studieprogrammet vi søker om å få opprette.

8) Antall studenter

Vi forventer stor interesse fra samfunnsvitenskapelige studenter omkring dette programmet, og tror at markedet er til stede. Man har eksempelvis takket nei til søkere med samfunnsvitenskapelig bakgrunn hvert år siden oppstarten i 2003.

Instituttet har som prinsipp at ferdig utviklede studieprogram skal kunne være fullt ut finansiert gjennom inntekstfordelingsmodellen. Dette betinger at studieprogrammet har en viss størrelse, og instituttet ser 10 studenter som et minimum for at dette skal være mulig. Vi ønsker derfor å starte med en kvote på 10 studenter, men ser for oss å øke dette noe på sikt, gitt at markedet viser interesse for studieprogrammet.

Siden studieprogrammet undervises på norsk, vil det i første omgang ikke være aktuelt med internasjonale studenter på programmet.

9) Opptakskrav og rangeringsregler

Opptakskravet vil være 3-årig Bachelor i samfunnsvitenskap med en fagkombinasjon som tilsier at kandidaten kan gå videre med relevante masterkurs som tilbys innenfor samfunnsvitenskap ved NTNU. Dette kravet er nødvendig fordi studieplanen forutsetter at

studenten skal ta fire samfunnsvitenskapelige emner på masternivå innenfor fagområdet studenten hadde i sin Bachelorgrad. Disse emnene skal tas ved NTNU som en del av graden, og vi må da være sikre på at det faktisk finnes aktuelle master-emner studenten kan ta.

I tillegg forutsettes det at studenten skal være motivert for å drive med praktisk entreprenørskap. For å sikre dette, vil studenten måtte stille til intervju. Studenten kan avvises til opptak på bakgrunn av at intervjuet ikke viser tilstrekkelig motivasjon for studieprogrammet.

Masterprogrammet vil ellers følge vanlige regler ved NTNU hva angår opptakskrav og opptaksrangering for de som har bestått intervjuet.

10) Samarbeidende fakulteter

Vi forutsetter at SVT er vertsfakultet for programmet, og at det operative ansvaret ligger hos IØT. IØT vil få ansvar for å tilrettelegge for at studentene skal kunne ta emner på masternivå innenfor det fagområde de har tatt i sin Bachelorgrad, og vil gjøre den nødvendige koordinering med de aktuelle fagmiljøene på HF- og SVT-fakultetene som skal ta imot studentene.

Dette vil dermed være et studieprogram som oppfyller NTNUs målsetninger om tverrfaglig samspill på tvers av fakultetsgrenser.

11) Eksterne samarbeidspartnere

Det er ikke planer om å involvere andre institusjoner enn NTNU i dette studieprogrammet.

12) Fellesgrader og fellesprogram

Det er ikke planer om fellesgrader med utenlandske institusjoner i forhold til dette studieprogrammet.

13) Markedsvurdering

Disse kandidatene vil ha en profil som på enkelte områder er lik den eksiterende profilen til studenter ved NTNUs Entreprenørskole. En evaluering fra 2008 viser at studentene fra NTNUs Entreprenørskole framstår som svært attraktive kandidater i arbeidsmarkedet. Samme evaluering viser også at 100 prosent av respondentene vil anbefale studiet for andre. Dette gir noen indikasjoner på relevans og studiets kvalitet. Det kan nevnes at vi i alle år fra opprettelsen av Entreprenørskolen har måttet takke nei på henvendelser og søknader fra interesserte kandidater med SV eller HF bakgrunn.

NTNU

Fakultet for samfunnsvitenskap og teknologiledelse

Dato 03.05.2011

Referanse 2011/474/PST

Notat

Til:	Studieavdelingen
Kopi til:	Geografisk institutt, Institutt for bevegelsesvitenskap, Institutt for industriell økonomi og teknologiledelse, Institutt for samfunnsøkonomi, Institutt for sosialt arbeid og helsevitenskap, Institutt for sosiologi og statsvitenskap, Institutt for voksnes læring og rådgivningsvitenskap, Norsk senter for barneforskning, Pedagogisk institutt, Program for lærerutdanning, Psykologisk institutt, Sosialantropologisk institutt
Fra:	Fakultet for samfunnsvitenskap og teknologiledelse

Utvikling av fakultetets studieprogramportefølje på lengre sikt - Forslag på endringer i studieprogramporteføljen 2012/2013

SAMMENDRAG

Strategi og ytre rammefaktorer for studieprogramporteføljen

Mens strategiplanen for 2006-2010 la opp til ekspansjon i fakultetets studieprogramportefølje, foreskriver strategiplanen for 2011-2015 i større grad konsolidering av eksisterende studieprogramportefølje med vekt på kvalitetshevning. Ser man på de ytre rammebetingelsene, får man følgende bilde:

A. Stagnerende budsjettrammer målt i faste priser (budsjettrammer korrigert for lønns- og prisstigning)
B. Den totale søkningen til fakultetet er svakt økende, men totalrammen for fakultetets studieplasser vil trolig endre seg lite.
C. Fortsatt økte forventninger fra KD når det gjelder NTNUs og dermed SVTs bidrag til en økende og kvalitativ god lærerutdanning. Dette skaper utfordringer særlig knyttet til egnet areal (Dragvoll).

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D. Det forventes at fordelingen mellom de ulike hovedkategoriene (lavere grad/mastergrad/ profesjonsstudier) i studieprogramporteføljen vil være ganske stabil i den kommende strategiperioden fram til 2015.

SVT-fakultetet er ett stort og sammensatt fakultet med mange og svært ulike studietilbud. Strategien for utvikling av de ulike studiene vil variere noe, men hovedretningen er konsolidering og kvalitetsforbedring.

Forslag til endringer i studieprogramporteføljen 2012/13

Fakultetet ønsker en tydelig profilering av de nye bachelorprogram og ber derfor om at gradsbenevnelse blir Bachelor i afrikastudier, Bachelor i bevegelsesvitenskap, osv. Fakultetet ber videre om at det opprettes følgende nye studieprogram/studieretninger:

- Master i entreprenørskap og samfunn
- Studieretning i arbeids- og organisasjonspsykologi innenfor master i psykologi
- Studieretning i læring innenfor master i psykologi

Følgende studieprogram/studieretninger bes lagt ned:

- MPhil in Human Development
- MPhil Risk Psychology, Environment and Safety
- Studieretning i biologisk og kognitiv psykologi, innenfor master i psykologi
- Studieretning i helse-, -organisasjons og kommunikasjonspsykologi innenfor master i psykologi
- Studieretning i kultur-, sosial- og samfunnspsykologi innenfor master i psykologi

1. STRATEGI FOR UTVIKLING AV STUDIEPROGRAMPORTEFØLJEN PÅ LENGRE SIKT

1.1 Fakultetets nye strategiplan for perioden 2011-2015 og ytre rammefaktorer

Strategiplanen for 2006-2010 la opp til en periode med ekspansjon i fakultetets studieprogramportefølje har da også økt. I strategiperioden har fakultetet opprettet seks toårige masterprogram, det ene med 5 studieretninger, to internasjonale mastergrader, en femårig lektorutdanning i samfunnsfag og to erfaringsbaserte mastergrader innenfor videreutdanning. I strategiperioden har fakultetet dessuten reorganisert bachelorgraden ut fra føringer gitt i inneværende strategiplan og ut fra forhold som ble avdekket gjennom kvalitetssikring av studiene. Dette medførte at det "gamle" bachelorprogrammet ble splittet opp i 11 nye program med en tydelig profilering. Profesjonsstudiet i psykologi har også vært igjennom en total reorganisering og tar nå opp studenter direkte fra videregående skole til ett seksårig løp. Oppsummert har dette gitt både en økning i antall studieprogram og i bredden av studietilbudet. Økningen i antall studieprogram og reorganisering av eksisterende program har dels vært motivert ut fra stigende søkerinteresse og dels vært knyttet til profilering og faglig kvalitetshevning.

