# Innkalling til møte i Studiestyret

Onsdag 6. juni 2018 kl. 1015-1200
Rom 1005, Realfagbygget 1. etasje

**I GODKJENNING AV INNKALLING OG SAKSLISTE**
**II PROTOKOLL FRA MØTE 4. APRIL 2018**

**SAK 18/11**
**Programevalueringer fra Institutt for fysikk og teknologi**
*Vedtakssak (Saksnr. 2014/1420)*
**VEDLEGG:** Masterprogram i fysikk – Programevaluering 2016-2018

**SAK 18/12**
**Foreløpige anbefalinger fra rapporten fra arbeidsgruppen for generisk kompetanse og ferdigheter i bachelorutdanningen**
*Diskusjonssak (Saksnr. 2018/1653)*

**SAK 18/13**
**Godkjenning av utfyllende regler for mastereksamen ved Institutt for geovitenskap**
*Vedtakssak (Saksnr.* 2010/3834*)*

**SAK 18/14**
**Oppretting av fellesgrad International Master of Science in Marine Biological Resources (IMBRSea)**
*Vedtakssak (Saksnr. 2018/6315)*

**SAK 18/15**
**EVENTUELT**

**ORIENTERINGSSAKER**

1. Masteropptak høsten 2018 - Lokalt masteropptak: Søkere per program/studieretning, Søkertall i internasjonalt og lokalt opptak
2. Søkertall fra Samordna Opptak og videre prosess
3. Sensurfrist og forsinket sensur: Brev til instituttene med oversikt over sensurfrist for alle skriftlige eksamener vår 2018
4. Nytt fra meritteringsordningen. Muntlig orientering.
5. SIU-rapport: **Fleire eller betre? Rekruttering av gradstudentar til Noreg**
6. NOKUT-rapport: **Slik lykkes de med tilbakemelding og veiledning**
   Notat om fellestrekk ved de studieprogrammene som scorer høyt på tilbakemelding og veiledning i Studiebarometeret.
7. Orientering fra møte i Utdanningsutvalget. Muntlig orientering

Harald Walderhaug
leder

Ingrid Christensen
sekretær

MN/INSO
Bergen, 1.6.18

**STUDIESTYRET – MØTE 4. APRIL 2018**

**Universitetet i Bergen - Det matematisk-naturvitenskapelige fakultet**

**Protokoll fra møtet i Studiestyret**

Onsdag 4. april 2018 kl. 1015-1200

(Det tas forbehold om godkjenning)

**Til stede:** Jarle Berntsen (Matematisk institutt), Haakon Ervik (studentrepresentant), Pål Magnus Gunnestad (Institutt for informatikk), Berit Oline Hjelstuen (Institutt for geovitenskap), Bjørn Tore Hjertaker (siv.ing.-utdanningene), Kjartan Olafsson (Institutt for fysikk og teknologi), Jan Rückmann (Institutt for informatikk), Svein Are Mjøs (Kjemisk institutt), Stian Torset (studentrepresentant), Ørjan Totland (Institutt for biologi), Harald Walderhaug (prodekan)

**Fra administrasjonen:** Birthe Gjerdevik (fungerende studiesjef), Stine Balevik (studieseksjon), Ingrid Solhøy (studieseksjon)

**I GODKJENNING AV INNKALLING OG SAKSLISTE**
**VEDTAK:** Innkallingen ble godkjent

**II PROTOKOLL FRA MØTE 14. FEBRUAR 2018**
**VEDTAK:** Protokollen ble godkjent

**SAK 18/6**
**SMÅ STUDIEPLANENDRINGER FOR HØSTSEMESTERET 2018**
*Vedtakssak (Saksnr. 2017/11118)*

**VEDTAK:** Studiestyret tar til etterretning forslaga til små endringar i emneskildringar som programstyra har fremja.

**SAK 18/7**
**UTDANNINGSMELDING 2017**
*Vedtakssak (Saksnr. 2018/1410, 2018/1158)*

**VEDTAK:** Studiestyret vedtok enstemmig utdanningsmeldingen for 2017 og prioriteringer for 2018 med de endringer som fremkom under møtet. Prodekan får fullmakt til å foreta redaksjonelle endringer. Utdanningsmeldingen oversendes til Universitetsdirektøren etter godkjenning i fakultetsstyret.

**SAK 18/8**
**PROGRAMEVALUERINGER FRA INSTITUTT FOR INFORMATIKK**
*Vedtakssak (Saksnr. 2014/1420)*

**VEDTAK:**
Studiestyret tar følgende evalueringsrapportene til etterretning
- Bachelorprogram i informatikk-matematikk-økonomi
- Masterprogram i informatikk

Rapportene blir lagt ut i studiekvalitetsbasen.
Masterprogram i fysikk får utsatt frist for evalueringsrapporten til 1. juni 2018.

**SAK 18/9**
**SENSURFRIST OG FORSINKET SENSUR**
*Diskusjons- og vedtakssak (Saksnr. 2018/3795)*

**VEDTAK:**
Studiestyret vedtar å nedfelle følgende i fakultetets utfyllende regler:
*Sensurfrist på emner med sen eksamen er 30. juni i vårsemesteret og 10. januar i høstsemesteret, selv om dette er mindre enn tre uker etter eksamen.*

Det implementeres nødvendige informasjonstiltak i forkant av vårens sensur basert på diskusjonen i møtet.

Dersom situasjonen på fakultetet rundt forsinket sensur ikke bedres vesentlig ved vårens sensur og UiB ikke innfører dagbøter sentralt, anbefaler Studiestyret at fakultetet ensidig innfører bøter ved forsinket sensur fra og med høsten 2018.

**SAK 18/10**
**EVENTUELT**
Ingen saker

**ORIENTERINGSSAKER**

1. Orientering om masteropptak våren 2018
2. Orientering fra møte i Utdanningsutvalget. Muntlig orientering

**VEDTAK:** Orienteringssakene ble tatt til etterretning

Harald Walderhaug
leder

Birthe Gjerdevik
sekretær

MN/INSO
Bergen, 4.4.18

**UNIVERSITETET I BERGEN**
Det matematisk-naturvitenskapelige fakultet

Studiestyresak: **18/11**

Saksnr.: 2014/1420

Møte: 6. juni 2018

**PROGRAMEVALUERINGER FRA INSTITUTT FOR FYSIKK OG TEKNOLOGI**

Institutt for fysikk og teknologi har levert programevaluering for masterprogrammet i fysikk. Den innleverte rapporten legges herved frem i Studiestyret.

Instituttet hadde innleveringsfrist 1. mars 2018 for evalueringsrapporten for masterprogrammet i fysikk, men fikk innvilget utsatt innlevering til 1. juni sammen med PTEK-programmene. Programkoordinator fra PTEK-programmene har nå på kort varsel fått beskjed at programsensor trekker seg og ikke leverer en evalueringsrapport for PTEK-programmene som avtalt. Instituttet foreslår at de utarbeider en intern evalueringsrapport som blant annet bygger på innspill fra programsensor. Denne rapporten kan imidlertid først leveres i høstsemesteret.

**FORSLAG TIL VEDTAK:**

Studiestyret tar evalueringsrapporten for masterprogrammet i fysikk til etterretning. Rapporten blir lagt ut i studiekvalitetsbasen.
Institutt for fysikk og teknologi får en ny frist 1. oktober 2018 for å levere en programevaluering for bachelorprogram i petroleum- og prosessteknologi, masterprogram i petroleumsteknologi og masterprogram i prosessteknologi.

Bergen 1. juni 2018
MN/INSO

**VEDLEGG:**
- Masterprogram i fysikk – Programevaluering 2016-2018

## FULLFØRT PLAN FOR PROGRAMEVALUERINGER 2014-2017

| ***Vedtak*** | ***Program*** |
|---|---|
| 20. mars 2015 | BSc Datavitenskap |
| 20. mars 2015 | BSc Datateknologi |
| 20. mars 2015 | MSc Nanovitenskap |
| 27. mai 2015 | BSc Kjemi |
| 27. mai 2015 | MSc Kjemi |
| 8. juni 2016 | BSc Geovitenskap |
| 8. juni 2016 | MSc Energi |
| 8. juni 2016 | MSc Programutvikling |
| 7. desember 2016 | BSc Biologi |
| 7. desember 2016 | MSc Fiskehelse |
| 7. desember 2016 | BSc Miljø- og ressursfag |
| 7. desember 2016 | Lektor med matematikk |
| 7. desember 2016 | BSc Nanoteknologi |
| 5. april 2017 | MSc Geovitenskap |
| 5. april 2017 | Erfaringsbasert master i undervisning |
| 5. april 2017 | BSc Molekylærbiologi |
| 5. april 2017 | MSc Molekylærbiologi |
| 14. februar 2018 | MSc Biologi |
| 14. februar 2018 | BSc Fysikk |
| 14. februar 2018 | BSc Matematikk |
| 14. februar 2018 | BSc Matematikk for teknologi |
| 14. februar 2018 | BSc Statistikk |
| 14. februar 2018 | MSc Aktuar |
| 14. februar 2018 | MSc Anvendt og beregningsorientert matematikk |
| 14. februar 2018 | MSc Matematikk |
| 14. februar 2018 | MSc Statistikk |
| 14. februar 2018 | BSc Meteorologi og oseanografi (nytt navn: klima-, atmosfære- og havfysikk) |
| 14. februar 2018 | MSc Meteorologi og oseanografi |
| | |
| **1. mars 2018** | |
| 4. april 2018 | BSc Informatikk-matematikk-økonomi |
| 4. april 2018 | MSc Informatikk |
| | |
| **1. juni 2018** | |
| *Levert 31. mai 2018* | MSc Fysikk |
| | |
| **1. oktober 2018** | |
| *Utsatt frist* | BSc Petroleum- og prosessteknologi |
| *Utsatt frist* | MSc Petroleumsteknologi |
| *Utsatt frist* | MSc Prosessteknologi |

# Masterprogram i fysikk – programevaluering 2016-2018

## Innledning

Masterprogrammet i fysikk har for tiden ni studieretninger som til sammen spenner over et stort område, fra ren grunnforskning på egenskapene til naturens minst byggesteiner til praktiske anvendelser av de grunnleggende naturlovene og utvikling av banebrytende ny teknologi. De studieretningene som tilbys er

- Akustikk
- Kjernefysikk
- Medisinsk fysikk og teknologi
- Mikroelektronikk
- Målevitenskap og instrumentering
- Optikk og atomfysikk
- Partikkelfysikk
- Romfysikk
- Teoretisk fysikk og energifysikk

Den sistnevnte studieretningen vil bli faset ut og det blir ikke tatt opp nye masterstudenter på den.

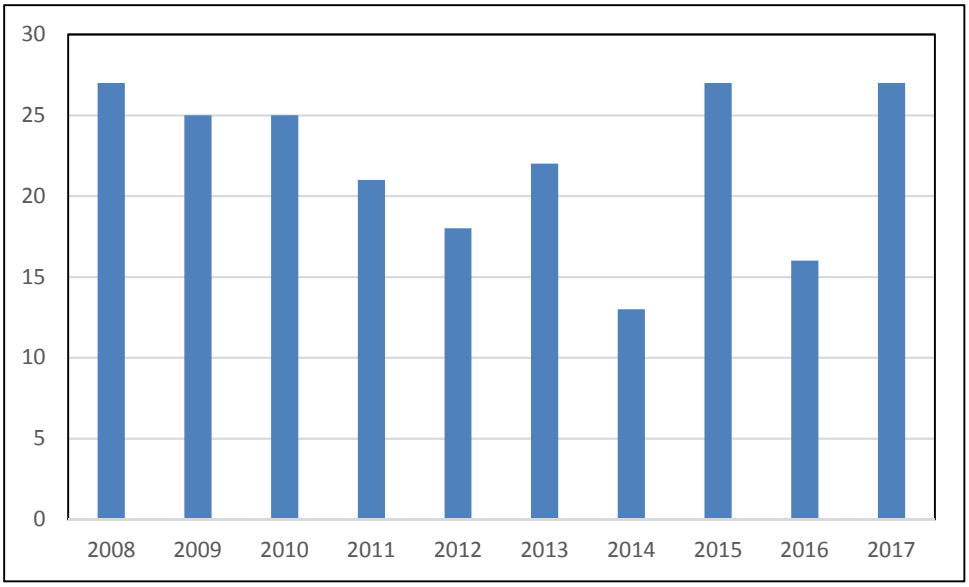
Det faglige opptakskravet til masterstudiet er en bachelorgrad i fysikk. Studenter med bachelorgrad i andre realfags- og ingeniørdisipliner kan også bli tatt opp dersom studentens fysikk- og matematikkbakgrunn vurderes som tilstrekkelig for masterprosjektet.

Mastergradstudiet består av emner og spesialpensum, til sammen 60 studiepoeng (stp), og en forskningsoppgave med arbeidsmengde tilsvarende 60 stp. Det tilbys ikke 30 stp masteroppgaver på dette programmet, men studenter på integrert lektorutdanning kan velge mellom 30 og 60 stp masteroppgaver.

## Kandidattall, gjennomføring og karakterfordeling på mastergrad.

Masterstudenter i fysikk rekrutteres hovedsakelig fra bachelorprogrammet i fysikk ved UiB og fra ingeniørutdanningen (elektro/automasjon) ved Høgskolen på Vestlandet (HVL). Flertallet av masterstudentene på studieretningene mikroelektronikk og måleteknologi og instrumentering kommer fra HVL. Internasjonale studenter utgjør ca. 10% av uteksaminerte kandidater den siste tiårsperioden.

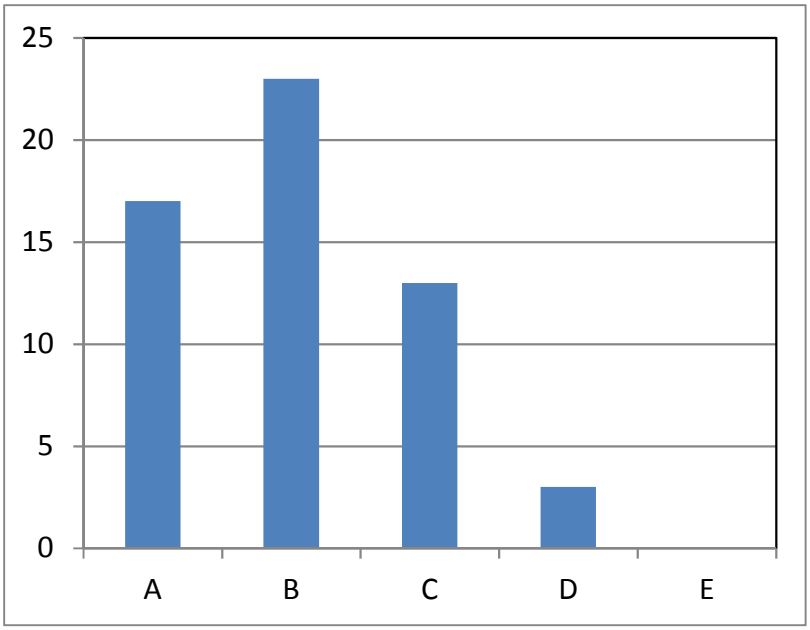
Antall uteksaminerte kandidater på masterprogrammet i fysikk 2008 – 2017 har i gjennomsnitt vært 22 per år, men det har vært betydelige svingninger i dette tallet i perioder. Det er også betydelige svingninger fra år til år i antall søkere på de forskjellige studieretningene.



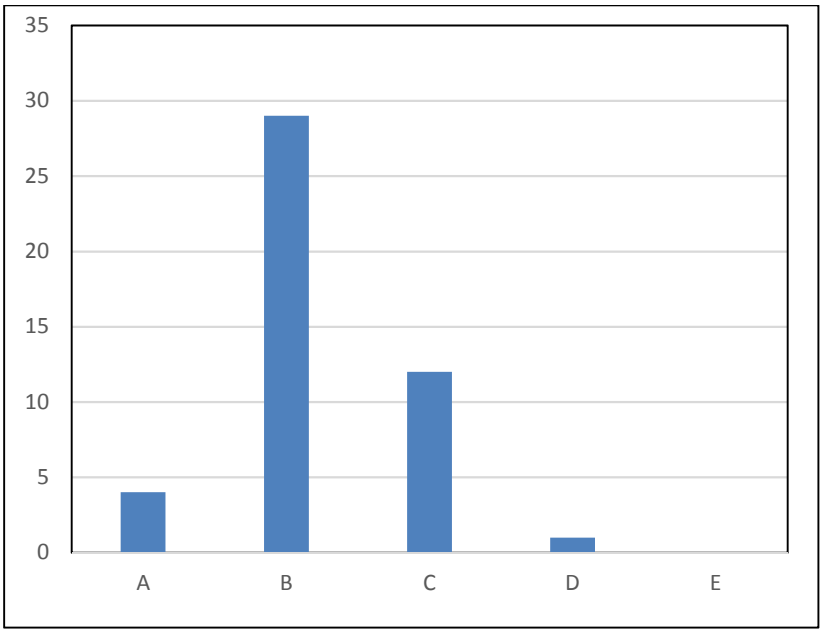

*Antall uteksaminerte kandidater på masterprogrammet i fysikk*

Frafall fra programmet er moderat; i denne tiårsperioden har om lag 10 studenter som har vært begynt på masterstudiet sluttet uten å fullføre. Dessuten har noen få kandidater som har takket ja til tilbud om opptak til masterprogrammet aldri begynt på studiet. Vårt inntrykk er at kandidatene i den sistnevnte kategorien i de fleste tilfellene har takket ja til flere tilbud, enten i Norge eller i utlandet, men de melder dessverre ikke fra om dette til oss.

Karakterfordeling på mastergradseksamen i fysikk har endret seg merkbart etter at reglene for karaktersetting for mastergradsoppgaver ble innskjerpet for kandidater tatt opp til masterstudiet fra og med høsten 2012. De to neste figurene viser karakterfordelingen for kandidater uteksaminert våren 2013 - våren 2015, og tilsvarende for perioden høsten 2015-høsten 2017:




*Karakterfordeling for kandidater uteksaminert våren 2013-våren 2015*




*Karakterfordeling for kandidater uteksaminert høsten 2015-høsten 2017*

Bruken av karakteren A er betydelig redusert og B er fremdeles den vanligste karakteren. Det arbeides fortsatt med å innstramminger av bruken av karakterskalaen, men dette er seig materie. Forventningen om en tilnærmet normalfordeling av mastergradskarakterene i det lange løp må likevel ikke overstyre en rettferdig karaktersetting: Det er selvsagt viktig at karakteren gjenspeiler masteroppgavens reelle kvalitet målt mot bedømmelseskriteriene; ingen masteroppgaver skal «påtvinges» karakteren E hvis kvaliteten er på høyde med kriteriene som beskriver en oppgave som fortjener karakteren D.

Våren 2016 ble Maria Hamrin, Institutionen för Fysik, Umeå Universitet, utnevnt til programsensor for masterprogrammene i fysikk ved UiB. Programstyret for fysikk valgte å be spesielt om å få belyst følgende hovedpunkter:

- Hvordan kan det være mulig å implementere innovasjon og kommunikasjon i studieprogrammet (masterprogrammet) i fysikk?
- Hvordan blir Mål og innhold og Læringsutbytte faktisk realisert i masterutdanningen?
- Hvordan er studentenes ressurstilgang og arbeidsforhold?

I tillegg sto Hamrin fritt til å vurdere noen av disse punktene og komme med egne innspill:

a) studieprogrammet sin profil og struktur, forekomst av felles undervisning og emne spesielt utvikla for studieprogrammet, høve til studieopphold i utlandet, faglige og sosiale aktiviteter om val av undervisnings- og vurderingsformer er i tråd med fastsett læringsutbytte for studieprogrammet

b) praktisk gjennomføring

c) søkertall/studieplasser, gjennomføring, strykprosent og frafall

d) karakterfordeling

e) ressurstilgang

f) kommentarer til studentevalueringer

g) studieinformasjon og dokumentasjon

h) tilgang til digitale ressurser/hjelpemiddel

Hamrin besøkte IFT i september 2016 og hadde samtaler med programstyret for fysikk, daværende programstyreleder, studieadministrasjon, masterstudenter og representanter (veiledere) fra de forskjellige studieretningene. På forhånd fikk hun tilsendt lenker til sentrale dokument og programbeskrivelser på UiBs nettsider. Hun leverte skriftlig rapport i oktober 2016.

Det viste seg at programbeskrivelsene på UiBs nettsider var gamle og utdaterte, fra 2011; de reviderte beskrivelsene som IFT utarbeidet i 2014 hadde – av ukjent grunn - aldri vært lagt inn på nettsidene. Dette ble først oppdaget etter at rapporten var levert. Etter revisjonen av læringsutbytte i 2017 anser vi beskrivelsen av de forskjellige studieretningene som meget tilfredsstillende.

**Hvordan blir læringsutbytte faktisk realisert i masterudanningen?**

Programsensor etterlyste matriser som viser hvor de forskjellige læringsutbyttene faktisk blir realisert. Dette har vi tatt til etterretning og utarbeidet matrisene i forbindelse med revisjonen av beskrivelsene av studieprogrammene i 2017. Slike matriser er et nyttig verktøy både for å vise at læringsutbyttene er mer enn bare fagre ord og for å skjerpe oppmerksomheten til fagmiljøet når det gjelder masterutdanningens mange fasetter og hva vi egentlig vil med den. Læringsutbyttematriser har vært utarbeidet for bachelorgraden i fysikk og for alle studieretningene på mastergrad, bortsett fra teoretisk fysikk/energifysikk som ikke lenger tilbys for nye studenter.

| **Studieretning akustikk** | PHYS 271 | PHYS 272 | 300-talls-emner | Spesial-pensum | Seminar konferanser gruppemøter | Master-oppgave |
|---|---|---|---|---|---|---|
| gjengi fakta og drøfte grunnleggjande teoriar innan akustikk | X | X | X | X | X | X |
| forklare grunnlaget for bruk av akustikk på utvalde område innen m.a. medisin, måleinstrumentering og havforsking | X | X | X | X | | X |
| forklare utvalde eksperimentelle metodar og måleteknikkar innan akustikk | | X | X | X | X | X |
| vise at ein har avanserte kunnskapar innan akustikk på eit godt nivå, og spesialisert innsikt i eit avgrensa område knytt til mastergradsprosjektet | | | X | X | X | X |
| utføre eit sjølvstendig og avgrensa forskingsprosjekt under rettleiing, med stor grad av sjølvstende og eige initiativ, i tråd med forskingsetiske normer | | | | | X | X |
| handtere og presentere vitskaplege data, drøfte presisjon og nøyaktigheit, og bruke programmeringsverktøy for å analysere og behandle data | | X | | | X | X |
| analysere problemstillingar i akustikk, og drøfte måtar å utforske desse på ved hjelp av teori og eksperimentelle metodar | | X | X | X | X | X |
| orientere seg i fagmiljøet og innhente, analysere, og bruke, nødvendige kunnskapar og verktøy som trengs for å utføre eit forskingsprosjekt | | X | X | X | X | X |
| analysere og kritisk vurdere vitskapelege informasjonskjelder, og bruke desse til å strukturere og formulere resonnement og nye idear innan akustikk | | | X | X | X | X |
| analysere, tolke, og drøfte eigne resultat på ein fagleg god og kritisk måte, i lys av data og teoriar innan det aktuelle fagområdet | | X | | | X | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| kunne analysere vitskaplege problemstillingar generelt, og kunne delta i diskusjon om innfallsvinklar og måtar å løyse problem på | | | | X | X | X |
| gje god skriftleg og munnleg framstilling av vitskaplege tema og forskingsresultat | | X | | X | X | X |
| kommunisere om faglege problemstillingar, analysar og konklusjonar innan akustikk, både med spesialistar og til allmennheita | | | | | X | X |
| kunne reflektere over sentrale vitskaplege problemstillingar i eige og andre sitt arbeid | | | | X | X | X |
| demonstrere forståing og respekt for vitskapelege verdiar som openheit, presisjon og pålitelegheit | X | X | X | X | X | X |

| **Studieretning kjernefysikk** | PHYS 201 | PHYS 241 | PHYS 232 | 300-talls-emner | Spesial-pensum | Seminar konferanser gruppemøter | Master-oppgave |
|---|---|---|---|---|---|---|---|
| gjere greie for dei ulike delane av ein atomkjerne og vekselverkandene mellom dei | X | X | X | X | X | | X |
| gjere greie for grunnleggjande idear innan kjernefysikk | | X | X | X | X | X | X |
| forklare utvalde eksperimentelle metodar og måleteknikkar i kjernefysikk | | | X | X | X | X | X |
| vise at ein har avanserte kunnskapar innan kjernefysikk på eit godt nivå, og spesialisert innsikt i eit avgrensa område knytt til mastergradsprosjektet | | | | X | X | X | X |
| utføre eit sjølvstendig og avgrensa forskingsprosjekt under rettleiing, med stor grad av sjølvstende og eige initiativ, i tråd med forskingsetiske normer | | | | | | X | X |
| handtere og presentere vitskaplege data, drøfte presisjon og nøyaktigheit, og bruke programmeringsverktøy for å analysere og behandle data | | | X | | | X | X |
| analysere problemstillingar i kjernefysikk, og drøfte måtar å utforske desse på ved hjelp av teori og eksperimentelle metodar | | | X | X | X | X | X |
| orientere seg i fagmiljøet og innhente, analysere, og bruke nødvendige kunnskapar og verktøy som trengs for å utføre eit forskingsprosjekt | | | | X | X | X | X |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| analysere og kritisk vurdere vitskapelege informasjonskjelder, og bruke desse til å strukturere og formulere resonnement og nye idear innan kjernefysikk | | | | X | X | X | X |
| analysere, tolke, og drøfte eigne resultat på ein fagleg god og kritisk måte, i lys av data og teoriar innan det aktuelle fagområdet | | | | | | X | X |
| kunne analysere vitskaplege problemstillingar generelt, og kunne delta i diskusjon om innfallsvinklar og måtar å løyse problem på | | | | | | X | X |
| gje god skriftleg og munnleg framstilling av vitskaplege tema og forskingsresultat | | | | | X | X | X |
| kommunisere om faglege problemstillingar, analysar og konklusjonar innan kjernefysikk, både med spesialistar og til allmennheita | | | | | | X | X |
| kunne reflektere over sentrale vitskaplege problemstillingar i eige og andre sitt arbeid | | | | | | X | X |
| demonstrere forståing og respekt for vitskapelege verdiar som openheit, presisjon og pålitelegheit | X | X | X | X | X | X | X |

| **Studieretning medisinsk fysikk og teknologi** | PHYS 212 | PHYS 213 | PHYS 231 | Spesial-pensum | Seminar konferanser gruppemøter | Master-oppgave |
|---|---|---|---|---|---|---|
| gjengi fakta og drøfte grunnleggjande teoriar innan medisinsk fysikk | X | X | X | X | X | X |
| forklare grunnlaget for moderne medisinsk diagnostikk og avansert stråleterapi | X | X | | X | | |
| forklare utvalde eksperimentelle metodar og måleteknikkar i medisinsk fysikk | X | X | X | X | X | X |
| vise at ein har avanserte kunnskapar innan medisinsk fysikk på eit godt nivå, og spesialisert innsikt i eit avgrensa område knytt til mastergradsprosjektet | | | | X | X | X |
| utføre eit sjølvstendig og avgrensa forskingsprosjekt under rettleiing, med stor grad av sjølvstende og eige initiativ, i tråd med forskingsetiske normer | | | | | X | X |
| handtere og presentere vitskaplege data, drøfte presisjon og nøyaktigheit, og bruke programmeringsverktøy for å | | | | | X | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| analysere og behandle data | | | | | | |
| analysere problemstillingar i medisinsk fysikk, og drøfte måtar å utforske desse på ved hjelp av teori og eksperimentelle metodar | | | | X | X | X |
| orientere seg i fagmiljøet og innhente, analysere, og bruke nødvendige kunnskapar og verktøy som trengs for å utføre eit forskingsprosjekt | | X | | X | X | X |
| analysere og kritisk vurdere vitskapelege informasjonskjelder, og bruke desse til å strukturere og formulere resonnement og nye idear innan medisinsk fysikk | | | | X | X | X |
| analysere, tolke, og drøfte eigne resultat på ein fagleg god og kritisk måte, i lys av data og teoriar innan sitt fagområde | | | | | X | X |
| kunne analysere vitskaplege problemstillingar generelt, og kunne delta i diskusjon om innfallsvinklar og måtar å løyse problem på | | | | X | X | X |
| gje god skriftleg og munnleg framstilling av vitskaplege tema og forskingsresultat | | | | X | X | X |
| kommunisere om faglege problemstillingar, analysar og konklusjonar innan medisinsk fysikk, både med spesialistar og til allmennheita | | | | | X | X |
| kunne reflektere over sentrale vitskaplege problemstillingar i eige og andre sitt arbeid | | | | | X | X |
| demonstrere forståing og respekt for vitskapelege verdiar som openheit, presisjon og pålitelegheit | X | X | X | X | X | X |

| **Studieretning mikroelektronikk** | PHYS 222 | PHYS 223 | PHYS 321 | Spesial-pensum | Seminar konferanser gruppemøter | Master-oppgave |
|---|---|---|---|---|---|---|
| gjere bruk av mikroelektronikk, gjerne i eit fysikkeksperiment eller målesystem, til dømes ved å designe med blanda analoge og digitale teknikkar, og gjennom dette vise kunnskap om systematiske metodar for val av rett elektronikk og tilhøyrande datasystem | X | X | X | X | X | X |
| vise at ein har avanserte kunnskapar innan mikroelektronikk og spesialisert innsikt i eit avgrensa område knytt til mastergradsprosjektet | | | X | X | X | X |
| nytte systematiske designmetodar og avanserte designverktøy for modellering, simulering, produksjon, testing og dokumentasjon av mikroelektronikk | X | X | X | | X | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| utføre eit sjølvstendig, avgrensa forskingsprosjekt under rettleiing, men med stor grad av sjølvstende og eige initiativ, og i tråd med forskingsetiske normer | | | | | X | X |
| handtere og presentere vitskaplege data, drøfte presisjon og nøyaktigheit og bruke programmeringsverktøy for å analysere og behandle data | | | X | X | X | X |
| analysere problemstillingar i mikroelektronikk og drøfte måtar å utforske desse på ved hjelp av teori og eksperimentelle metodar | X | X | X | X | X | X |
| orientere seg i fagmiljøet og hente inn, analysere og anvende nødvendige kunnskapar og verktøy som trengs for å utføre eit forskingsprosjekt | | | X | X | X | X |
| analysere og kritisk vurdere vitskapelege informasjonskjelder og anvende desse til å strukturere og formulere resonnement og nye idéar innan mikroelektronikk | | | X | X | X | X |
| analysere, tolke og drøfte eigne resultat på ein fagleg god og kritisk måte, og i lys av data og teoriar innan sitt fagområde | | | | | X | X |
| kunne analysere vitskaplege problemstillingar generelt, og kunne delta i diskusjon om innfallsvinklar og måtar å løyse problem på | | | X | X | X | X |
| gje god skriftleg og munnleg framstilling av vitskaplege tema og forskingsresultat | | | | X | X | X |
| kommunisere om faglege problemstillingar, analysar og konklusjonar innan mikroelektronikk, både med spesialistar og til allmennheita | | | | | X | X |
| kunne reflektere over sentrale vitskaplege problemstillingar i eige og andre sitt arbeid | | | | | X | X |
| demonstrere forståing og respekt for vitskapelege verdiar som openheit, presisjon og pålitelegheit | X | X | X | X | X | X |

| **Studieretning måleteknologi og instrumentering** | PHYS 225 | PHYS 227 | PHYS 328 | Spesial-pensum | Seminar konferanser gruppemøter | Master-oppgave |
|---|---|---|---|---|---|---|
| kan forklare utvalde aktuelle eksperimentelle metodar og teknikkar innan måleteknologi | X | X | X | X | X | X |
| kan vise at ein har avanserte kunnskapar innan måleteknologi på eit godt nivå, og spesialisert innsikt i eit avgrensa område knytta til mastergradsprosjektet | | | X | X | X | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| utføre eit sjølvstendig og avgrensa forskingsprosjekt under rettleiing, med stor grad av sjølvstende og eige initiativ, i tråd med forskingsetiske normer | | | | | X | X |
| analysere problemstillingar i måleteknologi, og drøfte måtar å utforske desse på ved hjelp av teori og eksperimentelle metodar | | | X | X | X | X |
| kan analysere vitskaplege problemstillingar generelt, og kunne delta i diskusjon om innfallsvinklar og måtar å løyse problem på | | | | | X | X |
| gje god skriftleg og munnleg framstilling av vitskaplege tema og forskingsresultat | | X | | | X | X |
| demonstrere forståing og respekt for vitskapelege verdiar som openheit, presisjon og pålitelegheit | X | X | X | X | X | X |

| **Studieretning optikk og atomfysikk** | PHYS 261/264 | 300-talls-emner | Spesial-pensum | Seminar konferanser gruppemøter | Master-oppgave |
|---|---|---|---|---|---|
| gjengi fakta og drøfte grunnleggjande idear om vekselverknad mellom lys og materie | X | X | X | X | X |
| forklare utvalde eksperimentelle eksperimentelle metodar og måleteknikkar i optikk, eller forklare modelleringsmetodar i atomfysikk | X | X | X | X | X |
| vise generell avansert kunnskap innan optikk og atomfysikk, og spesialisert innsikt i eit avgrensa område knytt til mastergradsprosjektet | | X | X | X | X |
| utføre eit sjølvstendig og avgrensa forskingsprosjekt under rettleiing, med stor grad av sjølvstende og eige initiativ, i tråd med forskingsetiske normer | | | | X | X |
| handtere og presentere vitskaplege data, drøfte presisjon og nøyaktigheit, og bruke programmeringsverktøy for å analysere og behandle data | | | | X | X |
| analysere problemstillingar i optikk og atomfysikk, og drøfte måtar å utforske desse på ved hjelp av teori og eksperimentelle metodar | | X | X | X | X |
| orientere seg i fagmiljøet og innhente, analysere, og bruke nødvendige kunnskapar og verktøy som trengs for å utføre eit | | | X | X | X |

| | | | | | |
|---|---|---|---|---|---|
| forskingsprosjekt | | | | | |
| analysere og kritisk vurdere vitskapelege informasjonskjelder, og bruke desse til å strukturere og formulere resonnement og nye idear innan optikk og atomfysikk | | | X | X | X |
| analysere, tolke, og drøfte eigne resultat på ein fagleg god og kritisk måte, i lys av data og teoriar innan sitt fagområde | | | | X | X |
| kunne analysere vitskaplege problemstillingar generelt, og kunne delta i diskusjon om innfallsvinklar og måtar å løyse problem på | | | X | X | X |
| gje god skriftleg og munnleg framstilling av vitskaplege tema og forskingsresultat | | | | X | X |
| kommunisere om faglege problemstillingar, analysar og konklusjonar innan optikk og atom fysikk, både med spesialistar og til allmennheita | | | | X | X |
| kunne reflektere over sentrale vitskaplege problemstillingar i eige og andre sitt arbeid | | | X | X | X |
| demonstrere forståing og respekt for vitskapelege verdiar som openheit, presisjon og pålitelegheit | X | X | X | X | X |

| **Studieretning partikkelfysikk** | PHYS 201 | PHYS 241 | PHYS 232 | 300-talls-emner | Spesial-pensum | Seminar konferanser gruppemøter | Master-oppgave |
|---|---|---|---|---|---|---|---|
| gjere greie for dei fundamentale bygjesteinane i naturen | X | X | X | X | X | X | X |
| gjere greie for partiklane og vekselverknadene som er skildra i Standardmodellen (omfanget avheng av spesialiseringa i masteroppgåva) | | X | | X | X | X | X |
| forklare utvalde eksperimentelle metodar og måleteknikkar i partikkelfysikk | | X | X | X | X | X | X |
| vise at ein har avanserte kunnskapar innan partikkelfysikk på eit godt nivå, og spesialisert innsikt i eit avgrensa område knytt til mastergradsprosjektet | | | | X | X | X | X |
| utføre eit sjølvstendig og avgrensa forskingsprosjekt under rettleiing, med stor grad av sjølvstende og eige initiativ, i tråd med forskingsetiske normer | | | | | | X | X |
| handtere og presentere | | | | | X | X | X |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| vitskaplege data, drøfte presisjon og nøyaktigheit, og bruke programmeringsverktøy for å analysere og behandle data | | | | | | | |
| analysere problemstillingar i partikkelfysikk, og drøfte måtar å utforske desse på ved hjelp av teori og eksperimentelle metodar | | | | X | X | X | X |
| orientere seg i fagmiljøet og innhente, analysere, og bruke nødvendige kunnskapar og verktøy som trengs for å utføre eit forskingsprosjekt | | | | X | X | X | X |
| analysere og kritisk vurdere vitskapelege informasjonskjelder, og bruke desse til å strukturere og formulere resonnement og nye idear innan partikkelfysikk | | | | | X | X | X |
| analysere, tolke, og drøfte eigne resultat på ein fagleg god og kritisk måte, i lys av data og teoriar innan det aktuelle fagområdet | | | | | | X | X |
| kunne analysere vitskaplege problemstillingar generelt, og kunne delta i diskusjon om innfallsvinklar og måtar å løyse problem på | | | | X | X | X | X |
| gje god skriftleg og munnleg framstilling av vitskaplege tema og forskingsresultat | | | | | X | X | X |
| kommunisere om faglege problemstillingar, analysar og konklusjonar innan partikkelfysikk, både med spesialistar og til allmennheita | | | | | | X | X |
| kunne reflektere over sentrale vitskaplege problemstillingar i eige og andre sitt arbeid | | | | X | X | X | X |
| demonstrere forståing og respekt for vitskapelege verdiar som openheit, presisjon og pålitelegheit | X | X | X | X | X | X | X |

| **Studieretning romfysikk** | PHYS 251 | PHYS 252 | 300-talls-emner | Spesial-pensum | Seminar konferanser gruppemøter | Master-oppgave |
|---|---|---|---|---|---|---|
| gjengi fakta og drøfte grunnleggjande teoriar om fysiske prosessar på sola, i | X | X | X | X | X | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| solvinden, i magnetosfæren og i ionosfæren | | | | | | |
| forklare korleis nordlys oppstår og korleis romver kan forstyrre teknologiske system | X | X | | X | | |
| forklare utvalde eksperimentelle metodar og måleteknikkar i romfysikk | | X | X | X | X | X |
| vise at ein har avanserte kunnskapar innan romfysikk på eit godt nivå, og spesialisert innsikt i eit avgrensa område knytt til mastergradsprosjektet | | | X | X | X | X |
| utføre eit sjølvstendig og avgrensa forskingsprosjekt under rettleiing, med stor grad av sjølvstende og eige initiativ, i tråd med forskingsetiske normer | | | | | X | X |
| handtere og presentere vitskaplege data, drøfte presisjon og nøyaktigheit, og bruke programmeringsverktøy for å analysere og behandle data | | X | | | X | X |
| analysere problemstillingar i romfysikk, og drøfte måtar å utforske desse på ved hjelp av teori og eksperimentelle metodar | | X | X | X | X | X |
| orientere seg i fagmiljøet og innhente, analysere, og bruke nødvendige kunnskapar og verktøy som trengs for å utføre eit forskingsprosjekt | | | | X | X | X |
| analysere og kritisk vurdere vitskapelege informasjonskjelder, og bruke desse til å strukturere og formulere resonnement og nye idear innan romfysikk | | | | X | X | X |
| analysere, tolke, og drøfte eigne resultat på ein fagleg god og kritisk måte, i lys av data og teoriar innan det aktuelle fagområdet | | | | | X | X |
| kunne analysere vitskaplege problemstillingar generelt, og kunne delta i diskusjon om innfallsvinklar og måtar å løyse problem på | | | | | X | X |
| gje god skriftleg og munnleg framstilling av vitskaplege tema og forskingsresultat | | X | | | X | X |
| kommunisere om faglege problemstillingar, analysar og konklusjonar innan romfysikk, både med spesialistar og til | | | | | X | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| allmennheita | | | | | | |
| kunne reflektere over sentrale vitskaplege problemstillingar i eige og andre sitt arbeid | | | | X | X | X |
| demonstrere forståing og respekt for vitskapelege verdiar som openheit, presisjon og pålitelegheit | X | X | X | X | X | X |

Vår hovedkonklusjon er at alle læringsutbyttene faktisk blir realisert og de fleste i flere enn en av komponentene i masterutdanningen. Det arbeides selvsagt kontinuerlig med studieplaner og emnebeskrivelser slik at de utvikler seg i takt med relevante endringer innenfor studieretningene.

## Hvordan kan det være mulig å implementere innovasjon og kommunikasjon i studieprogrammet (masterprogrammet) i fysikk?

Programsensors anbefaling på dette punktet er forholdsvis knapp:

«*Inslag av kommunikationsträning bör ses över på alla inriktningar för att säkerställa att alla studenter får tillräcklig träning i muntlig och skriftlig kommunikation*.»

Dette er i varierende grad allerede ivaretatt, men når det gjelder mer formalisert trening i muntlig og skriftlig kommunikasjon og utforming av postere er det fornuftig å starte allerede i bachelorutdanningen, i tillegg til den treningen som studenten får i samspill med veiledningsmiljøet internt i forskningsgruppen i masterstudiet. Slik trening inngår i en del av laveregradsemnene i fysikk, bortsett fra opplæring i utforming av postere, som vi vurderer å innføre i emnet PHYS117 Prosjektoppgave i fysikk.