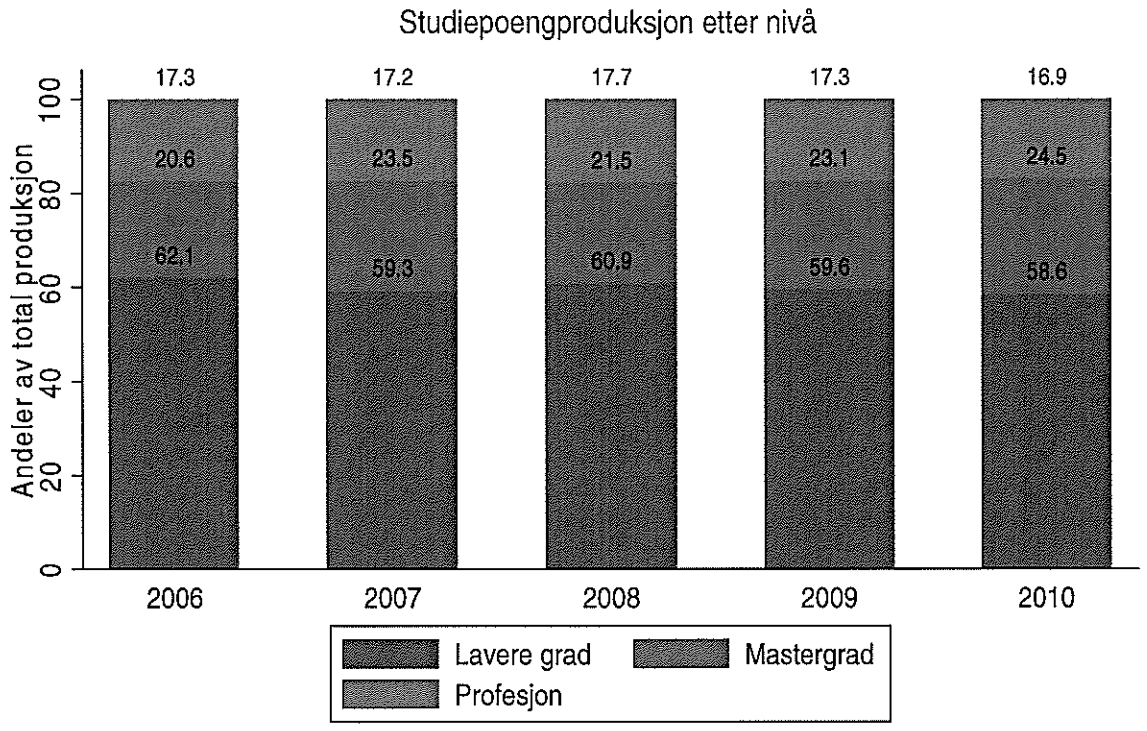
SVT-fakultetet synes å stå overfor følgende ytre rammebetingelser:

A. Stagnerende budsjettrammer målt i faste priser (budsjettrammer korrigert for lønns- og prisstigning)
B. Den totale søkningen til fakultetet er svakt økende, men totalrammen for fakultetets studieplasser vil trolig endre seg lite.
C. Fortsatt økte forventninger fra KD når det gjelder NTNUs og dermed SVTs bidrag til en økende og kvalitativ god lærerutdanning. Dette skaper utfordringer særlig knyttet til egnet areal (Dragvoll).
D. Det forventes at fordelingen mellom de ulike hovedkategoriene (lavere grad/mastergrad/ profesjonsstudier) i studieprogramporteføljen vil være ganske stabil i den kommende strategiperioden fram til 2015.

I det foreliggende forslag til ny strategi for studieprogram og undervisning understrekes det at fakultetets studietilbud skal være forankret i robuste fagmiljø med høy forskningsinnsats. Videre påpekes det at hovedutfordringene er å utvikle kultur for faglig ledelse som skaper rom og engasjement for helhetlig kvalitetsarbeid. I dette ligger det en konsolidering av dagens virksomhet, en konsolidering som vektlegger:

- Forskningsforankring
- Profilering med vekt på samfunnsrelevans
- Læringsmiljø som stimulerer studentene til egen innsats og stort læringsutbytte.

Figuren nedenfor viser fordelingen av de tre hovedkategoriene av studieprogram ved fakultetet: lavere grad, høyere grad og profesjon. Fakultetet har valgt å bruke studiepoengproduksjon i stedet for registrerte studenter. Dette gir et bedre bilde av studieaktiviteten og kompenserer for registrerte studenter med liten eller ingen studieaktivitet.



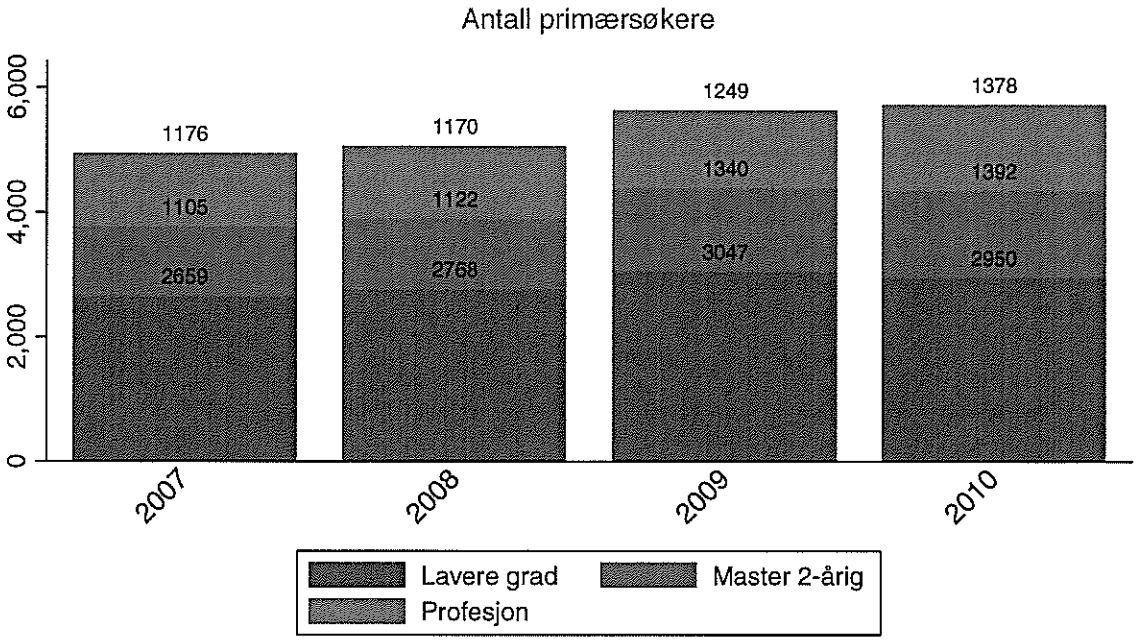
Kilde: DBH

Figuren viser en stabil fordeling mellom de tre hovedkategoriene av studieprogram i perioden fra 2006 til 2010 er stabil. Det kan spores en liten økning i andelen mastergrad/ profesjonsstudier i forhold til lavere grad, men den er liten. Fakultetet forventer ikke at denne fordelingen vil endres vesentlig i den neste strategiperioden fram til 2015 selv om fortsatt ekspansjon i lærerutdanningen kan øke andelen av profesjonsstudenter noe. Hovedbildet vil likevel være at fakultetets programportefølje vil preges av konsolidering. Det vil da være viktig å opprettholde rekrutteringen og omfanget av lavere grads studier for å sikre tilgangen av godt motiverte studenter til de toårige mastergradene.

1.2 Rammefaktorer

1.2.1 Søkerinteressen

Figuren nedenfor viser det totale antall primærsøkere til SVT-fakultetet fordelt på de tre hovedkategoriene: Lavere grad, toårige mastergrader og profesjonsstudier.



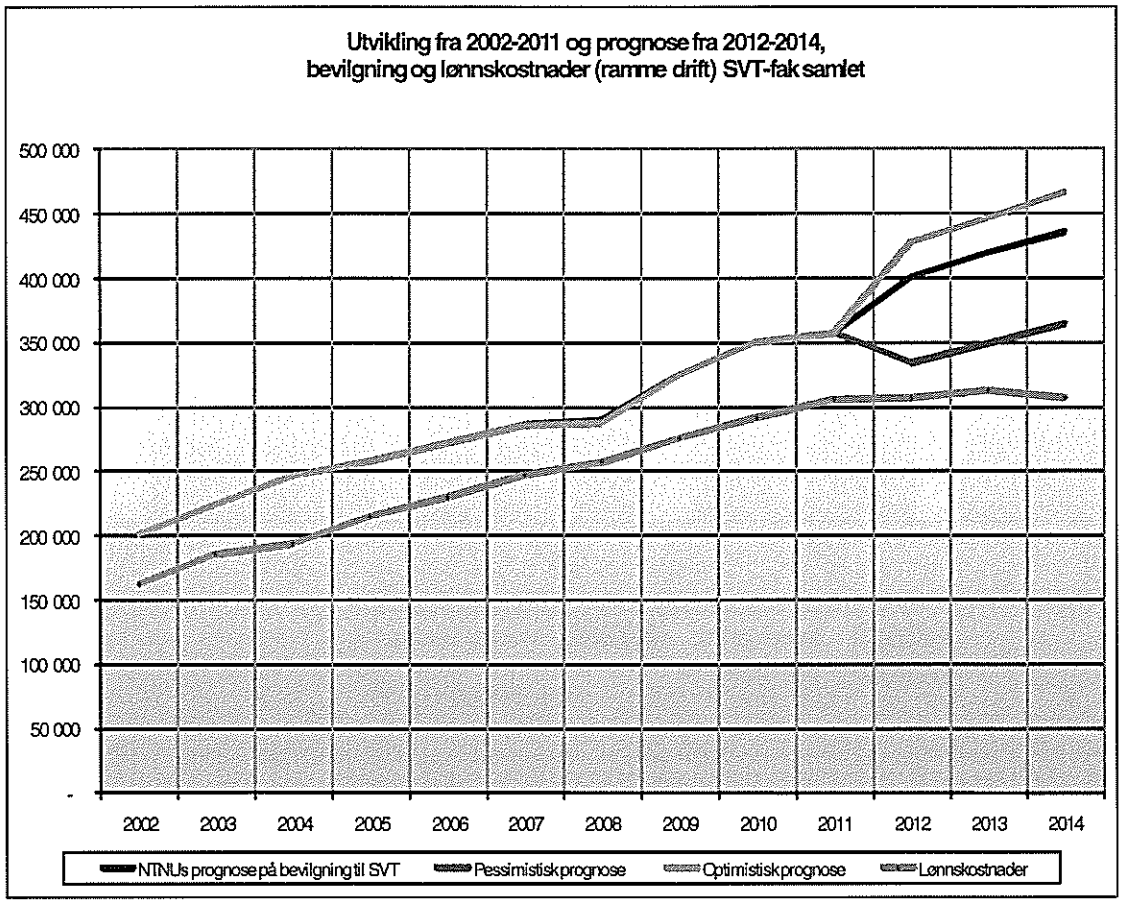
Kilde: FS

Figuren viser en jevn økning i antall primærsøkere i perioden fra 2007 til 2010. Det er en jevn økning for alle de tre hovedkategoriene fram mot 2009. Fra 2009 til 2010 er det fortsatt økende interesse for fakultetet samlet, men økningen skyldes de toårige mastergradene og profesjonsstudiene og ikke de lavere grads studier som har en nedgang i søkerinteressen. Denne endringen er liten og kan kanskje kompenseres ved innføring av de nye bachelorprogrammene. Fakultetet vil analysere årsaken til nedgangen nærmere, men den gir ikke grunnlag for endringer i fakultetets studieprogramportefølje.