## Hvordan er studentenes ressurstilgang og arbeidsforhold?

Hamrin hadde et møte med representanter fra masterstudentene for å diskutere blant annet dette temaet. Hennes oppsummering av dette møtet er følgende:

- **Organisation, läromål och kontaktpersoner:** Studenterna känner inte till hur programmet leds (t.ex. programstyret och ordförande för denna) eller vad som är kravet för masterexamen (läromålen – se bilagor). Ej heller vet de vem de ska kontakta ifall problem uppstår (t.ex. om handledare inte sköter sitt jobb). Studenterna anser dock inte att det är ett problem att de inte vet vem de ska kontakta: I de fall de skulle behöva kontakta någon ansvarig så ansåg de att de borde kunna leta fram namn och kontaktuppgifter till rätt person. Studenterna nämner vidare att ett studiekontrakt ska upprättas mellan varje student och utbildningen, men att det inte alltid följs upp. Man gav t.ex. ett exempel på ett kontrakt som aldrig undertecknats och lämnats in helt utan påföljd.

- **Handledning:** Typiskt sett får varje student handledning ca. 1 h/vecka, men omfattningen och utformningen på handledningen varierar mycket från grupp till grupp. I vissa grupper har

man uppstyrda möten, medan studenterna i andra grupper själva måste ta initiativ till handledningsmöte. De flesta studenter var dock i stort sett nöjda med formen på handledningen.

- **Kurser:** Studenterna beskriver att det ibland är svårt att välja lämpliga kurser till kursdelen inom masterprogrammet. Vissa kurser kan vara rekommenderade (eller krav) från inriktningarna medan andra kurser väljes av studenter (ibland i samråd med handledare). Man upplever ibland att kurser om 10 SP är för omfattande för att kunna skapa lämplig bredd på kursdelen inom mastern och att det finns för få lämpliga kurser på UiB att välja bland. Dessutom nämner studenterna att kvaliteten på kurserna och lärarnas insatser kan variera mycket, bl.a. p.g.a. oengagerade lärare som de upplever egentligen inte vill undervisa.

- **Utbytesstudier:** Studenterna nämner att det inte är så lätt att praktiskt få plats med utbytesstudier under mastertiden, bl.a. beroende på att många studenter börjar sitt examensarbete redan under första läsåret och/eller att de är de bundna till sina laboratorier. De upplever inte att utbytesstudenter är något som rekommenderas i masterprogrammet, men snarare i bachelor-programmet.

- **Kommunikationsträning:** Studenterna nämner att det på de flesta inritningarna inte finns någon strukturerad träning (med feed-back) i muntlig och skriftlig kommunikation. Flertalet av de intervjuade studenterna anser sig dock ändå vara ganska bra på att kommunicera skriftligt och muntligt (värt att notera att de flesta av dessa studenter inte ännu börjat skriva på sin masterrapport och därmed inte fått respons på skrivprocessen). Studenterna säger att de lär sig skriva genom att läsa läroböcker (i fysik) och vetenskapliga artiklar.

- **Genomströmning:** Man anser att studenter vanligtvis på masternivån är förhållandevis motiverade för sina studier och att risk för avhopp inte är så stort. Man nämner istället att det är mycket stora avhopp på bachelor-nivå. Detta kan göra att gruppen masterstudenter blir mer homogen och bestående av förhållandevis studiemotiverade studenter.

- **Studentnöjdhet:** Studenterna ger en bild av att de generellt är nöjda med den utbildning de behöver. De ser inget större behov av förbättring om något eller några områden.

Det er alltid rom for forbedringer av studieprogrammene, både av formell karakter og ikke minst når det gjelder studentenes tilhørighet og trivsel. Vi vil arbeide videre med enda bedre faglig oppfølging av studentene og, i samråd med studentene, tiltak som fremmer et godt sosialt miljø.

Vi er ikke enig i Hamrins oppfatning av det første punktet som omhandler masterprogrammets organisasjon: I rapporten hevdes det at programstyret arbeider isolert og er for det meste frakoplet instituttledelsen. I stedet foreslås en modell der programstyret hører under til instituttledelsen og med gode koplinger mot administrasjon, lærere og studenter. Det er nettopp denne modellen som har vært en realitet i en årrekke – et av medlemmene i instituttets ledergruppe er også medlem av programstyret for fysikk og programstyret for petroleums- og prosessteknologi.

**UNIVERSITETET I BERGEN**
Det matematisk-naturvitenskapelige fakultet

Studiestyresak: **18/13**

Saksnr.: 2018/1653

Møte: 6. juni 2018

**FORELØPIGE ANBEFALINGER FRA RAPPORTEN FRA ARBEIDSGRUPPEN FOR GENERISK KOMPETANSE OG FERDIGHETER I BACHELORUTDANNINGEN**

I møte i fakultetsstyret 15. desember 2017 ble det satt ned en arbeidsgruppe for generisk kompetanse og ferdigheter i bachelorutdanningen. Bakgrunnen for at denne gruppen ble opprettet er at det i fakultetets strategi[1] pekes på behovet for *å utrede hvordan programmering og kvantitativ analyse eventuelt kan integreres i alle bachelorprogram og legge mer vekt på ferdigheter i kommunikasjon og samhandling i våre utdanninger.*

Arbeidsgruppen fikk følgende mandat:

Med fokus på treårige bachelorprogram og femårige integrerte masterprogram bes arbeidsgruppen om å:

- anbefale modeller for å bringe praksis og næringslivskontakt inn som elementer i alle studieprogram
- komme med anbefalinger for hvordan IKT og programmering kan integreres bedre i alle studieprogram ved fakultetet, i form av endret innhold og arbeidsformer i eksisterende emner, og eventuelt også gjennom egne dedikerte emner.
- i samråd med fakultetets arbeidsgruppe for innovasjon komme med anbefalinger om hvordan studieprogrammene kan øke fokus på innovasjon og nyskapning
- anbefale en felles minstestandard for fagkunnskap innen verktøyfag som matematikk, statistikk og programmering
- komme med anbefalinger for hvordan studieprogrammene kan ivareta trening i muntlig og skriftlig kommunikasjon og samhandling
- anbefale felles standarder/modeller for opplæring i etikk og vitenskapelig metode
- identifisere eventuelle andre generiske ferdigheter og kompetanser som kan være viktige for fremtidens utdanning

Gruppen fikk frist for å levere sine anbefalinger innen 1. juni 2018, og har nå utarbeidet sin foreløpige rapport. Instituttledergruppen fungerer som referansegruppe i prosessen, og hovedanbefalingene under ble kort presentert for dem i møte 23. mai. Det framkom ikke store innvendinger mot de enkelte forslagene i møtet, men instituttlederne ønsket bedre tid til å diskutere og justere den preliminære rapporten før endelige forslag fremlegges i fakultetsstyret. I tillegg ble det etterlyst mer fokus på tverrfaglighet, eksempelvis ved å opprette et emne etter mønster av NTNUs «Eksperter i team». Arbeidsgruppen har også hatt innledende samtaler med Institutt for filosofi og førstesemesterstudier (ansvarlige for ex.phil.) og Universitetsbiblioteket, som begge er positive til et samarbeid rundt de anbefalingene som berører dem.

I lys av instituttledergruppens ønske om en aktiv rolle i ferdigstilling av forslagene fremlegges arbeidsgruppens forslag som en orienterings- og diskusjonssak i denne omgang, med sikte på en vedtakssak i studiestyret og fakultetsstyret over sommeren. Siden implementering av de fleste tiltakene

[1] Fakultetets strategi 2016-2022 Dypere innsikt - felles innsats - sterkere innflytelse
Fakultetsstyresak 98/2017: https://wiki.uib.no/matnat/images/d/de/98-arbeidsgruppe_for_generiske_ferdigheter_og_kompetanse_i_bachelorutdan.._.pdf

uansett må tilpasses UiBs årshjul for studieplanendringer, vil dette ha liten praktisk betydning for når de foreslåtte endringene kan tre i kraft.

**Rapportens hovedanbefalinger**

- Alle studenter ved fakultetet skal ha et obligatorisk kurs i programmering i løpet av første studieår. Kurset gis i regi av Institutt for informatikk, men ulike fagnære eksempler og problemstillinger integreres i samarbeid med de ulike studieprogrammene.
- Studentenes kunnskap fra programmeringskurset skal tas aktivt i bruk gjennom arbeidsmetodene i senere disiplinfaglige kurs.
- Hvert studieprogram skal utvikle en stige som klart viser plassering og ansvar i studieprogrammet for opplæring og progresjon i ulike ferdigheter og generelle kompetanser som etikk, informasjonskompetanse, vitenskapelig metode, muntlig og skriftlig kommunikasjon og samhandling. Det foreslås IKKE et felles kurs på fakultetet for opplæring i "felles tema", tilsvarende ex.fac. Det utvikles nettbaserte moduler for ulike generelle kompetanser og ferdigheter som kan integreres i eksisterende kurs i samarbeid med bl.a. Universitetsbiblioteket.
- Arbeidsgruppen slutter seg til utdanningsanbefalingene fra fakultetets arbeidsgruppe for innovasjon (Forslag til handlingsplan for innovasjon og nyskaping). Dette innebærer blant annet at studentene gis økt innovasjonskompetanse ved å integrere innovasjonstenkning i ordinære fagemner, og et tettere samarbeid med næringsliv og offentlig sektor. I tillegg bør det utvikles et utvidet tilbud for spesielt interesserte studenter i samarbeid med BTO.
- Fakultetet bør utrede muligheten for et utviklingssemester etter mønster fra MatNat-UiO, der studentene har mulighet til å velge mellom ulike tiltak for personlig utvikling og/eller selvstendig arbeid - herunder internasjonal utveksling, UNIS-studier, fordypning innen innovasjon, internship/utvidet praksis, større selvstendig oppgave/bacheloroppgave.
- Ex.phil. bør legges sent i bachelorstudiene. Dette gir mulighet til å få et emne som oppleves mer relevant (Jfr Fuglesangrapporten). Fakultetet og studentrepresentanter bør i den forbindelse gå i dialog med Institutt for filosofi og førstesemesterstudier om å utnytte den økte fagkompetansen studentene da vil ha til å tilpasse et innhold som oppleves relevant og engasjerende for realfagstudenter.
- lle studieprogram skal ha et tilbud om praksis, og hvert studieprogram skal oppnevne en praksisansvarlig med ansvar for koordinering av praksis/innovasjonstilbudet og kontakt mot relevante eksterne partnere og næringsliv. Praksis kan integreres i andre studiepoenggivende emner. Mulighet for et lengre praksisopphold/internship kan legges til utviklingssemesteret.
- Skjerpede opptakskrav i matematikk fra videregående skole og obligatorisk programmering for alle i løpet av første studieår endrer forutsetningene også for dagens brukerkurs i matematikk og statistikk (MAT101, MAT102, STAT101). Det bør utredes om endringene i forkunnskaper kan utnyttes til å gi et bedre felles brukertilbud i matematikk/statistikk for programmene som i dag starter med MAT101.
- Økt fokus på generisk kompetanse og ferdigheter i bachelorprogrammene vil kreve tydeligere utdanningsledelse. Hovedansvar for å definere ikke bare disiplinfaglig innhold men også form og undervisningsmetoder på alle emner som i inngår i en bachelorutdanning, bør i større grad forskyves fra emneansvarlige til programstyrer/utdanningsledere. Utdanningsledelsen har det overordnete ansvaret for å sørge for at ikke bare kunnskap, men også ferdigheter og generell kompetanse formidles og bygges systematisk opp i studieprogrammene som helhet og i henhold til læringsutbytte.

**Rammebetingelser og Implementering**

Logistisk sett faller endringene som er diskutert og foreslått i rapporten i tre ulike kategorier. Dette vil ha betydning for hvor fort det er realistisk å implementere de ulike endringsforslagene.

***Tiltak som kan implementeres innenfor eksisterende emner uten behov for strukturell endring eller vesentlige økonomiske ressurser:***

I denne kategorien faller endringer som i stor grad kan utføres gjennom å endre måten eksisterende emner undervises på. Eksempelvis kan forbedrede generiske ferdigheter innen kommunikasjon og samarbeid oppnås gjennom økt fokus på team based learning og skrivetrening uten at dette vil gå på bekostning av disiplinfaglig innhold i programmet. Noen slike endringer bør kunne implementeres umiddelbart.

***Tiltak som krever strukturelle endringer i studieprogrammene:***

I denne kategorien faller forslagene om å innføre et obligatorisk programmeringsemne i alle studieprogram som ikke har dette i dag, forslag om å legge ex.phil. sent i bachelorstudiet, et eventuelt nytt brukeremne i matematikk/statistikk og et utviklingssemester. Dette vil gi store omrokkeringer i studieplaner som må vedtas gjennom UiBs ordinære prosedyrer og tidsfrister, og avklares med andre berørte aktører som for eksempel de ansvarlige for ex.phil. Omlegging av eksisterende disiplinemner for å integrere IKT/databehandling kan heller ikke implementeres før studentene har gjennomført det nye programmeringsemnet. En realistisk tidsramme er derfor at nødvendige studieplanendringer vil kunne vedtas til den årlige fristen i oktober 2019 og da ha virkning fra høsten 2020, men pilotering av noen av tiltakene bør kunne realiseres ett år før.

***Tiltak som krever økt tilførsel av ressurser:***

Dersom vi har en ambisjon om at alle studenter ved fakultetet skal tilbys et praksisopphold hos en ekstern partner, tilsier erfaringene fra andre fakultet og aktører at dette krever omfattende ressurser til oppretting, tilrettelegging og administrativ koordinering, selv om vi forutsetter velvillige eksterne partnere bl.a. gjennom klyngesamarbeidet. Likeledes vil eksempelvis oppretting av et emne etter mønster av NTNUs «Eksperter i team» og eventuelt oppretting av et nytt innovasjonsemne i fakultetets regi som to av tilbudene i et utviklingssemester kreve ressurser og ny kompetanse. Mengde og dimensjonering av slike tilbud vil derfor måtte ses i lys av ressursbruk på fakultets- og instituttnivå.

**VEDTAK**
Studiestyret har diskutert de foreløpige hovedanbefalingene fra arbeidsgruppen for generisk kompetanse og ferdigheter i bachelorutdanningen. Studiestyrets innspill og kommentarer blir tatt med videre når endelig rapport blir ferdigstilt.

Bergen 1. juni 2018
MN/HW/INSO

**UNIVERSITETET I BERGEN**
Det matematisk-naturvitenskapelige fakultet

Studiestyresak: **18/13** Saksnr.: 2010/3834

Møte: 6. juni 2018

**GODKJENNING AV UTFYLLENDE REGLER FOR MASTEREKSAMEN VED INSTITUTT FOR GEOVITENSKAP**

Etter de *Utfyllende regler for gradsstudier ved Det matematisk-naturvitenskapelige fakultet* skal Studiestyret godkjenne utfyllende regler som lages av programstyrene.

Programstyret ved Institutt for geovitenskap har revidert sine utfyllende regler for mastereksamen i geovitenskap. Instituttet ber Studiestyret om å godkjenne disse.

**UTFYLLENDE REGLER FOR MASTEREKSAMEN VED INSTITUTT FOR GEOVITENSKAP**

Mastergradseksamener ved Institutt for geovitenskap skal bedømmes av en eksamenskommisjon bestående av ekstern og intern sensor.

Forslag til ekstern og intern sensor fremmes av den aktuelle faggruppen, der ekstern sensor skal hentes fra den til enhver tid gjeldende sensorliste ved instituttet. Forslaget må være oversendt programstyret for godkjenning senest 15. oktober for eksamener i høstsemesteret, og 1. mai for eksamener i vårsemesteret.

Minst en av sensorene skal inneha en professor- eller førsteamanuensisstilling. Faggruppen har ansvar for at sensorene, foruten faglig kompetanse skal ha tilstrekkelig kjennskap til det norske utdannings- og karaktersystemet.

Veileders rolle er å bidra med nødvendige bakgrunnsopplysninger til eksamenskommisjonen, slik som grad av selvstendighet i arbeidet og eventuelle forhold utenfor kandidatens kontroll som kan ha påvirket det endelige resultatet. Ekstern og intern sensor har ansvar for selve karakterfastsettelsen. I henhold til Universitetet i Bergen sine retningslinjer er sensorene likestilt ved karakterfastsettelsen.

**FORSLAG TIL VEDTAK:**
Studiestyret vedtar å godkjenne de utfyllende regler for mastereksamen ved Institutt for geovitenskap.

Bergen 28.05.2018
MN/INSO

**UNIVERSITETET I BERGEN**
Det matematisk-naturvitenskapelige fakultet

Studiestyresak: **18/14**
Møte: 6. juni 2018

Saksnr.: 2018/6315

**OPPRETTING AV FELLESGRAD *INTERNATIONAL MASTER OF SCIENCE IN MARINE BIOLOGICAL RESOURCES (IMBRSEA)***

**Innledning**

Institutt for biovitenskap har sammen med 7 andre europeiske institusjoner fått innvilget et internasjonalt Erasmus Mundus Joint masterprogram «*International Master of Science in Marine Biological Resources (IMBRSea)*». Universitetet i Ghent er koordinator.

Programmet ble godkjent i EU i august 2016, og de første studentene har allerede startet på programmet ved noen av de andre institusjonene. Høst 2018 kommer de første 21 studentene til UiB, og studieprogrammet skal derfor godkjennes i Universitetsstyret allerede i august.

**Om programmet**

IMBRSea er et interuniversitetsprogram basert på rammen Erasmus Mundus Master Joint Master Degrees. Det er 8 hovedpartnere og i tillegg er det 14 assosierte partnere involvert (http://imbrsea.eu/). IMBRSea har utspring i erfaringer fra partneruniversitetene fra organiseringen av *International Master of Science in Marine Biodiversity and Conservation EMBC/EMBC+*.

Programmet er delt opp i ni blokker som går over to år (4 semester, 120 ECTS), undervisningsspråket er engelsk. Ved UiB er det mulig å ta masteroppgave, eller velge mellom syv emner. Alle emnene er hele eller deler av emner som Institutt for biovitenskap har fra før i sin emneportefølje. De har utarbeidet nye emnebeskrivelser for emnene (vedlagt saken).

Universitetet i Ghent er koordinator for programmet, og ansvarlig for å skrive ut et felles vitnemål ved oppnådd grad.

**Saksgang**

Institutt for biovitenskap har tidligere varslet i studieplanendringene (sak 16/9271) at programmet var søkt om, og ville bli opprettet dersom søknaden ble innvilget. Nytt studieprogram er også varslet til Studieadministrativ avdeling i november 2016 (15/12262-7). Kontrakt for konsortiet er utarbeidet, og signert ved UiB av rektor 6.11.2017 (15/12262-14).

I tillegg til dette må programmet formelt opprettes ved UiB. Ifølge kvalitetshåndboken (s. 15) ved UiB kan fellesgrader opprettes utenom universitetet sine gjeldende frister for oppretting av ordinære bachelor- og masterprogram. I kvalitetshåndboken framgår det også at for fellesgrader gjelder UiB sitt kvalitetssystem for de emnene som UiB tilbyr.

Dersom oppretting av programmet blir anbefalt i Studiestyret og Fakultetsstyret skal det til endelig vedtak i Universitetsstyret 30. august. I tillegg til dette skal programmet vurderes av programopprettingskomitéen ved UiB, som gir sin anbefaling til Universitetsstyret, basert på søknaden om Erasmus Mundus-støtte, studieplan for programmet og emnebeskrivelser for de syv UiB-emnene som inngår i programmet.

**UNIVERSITETET I BERGEN**
Det matematisk-naturvitenskapelige fakultet

**FORSLAG TIL VEDTAK:**

Studiestyret vedtar å anbefale at det internasjonale Erasmus Mundus Joint masterprogram *International Master of Science in Marine Biological Resources (IMBRSea)* opprettes ved UiB.

Bergen 01.06.2018

MN/BIG

**Vedlegg:**

1) Oversendelse fra Institutt for biovitenskap om å opprette fellesgrad
2) Studieplan IMBRSea
3) Emnebeskrivelse IMBRSeaBIO206
4) Emnebeskrivelse IMBRSeaBIO324
5) Emnebeskrivelse IMBRSea BIO325
6) Emnebeskrivelse IMBRSeaBIO382
7) Emnebeskrivelse IMBRSeaBIOxx
8) Emnebeskrivelse IMBRSeaBIOxxy
9) Emnebeskrivelse IMBRSeaBIOxyy
10) Søknad om Erasmus Mundus Joint Master, del 1
11) Søknad om Erasmus Mundus Joint Master, del 2
12) Innvilget søknad Erasmus Mundus Joint Master
13) Konsortiumavtale

UNIVERSITETET I BERGEN
*Institutt for biovitenskap*

Bergen, 1. juni 2018

Ber om opprettelse av International master of Science in Marine Biological Resources (IMBRSea)

Første varsel om opprettelsen av programmet IMBRsea ble varslet sendt høsten 2016 (ref 2015/12262), da var hensikten å tilby masteroppgaver i studieprogrammets 2. år. I følge brevet som ble sendt til SA, skulle studieplanen settes opp og det skulle legges et løp for oppretting av programmet. Dette er dessverre ikke gjort, og dette skrivet vil forsøke å gi en kortfattet oversikt over prosessen og programmet, samt en oversikt over studentflyt og emnene de skal ta.

Varselet ble sendt 03.11.2016 til studieasdministrativ avdeling og hele saken kan leses i ephorte: 2015/12262:

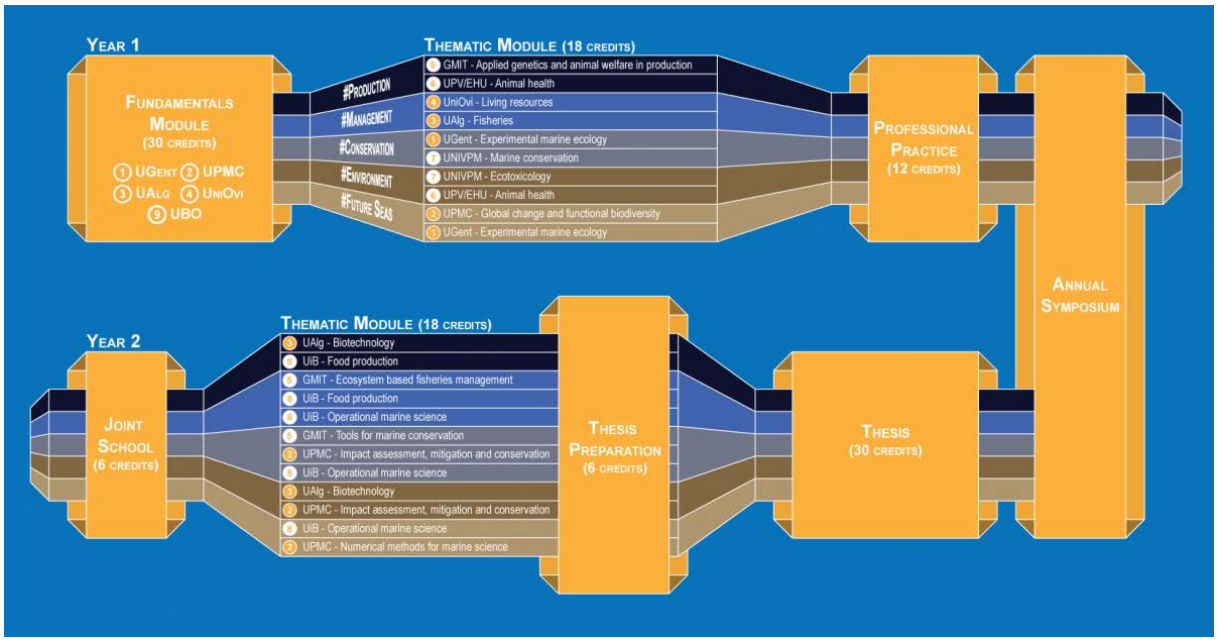
Varsel om nytt studieprogram Erasmus Mundus Joint Master's Degree - IMBRSea 2017/2018

Institutt for biologi, ved Audrey Geffen, er med i søknaden IMBRSea som ble sendt inn til EUs utlysning Erasmus Mundus Joint Master Degree-utlysning i februar. IMBRSea er et 2-årig masterprogram i marinbiologi og forvaltning. Universitetet i Ghent er koordinator. I august fikk BIO positivt svar, og programmet skal opprettes i løpet av 2016/2017. Konsortsieavtalen og finansiering er vedlagt.

IMBRSea er et interuniversitetsprogram basert på rammen Erasmus Mundus Master Joint Master Degrees. Det er 8 hovedpartnere og i tillegg er det 14 assosierte partnere (http://imbrsea.eu/). IMBRSea har utspring i erfaringer fra partneruniversitetene i fra organiseringen av International Master of Science in Marine Biodiversity and Conservation EMBC/EMBC+.

Programmet er delt opp i 9 blokker går over 2 år (4 semester, 120 ECTS) (Fig. 1), undervisningsspråket er engelsk.

*Postadresse:* Postboks 7803 N-5020 Bergen Norge/Norway
*Besøksadresse:* Thormöhlensgt 53A, 5006 Bergen Norway
*Telefon* +47 55 58 44 00
*Telefaks:* +47 55 58 44 50
*E-post:* post@bio.uib.no
*Internett:* http://www.uib.no/bio




Figur 1: IMBRSea master, utdanningløp for de forskjellige modulene.

Semesteret skal gå fra september/oktober til juni/august (http://imbrsea.eu/student/keydates). Dette passer jo dessverre ikke med vår semesterinndeling, men vi får dette til å gå opp med at studentene tar en tidlig sommerskole og kommer rett til Bergen fra denne. Studentene velger selv tema etter interesse og av de 5 forskjellige temamodulene tilbyr vi emner i 3. semester innen temaene: #Production, #Management, #Conservation og #Future seas.

Programmet er bygget opp som vist i Figur 1 og på nettsiden: http://imbrsea.eu/studyprogramme.

Overiskt over emner de skal ta, emnebeskrivelsene er vedlagt:

PRODUCTION, MANAGEMENT

Aquatic food production 10

Fish nutrition 8

Fish behaviour 8

MANAGEMENT, CONSERVATION, FUTURE SEAS

Quantitative methods for modern

fisheries and marine research 6

Sampling and observational field methods 6

Biological oceanography and ocean productivity 6

Alle emnene er hele eller deler av opprinnelige emner som BIO har fra før i sin emneportefølje.

Fra semesterstart høsten 2018 er det meldt inn at det kommer 21 studenter til UiB på dette programmet og alle skal bli godt mottatt. Vi har fått uvurderlig hjelp i fra Studieadministrativ avdeling for hjelp til å sende ut invitasjons- og opptaksbrev samt informasjon som nye studenter trenger til oppstart. Ta gjerne kontakt om det er noe som er uklart.

Med vennlig hilsen

Ørjan Totland

Instituttleder

Beate Ulrikke Rensvik

Konstituert studieleder

Mal for forside til studieplanar ved UiB:

International Master in Marine Biological Resources (IMBRSea)

## *Godkjenning:*

*Studieplanen er godkjend av:*

*Universitetsstyret: …….(dd.mm.år)*

*Programstyret: …….(dd.mm.år)*

*……. fakultet: …….(dd.mm.år)*

*Studieplanen vart justert: …….(dd.mm.år)*

## *Evaluering:*

*Studieprogrammet vart sist evaluert: …….(dd.mm.år)*

*Neste planlagde evaluering: …….(dd.mm.år)*

**Mal for studieplanar ved UiB**

**Krav til studieplanar for studieprogram går fram av:**

- § 2-1 og 2-2 i *Forskrift om tilsyn med utdanningskvaliteten i høyere utdanning (tilsynsforskriften)*
- Kapittel 3 i *Forskrift om opptak, studier, vurdering og grader ved Universitetet i Bergen*, (Studieforskrifta),

Forslag til formuleringar på engelsk finst i *Mal for norske vitnemål og vitnemålstillegg* frå Universitets- og høgskulerådet.

**Om framside og struktur i malen**

I tillegg til kategoriane i tabellen nedanfor, skal studieplanen innehalde følgjande informasjon: Dato for godkjenning av studieplan, dato for eventuelle justeringar, namn på instans som har godkjent planen, dato for siste og neste evaluering av programmet. Denne informasjonen skal stå på framsida til planen. Framsidemal finst sist i dette dokumentet.

Forslag til tekst står i kursiv i kolonnen «Tekst». Rettleiing og nokre døme finn ein i kolonnen til høgre. Denne må fjernast før studieplanen vert send til råd og styre. Kolonnen «Infotype» viser til kvar tekstane skal leggjast inn i Felles studentsystem (FS), som er eit studieadministrativt verktøy. Dei som har fagleg ansvar for å utvikle studieprogrammet, treng ikkje bry seg om infotypane.

| Kategori | Infotype | Tekst |
|---|---|---|
| **Namn på studieprogramme t, nynorsk** | | International Master in Marine Biological Resources (IMBRSea) |
| **Navn på studieprogramme t,**<br><br>**bokmål** | | International Master in Marine Biological Resources (IMBRSea) |

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| **Name of the programme of study,**<br><br>**English** | | International Master in Marine Biological Resources (IMBRSea) |
| **Namn på grad**<br><br><br>**Name of qualification** | SP_GRADEN | Joint Master in Marine Biological Resources (IMBRSea) |
| **Omfang og studiepoeng**<br><br><br>**ECTS credits** | SP_OMFANG | 120 ECTS. Two years of full-time study, where the normal workload for a full-time student is 60 credits for one academic year. |
| **Fulltid/deltid**<br><br><br>**Full-time/part-time** | SP_FULLDEL | Full-time |
| **Undervisningsspråk**<br><br><br>**Language of instruction** | SP_SPRAK | *English* |
| **Studiestart - semester**<br><br>**Semester** | SP_START | Autumn |
| **Mål og innhald**<br><br><br>**Objectives and content** | SP_INNHALD | IMBRSea covers a wide, yet consistent, range of subjects within the marine sciences and biological resources. With an emphasis on marine biological and ecological processes, the programme links biology of marine organisms and environmental studies with subjects in marine policy and planning.<br><br>The subjects are covered through Thematic Modules in Specialization Tracks to prepare the next generation of scientists who need to understand the marine ecosystem functioning and conservation of biodiversity to work in biological resources exploitation and management. IMBRSea offers a unique combination of Courses, Annual Symposia, Professional Practices and Thesis subjects in an integrated program to learn how to develop blue biotechnologies in a sustainable way. |

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| **Læringsutbytte**<br><br>**Required learning outcomes** | SP_UTBYTTE | Specialization tracks, one to choose:<br><br>**Marine Food production:**<br>The graduated student understands biological principles of culturing marine organisms for food or products;<br><br>The graduated student understands vectors of disease/parasites and principles of managing marine animal health in culture;<br><br>The graduated student understands challenges and societal conflicts arising from increased production of food and products from the marine environment<br><br>**Management of living Marine Resources:**<br><br>The graduated student understands and is able to apply quantitative methods of population assessment, including survey methods, data collection, analysis, and assessment models;<br><br>The graduated student understands the ecological principles governing variability in marine resource availability and its sustainable exploitation;<br><br>The graduated student is able to identify the major stakeholders and the conflicts arising from exploitation of marine resources in Europe.<br><br>**Applied marine Ecology and Conservation:**<br><br>Learning outcomes<br><br>The graduated student understands the principles of ecological interactions and how they shape the marine communities and their response to environmental pressures;<br><br>The graduated student is able to evaluate and assess anthropogenic impacts on marine ecosystems, services and resources, and to identify mitigation and remediation measures that can be taken on short and long terms;<br><br>The graduated student is able to implement restoration and conservation initiatives, together with the design and analysis of environmental monitoring schemes.<br><br>**Global Ocean Changes:**<br><br>Learning outcomes |

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| | | The graduated student understands basic physical, geochemical ocean system dynamics;<br><br>The graduated student is able to identify processes involved in local and regional changes for zones that are particularly affected by climate change, such as the Arctic Ocean and the Mediterranean-Atlantic biogeographical transition zone;<br><br>The graduated student understands the main drivers affecting at all scales the marine biodiversity, and is able to tackle the key challenges to diminish threats on evolving marine species and communities. |
| **Opptakskrav**<br><br>**Admission requirements** | SP_OPPTAK | A Bachelor, Honours or Master degree in biology, ecology, environmental sciences, oceanography, marine sciences, geography, geology, or other equivalent degrees with a minimum of 180 ETCS at the latest by 1st September of 2018 and for non-European students preferably before 1st March 2018.<br><br>Knowledge of the English language is considered as a basic requirement. All students must provide evidence of their proficiency in English through one of the following documents:<br><br>A recent TOEFL Certificate: minimum score: 570 points (paper) or 87 points (internet)<br><br>A recent IELTS Certificate: minimum score: 6.5<br><br>A recent Certificate of a University Language Centre testifying that the student masters the necessary knowledge of English to function academically (specify CEF-level / minimum CEF-level B2)<br><br>A recent Cambridge English certificate: Cambridge English First (FCE) - grade A or B<br><br>A certificate proving that you have followed at least 1 year of higher education in English |
| **Tilrådde forkunnskapar**<br><br>**Recommended previous knowledge** | SP_ANBFORK | |
| **Obligatoriske emne** | SP_OBLIGAT | Semester 1:<br>Marine policy and governance - 3 ECTS<br>Marine genomics - 3 ECTS<br>Quantitative methods in marine science - 6 ECTS<br>Oceanography - 6 ECTS |

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| **Compulsory units** | | Marine ecology - 6 ECTS<br>Marine GIS and spatial planning - 3 ECTS<br>Transferable skills course - 3 ECTS<br><br>These courses are at Ghent University, Université de Bretagne Occidentale, University of Algarve or University of Oviedo.<br><br>Semester 2:<br>Thematic Module 1 - 18 ECTS<br>Professional practice - 12 ECTS<br><br>Semester 3:<br>IMBRSea Joint School - 6 ECTS<br>Thematic Module 2 - 18 ECTS<br>Thesis Preparation: Research Design, Data management en Data communication in Marine Sciences - 6 ECTS<br><br>Semester 4:<br>Master thesis - 30 ECTS<br><br>More information about the study programme can be found at: www.imbrsea.eu/studyprogramme |
| **Spesialisering**<br><br>**Specialisation** | SP_SPESIAL | Specialization tracks (One to choose)<br><br>Marine Food Production<br>Aquatic food production 10 ECTS<br>Fish behaviour 8 ECTS<br>Fish nutrition 8 ECTS<br><br>Management of Living Marine Resources<br>Aquatic food production 10 ECTS<br>Fish behaviour 8 ECTS<br>Fish nutrition 8 ECTS<br><br>Applied Marine Ecology and Conservation<br><br>Biological oceanography and ocean productivity 6 ECTS<br>Quantitative methods for modern fisheries and marine research 6 ECTS<br>Sampling and observational field methods 6 ECTS<br><br>Marine Environment Health<br><br>Global Ocean Changes |

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| **Tilrådde valemne**<br><br>**Recommended electives** | SP_VALGFRI | None |
| **Rekkefølgje for emne i studiet**<br><br>**Sequential requirements, courses** | SP_REKKEFO | The recommended sequence of the courses in the programme can be found under the heading "Compulsory units". |
| **Delstudium i utlandet**<br><br>**Study period abroad** | SP_DELSTUD | Student mobility is an integral aspect of the IMBRSea programme. Partner universities engage to make practical arrangements for their incoming students before and during the mobility. This includes, if applicable, instructions on visa procedures, providing a local admission letter, housing and other services for international students. Students are required to undertake a mobility period of at least one semester (30 ECTS) but can, depending on their interests, maximize their mobility opportunities. The full IMBRSea study programme is divided into nine blocks run over two academic years. |
| **Arbeids- og undervisningsformer**<br><br>**Teaching and learning methods** | SP_ARBUND<br><br>(Erstatter SP_UNDMETO ) | A combination of teaching and learning methods is used in the various courses, including lectures, hands-on laboratory, workshops, seminars, computer labs, cruise on research vessels. You may find more information in the course description.<br><br>The Master's thesis is an independently scientific work, under supervision of an academic supervisor. |
| **Vurderingsformer**<br><br>**Assessment methods** | SP_VURDERI | Courses at UiB use different forms of examination such as written examinations, assigned exam papers, take-home examinations and oral examinations. The type of examination may vary according to the subject. Many courses require students to complete mandatory assignments (e.g. lab work or methodological assignments) or a term paper before being permitted to take examinations. Course may also offer continuous assessment throughout the semester. The examination or assessment type, and the grading scale (A-F or pass/fail), are listed in the course description of every course. |

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| **Litteraturliste**<br><br>**Reading list** | | The reading list will be published in Mitt UiB by 1 June/1 january. |
| **Karakterskala**<br><br>**Grading scale** | SP_KSKALA | At UiB the grades are given in one of two possible grading scales: passed/failed and A to F.<br><br>The master's thesis will be graded A to F.<br><br>The grading scale for each course is given in the course description. |
| **Vitnemål og vitnemålstillegg**<br><br>**Diploma and Diploma Supplement** | SP_VITNEM | After successful completion of the IMBRSEA academic Programme, graduates shall receive a Joint Masters degree by the nine Consortium Universities. The Diploma is fully based on the ECTS system and will be accompanied by a Diploma Supplement that lists all the courses and the title of the thesis with their accompanying ECTS credit points and grades with specification of training hours, language of instruction, institution delivering the course and all other relevant details such as the ECTS system. The Diploma will be materially issued by Ghent University, jointly with and also signed by the respective partner Universities, according to the European regulations. The Diploma supplement will be issued according to the European regulations, following the model developed by the European Commission, the Council of Europe and UNESCO/CEPES. The Supplement provides sufficient independent data to ensure the international transparency and fair academic and professional recognition of qualification (diplomas, degrees, etc.). The Supplement will provide a description of the nature, level, content, context and status of studies pursued and successfully completed by the student |
| **Grunnlag for vidare studium**<br><br>**Access to further studies** | SP_KOMPETA | *To be eligible for admission to the Doctoral education (PhD) the candidate must have completed a master's degree.* |
| **Relevans for arbeidsliv** | SP_ARBLREL | Graduates in the Marine Food Production track will be competitive applicants and attractive to employers for jobs in the aquaculture sector as employee or self-employed in production, managerial, sales or technical roles; in the seafood processing and technology sector; in national or regional planning offices (evaluation of site |

| | | |
|---|---|---|
| **Employability** | | licenses); in animal feed/pharmaceutical and aquamedicine companies; for further veterinary training; with NGOs for food security, food safety and authenticity.<br><br>Graduates in the Management of Living Marine Resources track will be competitive applicants and attractive to employers for jobs in fisheries research (as scientist or technician) at national and international fisheries institutes; regional fisheries management boards; advising bodies to commercial fishing companies and associations; consultancy companies (e.g. development of fisheries management plans); environmental impact assessment; climate change effects, as database manager; fisheries monitoring; conservation; fisheries advisory bodies (at NGO or government ministry level); regional planning offices (coastal zone planning); mineral and oil exploitation companies; NGOs for food security, food safety and labeling, and authenticity; lobbying.<br><br>Graduates in the Applied Marine Ecology and Conservation Track will be competitive applicants and attractive to employers for jobs in compliance/observer activities for offshore oil and gas companies, marine construction, dredging and pipe/cable laying; marine renewable energy sectors; NGOs; lobbying; marine spatial management/planning.<br><br>Graduates in the Global Oceas ChangesTrack will be competitive applicants and attractive to employers for jobs in modelling in environmental consultancy companies and government research institutions; data management in research projects; scientific or technical roles in geophysics and climate related institutions (e.g. IOC, ICES). |
| **Evaluering**<br><br>**Evaluation** | SP_EVALUER | The programme will be evaluated according to the quality assurance system of the University of Bergen. |
| **Skikkavurdering og autorisasjon**<br><br>**Suitability and authorisation** | SP_AUTORIS | |
| **Programansvarleg** | SP_FAGANSV | *Programstyret har ansvar for fagleg innhald og oppbygging av studiet og for kvaliteten på studieprogrammet* |

| | | |
|---|---|---|
| **Programme committe** | | |
| **Administrativt ansvarleg**<br><br>**Administrative responsibility** | SP_ADMANSV | *Institutt for biovitenskap har det administrative ansvaret for studieprogrammet.* |
| **Kontaktinformasjon**<br><br>**Contact information** | SP_KONTAKT | *studie@bio.uib.no* |

Emnekode:

# *Mal for Det matematisk-naturvitskaplege fakultet*

## Mal for emnebeskrivingar ved Universitetet i Bergen - Course Plan

Eit studieprogram inneheld fleire emne. Ei emnebeskriving er ein detaljert plan for eitt av emna i eit studieprogram.
Krav til studiar går fram av *Forskrift for tilsyn med utdanningskvalitet i høyere utdanning (studietilsynsforskriften),* NOKUT 2013, http://link.uib.no/?21Vcl . UiBs *Forskrift om opptak, studier, vurdering og grader ved Universitetet i Bergen* (Studieforskrifta) gir i kapittel 3 reglar for studiestruktur og studieplan: http://link.uib.no/?YoXx

UiB si *Handbok for kvalitetssikring av universitetsstudia* gir meir rettleiing om ansvar, prosedyrar og krav til oppretting av studieprogram og emne (pkt. 16.1 og 16.4). Sjå http://www.uib.no/studiekvalitet .

Studietilsynsforskrifta (NOKUT) seier i § 7-4 at «Delene studiet består av skal utgjøre en samlet helhet i samsvar med læringsutbyttet for studiet», og at de «skal tilfredsstille standarder og kriterier for akkreditering av studier i § 7-1 til § 7-3.»

I tillegg til kategoriane i tabellen nedanfor, skal emnebeskrivinga innehalde følgjande informasjon: dato for godkjenning, dato for eventuelle justeringar, namn på instans som har godkjent beskrivinga, dato for førre evaluering og neste planlagde evaluering av emnet. Denne informasjonen skal stå på forsida til planen. Forsidemal finn ein sist i dette dokumentet.

Eventuelt forslag til tekst står i kursiv i kolonnen «Tekst». Rettleiing og nokre døme finn ein i kolonnen til høgre. Den må fjernast før emnebeskrivinga vert send til programstyre, institutt og fakultet.