Dersom søkerinteressen splittes opp på de enkelte søknadsalternativene er det store variasjoner i søkerinteressen. For studietilbud med svak søkerinteresse, vil fakultetet sette i gang tiltak rettet mot de enkelte søknadsalternativene og i første omgang redusere bredden i studietilbudet innenfor enheten og videre redusere antall studieretninger innenfor studieprogram med lav søkerinteresse.

1.2.2. Ressurser

Figuren nedenfor er tatt fra fakultetets plan og budsjettdokument for 2011. Den viser utviklingen i bevilgningen til fakultetet fram til 2011 og ulike prognoser for videre vekst.



Den grønne kurven viser utviklingen i bevilgningen til fakultetet fram mot 2011. Etter en stigning fram mot 2010 synes kurven og dermed bevilgningen å flate ut. NTNUs prognose (blå)for bevilgning til SVT-fakultetet viser fortsatt vekst, men en varslet revisjon av den sentrale IFM-modellen med virkning fra 2012 og ny praksis for internhusleie fra 2012, gir usikkerhet om ressurssituasjonen.

Det er med utgangspunkt i ressurssituasjonen ikke grunnlag for ekspensjon i studieprogramporteføljen. Ressursutviklingen taler for konsolidering, trykk på profilering og kvalitetsforbedringer i de program fakultetet allerede har.

2. FORSLAG TIL ENDRINGER I STUDIEPROGRAMPORTEFØLJEN 2012/2013

2.1. Profilering og gradsbenevnelse på bachelorprogram

Fakultetet sendte den 22.02.2011 en sak om gradsbenevnelser for de nye bachelorprogrammene ved fakultetet (2009/9242) og ber nå om at denne saken behandles i forbindelse med studieprogramporteføljen for 2012/2013. Forslaget fra fakultetet er et viktig tiltak i forbindelse med en bedre profilering av studieprogrammene og det vises i den forbindelse til SV-fakultetet ved UiB.

De nye bachelorprogrammene ved fakultetet er entydig knyttet til en disiplin. De har større fordypning innen disiplinen og det er vesentlig å vise fagtilhørighet og hvilken kompetanse studentene har. Det er også viktig å få vist endring fra gammel/eksisterende bachelorgrad. Dette er

viktig ved markedsføring og profilering av de nye gradene. Det har i denne forbindelse vært henvendelser fra studentene og fra enheter ved fakultetet som ønsker en tydeligere profilering av de nye bachelorprogrammene på vitnemålene.

Vitnemålet for nye bachelorprogram slik som det ble vedtatt i Styret, skiller seg lite fra vitnemålet for den gamle/gjeldende Bachelor i samfunnsvitenskapelige fag. Her var det uproblematisk at den mest fremtredende tekst på vitnemålet var Bachelor i samfunnsvitenskapelige fag i og med at den kunne ha to fordypninger og var ikke så nært knyttet til de enkelte disiplinene.

SVT-fakultetet ber derfor om at det på vitnemål for bachelorprogrammene benyttes gradsbenevnelser som lyder "Bachelor i (programnavn)" (eksempelvis Bachelor i geografi, Bachelor i bevegelsesvitenskap, osv.). Det kan tilføyes at vitnemålene dermed får en utforming som tilsvarer masterprogrammene hvor det står Master i geografi, master i bevegelsesvitenskap, osv.

Gradsbenevnelsene blir: Bachelor i afrikastudier, Bachelor i bevegelsesvitenskap, Bachelor i geografi, Bachelor i pedagogikk, Bachelor i psykologi, Bachelor i rådgivning og voksnes læring, Bachelor i samfunn- og idrettsvitenskap, Bachelor i samfunnsøkonomi, Bachelor i sosialantropologi, Bachelor i sosiologi og Bachelor i statsvitenskap.

Det vises for øvrig til vedlagt notat fra fakultetet av 22.02.11.

3.2 Høyere grads studier på Psykologisk institutt

Psykologisk institutt har gjennomført en revisjon av studieplanene for de toårige mastergradene og de internasjonale mastergradene ved instituttet. De har hatt et bredt studietilbud med tre studieretninger innenfor master i psykologi og to internasjonale mastergrader.

Enkelte av studietilbudene har slitt med små fagmiljø og det har gjort undervisning og veiledning sårbart. Revisjon vil gi studietilbud som er basert på et større fagmiljø, et mer stabilt læringsmiljø og bedre grunnlag for veiledning på masteroppgavene.

Endringen må også sees som et tiltak for en bedre profilering av studietilbudene og en innledende tilpassing til EUROPSY som er et felles rammeverk og en godkjenningsordning for europeiske psykologutdanninger. Det kan også vises til vedvarende lav søkerinteresse for de internasjonale mastergradene og det synes heller ikke å være tegn til tydelige forbedringer.

Instituttet ber om å få opprette to nye studieretninger innenfor Master i psykologi. Navn på den ene studieretningen var opprinnelig "læring og ferdighetsutvikling", men dette er nå foreslått endret til "læring":

- Studieretning i arbeids- og organisasjonspsykologi
- Studieretning i læring
- Det arbeides med ytterligere en studieretning som eventuelt kan starte i studieåret 2013/2014.

De ber videre om å få legge ned følgende studieretninger innenfor master i psykologi:

- Studieretning i biologisk og kognitiv psykologi
- Studieretning i helse-, organisasjons- og kommunikasjonspsykologi
- Studieretning i kultur-, sosial- og samfunnspsykologi

og følgende studieprogram innenfor Master of Philosophy

- Human Development
- Risk Psychology, Environment and Safety

Fakultetet slutter seg til instituttets vurderinger og forslag om endringer i studieprogramporteføljen. Det vises for øvrig til vedlagt notat fra instituttet av 12.04.2011 med ett tillegg av 02.05.11.

3.3 Master i entreprenørskap og samfunn

Fakultetet er av universitetsledelsen oppfordret til å utvikle en master i entreprenørskap med samfunnsvitenskapelig vinkling. Geografisk institutt i samarbeid med fakultetet, har arbeidet med saken og har akkurat fram til fristen klart å utvikle en foreløpig skisse til studieplan for Master i entreprenørskap og samfunn. Se vedlagt notat.

Studiet er ikke primært rettet mot studenter som ønsker å etablere egen virksomhet. Målet med studiet er å gi studentene en forståelse av fenomenet entreprenørskap og entreprenøren som aktør i samfunnet. Det er i hovedsak beregnet på kandidater med en samfunnsvitenskapelig bachelorgrad, men annen kompetanse kan etter individuell vurdering også gi opptak.

Opprettelsen av nytt studieprogram har ikke vært behandlet i instituttets styre og det tas derfor forbehold om eventuell tilslutning. Fakultetet prioriterer dette initiativet høyt.

NTNU

Fakultet for samfunnsvitenskap og teknologiledelse
Psykologisk institutt

Dato 12.04.2011

Referanse 2011/474/BCS

Notat

Til:	Per Stene
Kopi til:	
Fra:	Psykologisk institutt

Opprettelse og nedleggelse av studieprogram - Psykologisk institutt - studieåret 2012/2013.

Psykologisk institutt ønsker med dette å opprette to studieretninger innenfor master i psykologi:

Master i psykologi, studieretning arbeids- og organisasjonspsykologi
Master i psykologi, studieretning læring og ferdighetsutvikling

Instituttet ønsker samtidig å legge ned to internasjonale studieprogrammene i psykologi og tre studieretninger innenfor master i psykologi:

MPhil in Human Developement
MPhil in Risk Psychology, Environment and Safety

Master i psykologi, studieretning biologisk og kognitiv psykologi
Master i psykologi, studieretning helse-, organisasjons- og kommunikasjonspsykologi
Master i psykologi, studieretning kultur-, sosial- og samfunnspsykologi

Bakgrunn:
Psykologisk institutt har gjennom en lengre prosess jobbet med alle studieprogrammene i psykologi. Med grunnlag i en historisk underbemanning har instituttet hatt behov for en revisjon av masterretningene. Det har i de siste semestrene vært mange masterstudenter i små miljøer, noe som gjør undervisning og veiledning sårbart. Dette er et av argumentene for å revidere, slik at alle masterprogrammene skal være forankret i større miljøer, som sikrer stabil og god undervisning og veiledning til våre masterstudenter over tid. Psykologisk institutt ønsker å tilby et godt læringsmiljø med en dyktig fagstab som støtter studentene i deres egen læringsprosess for å tilegne seg fagene og

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Telefon
+47 73 59 19 60

Telefaks
+47 73 59 19 20

Saksbehandler
Bente Christensen Stavne
Tlf: +47 73 59 15 74

utvikle respekt for disiplinert og ærlig sannhetssøking og nysgjerrighet for andres innsikt og erfaringer i tråd med NTNUs strategi for utvikling av nye studietilbud.

Bachelorprogrammet i psykologi ble revidert med oppstart studieåret 2011/2012, og i en forlengelse av dette, er det nå master i psykologi som er på agendaen.

Studentene som starter på master i psykologi etter å ha fullført den nye bachelormodellen, vil ha langt mer psykologifaglig bakgrunn enn tidligere, hvor de hadde en fordypning på 52,5 studiepoeng. På bakgrunn av dette ble det også viktig å revidere masterspesialiseringene, slik at studentene kan få en naturlig progresjon i studiene sine.

Vi har lagt til grunn tilbakemeldinger fra masterstudentene i revisjonsarbeidet, slik at vi kan tilby studieretninger som er i tråd med deres ønsker. Dette regner vi med vil være med på å styrke rekrutteringen av studenter til instituttet. Det vil også bli tilbud om bachelorprosjekt i tema som er relevante for de masterspesialiseringene vi tilbyr, noe som også vil være med på å øke rekrutteringen til programmene. Med færre masterprogram vil også dette føre til større tilstrømning til de nye tilbudene.

Vi ønsket en mer markedstilpasset studieprogramportefølje, og å gjenspeile den faglige profilen ved instituttet. Etter en prosess i fagmiljøene har instituttet kommet opp med flere forslag til nye masterspesialiseringer. Etter en totalvurdering av forslagene gjenstår to program. Det vil si at det er kapasitet utover dette til en spesialisering, noe som vil forsøkes videreutviklet med sikte på oppstart studieåret 2013/2014.

Oppbygging av de nye studieretningene ser slik ut:

Master i psykologi, studieretning læring og ferdighetsutvikling:

Semester	Emne (sp)	Emne (sp)	Emne (sp)	Emne (sp)
4. semester	Masteroppgave 30 sp			
3. semester	Forskningspraksis 15 sp		Masteroppgave 15 sp	
2. semester	Artikkelseminar 7,5 sp	EiT 7,5 sp	Spesialisering valgfritt emne 15 sp	
1. semester	Quantitative methods (7.5)	Qualitative methods (7.5)	Læring, atferd og omgivelser 7,5 sp	Individuell utvikling, gener, nervesystem og atferd 7,5 sp

Master i psykologi, studieretning arbeids- og organisasjonspsykologi:

Semester	Emne (sp)	Emne (sp)	Emne (sp)	Emne (sp)
4.semester	Masteroppgave (30)			
3. semester	Mediepsyk- og komm. i org. (7.5)	Masteroppgave (15)		Selvvalgt spesialisering (7.5)
2. semester	Testmetodikk og Human factors(7.5)	Studentbedrift (15)		EiT (langsgående)
1. semester	Helsepsykologi (7.5)	PSY 3001 (15) Research Methodology		Arbeids- og organisasjons-psyk(7.5)

Metode-emnene i første semester vil ha felles undervisning, slik som ved dagens ordning. Begge studieretningene er tenkt å ha en opptaksramme på 20-30 studenter. Det er lagt inn muligheter for 15 studiepoeng praksis (hhv. Forskningspraksis og Studentbedrift), i tråd med reglene for Europsy. Det er på sikt lagt opp til at studentene kan få et praksisår via etter- og videreutdanning, for å tilfredsstille Europsy-kravet.

Master i psykologi, studieretning læring og ferdighetsutvikling er myntet på studenter som ønsker å fordype seg innenfor kognitiv/biologisk/sosial/utviklingspsykologi. En større tematisk bredde vil være med på å øke rekrutteringen til programmet. En av våre mest populære tilbud; spesialisering i kultur- sosial- og samfunnspsykologi, legges ned og denne spesialiseringen vil rekruttere søkere fra denne søkermassen.

Dette masterprogrammet vil ta for seg læring og individ til forskjell fra andre konkurrerende mastertilbud som fokuserer på læring og grupper. Spesialiseringen skal gi en grundig vitenskapelig skolering i psykologi, både teoretisk og anvendt. Spesialiseringen skal gi kompetanse innen forskning og undervisning, konsulent- og rådgivingsarbeid, utredning. Studentene skal ha teoretisk forståelse for og praktisk erfaring med vitenskapelige forskningsmetoder.

Spesialiseringen vil ha et hovedfokus på læring i en bred forstand. Mekanismene som er involvert i utviklings-og læringsprosessen vil bli belyst ut ifra et biologisk, kognitivt, sosial-, og utviklingspsykologisk perspektiv. Studentene blir i stand til å generere kunnskap om generelle prinsipper som kan ligge til grunn for læring og utvikling av ferdigheter og atferd i et livsløp. Målet er at studentene tilegne seg ekspertise i læringsprosessen med et genuint psykologisk, i.e. individuelt fokusert perspektiv som omfatter intraindividuelle forandringer (utvikling) så vel som interindividuell variasjon (lærings- og utviklingsvansker; topp performance).

Master i psykologi, studieretning arbeids- og organisasjonspsykologi vil være mer spisset i forhold til det tidligere masterprogrammet i HOK (Helse-, organisasjons- og kommunikasjonspsykologi). Denne spissingen er gjort i tråd med tilbakemeldingene fra referansegruppene (KVASS) på masterprogrammet. Særlig er emnene innen kommunikasjon og helse fokusert inn mot arbeidsliv. Rekrutteringen til det tidligere programmet har vært god, dette har vært det mest populære tilbudet innunder master i psykologi, og vi regner med at denne spissingen vil gjøre programmet mer konkurransedyktig og relevant og dermed vil søkermassen kunne økes.

Dette er studiet for de som ønsker å arbeide med organisasjonsutvikling, human factors, helse og livskvalitet, personalutvelgelse, helse-, miljø og sikkerhet, psykososialt arbeidsmiljø, arbeidsidentitet, jobbengasjement, kommunikasjon i organisasjoner og tilgrensende fagfelt. Vi ønsker å profilere vår master i retning av psykologi som vektlegger positive faktorer i arbeidslivet og helsefremming ved å fokusere på begreper som livskvalitet, engasjement, positiv tilrettelegging, eustress og sunne omstillinger og liknende. I tillegg vil vi fortsatt ha en profilering rundt metode, både kvalitativ og kvantitativ. Dette for å etablere en samlende rød tråd i vår spesialiseringen som også er konkurransedyktig med andre masterutdanninger.

En grundigere beskrivelse av spesialiseringene kommer frem av de vedlagte utkast til programmene. Læringsmålene vil bli videreutviklet i tråd med det nasjonale kvalifikasjonsrammeverket i forbindelse med det videre studieplanarbeidet.

Emnetekster og læringsmål for disse, må det jobbes videre med, samt opptaksgrunnlag og eventuelle anbefalinger av emner på bachelornivå. F.eks. masteremner som er forslått som del av bachelorgraden for opptak til arbeids- og organisasjonspsykologi må vurderes. Her må det i tilfelle ordnes avtaler med de respektive instituttene, hvis våre bachelorstudenter skal få tilgang til disse emnene. Evt. om rådgivningsemner på bachelornivå vil være relevante.

De økonomiske rammene er vurdert, og psykologisk institutt finner at det er ressurser til å drifte disse to spesialiseringer på master i psykologi i tillegg til de øvrige studiene på bachelor, Phd og profesjonsstudiet i psykologi. Timeverksregnskapet vil bli normert etter faste satser for emner ut ifra studiepoeng. Dette med utgangspunkt i at de nåværende spesialiseringene nedlegges.

Forslag til vedtak:

Psykologisk institutt foreslår nedleggelse av følgende studieprogram med virkning fra og med høsten 2012:

To internasjonale studieprogram:
MPhil in Human Developement
MPhil in Risk Psychology, Environment and Safety

Tre studieretninger innenfor master i psykologi:
Master i psykologi, studieretning biologisk og kognitiv psykologi
Master i psykologi, studieretning helse-, organisasjons- og kommunikasjonspsykologi
Master i psykologi, studieretning kultur-, sosial- og samfunnspsykologi

Dvs. at siste opptak for Mphil in Human Development, Mphil in Ripensa, Master i helse-, organisasjons- og kommunikasjonspsykologi, Master i kultur-, sosial- og samfunnspsykologi og Master i kognitiv og biologisk psykologi er høsten 2011.

Psykologisk institutt foreslår opprettelse av følgende studieprogram innenfor master i psykologi:

Master i psykologi, studieretning arbeids- og organisasjonspsykologi
Master i psykologi, studieretning læring og ferdighetsutvikling

Opptaksrammen vil være anslagsvis 20-30 studenter pr program.

Den tredje studieretning på masternivå vil forsøkes utviklet med tanke på oppstart i studieåret 2013/2014.