Emnekode:

| Kategori | Infotype | Tekst | |
|---|---|---|---|
| **Emnekode**<br><br>**Course Code** | | IMBRSeaBIO206 | |
| **Namn på emnet, nynorsk** | | Ernæring hjå fisk | |
| **Namn på emnet, bokmål** | | Ernæring hos fisk | |
| **Course Title, English** | | Fish Nutrition | |
| **Studiepoeng, omfang**<br><br>**ECTS Credits** | EB_POENG | 8 | |
| **Studienivå (studiesyklus)**<br><br>**Level of Study** | EB_NIVA | *Bachelor/master* | |
| **Fulltid/deltid**<br><br>**Full-time/Part-time** | EB_FULLDEL | Full-time | Til dømes kan eit studieemne normert til eitt semester leggjast til rette for å gjennomførast på 2 semester. Det er då eit deltidsstudium med 50% studieprogresjon. |
| **Undervisningsspråk**<br><br>**Language of Instruction** | EB_SPRAK | English | |
| **Undervisningssemester**<br><br>**Semester of Instruction** | EB_UNDSEM | *Autumn* | |
| **Undervisningsstad**<br><br>**Place of Instruction** | EB_UNDSTED | | Skal fyllast ut dersom undervisninga ikkje er ved UiB, i Bergen. |

Emnekode:

| | | | |
|---|---|---|---|
| **Mål og innhald**<br><br>**Objectives and Content** | EB_INNHOLD | *The course will provide an introduction to the various food components nutritional impact on growth, development, reproduction, health and quality of farmed fish. This involves learning about the fish's digestive system and the various nutrients' digestion, absorption, metabolism and biochemical function. The course also covers relevant undesirable substances in feed that can be a challenge for the health and for the seafood product produced. Students will also learn about alternative resources and substances used in fish feed, and the legislation that the FSA and the industry must deal with in this area. The course builds on the basic knowledge of biology and biochemistry* | Om innhald:<br>Gi ei kort oversikt over faginnhaldet.<br><br>En behøver ikkje å ha med underoverskrifter (*Mål, innhald*). Det kan være en samanhengande tekst som dekker begge.<br>Det kan være greitt å begynne med «Målet med programmet/emnet er å … ( /at …) ..» for deretter å gå vidare med info om innhald og kanskje også trekke fram særlig viktige/karakteristiske sider ved programmet/emnet/fagområdet. |
| **Læringsutbyte (endret standardoppsett og introsetning)**<br><br>**Learning Outcomes** | EB_UTBYTTE | The course aims to give students the knowledge and skills to keep track of the quantitative importance of food in the production of farmed fish, which feed resources are used, and the ratios between the energizing nutrient (protein, fat and carbohydrates) in commercial feeds.<br><br>By completing the course, students will:<br>Possess a detailed knowledge of the fish's digestive system, including a deeper focus on the development of the gastrointestinal tract of marine fish larvae<br>Show detailed knowledge of various energizing- and micro (vitamins and minerals) nutrients digestion, absorption, metabolism and biochemical function.<br>Understand how the food composition can affect health, both by lack of nutrients and through preventive nutrition<br>Explain the components of fish feed on fish product quality, both positive (nutrients) and negative (contaminants from food and environment)<br>Have knowledge of fish reproduction and how diet affects egg and fry quality<br>Have a basic understanding of legislation that business and government must deal with in the food area, in terms of fish quality, health and environmental impact | Læringsutbyte er det ein person veit, kan og er i stand til å gjere som eit resultat av læringsprosessen.<br>Læringsutbytet skal beskrivast i kategoriane kunnskapar, ferdigheiter og generell kompetanse. **(* Bruk verb i presens.)**<br>Ein kan sløyfe ein kategori dersom den ikkje er relevant. |

Emnekode:

| | | | |
|---|---|---|---|
| **Krav til forkunnskapar**<br><br>**Required Previous Knowledge** | EB_KRAV | None | Krav til forkunnskapar, eventuelt andre emne som skal vere bestått før opptak til emnet. Skriv "Ingen" her dersom det ikkje finst slike krav. |
| **Tilrådde forkunnskapar**<br><br>**Recommended previous Knowledge** | EB_ANBKRAV | | |
| **Studiepoengsreduksjon**<br><br>**Credit Reduction due to Course Overlap** | EB_SPREDUK | BIO206 – 8 sp | Skal fyllast ut om emnet overlappar med andre emne. Talet på studiepoeng emnet overlappar med andre emne. |
| **Krav til Studierett**<br><br>**Access to the Course** | EB_STUDRET | Access to the course requires admission to a programme of study at The Faculty of Mathematics and Natural Sciences | Her kan ein informere t.d. om emnet er eit tilbod berre til studentar som er tatt opp til eit bestemt program. |
| **Arbeids- og undervisningsformer**<br><br>**Teaching and Learning Methods** | EB_ARBUND<br><br>(Erstattar EB_UNDMETO) | **Contact hours:** Lectures (20), practicals (0), seminars (4), computerclass (0), fieldwork (0), other (0) | Undervisningsformer kan vere seminar, gruppearbeid, prosjekt, førelesningar, feltkurs, laboratoriekurs osv.<br><br>Kravet til eit studieår (60 studiepoeng) er for studentane ved UiB 1600 arbeidstimar fordelt på 10 månader. Eitt – 1 – studiepoeng svarer til 26/27 arbeidstimar. Eit 15 studiepoengs emne har såleis 400 studietimar. Her reknar ein inn alle former for studierelatert arbeid. Tid til individuelt arbeid er det som blir att når ein trekkjer frå tida til organisert undervisning. |

Emnekode:

| | | | |
|---|---|---|---|
| **Obligatorisk undervisningsaktivitet**<br><br>**Compulsory Assignments and Attendance** | EB_OBLIGAT | Compulsory assignment and oral presentation. | Her registrerer ein både krav om obligatorisk frammøte og obligatoriske arbeidskrav. *Hugs å ta med tal på semester aktiviteten er gyldig.*<br>NB! Ein brukar omgrepet «godkjent» for å registrere at krava er oppfylte.<br><br>Egenandel: jf september 2017 brev fra KD: kan vi ikkje ta betalt for transport og oppoldsutgifter i forbindelse med obligatoriske undervisningsaktiviteter, herunder obligatorisk feltarbeid og ekskursjoner. Derfor er setning under fjernet.<br><br>*Standardsetning Eigendel::*<br>*«Dette emne har obligatorisk felt/toktbasert aktivitet og har eigendel ved gjennomføring av emne. Summen på eigendel vert opplyst ved oppstart på emne»*<br>*«This course has mandatory field work/scientific cruise and has course costs. The amount will be announced at course start."* |
| **Vurderingsformer**<br><br>**Forms of Assessment** | EB_VURDERI | Digital exam (60%), evaluation of assignment (20%) and oral presentation (20%). | Gi ei oversikt over vurderingsformene (eksempel skriftleg, munnleg, hjemmeeksamen) som blir brukte for å vurdere om læringsutbytet er oppnådd. Vis gjerne til dei læringsutbyta som vurderings-formene skal vurdere oppnåinga av.<br><br>Ta med faktainformasjon som er viktig for studenten, mellom anna om varigheit, vekting av dei ulike vurderingsdelane i høve til kvarandre, og elles ulike krav eller ordningar som gjeld her.<br>Angje her om skriftleg eksamen er digital og henvisning |

Emnekode:

| | | | |
|---|---|---|---|
| | | | til nettstad om digital vurdering for studentar:<br><br>Norsk:<br>http://www.uib.no/student/86719/digital-vurdering-studenter<br><br>Engelsk:<br><br>http://www.uib.no/en/student/87471/digital-assessment-students |
| **Hjelpemiddel til eksamen**<br><br>**Examination Support Material** | EB_HJELPEM | None | Skal fyllast ut der det er aktuelt. Skriv Ingen dersom ingen hjelpemidlar er tillatt. |
| **Karakterskala**<br><br>**Grading Scale** | EB_K-SKALA | *The grading scale used is A to F. Grade A is the highest passing grade in the grading scale, grade F is a fail.* | Det finst to karakterskalaer:<br>• «bestått» / «ikkje bestått»<br>• Bokstavkarakterar med skalaen A, B, C, D, E, F<br>Jf. Universitets- og høgskolerådet:<br>http://www.uhr.no/ressurser/temasider/karaktersystemet_1/tekst_som_beskriver_det_norske_karaktersystemet |
| **Vurderingssemester**<br><br>**Assessment Semester** | EB_EKSSEM | *Digital exam each semester.* | |
| **Litteraturliste**<br><br>**Reading List** | EB_LEREM | *The reading list will be available within June 1st for the autumn semester and December 1st for the spring semester* | Litteraturlista ligg ikkje inne i sjølve emnebeskrivinga, noko som gjer at ho kan endrast utan emnebeskrivinga vert endra.<br><br>Men ho skal, slik det står i tekstfeltet, vere lagd inn på Mitt UiB før 1. juni for haustsemesteret og før 1. desember for vårsemesteret (jf kvalitetshandboka).<br><br>Litteraturlista bør skilje tydeleg mellom kjernelitteratur og eventuell annan tilrådd litteratur.<br><br>Lista kan óg gje eit oversyn over ulike former for digitale læringsressursar og verkty som skal brukast. |

Emnekode:

| | | | |
|---|---|---|---|
| **Emneevaluering**<br><br>**Course Evaluation** | EB_EVALUER | The course will be evaluated by the students in accordance with the quality assurance system at UiB and the department | Kor ofte skal emnet evaluerast?<br><br>*Ev. skildring av evalueringsmetode (elektronisk skjema, referansegruppe, osv) og evalueringsfrekvens (kvart år, annen kvart år, osv)* |
| **Programansvarleg**<br><br>**Programme Committee** | EB_PROGANS | The Programme Committee is responsible for the content, structure and quality of the study programme and courses. | |
| **Emneansvarleg**<br><br>**Course Coordinator** | EB_EMNANSV | *You find course- and administrative coordinator at MittUiB, you can also contact: studie@bio.uib.no* | |
| **Administrativt ansvarleg**<br>**Course Administrator** | EB_ADMANSV | *The Department of biological sciences is course administrator.* | |
| **Kontaktinformasjon**<br>**Contact Information** | EB_KONTAKT | Contact the Study Section at the Department of Biological Sciences: *studie@bio.uib.no* | |

Emnekode:

Forside til emnebeskrivinga

# Emnebeskriving for …….. *(Namn på emnet, nynorsk)*

…….. *(Navn på emnet, bokmål)*

…….. *(Name of the course, English)*

## *Godkjenning:*

*Emnebeskrivinga er godkjend av (Fakultetet brukar nemningar for godkjenningsorgan i samsvar med eigen praksis.):*

*Programstyret: …….(dd.mm.år)*

*Institutt for …….. : ……(dd.mm.år)*

*…… fakultet: …….(dd.mm.år)*

*Emnebeskrivinga vart justert: …….(dd.mm.år) av …….*

## *Evaluering:*

*Emnet vart sist evaluert: …….(dd.mm.år)*

*Neste planlagde evaluering: …….(dd.mm.år)*

Emnekode:

# *Mal for Det matematisk-naturvitskaplege fakultet*

## Mal for emnebeskrivingar ved Universitetet i Bergen - Course Plan

Eit studieprogram inneheld fleire emne. Ei emnebeskriving er ein detaljert plan for eitt av emna i eit studieprogram.
Krav til studiar går fram av *Forskrift for tilsyn med utdanningskvalitet i høyere utdanning (studietilsynsforskriften),* NOKUT 2013, http://link.uib.no/?21Vcl . UiBs *Forskrift om opptak, studier, vurdering og grader ved Universitetet i Bergen* (Studieforskrifta) gir i kapittel 3 reglar for studiestruktur og studieplan: http://link.uib.no/?YoXx

UiB si *Handbok for kvalitetssikring av universitetsstudia* gir meir rettleiing om ansvar, prosedyrar og krav til oppretting av studieprogram og emne (pkt. 16.1 og 16.4). Sjå http://www.uib.no/studiekvalitet .

Studietilsynsforskrifta (NOKUT) seier i § 7-4 at «Delene studiet består av skal utgjøre en samlet helhet i samsvar med læringsutbyttet for studiet», og at de «skal tilfredsstille standarder og kriterier for akkreditering av studier i § 7-1 til § 7-3.»

I tillegg til kategoriane i tabellen nedanfor, skal emnebeskrivinga innehalde følgjande informasjon: dato for godkjenning, dato for eventuelle justeringar, namn på instans som har godkjent beskrivinga, dato for førre evaluering og neste planlagde evaluering av emnet. Denne informasjonen skal stå på forsida til planen. Forsidemal finn ein sist i dette dokumentet.

Eventuelt forslag til tekst står i kursiv i kolonnen «Tekst». Rettleiing og nokre døme finn ein i kolonnen til høgre. Den må fjernast før emnebeskrivinga vert send til programstyre, institutt og fakultet.

Emnekode:

| Kategori | Infotype | Tekst - | |
|---|---|---|---|
| **Emnekode**<br><br>**Course Code** | | IMBRSeaBIO324<br><br>https://www.uib.no/en/course/BIO206 | |
| **Namn på emnet, nynorsk** | | | |
| **Namn på emnet, bokmål** | | | |
| **Course Title, English** | | Fish behaviour | |
| **Studiepoeng, omfang**<br><br>**ECTS Credits** | EB_POENG | 8 | |
| **Studienivå (studiesyklus)**<br><br>**Level of Study** | EB_NIVA | *Master* | |
| **Fulltid/deltid**<br><br>**Full-time/Part-time** | EB_FULLDEL | Full-time | Til dømes kan eit studieemne normert til eitt semester leggjast til rette for å gjennomførast på 2 semester. Det er då eit deltidsstudium med 50% studieprogresjon. |
| **Undervisningsspråk**<br><br>**Language of Instruction** | EB_SPRAK | English | |
| **Undervisningssemester**<br><br>**Semester of Instruction** | EB_UNDSEM | *Autumn* | |
| **Undervisningsstad**<br><br>**Place of Instruction** | EB_UNDSTED | | Skal fyllast ut dersom undervisninga ikkje er ved UiB, i Bergen. |

Emnekode:

| | | | |
|---|---|---|---|
| **Mål og innhald**<br><br>**Objectives and Content** | EB_INNHOLD | *The subjects are the genetic basis of fish behaviour, motivation and ontogeny, different reactions to stimulation, and the most important sense organs. Special emphasis will be put on the behavioural ecology of foraging, reproduction and schooling, in particular differences in behaviour between populations and individuals. Selected articles and monographs will be discussed in seminars.* | Om innhald:<br>Gi ei kort oversikt over faginnhaldet.<br><br>En behøver ikkje å ha med underoverskrifter (*Mål, innhald*). Det kan være en samanhengande tekst som dekker begge.<br>Det kan være greitt å begynne med «Målet med programmet/emnet er å … ( /at …) ..» for deretter å gå vidare med info om innhald og kanskje også trekke fram særlig viktige/karakteristiske sider ved programmet/emnet/fagområdet. |
| **Læringsutbyte (endret standardoppsett og introsetning)**<br><br>**Learning Outcomes** | EB_UTBYTTE | The course aims to provide students with increased knowledge about the organisation and function of fish behaviour and how it can be quantified and analysed. | Læringsutbyte er det ein person veit, kan og er i stand til å gjere som eit resultat av læringsprosessen. Læringsutbytet skal beskrivast i kategoriane kunnskapar, ferdigheiter og generell kompetanse. **(* Bruk verb i presens.)**<br>Ein kan sløyfe ein kategori dersom den ikkje er relevant. |
| **Krav til forkunnskapar**<br><br>**Required Previous Knowledge** | EB_KRAV | On master's level | Krav til forkunnskapar, eventuelt andre emne som skal vere bestått før opptak til emnet. Skriv ”Ingen” her dersom det ikkje finst slike krav. |
| **Tilrådde forkunnskapar**<br><br>**Recommended previous Knowledge** | EB_ANBKRAV | Compulsory subjects of Bachelor's in Biology | Kan fyllast ut om det trengst. |
| **Studiepoengsreduksjon**<br><br>**Credit Reduction due to Course Overlap** | EB_SPREDUK | BIO324 – 5 sp | Skal fyllast ut om emnet overlappar med andre emne. Talet på studiepoeng emnet overlappar med andre emne. |

Emnekode:

| | | | |
|---|---|---|---|
| **Krav til Studierett**<br><br>**Access to the Course** | EB_STUDRET | Access to the course requires admission to a programme of study at The Faculty of Mathematics and Natural Sciences | Her kan ein informere t.d. om emnet er eit tilbod berre til studentar som er tatt opp til eit bestemt program. |
| **Arbeids- og undervisningsformer**<br><br>**Teaching and Learning Methods** | EB_ARBUND<br><br>(Erstattar EB_UNDMETO) | Lectures and seminars. | Undervisningsformer kan vere seminar, gruppearbeid, prosjekt, førelesningar, feltkurs, laboratoriekurs osv.<br><br>Kravet til eit studieår (60 studiepoeng) er for studentane ved UiB 1600 arbeidstimar fordelt på 10 månader. Eitt – 1 – studiepoeng svarer til 26/27 arbeidstimar. Eit 15 studiepoengs emne har såleis 400 studietimar. Her reknar ein inn alle former for studierelatert arbeid. Tid til individuelt arbeid er det som blir att når ein trekkjer frå tida til organisert undervisning. |

Emnekode:

| | | | |
|---|---|---|---|
| **Obligatorisk undervisningsaktivitet**<br><br>**Compulsory Assignments and Attendance** | EB_OBLIGAT | Deltagelse i forelesningsemnene gjennom hele semesteret, med 20-25 min forelesninger hver, som evalueres til 20% av endelig karakter.<br><br>En kortere tematisk semesteroppgave (5-6 sider) som evalueres til 20 % av endelig karakter.<br><br>Skriftlig digital eksamen som vektes til 60% av endelig karakter.<br><br>Godkjente obligatoriske aktiviteter er gyldig i 6 semestre, inkludert inneværende. | Her registrerer ein både krav om obligatorisk frammøte og obligatoriske arbeidskrav. *Hugs å ta med tal på semester aktiviteten er gyldig.*<br>NB! Ein brukar omgrepet «godkjent» for å registrere at krava er oppfylte.<br><br>Egenandel: jf september 2017 brev fra KD: kan vi ikkje ta betalt for transport og oppoldsutgifter i forbindelse med obligatoriske undervisningsaktiviteter, herunder obligatorisk feltarbeid og ekskursjoner. Derfor er setning under fjernet.<br><br>*Standardsetning Eigendel::*<br>*«Dette emne har obligatorisk felt/toktbasert aktivitet og har eigendel ved gjennomføring av emne. Summen på eigendel vert opplyst ved oppstart på emne»*<br><br>*«This course has mandatory field work/scientific cruise and has course costs. The amount will be announced at course start."* |
| **Vurderingsformer**<br><br>**Forms of Assessment** | EB_VURDERI | Oral examination | Gi ei oversikt over vurderingsformene (eksempel skriftleg, munnleg, hjemmeeksamen) som blir brukte for å vurdere om læringsutbytet er oppnådd. Vis gjerne til dei læringsutbyta som vurderings-formene skal vurdere oppnåinga av.<br><br>Ta med faktainformasjon som er viktig for studenten, mellom anna om varigheit, vekting av dei ulike vurderingsdelane i høve til kvarandre, og elles ulike krav eller ordningar som gjeld her.<br><br>Angje her om skriftleg eksamen er digital og henvisning |

Emnekode:

| | | | |
|---|---|---|---|
| | | | til nettstad om digital vurdering for studentar:<br><br>Norsk:<br>http://www.uib.no/student/86719/digital-vurdering-studenter<br><br>Engelsk:<br><br>http://www.uib.no/en/student/87471/digital-assessment-students |
| **Hjelpemiddel til eksamen**<br><br>**Examination Support Material** | EB_HJELPEM | None | Skal fyllast ut der det er aktuelt. Skriv Ingen dersom ingen hjelpemidlar er tillatt. |
| **Karakterskala**<br><br>**Grading Scale** | EB_K-SKALA | *The grading scale used is A to F. Grade A is the highest passing grade in the grading scale, grade F is a fail.* | Det finst to karakterskalaer:<br>• «bestått» / «ikkje bestått»<br>• Bokstavkarakterar med skalaen A, B, C, D, E, F<br>Jf. Universitets- og høgskolerådet:<br>http://www.uhr.no/ressurser/temasider/karaktersystemet_1/tekst_som_beskriver_det_norske_karaktersystemet |
| **Vurderingssemester**<br><br>**Assessment Semester** | EB_EKSSEM | Autumn and spring | |
| **Litteraturliste**<br><br>**Reading List** | EB_LEREM | *The reading list will be available within June 1st for the autumn semester and December 1st for the spring semester* | Litteraturlista ligg ikkje inne i sjølve emnebeskrivinga, noko som gjer at ho kan endrast utan emnebeskrivinga vert endra.<br><br>Men ho skal, slik det står i tekstfeltet, vere lagd inn på Mitt UiB før 1. juni for haustsemesteret og før 1. desember for vårsemesteret (jf kvalitetshandboka).<br><br>Litteraturlista bør skilje tydeleg mellom kjernelitteratur og eventuell annan tilrådd litteratur.<br><br>Lista kan óg gje eit oversyn over ulike former for digitale læringsressursar og verkty som skal brukast. |

Emnekode:

| | | | |
|---|---|---|---|
| **Emneevaluering**<br><br>**Course Evaluation** | EB_EVALUER | The course will be evaluated by the students in accordance with the quality assurance system at UiB and the department | Kor ofte skal emnet evaluerast?<br><br>*Ev. skildring av evalueringsmetode (elektronisk skjema, referansegruppe, osv) og evalueringsfrekvens (kvart år, annen kvart år, osv)* |
| **Programansvarleg**<br><br>**Programme Committee** | EB_PROGANS | The Programme Committee is responsible for the content, structure and quality of the study programme and courses. | |
| **Emneansvarleg**<br><br>**Course Coordinator** | EB_EMNANSV | *You find course- and administrative coordinator at MittUiB, alternatively; studie@bio.uib.no* | |
| **Administrativt ansvarleg**<br>**Course Administrator** | EB_ADMANSV | *Department of Biological Sciences are course administrators.* | |
| **Kontaktinformasjon**<br>**Contact Information** | EB_KONTAKT | *Contact the Study Section at the Department of Biological Sciences:*<br>*studie@bio.uib.no* | |

Emnekode:

Forside til emnebeskrivinga

# Emnebeskriving for …….. *(Namn på emnet, nynorsk)*

…….. *(Navn på emnet, bokmål)*

…….. *(Name of the course, English)*

## *Godkjenning:*

*Emnebeskrivinga er godkjend av (Fakultetet brukar nemningar for godkjenningsorgan i samsvar med eigen praksis.):*

*Programstyret: …….(dd.mm.år)*

*Institutt for …….. : ……(dd.mm.år)*

*…… fakultet: …….(dd.mm.år)*

*Emnebeskrivinga vart justert: …….(dd.mm.år) av …….*

## *Evaluering:*

*Emnet vart sist evaluert: …….(dd.mm.år)*

*Neste planlagde evaluering: …….(dd.mm.år)*

Emnekode:

# *Mal for Det matematisk-naturvitskaplege fakultet*

## Mal for emnebeskrivingar ved Universitetet i Bergen - Course Plan

Eit studieprogram inneheld fleire emne. Ei emnebeskriving er ein detaljert plan for eitt av emna i eit studieprogram.
Krav til studiar går fram av *Forskrift for tilsyn med utdanningskvalitet i høyere utdanning (studietilsynsforskriften),* NOKUT 2013, http://link.uib.no/?21Vcl . UiBs *Forskrift om opptak, studier, vurdering og grader ved Universitetet i Bergen* (Studieforskrifta) gir i kapittel 3 reglar for studiestruktur og studieplan: http://link.uib.no/?YoXx

UiB si *Handbok for kvalitetssikring av universitetsstudia* gir meir rettleiing om ansvar, prosedyrar og krav til oppretting av studieprogram og emne (pkt. 16.1 og 16.4). Sjå http://www.uib.no/studiekvalitet .