Med vennlig hilsen
Psykologisk institutt

Ute Gabriel
Nestleder*(sign.)*

Bente Christensen
Førstekonsulent*(sign.)*

Vedlegg:
Master i psykologi, studieretning arbeids- og organisasjonspsykologi og
Master i psykologi, studieretning læring og ferdighetsutvikling

Dragvoll 4.mai 2011

Notat om entreprenørskapsmaster lagt til Geografisk institutt, NTNU

Foreløpig tittel studieprogram: Entreprenørskap og Samfunn

Det planlagte studiet vil sette entreprenørskap inn i et samfunnsmessig perspektiv. Søkelyset rettes både mot entreprenørens betydning for samfunnsutviklingen og samfunnskontekstens betydning for entreprenørskap. Koblingen mellom entreprenørskap, nyskaping/innovasjon og omstilling vil bli vektlagt. Studiet vil både gi innsikt i den klassiske forskningstradisjonen rundt entreprenørskap og gi kjennskap til nye former for entreprenørskap som får mye oppmerksomhet i dag (som for eksempel sosialt entreprenørskap og kulturelt entreprenørskap) og nye former for omstilling (som for eksempel "grønn" omstilling og kulturbasert næringsutvikling).

Målgrupper: Studiet retter seg mot kandidater med bachelorutdanning i samfunnsvitenskapelige fag. Studenter med annen utdanningsbakgrunn kan få opptak etter individuell vurdering.

Arbeidsmarked/ yrkesmuligheter: Studiet kvalifiserer særlig for stillinger innen:

- Det offentlige næringsutviklings- og virkemiddelapparat på statlig, fylkeskommunalt, interkommunalt og kommunalt nivå, som for eksempel Innovasjon Norge, SIVA, departementer, næringsavdelinger i fylkeskommuner og kommuner, interkommunale nærings- og utviklingsselskaper.
- Private næringsutviklings-, konsulent- og destinasjonsselskaper, inkubatorer og næringshager
- Forskning og utvikling
- Skoleverket på ulike nivå
- Fag og interesseorganisasjoner
- Bistands- og humanitære organisasjoner

Overordnet læringsmål: Målet med studiet er å gi studentene en forståelse av fenomenet entreprenørskap og entreprenøren som aktør i samfunnet, det vil si en forståelse av hva entreprenørskap og entreprenører er. Masteren søker å gi studenten kunnskap om det tverrfaglige forskningsfeltet entreprenørskap helt fra de klassiske bidragene og fram til dagens forskningsfront på feltet, med fokus på teoretiske og metodiske tilnærminger og sentrale problemstillinger. Det legges særlig vekt på at studentene skal få god innsikt i sosio-kulturelle betingelser for entreprenørskap og betydningen entreprenørskap har for steder og regioner. Følgelig er det et mål at studentene skal se sammenhenger mellom entreprenørskap, stedlige/regionale omstillingsprosesser, by- og bygdeutvikling, samt regional- og næringspolitikk. Med case-basert undervisning og masteroppgaver skal studentene tilegne seg kompetanse og ferdigheter som er samfunns- og næringsrelevant.

Forslag til studieplan for master i Entreprenørskap og Samfunn:

Semester	Emne (7,5 sp)	Emne (7,5 sp)	Emne (7,5 sp)	Emne (7,5 sp)
4.semester/V	Masteroppgave			
3.semester/H	Masteroppgave			
2.semester/V	Kjerneemne/obl.	2 alt. metodekurs	Valgemner 7,5 sp.	EiT
1.semester/H		Metode obl.	Valgemne 15 sp	

Obligatoriske masteremner gitt av Geografisk Institutt:

Kjerneemne som vil utvikles: Samfunnsperspektiv på entreprenørskap

Belastning 15 sp over første og andre semester.

Læringsmål: Emnet gir studentene oversikt over og kunnskap om overordnete og sentrale begreper, teorier og metoder innen entreprenørskapsfeltet, samt dypere innsikt i noen sentrale temaer og problemstillinger knyttet til disse.

Faglig innhold: Et overordnet perspektiv er entreprenørskap som samfunnsfenomen, og det fokuseres på samspillet mellom entreprenørskap og sosio-kulturell kontekst. Videre legges det vekt på å relatere entreprenørskap til regional utvikling og regionalpolitikk, og et meget sentralt stikkord er omstillingsproblematikk, knyttet både til næringsliv og bosetting. Entreprenørskap i henholdsvis by- og bygdekontekst og entreprenørskap som politisk mål og virkemiddel er helt sentrale og faste temaer, mens øvrige tema og problemstillinger som tas opp, vil avspeile forskningsaktiviteten på instituttet og forskningsfronten på feltet. Undervisningen vil dessuten være orientert mot case, være seg entreprenører, bedrifter, organisasjoner, næringsklynger, kommuner m.m. Det vil trekke inn forelesere fra praksisfeltet, slik som virkemiddelapparat, nærings- og organisasjonsliv. Studentene vil arbeide med hvert sitt arbeidsnotat, der det generelle stoffet knyttes opp mot valgt tema/problemstilling for masteroppgaven. Arbeidsnotatene skal presenteres og diskuteres på et seminar (1 time pr. student).

I første semester er emnet *Methodology and the Research process* gitt ved Geografisk institutt obligatorisk. Dette munner ut i en prosjektbeskrivelse for masteroppgaven. Dette danner basis for å velge ett (obligatorisk) metodeemne, enten *Qualitative Methods* eller *Quantative Methods* som også tilbys ved instituttet.

I tredje semester er Eksperter i team obligatorisk. Her er det mange faglig relevante landsbyer å velge blant, ikke minst *Green Industrial Restructuring* tilbudt av Geografisk Institutt.

Første og andre semester vil studentene kunne velge fra en liste av valgemner. De valgfrie emnene må til sammen utgjøre minst 22,5 studiepoeng.

Geografisk institutt tilbyr pr. i dag tre valgfrie kurs som er relevante for masteren. Emnet *Knowledge management in a Global Economy* tar for seg innovasjon i globalt perspektiv. Et annet emne er *Sosial ulikhet, identitet og sted* der entreprenørskap gjerne er en inngang til disse tema. Et tredje emne er *Humanitarism, Theory and Practice*. Her vil sosialt entreprenørskap bli et element i undervisningen.

Studenter vil også kunne velge masteremner gitt av andre institutter ved NTNU:

Institutt for Økonomi og Teknologiledelse tilbyr en rekke emner innenfor *produktutvikling og entreprenørskap* samt innenfor *innovasjon* som er aktuelle.

Institutt for Sosiologi og Statsvitenskap tilbyr et relevant emne *Bygdesosiologi og regionalpolitikk* som er utviklet i samarbeid med Bygdeforskning.

Institutt for Tverrfaglige Kulturstudier tilbyr emner i *Teknologi og vitenskapsstudier* som også er aktuelle.

Masterstudentene kan sette sammen valgfrie kurs, slik at masteren får en mer teoretisk profil for eksempel med emner gitt av Geografisk institutt og Institutt for tverrfaglige kulturstudier eller en mer praktisk profil med kurs fra Institutt for Industriell Økonomi.

Øvrige samarbeidspartnere

For å sikre at masterprogrammet blir samfunns- og næringsrelevant vil vi utvide vårt samarbeid med våre samarbeidspartnere samt også søke nye samarbeidspartnere.

- Innovasjon Norge
- SIVA
- Fylkeskommuner i Midt-Norge
- Senter for bygdeforskning
- Sintef Teknologi og Samfunn avd. for Innovasjon og virksomhetsutvikling
- NTNU Technology Transfer
- Start NTNU
- Leiv Eriksson Nyskaping

Av praktiske hensyn vil vi i første rekke trekke veksler på samarbeidspartnere i Midt-Norge. Vi må presisere at masterstudiet allikevel vil ha et tematisk innhold som har relevans utover denne regionen.

Vi ser for oss at disse samarbeidspartnerne kan bidra med faglig relevante case til prosjekter og masteroppgaver. Vi vil også trekke veksler på nøkkelpersoner fra enkelte av samarbeidspartnerne i undervisningssammenheng.

Rekrutteringspotensial

Masterprogrammet i Entreprenørskap og Samfunn kan rekruttere fra ulike studier:

- Instituttets egen bachelorutdanning i geografi.

- Andre samfunnsvitenskapelige bachelorutdanninger ved NTNU.
- Studenter med samfunnsfaglig bakgrunn fra andre studiesteder i inn- og utland

Det finnes andre masterstudier innenfor entreprenørskap i Norge, men de aller fleste er rettet mot studenter som vil etablere sin egen bedrift. I Norge finnes et par masterstudier innenfor innovasjon som har en samfunnsvitenskapelig profil som kan være noe konkurrerende aktuelle masterprogram. Det finnes imidlertid ingen tilsvarende masterstudier i entreprenørskap. Masterens samfunnsfaglige relevans som oppnås gjennom samarbeid med eksterne partnere, vil trolig ha appell og gjøre masterstudiet attraktivt. Det er imidlertid vanskelig å vurdere rekrutteringspotensialet som også er avhengig av et framtidig arbeidsmarked som vi foreløpig ikke kjenner i detalj. Hvor attraktivt det blir, vil også avhenge av om masteren kommer kompetansebehovet blant annet hos samarbeidspartnerne i møte. Det gjenstår derfor utviklingsarbeid der vi har en dialog med våre samarbeidspartnere om profil og faglig innhold.

Bemanningsbehov og utviklingsressurser

Geografisk institutt har lang erfaring med forskning på entreprenørskapsfeltet som er et aktivum i etableringen av forskningsbasert undervisning på feltet. På grunn av at sentrale fast vitenskapelig ansatte i vår stab er i ulike lederverv eller forskningstermin har vi begrenset undervisningskapasitet på feltet. Vi har derfor behov for to fast vitenskapelige ansatte for å drifte et masterprogram i entreprenørskap og samfunn fra høsten 2012. Fram til da vil vi også ha behov for ressurser til å utvikle masteren, slik at den holder høy faglig standard. Vi har også behov for ressurser til å markedsføre den nye masteren, for å rekruttere faglig gode kandidater.

Nina Gunnerud Berg Britt Dale Asbjørn Karlsen

LÆRING

Mastergraden skal gi en grundig vitenskapelig skolering i psykologi, både teoretisk og anvendt. Mastergraden skal gi kompetanse innen forskning og undervisning, konsulent- og rådgivingsarbeid, utredning. Studentene skal ha teoretisk forståelse for og praktisk erfaring med vitenskapelige forskningsmetoder.

Denne mastergraden vil ha et hovedfokus på læring i en bred forstand. Mekanismene som er involvert i utviklings-og læringsprosessen vil bli belyst ut ifra et biologisk, kognitivt, sosial-, og utviklingspsykologisk perspektiv. Studentene blir i stand til å generere kunnskap om generelle prinsipper som kan ligge til grunn for læring og utvikling av ferdigheter og atferd i et livsløp. Målet er at studentene tilegne seg ekspertise i læringsprosessen med et genuint psykologisk, i.e. individuelt fokusert perspektiv som omfatter intraindividuelle forandringer (utvikling) så vel som interindividuell variasjon (lærings- og utviklingsvansker; topp performance).

For å bygge på studentenes kompetanse benytter denne Mastergraden seg av forskjellige faglige tilnærminger og av en studieorganisering som tar for seg en sterk teoretisk tilnærming i første studieåret og så videre spesialiseringsoptioner i andere studieåret. På den måten vil studenter har mulighet til å koordinere sitt studiet med sine akademiske og profesjonelle aspirasjoner /ønsker .

Mastergrad organisering

Det er foreslått en sterk teoretisk tilnærming i denne mastergraden i semester 1 og 2.

På 1 semester blir det 2 kurs på 7.5 stp hvorav den ene vil ta for seg individuell utvikling og de prosesser som er knyttet mot det; gener, nervesystem, atferd, omgivelser. Den andre vil ta opp temaer knyttet opp mot læring og utviklingspsykologi. Det vil også være metode 15 stp på 1 semester.

Semester 2 vil bestå av artikkelseminar på 7.5 stp som vil inneholde temaer innen individuell utvikling og læring – studenten skal også skrive essay innen utvalgte temaer.
I tillegg blir det spesialisering på 15 stp. Studentene kan velge mellom to spesialiseringer den ene er spesialisering i læring, atferd og omgivelser og den andre er spesialisering i individuell utvikling, gener, nervesystem og atferd. Spesialiseringa kan enten være teoretisk eller teoretisk/metodisk – der studentene skal skrive en artikkel på 15-20 sider. EiT vil også være på 2 semester.

Semester 3 vil ha forskingspraksis på 15 stp der studentene skal gjennomføre en pilotstudie som knyttes mot metoden brukt i deres mastergrad. Studentene kan velge mellom to forskningspraksis den ene forskningspraksis knyttet mot læring, atferd og omgivelser og den andre forskningspraksis knyttet mot individuell utvikling, gener, nervesystem og atferd.
I tillegg skal studentene bruke 15 stp på sin masteroppgave. I 4 semester skal studentene arbeide med sin mastergrad.

4. semester	**Masteroppgave 30 sp**			
3. semester	**Velge et av de to: Forskningspraksis læring, atferd og omgivelser 15 sp eller Forskningspraksis individuell utvikling, gener, nervesystem og atferd 15 stp**		**Masteroppgave 15 sp**	
2. semester	**Artikkelseminar 7,5 sp**	**EiT 7,5 sp**	**Velge et av de to: Spesialisering læring, atferd og omgivelser 15 sp eller Spesialisering individuell utvikling, gener, nervesystem og atferd 15 stp**	
1. semester	**Quantitative methods (7.5) Shared course**	**Qualitative methods (7.5) Shared course**	**Læring, atferd og omgivelser 7,5 sp**	**Individuell utvikling, gener, nervesystem og atferd 7,5 sp**

Forslag til studieplan:

1. semester:

Metode (15 stp) PSY3001

Teori (7.5 stp): Læring, atferd og omgivelser

Faglig innhold
Emnet gir oversikt over sentrale utviklingspsykologiske temaer som arv versus miljø, dynamisk systemteori og læringspsykologiske temaer som læringsprosessen, læringsprinsipper, sosiale og kognitive prosesser i læring, biologiske prosesser i læring, evner versus ferdigheter, flyt og læring. I dette emnet vil det også bli lagt vekt på å forstå utviklings- og læringsvansker samt få en forståelse av de prosesser som gjør at noen klarer å prestere på et høyt nivå.

Læringsmål: målet med studiet er å gi innsikt i læring, ferdighetsutvikling og læringsprosessen i et livsløps perspektiv. Det å forstå samspillet mellom atferd og omgivelser er viktig.

Vurderingsform: skriftlig eksamen 4 timer

Teori (7.5 stp): Individuell utvikling, gener, nervesystem og atferd

Faglig innhold

Emnet er et teoretisk fordypningsemne i kognitiv og biologisk psykologi med hovedfokus på individuell utvikling. Faktorer som gen, nervesystem og atferd vil bli diskutert og samspillet mellom disse faktorene og omgivelser i forhold til individets utvikling.

Emnet gir en gjennomgang av det biologiske/kognitive grunnlaget for opplevelse og atferd som omfatter hele forløpet av menneskelig erkjennelse, fra oppmerksomhet, sansing, persepsjon, handling, språklige prosesser, problemløsning, og tenkning til læring og hukommelse. Emnet gir studentene kjennskap til sentrale begreper, temaer, problemstillinger og empiriske forskningsfunn i sosial-kognitiv, kognitiv og biologisk psykologi. For studenter som ikke har en bachelor i psykologi vil kursansvarlig anbefale noe bakgrunnslitteratur i tillegg til pensum.

Læringsmål

Emnet skal danne grunnlag for utvikling av en vitenskapelig basis i teoretiske temaer innen kognitiv og biologisk psykologi med hovedfokus på individets utvikling.

Vurderingsform: skriftlig eksamen 4 timer

2. semester:

Artikkelseminar (7.5 stp)

Faglig innhold

Emnet gir en teoretisk og forskningsmetodisk gjennomgang av emner knyttet opp i mot hjerne, kognisjon, persepsjon og læring. I løpet av kurset vil studentene ha gjennomgått 10 vitenskapelig artikler med hovedfokus på teoretiske og metodiske aspekter ved artikkelskriving. I tillegg skal studentene ha skrevet 2 essay på temaer som er fokus i dette emnet.

Læringsmål
- gi teoretisk grunnlag innen fagområdet
- danne et grunnlag for vitenskapelig refleksjon
- opparbeide evnen til selvstendighet og utvikle skriveferdighet

Vurderingsform: ARBEIDER

- GODKJENT ARBEID	*1/2*
- Godkjent arbeid	1/2

Spesialisering læring, atferd og omgivelser (15 stp)

Emnet er spesialisering innenfor læring, atferd og omgivelser. Studentene skal skrive en semesterrapport på ca. 5000 ord. Tema for oppgaven skal velges i samråd med faglærer og fortrinnsvis representere en fordypning innenfor fagområder berørt i emnet læring, atferd og omgivelser gjennomført på første semester.

Studentene må ha godkjent tema for masteroppgaven og oppnevnt veileder før de begynner på spesialiseringen som tematisk skal være knyttet masteroppgaven.

Læringsmål:
hovedmålsettingen med emnet er å gi studentene et grundig teoretisk innsikt i et valgt psykologisk tema knyttet opp i mot læring, atferd og omgivelser.

Vurderingsform: oppgave

Spesialisering individuell utvikling, gener, nervesystem og atferd (15 stp)
Emnet er spesialisering innenfor individuell utvikling, gener, nervesystem og atferd. Studentene skal skrive en semesterrapport på ca. 5000 ord. Tema for oppgaven skal velges i samråd med faglærer og fortrinnsvis representere en fordypning innenfor fagområder berørt i emnet individuell utvikling, gener, nervesystem og atferd gjennomført på første semester.

Studentene må ha godkjent tema for masteroppgaven og oppnevnt veileder før de begynner på spesialiseringen som tematisk skal være knyttet masteroppgaven.

Læringsmål:
hovedmålsettingen med emnet er å gi studentene et grundig teoretisk innsikt i et valgt psykologisk tema knyttet opp i mot individuell utvikling, gener, nervesystem, atferd og omgivelser.