Studietilsynsforskrifta (NOKUT) seier i § 7-4 at «Delene studiet består av skal utgjøre en samlet helhet i samsvar med læringsutbyttet for studiet», og at de «skal tilfredsstille standarder og kriterier for akkreditering av studier i § 7-1 til § 7-3.»

I tillegg til kategoriane i tabellen nedanfor, skal emnebeskrivinga innehalde følgjande informasjon: dato for godkjenning, dato for eventuelle justeringar, namn på instans som har godkjent beskrivinga, dato for førre evaluering og neste planlagde evaluering av emnet. Denne informasjonen skal stå på forsida til planen. Forsidemal finn ein sist i dette dokumentet.

Eventuelt forslag til tekst står i kursiv i kolonnen «Tekst». Rettleiing og nokre døme finn ein i kolonnen til høgre. Den må fjernast før emnebeskrivinga vert send til programstyre, institutt og fakultet.

Emnekode:

| Kategori | Infotype | Tekst |
|---|---|---|
| **Emnekode**<br><br>**Course Code** | | IMBRSeaBIO382<br><br>https://www.uib.no/emne/BIO382 |
| **Namn på emnet, nynorsk** | | Akvatisk matproduksjon |
| **Namn på emnet, bokmål** | | Akvatisk matproduksjon |
| **Course Title, English** | | Aquatic food production |
| **Studiepoeng, omfang**<br><br>**ECTS Credits** | EB_POENG | 10 |
| **Studienivå (studiesyklus)**<br><br>**Level of Study** | EB_NIVA | *Master* |
| **Fulltid/deltid**<br><br>**Full-time/Part-time** | EB_FULLDEL | Full-time |
| **Undervisningsspråk**<br><br>**Language of Instruction** | EB_SPRAK | English |
| **Undervisningssemester**<br><br>**Semester of Instruction** | EB_UNDSEM | *Autumn* |
| **Undervisningsstad**<br><br>**Place of Instruction** | EB_UNDSTED | |

Emnekode:

| | | |
|---|---|---|
| **Mål og innhald**<br><br>**Objectives and Content** | EB_INNHOLD | The aquatic environment covers about 70% the globe and is central in today's discussion on increased global food production. The challenges are both to produce enough food from well treated organisms and food with a good composition of nutrients. This course will give students a state of the art insight to how aquatic food production has global impact on food access and the environment and discuss the future potentials for growth. It will use a combination of selected scientific articles, interdisciplinary expert panels with outside guests, and Oxford-style student debates to elucidate key aspects of seafood production and nutritional value.<br><br>The aim of the course is to disseminate knowledge about the composition of seafood in relation to the global nutritional challenges; under nutrition, over nutrition and malnutrition, and how nutrients and contaminants are transported in the man-made food chain developed for aquaculture. We will discuss the sustainability of traditional and novel feed resources, which resources are limiting and which ingredients can supply the needed nutrients for the cultured organisms and for the people who eat them. Environmental effects of aquaculture, effects of climate on aquatic farming and the future potential of fisheries and aquaculture to contribute to the global food production will be discussed. |
| **Læringsutbyte (endret standardoppsett og introsetning)**<br><br>**Learning Outcomes** | EB_UTBYTTE | The student should explain well-founded, biologically based views within the course topics. He/she must be able to assess the extent to which claims are documented and distinguish between emotional, political and biological basis for decision making, show insight in current theories and could argue structured and convincing both in writing and orally. |
| **Krav til forkunnskapar**<br><br>**Required Previous Knowledge** | EB_KRAV | Bachelor's in Biology |
| **Tilrådde forkunnskapar**<br><br>**Recommended previous** | EB_ANBKRAV | Bachelor's in Biology |

Emnekode:

| Knowledge | | |
|---|---|---|
| **Studiepoengsreduksjon**<br><br>**Credit Reduction due to Course Overlap** | EB_SPREDUK | BIO382 |
| **Krav til Studierett**<br><br>**Access to the Course** | EB_STUDRET | Access to the course requires admission to a master's programme at The Faculty of Mathematics and Natural Sciences |
| **Arbeids- og undervisningsformer**<br><br>**Teaching and Learning Methods** | EB_ARBUND<br><br>(Erstattar EB_UNDMETO) | |

Emnekode:

| | | |
|---|---|---|
| **Obligatorisk undervisningsaktivitet**<br><br>**Compulsory Assignments and Attendance** | EB_OBLIGAT | *Written assignment, participation in at least one debate panel, participation in class.* |
| **Vurderingsformer**<br><br>**Forms of Assessment** | EB_VURDERI | *Folder evaluation of written and oral assignments* |
| **Hjelpemiddel til eksamen**<br><br>**Examination Support Material** | EB_HJELPEM | None |
| **Karakterskala**<br><br>**Grading Scale** | EB_K-SKALA | *The grading scale used is A to F. Grade A is the highest passing grade in the grading scale, grade F is a fail.* |

Emnekode:

| | | |
|---|---|---|
| **Vurderingssemester**<br><br>**Assessment Semester** | EB_EKSSEM | Autumn |
| **Litteraturliste**<br><br>**Reading List** | EB_LEREM | *The reading list will be available within June 1st for the autumn semester and December 1st for the spring semester.* |
| **Emneevaluering**<br><br>**Course Evaluation** | EB_EVALUER | The course will be evaluated by the students in accordance with the quality assurance system at UiB and the department. |
| **Programansvarleg**<br><br>**Programme Committee** | EB_PROGANS | The Programme Committee is responsible for the content, structure and quality of the study programme and courses. |
| **Emneansvarleg**<br><br>**Course Coordinator** | EB_EMNANSV | *You find course- and administrative coordinatior at MittUiB, alternatively: studie@bio.uib.no* |
| **Administrativt ansvarleg**<br>**Course Administrator** | EB_ADMANSV | *Department of Biological Sciences is responsible for the course.* |
| **Kontaktinformasjon**<br>**Contact Information** | EB_KONTAKT | *Contact the Study Section at the Department of Biological Sciences: studie@bio.uib.no* |

Emnekode:

# Emnebeskriving for: Akvatisk matproduksjon

# Aquatic Food Production

## *Godkjenning:*

*Emnebeskrivinga er godkjend av (Fakultetet brukar nemningar for godkjenningsorgan i samsvar med eigen praksis.):*

*Programstyret: …….(dd.mm.år)*

*Institutt for …….. : ……(dd.mm.år)*

*…… fakultet: …….(dd.mm.år)*

*Emnebeskrivinga vart justert: …….(dd.mm.år) av …….*

## *Evaluering:*

*Emnet vart sist evaluert: …….(dd.mm.år)*

*Neste planlagde evaluering: …….(dd.mm.år)*

Emnekode:

# *Mal for Det matematisk-naturvitskaplege fakultet*

## Mal for emnebeskrivingar ved Universitetet i Bergen - Course Plan

Eit studieprogram inneheld fleire emne. Ei emnebeskriving er ein detaljert plan for eitt av emna i eit studieprogram.
Krav til studiar går fram av *Forskrift for tilsyn med utdanningskvalitet i høyere utdanning (studietilsynsforskriften),* NOKUT 2013, http://link.uib.no/?21Vcl . UiBs *Forskrift om opptak, studier, vurdering og grader ved Universitetet i Bergen* (Studieforskrifta) gir i kapittel 3 reglar for studiestruktur og studieplan: http://link.uib.no/?YoXx

UiB si *Handbok for kvalitetssikring av universitetsstudia* gir meir rettleiing om ansvar, prosedyrar og krav til oppretting av studieprogram og emne (pkt. 16.1 og 16.4). Sjå http://www.uib.no/studiekvalitet .

Studietilsynsforskrifta (NOKUT) seier i § 7-4 at «Delene studiet består av skal utgjøre en samlet helhet i samsvar med læringsutbyttet for studiet», og at de «skal tilfredsstille standarder og kriterier for akkreditering av studier i § 7-1 til § 7-3.»

I tillegg til kategoriane i tabellen nedanfor, skal emnebeskrivinga innehalde følgjande informasjon: dato for godkjenning, dato for eventuelle justeringar, namn på instans som har godkjent beskrivinga, dato for førre evaluering og neste planlagde evaluering av emnet. Denne informasjonen skal stå på forsida til planen. Forsidemal finn ein sist i dette dokumentet.

Eventuelt forslag til tekst står i kursiv i kolonnen «Tekst». Rettleiing og nokre døme finn ein i kolonnen til høgre. Den må fjernast før emnebeskrivinga vert send til programstyre, institutt og fakultet.

Emnekode:

| Kategori | Infotype | Tekst |
|---|---|---|
| **Emnekode**<br><br>**Course Code** | | IMBRSeaBIO382<br><br>https://www.uib.no/emne/BIO382 |
| **Namn på emnet, nynorsk** | | Akvatisk matproduksjon |
| **Namn på emnet, bokmål** | | Akvatisk matproduksjon |
| **Course Title, English** | | Aquatic food production |
| **Studiepoeng, omfang**<br><br>**ECTS Credits** | EB_POENG | 10 |
| **Studienivå (studiesyklus)**<br><br>**Level of Study** | EB_NIVA | *Master* |
| **Fulltid/deltid**<br><br>**Full-time/Part-time** | EB_FULLDEL | Full-time |
| **Undervisningsspråk**<br><br>**Language of Instruction** | EB_SPRAK | English |
| **Undervisningssemester**<br><br>**Semester of Instruction** | EB_UNDSEM | *Autumn* |
| **Undervisningsstad**<br><br>**Place of Instruction** | EB_UNDSTED | |

Emnekode:

| | | |
|---|---|---|
| **Mål og innhald**<br><br>**Objectives and Content** | EB_INNHOLD | The aquatic environment covers about 70% the globe and is central in today's discussion on increased global food production. The challenges are both to produce enough food from well treated organisms and food with a good composition of nutrients. This course will give students a state of the art insight to how aquatic food production has global impact on food access and the environment and discuss the future potentials for growth. It will use a combination of selected scientific articles, interdisciplinary expert panels with outside guests, and Oxford-style student debates to elucidate key aspects of seafood production and nutritional value.<br><br>The aim of the course is to disseminate knowledge about the composition of seafood in relation to the global nutritional challenges; under nutrition, over nutrition and malnutrition, and how nutrients and contaminants are transported in the man-made food chain developed for aquaculture. We will discuss the sustainability of traditional and novel feed resources, which resources are limiting and which ingredients can supply the needed nutrients for the cultured organisms and for the people who eat them. Environmental effects of aquaculture, effects of climate on aquatic farming and the future potential of fisheries and aquaculture to contribute to the global food production will be discussed. |
| **Læringsutbyte (endret standardoppsett og introsetning)**<br><br>**Learning Outcomes** | EB_UTBYTTE | The student should explain well-founded, biologically based views within the course topics. He/she must be able to assess the extent to which claims are documented and distinguish between emotional, political and biological basis for decision making, show insight in current theories and could argue structured and convincing both in writing and orally. |
| **Krav til forkunnskapar**<br><br>**Required Previous Knowledge** | EB_KRAV | Bachelor's in Biology |
| **Tilrådde forkunnskapar**<br><br>**Recommended previous** | EB_ANBKRAV | Bachelor's in Biology |

Emnekode:

| Knowledge | | |
|---|---|---|
| **Studiepoengsreduksjon**<br><br>**Credit Reduction due to Course Overlap** | EB_SPREDUK | BIO382 |
| **Krav til Studierett**<br><br>**Access to the Course** | EB_STUDRET | Access to the course requires admission to a master's programme at The Faculty of Mathematics and Natural Sciences |
| **Arbeids- og undervisningsformer**<br><br>**Teaching and Learning Methods** | EB_ARBUND<br><br>(Erstattar EB_UNDMETO) | |

Emnekode:

| | | |
|---|---|---|
| **Obligatorisk undervisningsaktivitet**<br><br>**Compulsory Assignments and Attendance** | EB_OBLIGAT | *Written assignment, participation in at least one debate panel, participation in class.* |
| **Vurderingsformer**<br><br>**Forms of Assessment** | EB_VURDERI | *Folder evaluation of written and oral assignments* |
| **Hjelpemiddel til eksamen**<br><br>**Examination Support Material** | EB_HJELPEM | None |
| **Karakterskala**<br><br>**Grading Scale** | EB_K-SKALA | *The grading scale used is A to F. Grade A is the highest passing grade in the grading scale, grade F is a fail.* |

Emnekode:

| | | |
|---|---|---|
| **Vurderingssemester**<br><br>**Assessment Semester** | EB_EKSSEM | Autumn |
| **Litteraturliste**<br><br>**Reading List** | EB_LEREM | *The reading list will be available within June 1st for the autumn semester and December 1st for the spring semester.* |
| **Emneevaluering**<br><br>**Course Evaluation** | EB_EVALUER | The course will be evaluated by the students in accordance with the quality assurance system at UiB and the department. |
| **Programansvarleg**<br><br>**Programme Committee** | EB_PROGANS | The Programme Committee is responsible for the content, structure and quality of the study programme and courses. |
| **Emneansvarleg**<br><br>**Course Coordinator** | EB_EMNANSV | *You find course- and administrative coordinatior at MittUiB, alternatively: studie@bio.uib.no* |
| **Administrativt ansvarleg**<br>**Course Administrator** | EB_ADMANSV | *Department of Biological Sciences is responsible for the course.* |
| **Kontaktinformasjon**<br>**Contact Information** | EB_KONTAKT | *Contact the Study Section at the Department of Biological Sciences: studie@bio.uib.no* |

Emnekode:

# Emnebeskriving for: Akvatisk matproduksjon

# Aquatic Food Production

## *Godkjenning:*

*Emnebeskrivinga er godkjend av (Fakultetet brukar nemningar for godkjenningsorgan i samsvar med eigen praksis.):*

*Programstyret: …….(dd.mm.år)*

*Institutt for …….. : ……(dd.mm.år)*

*…… fakultet: …….(dd.mm.år)*

*Emnebeskrivinga vart justert: …….(dd.mm.år) av …….*

## *Evaluering:*

*Emnet vart sist evaluert: …….(dd.mm.år)*

*Neste planlagde evaluering: …….(dd.mm.år)*

Emnekode:

# *Mal for Det matematisk-naturvitskaplege fakultet*

## Mal for emnebeskrivingar ved Universitetet i Bergen - Course Plan

Eit studieprogram inneheld fleire emne. Ei emnebeskriving er ein detaljert plan for eitt av emna i eit studieprogram.
Krav til studiar går fram av *Forskrift for tilsyn med utdanningskvalitet i høyere utdanning (studietilsynsforskriften),* NOKUT 2013, http://link.uib.no/?21Vcl . UiBs *Forskrift om opptak, studier, vurdering og grader ved Universitetet i Bergen* (Studieforskrifta) gir i kapittel 3 reglar for studiestruktur og studieplan: http://link.uib.no/?YoXx

UiB si *Handbok for kvalitetssikring av universitetsstudia* gir meir rettleiing om ansvar, prosedyrar og krav til oppretting av studieprogram og emne (pkt. 16.1 og 16.4). Sjå http://www.uib.no/studiekvalitet .

Studietilsynsforskrifta (NOKUT) seier i § 7-4 at «Delene studiet består av skal utgjøre en samlet helhet i samsvar med læringsutbyttet for studiet», og at de «skal tilfredsstille standarder og kriterier for akkreditering av studier i § 7-1 til § 7-3.»

I tillegg til kategoriane i tabellen nedanfor, skal emnebeskrivinga innehalde følgjande informasjon: dato for godkjenning, dato for eventuelle justeringar, namn på instans som har godkjent beskrivinga, dato for førre evaluering og neste planlagde evaluering av emnet. Denne informasjonen skal stå på forsida til planen. Forsidemal finn ein sist i dette dokumentet.

Eventuelt forslag til tekst står i kursiv i kolonnen «Tekst». Rettleiing og nokre døme finn ein i kolonnen til høgre. Den må fjernast før emnebeskrivinga vert send til programstyre, institutt og fakultet.

Emnekode:

| Kategori | Infotype | Tekst |
|---|---|---|
| **Emnekode**<br><br>**Course Code** | | IMBRSeaBIOXXX |
| **Namn på emnet, nynorsk** | | |
| **Namn på emnet, bokmål** | | |
| **Course Title, English** | | Biological oceanography and ocean productivity |
| **Studiepoeng, omfang**<br><br>**ECTS Credits** | EB_POENG | 6 |
| **Studienivå (studiesyklus)**<br><br>**Level of Study** | EB_NIVA | *Master* |
| **Fulltid/deltid**<br><br>**Full-time/Part-time** | EB_FULLDEL | Full-time |
| **Undervisningsspråk**<br><br>**Language of Instruction** | EB_SPRAK | English |
| **Undervisningssemester**<br><br>**Semester of Instruction** | EB_UNDSEM | *Autumn* |
| **Undervisningsstad**<br><br>**Place of Instruction** | EB_UNDSTED | |

Emnekode:

| | | |
|---|---|---|
| **Mål og innhald**<br><br>**Objectives and Content** | EB_INNHOLD | An introduction to biological oceanography, the basis for marine productivity, and presentation of selected marine ecosystems and models. The course builds on theory, with hands-on practical exercises working with ocean models. Lectures and hands-on practical exercises are combined to help understand how physical processes and structure influence the biological interactions and distribution of marine organisms. Further topics include biological production - ocean versus land, the importance of microbial life in marine primary production, and marine productivity patterns and modelling |
| **Læringsutbyte (endret standardoppsett og introsetning)**<br><br>**Learning Outcomes** | EB_UTBYTTE | - Understand and be able to use modelling tools to study the driving forces of marine productivity<br>- Understand how physical processes and structure influence the biological interactions and distribution of marine organisms<br>- Be able to communicate scientific results from field studies<br>- Have knowledge of the basic effects of fisheries and harvesting/exploitation of marine biological resources<br>- Understand and consider the uncertainties in marine data collection and modelling and what that means for management advice |
| **Krav til forkunnskapar**<br><br>**Required Previous Knowledge** | EB_KRAV | Bachelor's in Biology |
| **Tilrådde forkunnskapar**<br><br>**Recommended previous Knowledge** | EB_ANBKRAV | Bachelor's in Biology |
| **Studiepoengsreduksjon**<br><br>**Credit Reduction due to Course Overlap** | EB_SPREDUK | BIO325 – 6 sp |

Emnekode:

| | | |
|---|---|---|
| **Krav til Studierett**<br><br>**Access to the Course** | EB_STUDRET | Access to the course requires admission to a master's programme at The Faculty of Mathematics and Natural Sciences |
| **Arbeids- og undervisningsformer**<br><br>**Teaching and Learning Methods** | EB_ARBUND<br><br>(Erstattar EB_UNDMETO) | *Lectures (16), Seminars (4) and Computerclass (12)* |
| **Obligatorisk undervisningsaktivitet**<br><br>**Compulsory Assignments and Attendance** | EB_OBLIGAT | *Lectures (16), Seminars (4) and Computerclass (12)* |
| **Vurderingsformer** | EB_VURDERI | *practical reports (modelling experiments), multiple choice exam* |

Emnekode:

| Forms of Assessment | | |
|---|---|---|
| **Hjelpemiddel til eksamen**<br><br>Examination Support Material | EB_HJELPEM | None |
| **Karakterskala**<br><br>Grading Scale | EB_K-SKALA | *The grading scale used is A to F. Grade A is the highest passing grade in the grading scale, grade F is a fail.* |
| **Vurderingssemester**<br><br>Assessment Semester | EB_EKSSEM | Autumn |
| **Litteraturliste**<br><br>Reading List | EB_LEREM | *The reading list will be available within June 1st for the autumn semester and December 1st for the spring semester.* |
| **Emneevaluering**<br><br>Course Evaluation | EB_EVALUER | The course will be evaluated by the students in accordance with the quality assurance system at UiB and the department. |
| **Programansvarleg**<br><br>Programme Committee | EB_PROGANS | The Programme Committee is responsible for the content, structure and quality of the study programme and courses. |
| **Emneansvarleg**<br><br>Course Coordinator | EB_EMNANSV | *You find course- and administrative coordinatior at MittUiB, alternatively: studie@bio.uib.no* |
| **Administrativt ansvarleg**<br>Course Administrator | EB_ADMANSV | *Department of Biological Sciences is responsible for the course.* |
| **Kontaktinformasjon**<br>Contact Information | EB_KONTAKT | *Contact the Study Section at the Department of Biological Sciences: studie@bio.uib.no* |

Emnekode:

# Emnebeskriving for: Biological oceanography and ocean productivity

## *Godkjenning:*

*Emnebeskrivinga er godkjend av (Fakultetet brukar nemningar for godkjenningsorgan i samsvar med eigen praksis.):*

*Programstyret: …….(dd.mm.år)*

*Institutt for …….. : ……(dd.mm.år)*

*…… fakultet: …….(dd.mm.år)*

*Emnebeskrivinga vart justert: …….(dd.mm.år) av ……*

## *Evaluering:*

*Emnet vart sist evaluert: …….(dd.mm.år)*

*Neste planlagde evaluering: …….(dd.mm.år)*

Emnekode:

# *Mal for Det matematisk-naturvitskaplege fakultet*

## Mal for emnebeskrivingar ved Universitetet i Bergen - Course Plan

Eit studieprogram inneheld fleire emne. Ei emnebeskriving er ein detaljert plan for eitt av emna i eit studieprogram.
Krav til studiar går fram av *Forskrift for tilsyn med utdanningskvalitet i høyere utdanning (studietilsynsforskriften),* NOKUT 2013, http://link.uib.no/?21Vcl . UiBs *Forskrift om opptak, studier, vurdering og grader ved Universitetet i Bergen* (Studieforskrifta) gir i kapittel 3 reglar for studiestruktur og studieplan: http://link.uib.no/?YoXx

UiB si *Handbok for kvalitetssikring av universitetsstudia* gir meir rettleiing om ansvar, prosedyrar og krav til oppretting av studieprogram og emne (pkt. 16.1 og 16.4). Sjå http://www.uib.no/studiekvalitet .

Studietilsynsforskrifta (NOKUT) seier i § 7-4 at «Delene studiet består av skal utgjøre en samlet helhet i samsvar med læringsutbyttet for studiet», og at de «skal tilfredsstille standarder og kriterier for akkreditering av studier i § 7-1 til § 7-3.»

I tillegg til kategoriane i tabellen nedanfor, skal emnebeskrivinga innehalde følgjande informasjon: dato for godkjenning, dato for eventuelle justeringar, namn på instans som har godkjent beskrivinga, dato for førre evaluering og neste planlagde evaluering av emnet. Denne informasjonen skal stå på forsida til planen. Forsidemal finn ein sist i dette dokumentet.

Eventuelt forslag til tekst står i kursiv i kolonnen «Tekst». Rettleiing og nokre døme finn ein i kolonnen til høgre. Den må fjernast før emnebeskrivinga vert send til programstyre, institutt og fakultet.

Emnekode:

| Kategori | Infotype | Tekst |
|---|---|---|
| **Emnekode**<br><br>**Course Code** | | IMBRSeaBIOXXY |
| **Namn på emnet, nynorsk** | | |
| **Namn på emnet, bokmål** | | |
| **Course Title, English** | | Quantitative methods for modern fisheries and marine research |
| **Studiepoeng, omfang**<br><br>**ECTS Credits** | EB_POENG | 6 |
| **Studienivå (studiesyklus)**<br><br>**Level of Study** | EB_NIVA | *Master* |
| **Fulltid/deltid**<br><br>**Full-time/Part-time** | EB_FULLDEL | Full-time |
| **Undervisningsspråk**<br><br>**Language of Instruction** | EB_SPRAK | English |
| **Undervisningssemester**<br><br>**Semester of Instruction** | EB_UNDSEM | *Autumn* |
| **Undervisningsstad**<br><br>**Place of Instruction** | EB_UNDSTED | |

Emnekode:

| | | |
|---|---|---|
| **Mål og innhald**<br><br>**Objectives and Content** | EB_INNHOLD | The course is aimed at understanding fisheries in an ecological context and with a global perspective. Topics include the distribution of marine biological resources and responsibility for management of the resources and the importance of fish resources for national economies. Population ecology and fisheries assessment models are covered, as well as the impact of uncertainties in marine data collection and modelling and what that means for management advice. |
| **Læringsutbyte (endret standardoppsett og introsetning)**<br><br>**Learning Outcomes** | EB_UTBYTTE | - Understand and be able to use modelling tools to study the driving forces of marine productivity<br><br>- Understand how physical processes and structure influence the biological interactions and distribution of marine organisms<br><br>- Have knowledge of selected habitats and nursery areas/recruitment areas of marine organisms and have an overview of the major inshore and open ocean organisms and their ecology<br><br>- Be able to plan and execute field work to answer research questions<br><br>- Have basic knowledge of the most common methods for collection of field data for modern marine research<br><br>- Be able to explain and evaluate the principles of different sampling approaches, and their strengths and weaknesses<br><br>- Be able to process, catalog, and interpret collected field samples and experimental data<br><br>- Be able to communicate scientific results from field studies<br><br>- Have knowledge of the basic effects of fisheries and harvesting/exploitation of marine biological resources<br><br>- Understand and consider the uncertainties in marine data collection and modelling and what that means for management advice |

Emnekode:

| | | |
|---|---|---|
| | | - Have learned to work as part of a team onboard a research ship, following safe practices in field work |
| **Krav til forkunnskapar**<br><br>**Required Previous Knowledge** | EB_KRAV | Bachelor's in Biology |
| **Tilrådde forkunnskapar**<br><br>**Recommended previous Knowledge** | EB_ANBKRAV | Bachelor's in Biology |
| **Studiepoengsreduksjon**<br><br>**Credit Reduction due to Course Overlap** | EB_SPREDUK | BIO325 – 6 sp |
| **Krav til Studierett**<br><br>**Access to the Course** | EB_STUDRET | Access to the course requires admission to a master's programme at The Faculty of Mathematics and Natural Sciences |
| **Arbeids- og undervisningsformer**<br><br>**Teaching and Learning Methods** | EB_ARBUND<br><br>(Erstattar EB_UNDMETO) | *Lectures (20), Practicals (4), Fieldwork (8) and Computerclass (4)* |

Emnekode:

| | | |
|---|---|---|
| **Obligatorisk undervisningsaktivitet**<br><br>**Compulsory Assignments and Attendance** | EB_OBLIGAT | *Lectures (20), Practicals (4), Fieldwork (8) and Computerclass (4)* |
| **Vurderingsformer**<br><br>**Forms of Assessment** | EB_VURDERI | lab report, oral exam |
| **Hjelpemiddel til eksamen**<br><br>**Examination Support Material** | EB_HJELPEM | None |
| **Karakterskala**<br><br>**Grading Scale** | EB_K-SKALA | *The grading scale used is A to F. Grade A is the highest passing grade in the grading scale, grade F is a fail.* |

Emnekode:

| | | |
|---|---|---|
| **Vurderingssemester**<br><br>**Assessment Semester** | EB_EKSSEM | Autumn |
| **Litteraturliste**<br><br>**Reading List** | EB_LEREM | *The reading list will be available within June 1st for the autumn semester and December 1st for the spring semester.* |
| **Emneevaluering**<br><br>**Course Evaluation** | EB_EVALUER | The course will be evaluated by the students in accordance with the quality assurance system at UiB and the department. |
| **Programansvarleg**<br><br>**Programme Committee** | EB_PROGANS | The Programme Committee is responsible for the content, structure and quality of the study programme and courses. |
| **Emneansvarleg**<br><br>**Course Coordinator** | EB_EMNANSV | *You find course- and administrative coordinatior at MittUiB, alternatively: studie@bio.uib.no* |
| **Administrativt ansvarleg**<br>**Course Administrator** | EB_ADMANSV | *Department of Biological Sciences is responsible for the course.* |
| **Kontaktinformasjon**<br>**Contact Information** | EB_KONTAKT | *Contact the Study Section at the Department of Biological Sciences: studie@bio.uib.no* |

Emnekode:

# Emnebeskriving for: Quantitative methods for modern fisheries and marine research

## *Godkjenning:*

*Emnebeskrivinga er godkjend av (Fakultetet brukar nemningar for godkjenningsorgan i samsvar med eigen praksis.):*

*Programstyret: …….(dd.mm.år)*

*Institutt for …….. : ……(dd.mm.år)*

*…… fakultet: …….(dd.mm.år)*

*Emnebeskrivinga vart justert: …….(dd.mm.år) av …….*

## *Evaluering:*

*Emnet vart sist evaluert: …….(dd.mm.år)*

*Neste planlagde evaluering: …….(dd.mm.år)*

Emnekode:

# *Mal for Det matematisk-naturvitskaplege fakultet*

## Mal for emnebeskrivingar ved Universitetet i Bergen - Course Plan

Eit studieprogram inneheld fleire emne. Ei emnebeskriving er ein detaljert plan for eitt av emna i eit studieprogram.
Krav til studiar går fram av *Forskrift for tilsyn med utdanningskvalitet i høyere utdanning (studietilsynsforskriften),* NOKUT 2013, http://link.uib.no/?21Vcl . UiBs *Forskrift om opptak, studier, vurdering og grader ved Universitetet i Bergen* (Studieforskrifta) gir i kapittel 3 reglar for studiestruktur og studieplan: http://link.uib.no/?YoXx

UiB si *Handbok for kvalitetssikring av universitetsstudia* gir meir rettleiing om ansvar, prosedyrar og krav til oppretting av studieprogram og emne (pkt. 16.1 og 16.4). Sjå http://www.uib.no/studiekvalitet .

Studietilsynsforskrifta (NOKUT) seier i § 7-4 at «Delene studiet består av skal utgjøre en samlet helhet i samsvar med læringsutbyttet for studiet», og at de «skal tilfredsstille standarder og kriterier for akkreditering av studier i § 7-1 til § 7-3.»

I tillegg til kategoriane i tabellen nedanfor, skal emnebeskrivinga innehalde følgjande informasjon: dato for godkjenning, dato for eventuelle justeringar, namn på instans som har godkjent beskrivinga, dato for førre evaluering og neste planlagde evaluering av emnet. Denne informasjonen skal stå på forsida til planen. Forsidemal finn ein sist i dette dokumentet.

Eventuelt forslag til tekst står i kursiv i kolonnen «Tekst». Rettleiing og nokre døme finn ein i kolonnen til høgre. Den må fjernast før emnebeskrivinga vert send til programstyre, institutt og fakultet.

Emnekode:

| Kategori | Infotype | Tekst |
|---|---|---|
| **Emnekode**<br><br>**Course Code** | | IMBRSeaBIOXYY |
| **Namn på emnet, nynorsk** | | |
| **Namn på emnet, bokmål** | | |
| **Course Title, English** | | Sampling and observational field methods |
| **Studiepoeng, omfang**<br><br>**ECTS Credits** | EB_POENG | 6 |
| **Studienivå (studiesyklus)**<br><br>**Level of Study** | EB_NIVA | *Master* |
| **Fulltid/deltid**<br><br>**Full-time/Part-time** | EB_FULLDEL | Full-time |
| **Undervisningsspråk**<br><br>**Language of Instruction** | EB_SPRAK | English |
| **Undervisningssemester**<br><br>**Semester of Instruction** | EB_UNDSEM | *Autumn* |
| **Undervisningsstad**<br><br>**Place of Instruction** | EB_UNDSTED | |

Emnekode:

| | | |
|---|---|---|
| **Mål og innhald**<br><br>**Objectives and Content** | EB_INNHOLD | Sampling and recording and handling marine field data, as well as data analysis and modelling, will give training in the central research methods for observation and assessing abundance of marine species. Field work/experiments will cover various techniques, using practical examples to evaluate the purpose, strengths and weaknesses of each approach. This will include common approaches for collecting data for marine research, such as surveys, acoustics, times series, ROVs, and their applications in process studies and resource mapping. The links between these and assessment and advice for exploitation of marine resources will be introduced in this course. |
| **Læringsutbyte (endret standardoppsett og introsetning)**<br><br>**Learning Outcomes** | EB_UTBYTTE | - Understand how physical processes and structure influence the biological interactions and distribution of marine organisms<br><br>- Have knowledge of selected habitats and nursery areas/recruitment areas of marine organisms and have an overview of the major inshore and open ocean organisms and their ecology<br><br>- Be able to use appropriate tools, including taxonomic keys, to identify common marine animals in Norwegian waters<br><br>- Be able to plan and execute field work to answer research questions<br><br>- Have basic knowledge of the most common methods for collection of field data for modern marine research<br><br>- Be able to explain and evaluate the principles of different sampling approaches, and their strengths and weaknesses<br><br>- Be able to process, catalog, and interpret collected field samples and experimental data<br><br>- Be able to communicate scientific results from field studies<br><br>- Have knowledge of the basic effects of fisheries and harvesting/exploitation of marine biological resources |

Emnekode:

| | | |
|---|---|---|
| | | - Understand and consider the uncertainties in marine data collection and modelling and what that means for management advice<br><br>- Have learned to work as part of a team onboard a research ship, following safe practices in field work |
| **Krav til forkunnskapar**<br><br>**Required Previous Knowledge** | EB_KRAV | Bachelor's in Biology |
| **Tilrådde forkunnskapar**<br><br>**Recommended previous Knowledge** | EB_ANBKRAV | Bachelor's in Biology |
| **Studiepoengsreduksjon**<br><br>**Credit Reduction due to Course Overlap** | EB_SPREDUK | BIO325 – 6 sp |
| **Krav til Studierett**<br><br>**Access to the Course** | EB_STUDRET | Access to the course requires admission to a master's programme at The Faculty of Mathematics and Natural Sciences |
| **Arbeids- og undervisningsformer**<br><br>**Teaching and Learning Methods** | EB_ARBUND<br><br>(Erstattar EB_UNDMETO) | *Lectures (20), Computerclass (12) and fieldwok (3 day cruise)* |

Emnekode:

| | | |
|---|---|---|
| **Obligatorisk undervisningsaktivitet**<br><br>**Compulsory Assignments and Attendance** | EB_OBLIGAT | *Lectures (20), Computerclass (12) and fieldwok (3 day cruise)* |
| **Vurderingsformer**<br><br>**Forms of Assessment** | EB_VURDERI | production of demo VIDEO on selected methods, field report, oral exam. |
| **Hjelpemiddel til eksamen**<br><br>**Examination Support Material** | EB_HJELPEM | None |
| **Karakterskala**<br><br>**Grading Scale** | EB_K-SKALA | *The grading scale used is A to F. Grade A is the highest passing grade in the grading scale, grade F is a fail.* |

Emnekode:

| | | |
|---|---|---|
| **Vurderingssemester**<br><br>**Assessment Semester** | EB_EKSSEM | Autumn |
| **Litteraturliste**<br><br>**Reading List** | EB_LEREM | *The reading list will be available within June 1st for the autumn semester and December 1st for the spring semester.* |
| **Emneevaluering**<br><br>**Course Evaluation** | EB_EVALUER | The course will be evaluated by the students in accordance with the quality assurance system at UiB and the department. |
| **Programansvarleg**<br><br>**Programme Committee** | EB_PROGANS | The Programme Committee is responsible for the content, structure and quality of the study programme and courses. |
| **Emneansvarleg**<br><br>**Course Coordinator** | EB_EMNANSV | *You find course- and administrative coordinatior at MittUiB, alternatively: studie@bio.uib.no* |
| **Administrativt ansvarleg**<br>**Course Administrator** | EB_ADMANSV | *Department of Biological Sciences is responsible for the course.* |
| **Kontaktinformasjon**<br>**Contact Information** | EB_KONTAKT | *Contact the Study Section at the Department of Biological Sciences: studie@bio.uib.no* |

Emnekode:

# Emnebeskriving for: Sampling and observational field methods

## *Godkjenning:*

*Emnebeskrivinga er godkjend av (Fakultetet brukar nemningar for godkjenningsorgan i samsvar med eigen praksis.):*

*Programstyret: ……(dd.mm.år)*

*Institutt for …….. : ……(dd.mm.år)*

*…… fakultet: ……(dd.mm.år)*

*Emnebeskrivinga vart justert: ……(dd.mm.år) av ……*

## *Evaluering:*

*Emnet vart sist evaluert: ……(dd.mm.år)*

*Neste planlagde evaluering: ……(dd.mm.år)*

**F STEP 1**
**2016 – Erasmus Mundus Joint Master Degrees (EMJMD)**

In this step the following information will be considered during the evaluation:

- **Award criterion:**
  - *Relevance of the project*

The information below provides guidance on the type and scope of information to be provided by applicants under the award criterion. Applicants should provide full but concise information on each point. The questions in *italics* should give guidance to applicants in order to respond to the award criterion.

The information provided by applicants on this first EMJMD award criterion should not exceed **15 pages in total** (Font 11 - Times New Roman).

Only those proposals that score at least 75% of the maximum allocated points (i.e. minimum 30 points out of 40) under this criterion will go to step 2 of the selection.

## A.1 ***Relevance of the project (maximum 40 points)***

A.1.1 The proposal's elements of *"jointness"*/integration, design and structure are tailored and effective for achieving the EMJMD aims and objectives.

*How does your proposed EMJMD reflect a common and integrated approach by the consortium? What concrete elements of "jointness" have been tailored and incorporated into the Master design/structure? How relevant are these elements for achieving the EMJMD's objectives?*

The International Master in Marine Biological Resources (IMBRSea), is a joint Master programme organized by eight leading European universities in the field of marine sciences, supported by the European Marine Biological Resource Centre (EMBRC). The IMBRSea programme takes the strengths from the International Master of Science in Marine Biodiversity and Conservation (EMBC+, formerly EMBC), and prepares students for the rapidly evolving demands of the blue bio-economy (all economic activities that depend on the sea) and research on the sustainable use of marine biological resources.

Industry and society face significant challenges to achieve growth and to further develop the blue bio-economy in Europe, in harmony with the European Union's (EU) Blue Growth strategy (see page 14 for a glossary of all words beginning with a capital letter and a list of abbreviations). The international, interdisciplinary and intersectoral nature of these challenges demands a similarly integrated approach to train the marine scientists of tomorrow. IMBRSea is designed so its students will graduate with both core and specialist competences and skills required by employers in key themes of the blue bio-economy: fisheries and aquaculture; nature conservation; sustainability; ecosystem based management; blue biotechnology and global change.

The proposed IMBRSea programme stems from the experience of different Partner universities in organizing the International Master of Science in Marine Biodiversity and Conservation, EMBC/EMBC+, successfully running since 2008 (http://www.embcplus.org): Ghent University (UGent - P1), University of Pierre and Marie Curie (UPMC - P2), University of the Algarve (UAlg - P3), University of Oviedo (UniOvi - P4), and Galway-Mayo Institute of Technology (GMIT - P5). Three new Partners, University of the Basque Country (UPV/EHU - P6), Polytechnic University of Marche (UNIVPM - P7), and University of Bergen (UiB - P8) will join the consortium in order to cover all complementary expertise fields relevant in organizing the IMBRSea programme.

Although the EMBC/EMBC+ programme was considered as a success story on many aspects, for different reasons addressed in the needs analysis in section A.1.3, the consortium decided, with the support of EMBRC, to assimilate EMBC/EMBC+ into an improved innovative Master programme: IMBRSea.