Vurderingsform: oppgave

Eksperter i team (7.5 stp)

3 semester:

Forskningspraksis læring, atferd og omgivelser 15 stp
Emnet er en læreperiode, som omfatter en empirisk eller teoretisk undersøkelse, for eksempel et pilot-eksperiment, for å studere metodikk knyttet til masteroppgaven. Tematikken i dette ment skal være innen læring, atferd og omgivelser. Arbeidet skal utføres under veiledning av oppnevnt veileder for masteroppgaven, og sammenfattes i en skriftlig rapport. Tema for arbeidet skal godkjennes av veileder.

Læringsmål:
Målet med emnet er å gi studentene en praktisk erfaring med innsamling av data og utprøving av et måleinstrument.

Vurderingsform: oppgave
Forskningspraksis individuell utvikling, gener, nervesystem og atferd 15 stp

Emnet er en læreperiode, som omfatter en empirisk eller teoretisk undersøkelse, for eksempel et pilot-eksperiment, for å studere metodikk knyttet til masteroppgaven. Tematikken i dette emnet skal være innen individuell utvikling, gener, nervesystem og atferd. Metoden i dette emnet knyttes i hovedsak mot labratorievirksomhet. Arbeidet skal utføres under veiledning av oppnevnt veileder for masteroppgaven, og sammenfattes i en skriftlig rapport. Tema for arbeidet skal godkjennes av veileder.

Læringsmål:
Målet med emnet er å gi studentene en praktisk erfaring med innsamling av data og utprøving av et måleinstrument.

Vurderingsform: oppgave

Masteroppgave 15 stp

4 semester:

Masteroppgave 30 stp

NTNU

Fakultet for samfunnsvitenskap og teknologiledelse

Dato 22.02.2011

Referanse 2009/9242/PST

Notat

Til:	Studieavdelingen
Kopi til:	Geografisk institutt, Institutt for bevegelsesvitenskap, Institutt for samfunnsøkonomi, Institutt for sosiologi og statsvitenskap, Institutt for voksnes læring og rådgivningsvitenskap, Pedagogisk institutt, Psykologisk institutt, Sosialantropologisk institutt
Fra:	Fakultet for samfunnsvitenskap og teknologiledelse

Gradsbenevnelser for de nye bachelorprogrammene ved SVT-fakultetet

Aktuell sak

Styret ga i oktober 2010 fakultetet adgang til å opprette 11 nye bachelorprogram fra og med studieåret 2011/2012 (S-sak 62/10). Vedtaket var delt i 11 tilnærmet identiske punkter og følgende punkt kan tjene som eksempel:

> 3-årig bachelorprogram i bevegelsesvitenskap ved SVT-fakultetet.
> Kandidatenes tittel: -Bachelor i samfunnsvitenskapelige fag
> (Studieprogrammets tittel framkommer av vitnemål og Diploma Supplement)

De øvrige punktene i vedtaket er likelydende, men "bevegelsesvitenskap" er skiftet ut med "geografi", "psykologi", osv. Dette medfører at den mest framtredende tekst på vitnemålet blir "Bachelor i samfunnsvitenskapelige fag" og med studieprogrammet som en eventuell undertekst. For at en viktig del av intensjonen med endringene i fakultetets bachelorprogram skal realiseres, må vitnemålene få en utforming hvor gradsbenevnelsene blir tydelige. Gradsbenevnelser som lyder "Bachelor i geografi", "Bachelor i sosiologi", osv. bør være den mest framtredende tekst på vitnemålene.

Bakgrunn

De nye bachelorprogrammene er entydig knyttet til en disiplin. De har større fordypning innen disiplinen og det er vesentlig å vise fagtilhørighet og hvilken kompetanse studentene har. Det er også viktig å få vist endring fra gammel/eksisterende bachelorgrad. Dette er viktig ved markedsføring og profilering av de nye gradene. Det har i denne forbindelse vært henvendelser fra

Postadresse
7491 Trondheim

Org.nr. 974 767 880
E-post:
postmottak@svt.ntnu.no
http://www.ntnu.no

Besøksadresse
Bygg 1, nivå 4, NTNU
Dragvoll

Telefon
+47 73 59 19 00

Telefaks
+47 73 59 19 01

Saksbehandler
Per Stene
Tlf: +47 73 59 19 04

studentene og fra enheter ved fakultetet som ønsker en tydeligere profilering av de nye bachelorprogrammene på vitnemålene.

Vitnemålet for nye bachelorprogram slik som det ble vedtatt i Styret , skiller seg lite fra vitnemålet for den gamle/gjeldende Bachelor i samfunnsvitenskapelige fag. Her var det uproblematisk at den mest fremtredende tekst på vitnemålet var Bachelor i samfunnsvitenskapelige fag i og med at den kunne ha to fordypninger og var ikke så nært knyttet til de enkelte disipliner.

Gradsbenevnelser for de øvrige gradene ved NTNU

De toårige mastergradene fikk allerede i 2004 en bedre profilering og tydeliggjøring av disiplinen/faget på vitnemålene (S-sak 67/04, punkt 5). Vedtaket fastsatte at gradsbenevnelsen skulle være "Master i (programnavn)". Dette ga i praksis følgende gradsbenevnelser: "Master i geografi", "Master i bevegelsesvitenskap", osv, med studieretninger som en egen undertekst. Dette gjelder også for de erfaringsbaserte mastergradene ved fakultetet. Gradene master i teknologi/sivilingeniør og master i arkitektur /sivilarkitekt inneholder også "gamle" og velkjente betegnelsene på vitnemålet som er godt kjent i arbeidslivet. Alle disse vitnemålene er godt profilert og inneholder opplysninger som viser kandidatens kompetanse. Gradene Candidata/Candidatus medicinae og Candidata/Candidatus psychologiae er også velkjente titler i arbeidslivet og trenger ikke ytterligere profilering.

Gradsbenevnelser ved andre læresteder

UiB gikk i 2009 over til å benytte disiplinbetgnelser på sine vitnemål, slik at den mest framtredende tekst er "Bachelor i sosialantropologi", osv. Begrunnelsen var først og fremst at studentene ønsket en tydeligere profilering av faget de hadde fordypning i. UiB tildelte tidligere en bachelor i kultur og samfunn, en betegnelse som var felles for alle samfunnsvitenskapelige og humanistiske bachelorprogram. UiB ønsket i større grad å synliggjøre hvilket fagområde studentene faktisk hadde tatt graden innenfor, og gikk derfor inn for å tildele fagspesifikke grader.

Forslag om gradsbenevnelser for bachelorprogrammene

De grader ved NTNU som fortsatt har mer generelle gradsbetegnelsene på vitnemålene er de internasjonale mastergradene og bachelorgradene. Kanskje har også disse gradene et behov for en tydeligere profilering ? Et viktig siktemål med de nye bachelorprogrammene ved SVT-fakultetet, har vært å gjøre de mer tydelige for studentene, for å bygge identitet med faget og tydeliggjøre kompetansen for arbeidsmarkedet. SVT-fakultetet ber derfor om at det på vitnemål for bachelorprogrammene benyttes gradsbenevnelser som lyder "Bachelor i (programnavn)" (eksempelvis Bachelor i geografi, Bachelor i bevegelsesvitenskap, osv.). Vitnemålene for bachelorprogrammene må gis en utforming som tilsvarer masterprogrammene og hvor gradsbenevnelser blir den mest framtredende tekst.

LÆRING

Mastergraden skal gi en grundig vitenskapelig skolering i psykologi, både teoretisk og anvendt. Mastergraden skal gi kompetanse innen forskning og undervisning, konsulent- og rådgivingsarbeid, utredning. Studentene skal ha teoretisk forståelse for og praktisk erfaring med vitenskapelige forskningsmetoder.

Denne mastergraden vil ha et hovedfokus på læring i en bred forstand. Mekanismene som er involvert i utviklings-og læringsprosessen vil bli belyst ut ifra et biologisk, kognitivt, sosial-, og utviklingspsykologisk perspektiv. Studentene blir i stand til å generere kunnskap om generelle prinsipper som kan ligge til grunn for læring og utvikling av ferdigheter og atferd i et livsløp. Målet er at studentene tilegne seg ekspertise i læringsprosessen med et genuint psykologisk, i.e. individuelt fokusert perspektiv som omfatter intraindividuelle forandringer (utvikling) så vel som interindividuell variasjon (lærings- og utviklingsvansker; topp performance).

For å bygge på studentenes kompetanse benytter denne Mastergraden seg av forskjellige faglige tilnærminger og av en studieorganisering som tar for seg en sterk teoretisk tilnærming i første studieåret og så videre spesialiseringsoptioner i andere studieåret. På den måten vil studenter har mulighet til å koordinere sitt studiet med sine akademiske og profesjonelle aspirasjoner /ønsker .

Mastergrad organisering

Det er foreslått en sterk teoretisk tilnærming i denne mastergraden i semester 1 og 2.

På 1 semester blir det 2 kurs på 7.5 stp hvorav den ene vil ta for seg individuell utvikling og de prosesser som er knyttet mot det; gener, nervesystem, atferd, omgivelser. Den andre vil ta opp temaer knyttet opp mot læring og utviklingspsykologi. Det vil også være metode 15 stp på 1 semester.

Semester 2 vil bestå av artikkelseminar på 7.5 stp som vil inneholde temaer innen individuell utvikling og læring – studenten skal også skrive essay innen utvalgte temaer.
I tillegg blir det spesialisering på 15 stp. Studentene kan velge mellom to spesialiseringer den ene er spesialisering i læring, atferd og omgivelser og den andre er spesialisering i individuell utvikling, gener, nervesystem og atferd. Spesialiseringa kan enten være teoretisk eller teoretisk/metodisk – der studentene skal skrive en artikkel på 15-20 sider. EiT vil også være på 2 semester.

Semester 3 vil ha forskingspraksis på 15 stp der studentene skal gjennomføre en pilotstudie som knyttes mot metoden brukt i deres mastergrad. Studentene kan velge mellom to forskningspraksis den ene forskningspraksis knyttet mot læring, atferd og omgivelser og den andre forskningspraksis knyttet mot individuell utvikling, gener, nervesystem og atferd.
I tillegg skal studentene bruke 15 stp på sin masteroppgave. I 4 semester skal studentene arbeide med sin mastergrad.

4. semester	**Masteroppgave 30 sp**			
3. semester	**Velge et av de to: Forskningspraksis læring, atferd og omgivelser 15 sp eller Forskningspraksis individuell utvikling, gener, nervesystem og atferd 15 stp**		**Masteroppgave 15 sp**	
2. semester	**Artikkelseminar 7,5 sp**	**EiT 7,5 sp**	**Velge et av de to: Spesialisering læring, atferd og omgivelser 15 sp eller Spesialisering individuell utvikling, gener, nervesystem og atferd 15 stp**	
1. semester	**Quantitative methods (7.5) Shared course**	**Qualitative methods (7.5) Shared course**	**Læring, atferd og omgivelser 7,5 sp**	**Individuell utvikling, gener, nervesystem og atferd 7,5 sp**

Forslag til studieplan:

1. semester:

Metode (15 stp) PSY3001

Teori (7.5 stp): Læring, atferd og omgivelser

Faglig innhold
Emnet gir oversikt over sentrale utviklingspsykologiske temaer som arv versus miljø, dynamisk systemteori og læringspsykologiske temaer som læringsprosessen, læringsprinsipper, sosiale og kognitive prosesser i læring, biologiske prosesser i læring, evner versus ferdigheter, flyt og læring. I dette emnet vil det også bli lagt vekt på å forstå utviklings- og læringsvansker samt få en forståelse av de prosesser som gjør at noen klarer å prestere på et høyt nivå.

Læringsmål: målet med studiet er å gi innsikt i læring, ferdighetsutvikling og læringsprosessen i et livsløps perspektiv. Det å forstå samspillet mellom atferd og omgivelser er viktig.

Vurderingsform: skriftlig eksamen 4 timer

Teori (7.5 stp): Individuell utvikling, gener, nervesystem og atferd

Faglig innhold

Emnet er et teoretisk fordypningsemne i kognitiv og biologisk psykologi med hovedfokus på individuell utvikling. Faktorer som gen, nervesystem og atferd vil bli diskutert og samspillet mellom disse faktorene og omgivelser i forhold til individets utvikling.

Emnet gir en gjennomgang av det biologiske/kognitive grunnlaget for opplevelse og atferd som omfatter hele forløpet av menneskelig erkjennelse, fra oppmerksomhet, sansing, persepsjon, handling, språklige prosesser, problemløsning, og tenkning til læring og hukommelse. Emnet gir studentene kjennskap til sentrale begreper, temaer, problemstillinger og empiriske forskningsfunn i sosial-kognitiv, kognitiv og biologisk psykologi. For studenter som ikke har en bachelor i psykologi vil kursansvarlig anbefale noe bakgrunnslitteratur i tillegg til pensum.

Læringsmål

Emnet skal danne grunnlag for utvikling av en vitenskapelig basis i teoretiske temaer innen kognitiv og biologisk psykologi med hovedfokus på individets utvikling.

Vurderingsform: skriftlig eksamen 4 timer

2. semester:

Artikkelseminar (7.5 stp)

Faglig innhold

Emnet gir en teoretisk og forskningsmetodisk gjennomgang av emner knyttet opp i mot hjerne, kognisjon, persepsjon og læring. I løpet av kurset vil studentene ha gjennomgått 10 vitenskapelig artikler med hovedfokus på teoretiske og metodiske aspekter ved artikkelskriving. I tillegg skal studentene ha skrevet 2 essay på temaer som er fokus i dette emnet.

Læringsmål
- gi teoretisk grunnlag innen fagområdet
- danne et grunnlag for vitenskapelig refleksjon
- opparbeide evnen til selvstendighet og utvikle skriveferdighet

Vurderingsform: ARBEIDER

- GODKJENT ARBEID	*1/2*
- Godkjent arbeid	1/2

Spesialisering læring, atferd og omgivelser (15 stp)

Emnet er spesialisering innenfor læring, atferd og omgivelser. Studentene skal skrive en semesterrapport på ca. 5000 ord. Tema for oppgaven skal velges i samråd med faglærer og fortrinnsvis representere en fordypning innenfor fagområder berørt i emnet læring, atferd og omgivelser gjennomført på første semester.

Studentene må ha godkjent tema for masteroppgaven og oppnevnt veileder før de begynner på spesialiseringen som tematisk skal være knyttet masteroppgaven.

Læringsmål:
hovedmålsettingen med emnet er å gi studentene et grundig teoretisk innsikt i et valgt psykologisk tema knyttet opp i mot læring, atferd og omgivelser.

Vurderingsform: oppgave

Spesialisering individuell utvikling, gener, nervesystem og atferd (15 stp)
Emnet er spesialisering innenfor individuell utvikling, gener, nervesystem og atferd. Studentene skal skrive en semesterrapport på ca. 5000 ord. Tema for oppgaven skal velges i samråd med faglærer og fortrinnsvis representere en fordypning innenfor fagområder berørt i emnet individuell utvikling, gener, nervesystem og atferd gjennomført på første semester.

Studentene må ha godkjent tema for masteroppgaven og oppnevnt veileder før de begynner på spesialiseringen som tematisk skal være knyttet masteroppgaven.

Læringsmål:
hovedmålsettingen med emnet er å gi studentene et grundig teoretisk innsikt i et valgt psykologisk tema knyttet opp i mot individuell utvikling, gener, nervesystem, atferd og omgivelser.

Vurderingsform: oppgave

Eksperter i team (7.5 stp)

3 semester:

Forskningspraksis læring, atferd og omgivelser 15 stp
Emnet er en læreperiode, som omfatter en empirisk eller teoretisk undersøkelse, for eksempel et pilot-eksperiment, for å studere metodikk knyttet til masteroppgaven. Tematikken i dette ment skal være innen læring, atferd og omgivelser. Arbeidet skal utføres under veiledning av oppnevnt veileder for masteroppgaven, og sammenfattes i en skriftlig rapport. Tema for arbeidet skal godkjennes av veileder.

Læringsmål:
Målet med emnet er å gi studentene en praktisk erfaring med innsamling av data og utprøving av et måleinstrument.

Vurderingsform: oppgave
Forskningspraksis individuell utvikling, gener, nervesystem og atferd 15 stp

Emnet er en læreperiode, som omfatter en empirisk eller teoretisk undersøkelse, for eksempel et pilot-eksperiment, for å studere metodikk knyttet til masteroppgaven. Tematikken i dette emnet skal være innen individuell utvikling, gener, nervesystem og atferd. Metoden i dette emnet knyttes i hovedsak mot labratorievirksomhet. Arbeidet skal utføres under veiledning av oppnevnt veileder for masteroppgaven, og sammenfattes i en skriftlig rapport. Tema for arbeidet skal godkjennes av veileder.

Læringsmål:
Målet med emnet er å gi studentene en praktisk erfaring med innsamling av data og utprøving av et måleinstrument.

Vurderingsform: oppgave

Masteroppgave 15 stp

4 semester:

Masteroppgave 30 stp

NTNU

Studieavdelingen

Dato 04.05.2011

Referanse NM-program 2011. FUS

Notat

Til:	Studiedirektøren
Kopi til:	FUS
Fra:	Åge Søsveen

Signatur:

Nye nordiske masterprogram. Godkjenning i FUS

FUS behandlet 3 søknader om etablering av nye nordiske masterprogram o sitt møte 3.mai 2011. Utskrift av protokollen følger herved:

Sak 24/2011: Nytt nordisk masterprogram i Sustainable Urban Transition

Vedtak:

1. FUS anbefaler at NTNUs styre godkjenner opprettelsen av det nye Nordic Master in Sustainable Urban Transition innenfor N5T-alliansen, med AB-fakultetet ved NTNU som deltaker og Chalmers Universitet som vertsinstitusjon, i hht. fremlagt søknad.

Sak 25/2011: Nytt nordisk masterprogram i Environmental Engineering

Vedtak:

1. FUS anbefaler at NTNUs styre godkjenner opprettelsen av det nye Nordic Master in Environmental Engineering, "eNviron5Tech", med IVT/Institutt for vannforskning som bidragsyter fra NTNU og DTU som vertsinstitusjon, i hht. fremlagt søknad.

Sak 31/2011: Nytt nordisk masterprogram i Applied and Engineering Mathematics.

Vedtak:

1. **FUS anbefaler at NTNUs styre godkjenner opprettelsen av det nye Nordic Master in Applied and Engineering Mathematics, med Institutt for matematiske fag som bidragsyter fra NTNU og Aalto University som vertsinstitusjon, i hht. fremlagt søknad.**

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