EMBRC is a distributed European research infrastructure consortium that was added to the roadmap of the European Strategy Forum for Research Infrastructures (ESFRI) in 2008 as a research infrastructure of pan-European interest. The consortium builds on its experience and will extend its coverage to meet the challenges of producing the marine scientists of the next generation. IMBRSea will be an integrated flagship programme that capitalizes on the operational, research and academic strengths of its members, to provide the best possible opportunities for employability and career development of programme graduates. The programme integrates the operational utility of EMBRC's research infrastructure for marine biology with the combined research and academic capacities of experienced Partner universities, and involves important non-academic actors to forge strong industry and

governmental links for training opportunities. The IMBRSea consortium members are connected through their participation in the EMBRC network, and have been able to work jointly to identify what is needed to enable improvements in European marine biological resources education and training.

The resulting programme is thus a joint and integrated project, consistent with the goals of the EMBRC consortium and aligned with the EMJMD objectives:

- O.1. to foster excellence, innovation, and internationalization in higher education institutions (HEIs);
- O.2. to increase the quality and the attractiveness of the European higher education area (EHEA) and to support the EU's external action in the higher education field, by offering full degree scholarships to the best Master students worldwide;
- O.3. and to improve the level of competences and skills of Master graduates, and in particular their relevance for the labour market, through an increased involvement of employers.

IMBRSea offers a common and integrated approach for the functioning of the programme, forming joint boards and committees that take responsibility for administrative matters via the Coordination office (CO) and Local secretariats (LS) which support the Programme board (PB). Selection of students is done by the Selection committee (SC). The Examination board (EB) is responsible for the student evaluations. Promotion of the programme for recruitment of students within and beyond Europe is led by a communication officer. Furthermore, the Programme board is in charge of curriculum review and educational quality control and is, in this role, advised by student representatives of both first and second years (Student board - SB) and by a committee of external stakeholders (External advisory board - AB). During the first preparatory and promotion/awareness-raising year, the programme will be advertised and the first intake of students selected, jointly by all Partners. See Figure 1 below for an organogram of IMBRSea.

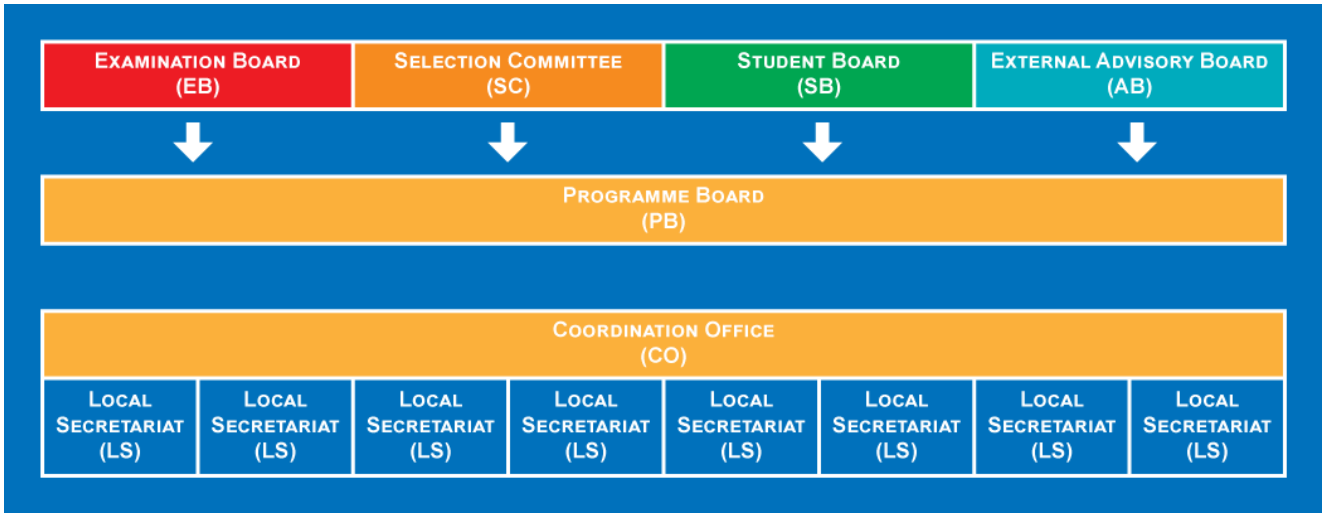



Figure 1: Organogram of IMBRSea

Integrated delivery of core competencies across the consortium occurs throughout the programme, and is complemented by the acquisition of specialist knowledge and skills aligned to student's personal interest. Figure 2 represents a detailed view on the structure of IMBRSea, see Annex 1 for a detailed view on the course offerings within each module. A jointly developed Fundamentals Module is delivered simultaneously by four Partners (UGent - P1, UPMC - P2, UAlg - P3 and UniOvi - P4) during the first semester of the programme. Further programme-level components include a Joint School and Annual Symposium, all planned and delivered jointly by Partners and Associate Partners. Specialization Tracks have been designed jointly by consortium Partners with complementary strengths to offer a progression of Thematic Modules of individual Courses. An online selection interface will allow students to evaluate all programme offerings, facilitating students in designing tailored Pathways through their selected Track, and the Thematic Modules within those Tracks that are most complementary to their chosen individual career paths.

IMBRSea combines the strengths of a jointly developed curriculum with the advantages of thematic specializations to enhance the educational outcomes and employability of student mobility, which is a fundamental pillar of the EMJMD concept. Programme-wide activities such as the Joint School and the Annual Symposium also foster good communication and networking among students and staff pursuing diverse thematic specializations. Teacher mobility and online teaching is built into the programme as part of the integrated delivery of programme-wide activities and jointly developed learning components.

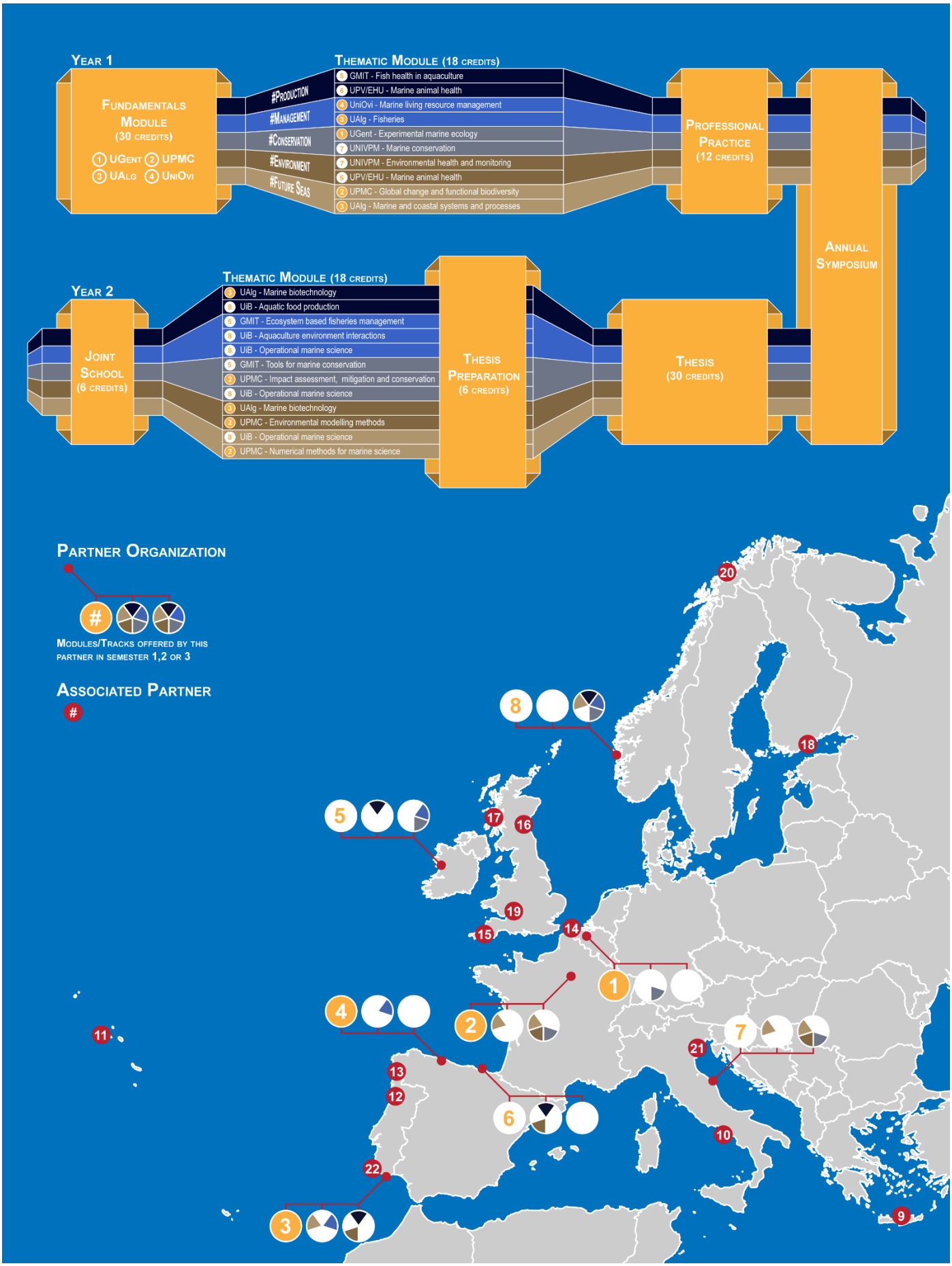



Figure 2: Structure and consortium of IMBRSea

The jointly developed curriculum reflects the cross-disciplinary components that are required to foster excellence, innovation and internationalization in marine science training, relevant to achieve the EMJMD objective 1 (O.1). The learning components offer a diversity of learning environments and real-world experiences, which showcase the quality and enhance the attractiveness of European HEIs, relevant to the EMJMD O.2. The teaching methods of the jointly developed curriculum exploit a diversity of learning platforms, including lectures, on-line modules, problem-based learning, activating teaching methods and study-led activities. The use of more active learning modes results in a more effective science learning experience and by adopting these principles, the IMBRSea programme will meet its objectives.

In the first semester, the Fundamentals Module, delivering basic knowledge and skills required by all programme graduates, will be taught at four universities (UGent - P1, UPMC - P2, UAlg - P3 and UniOvi - P4). This module contains six jointly developed Courses covering: Marine policy and governance, Marine genomics, Quantitative methods in marine science, Oceanography, Marine ecology, Marine GIS and spatial planning. In addition to these six Courses, students have also the opportunity to take one transferable skills Course (for example language training, scientific diving, scientific communication). For each of these topics, essential content, learning outcomes and the most appropriate learning and evaluation methodologies have been identified by a working group composed of experts from the four first year universities.

During the second and the third semester, the students follow two Thematic Modules, leading to one of the five Specialization Tracks defined according to the EU Horizon2020 Blue Growth innovation challenges:

1. Marine food production (#Production) led by UAlg - P3 and UPV/EHU - P6
2. Management of living marine resources (#Management), led by UniOvi - P4 and GMIT - P5
3. Applied marine ecology and conservation (#Conservation), led by UPMC - P2 and GMIT - P5
4. Marine environment health (#Environment), led by UAlg - P3 and UNIVPM - P7
5. Global ocean change (#FutureSeas), led by UPMV - P2 and UiB - P8

The curriculum in each Track is developed by the two Partner universities with the most expertise in the field of the Track, jointly with the other Partners involved in the curriculum of the concerned Track. During the first preparatory and promotion/awareness-raising year, the curriculum will be further reviewed by these expert groups and optimized where needed.

In the second half of the second semester, students will gain authentic experience during six weeks of Professional Practice offered by employers, relevant to EMJMD O.3. During these internships guidance of students by their industrial mentors will be integrated with support provided by academic supervisors from the Partner universities. At the end of the third semester, the students follow a jointly developed Thesis preparation before the start of their Thesis research. The first part of this preparation is a Joint School which will bring all students from the same cohort together for programme-wide training on multi-disciplinary topics, again relevant to EMJMD O.1. The Joint School is a truly integrated activity, organized and delivered by teachers representing each Partner university. Evaluations of student performance during the Joint School are also integrated: assessment criteria are common for all students and students are jointly assessed by representatives of the full consortium. Since the same evaluation criteria are used for the reports of the Joint School and the Thesis, the students gain a first exposure to this type of evaluation and feedback.

The second part of the Thesis preparation is more tailored to the individual student situation and her/his Thesis project. In all cases, transferable skills are important learning outcomes for the students to gain through topics including: project management, data management, research proposal writing and scientific communication. Transferable skills learning activities will be jointly developed assuring that, independent of the university where the student is, the same final competences are obtained. The Annual Symposium is a programme-wide activity that both first and second year students will attend, with important joint elements which address all EMJMD objectives. This is, amongst other activities, the forum for presentation and evaluation of the Master Thesis research (thesis defense). A jury will evaluate each Thesis and examine each student against jointly developed evaluation criteria (see Annex 2) that conform to the requirements of each HEI Partner, leading to the delivery of the Joint degree diploma. The Symposium also offers first year students the opportunity to see which choices are offered for their Thesis research. Associate Partners and other non-HEI actors will be encouraged to participate and take the opportunity to hold a professional (job) fair, relevant to EMJMD O.3., to attract students and future employees. Facilities for meet-places and interviews can also be made available at this professional fair within the Symposium.

Programme-wide activities are concrete joint measures that are incorporated into the design to deliver a better educational experience than available at a single institution. In addition, the consortium fosters increased cooperation between Partners and students. The Programme and Examination boards work together with assessment aligned to

learning outcomes. The Joint School and Annual Symposium ensure joint activities and planning. Students spend significant time together, so they can build up the network that will enhance their career prospects. Students who complete the IMBRSea programme, with its common and integrated approach, receive a Joint degree diploma, signed by a legal representative of all Partner universities. This Joint degree diploma meets EMJMD O.2. for increased attractiveness of European higher education. The Course curriculum and the cornerstones of the academic programme are clearly structured within a common framework, agreed upon by all consortium Partners.

A.1.2 The proposal describes how the EMJMD is integrated within the degree catalogues of partners and defines the degree(s) intended to be delivered, especially the award of an EMJMD joint degree, if national legislation allows.

*How does the EMJMD integrate within the accredited national degree catalogues of the HEIs partners from Programme Countries? Are these Master programmes recognised by all degree awarding consortium HEIs from Programme Countries? What type of degrees (joint/multiple/double degrees) will be provided to the EMJMD graduates? If applicable, outline the envisaged steps towards accreditation of the EMJMD as such and describe how the consortium will overcome any remaining obstacles for issuing joint degrees for EMJMD graduates?*

The IMBRSea programme will be supported by accredited local Master programmes currently running in all Partner universities (see Annex 3 for the links to the programme's website). The accreditation process for new courses will be finalized by the start of the proposed programme. IMBRSea graduates will receive a Joint degree diploma, signed by a legal representative of all Partner universities. As mentioned before IMBRSea is considered as the follow-up programme of the EMBC+ programme. Due to the fact that many of the modules and some of the thematic orientations have changed, it was decided to change the name "International Master of Science in Marine Biodiversity and Conservation" into the "International Master of Science in Marine Biological Resources". This change in name, as well as the change of courses, will be implemented in all the degree catalogues during the preparatory year, and thus before the start of the programme in September 2017.

Two accredited Master programmes are currently running at UGent (P1) of which Courses will support IMBRSea: the International Master of Science in Marine Biodiversity and Conservation (EMBC+) and the Master of Marine and Lacustrine Science and Management (Oceans and Lakes). Joint degree diplomas are possible at UGent.
The current accredited Master programmes on which IMBRSea will be based at UPMC (P2) are the International Master of Science in Marine Biodiversity and Conservation (EMBC+) and the Master en Océanographie, Environnement Marin - Oceanography and Marine Environment. The current accreditation includes the EMBC+ programme. In the framework of the new law for Higher Education and Research (loi 2013-660 of the 22nd of July 2013), the decree of the 4th of February 2014 fixes the MSc nomenclature, in which the corresponding degree is named Sciences de la Mer. At UPMC, a Joint degree diploma is possible, allowed by Decree 2005-450 of 11th of May 2005.
Two Masters in Aquaculture and Fisheries, and Marine Biology are the backbone of the current accredited EMBC+ programme at UAlg (P3). Both of the Master programmes were recently evaluated by A3ES (Agência de Avaliação e Acreditação do Ensino Superior) and have received a preliminary accreditation. In addition, the Master in Biotechnology will provide the Courses for the Thematic Module on marine biotechnology. This Master is accredited by A3ES. The Master in Marine and Coastal Systems will contribute to the Thematic Module on marine and coastal systems and processes at UAlg. In Portugal Joint degrees are possible according to decree-law nº 67/2005 of 15 March 2005.
Two accredited Masters with strong emphasis on management and monitoring of marine environments are offered at UniOvi (P4): EMBC+, accredited by ANECA (National Agency for Quality Evaluation and Accreditation) on 17/07/2015 with an ID 4315572, and Máster Universitario en Conservación Marina – Master in Marine Conservation (60 ECTS), accredited by ANECA on 17/07/2015 with an ID 4315571. UniOvi offers the possibility for Joint degree diplomas.
EMBC+ is currently running at GMIT (P5) and GMIT has an MSc in environmental resource management GMIT has the power to award Joint degrees under delegated authority from the Irish National Quality Assurance (QA) Agency, Quality and Qualifications Ireland (QQI), established by the Quality Assurance and Qualifications (Education and Training) Act 2012.
Two accredited Master programmes are running at UPV/EHU (P6) of which Courses will support IMBRSea: the Master in Environmental Contamination and Toxicology (CTA) and the European Master in Marine Environment and Resources (MER). Joint degree diplomas are possible at UPV/EHU.
The current accredited Master programme on which the IMBRSea programme will be based at UNIVPM (P7) is called Master in Marine Biology. UNIVPM offers two Thematic Modules in IMBRSea, on environmental health and monitoring, and on marine conservation. UNIVPM can offer Joint degree diplomas.

At UiB, the Master of Science in Biology, with seven specialization options relevant to IMBRSea (Microbiology; Marine biology; Fisheries biology and management; Aquaculture biology; Biodiversity, evolution and ecology; Developmental biology and physiology; Environmental toxicology), is offered. The Thematic Modules offered by UiB are composed of Courses which are currently in the university catalog. The Joint degree will be entered into the programme catalog with its own programme code after approval by the department and faculty programme boards, and Norwegian Agency for Quality Assurance in Education (NOKUT) accreditation. NOKUT is the government body that accredits Joint degrees, and an application will be made for full accreditation of the full IMBRSea programme following the legal government regulations.

### A.1.3 The proposed EMJMD responds to clearly identified needs in the academic field.

*How did the consortium conduct the needs analysis on which the proposal is built? Based on the needs analysis results (at national/international level), what does the proposal offer as added value in concrete terms? How does this justify EU financial support?*

In order to identify the needs for marine scientists with different specialization fields, a needs analysis was conducted based on (see Annex 4 for the complete list):

1) European Union and national marine policy documents and directives, including the Marine Strategy Framework Directive, Horizon2020 and Blue Growth EU Maritime Affairs;
2) the EMBRC Marine Training Portal (MarineTraining.eu), a centralized access point for marine training that has carried out a Marine Graduate Training Survey with the European Marine Board (EMB) Working Group on Marine Graduate Training of which some of the consortium members are members, and will produce a Future Science Brief;
3) analysis of other Master programmes;
4) non-academic stakeholder (industry) input.

The EU's blue bio-economy (all economic activities that depend on the sea) provides 5.4 million jobs and a gross added value of around €500 billion/year. Blue Growth is the long term strategy to support sustainable growth in the marine and maritime sectors as a whole. Seas and oceans are drivers for the European economy and have great potential for innovation and growth. It is the maritime contribution to achieving the goals of the Europe2020 strategy for smart, sustainable and inclusive growth. The Blue Growth EU Maritime Affairs policy highlights the need to develop sectors that have a high potential for sustainable jobs and growth, such as aquaculture, coastal tourism and marine biotechnology. The blue bio-economy will be driven by knowledge, requires legal certainty and security and sea basin specific strategies.

The European Marine Board Working Group on Marine Graduate Training: Future Science Brief (FSB) for building future marine graduate training programmes states the need "*...to bridge the culture gap between disciplines, marine and maritime sectors, to create an interdisciplinary and adaptable workforce that can tackle holistic ocean issues, marine graduate training needs"*, identifying the most promising segments of the marine and maritime sectors for marine graduate programmes and the need for innovative training, including transferable skills. It also highlights the importance of internationalization, with the need to coordinate and support mobility for training activities in search of an enhanced European training network in marine science, multidisciplinary sea-going practical training, removal of barriers to providing such training by for example: alliances with European Research Vessels Operators (ERVO), through programmes like Eurofleets or collaborative initiatives with RV operators, and the creation of national/European knowledge alliances or networks for exchange of learning/teaching practice, skills, quality assurances (QA) and standardization of training. It also promotes active partnerships between academia, policy and industry. It recommends best practice exchanges and co-design of training programmes between sectors, in the form of internships, work experience, practical training and invited lectures, and the inclusion of policy and industrial components in Master programmes.

Based on analysis of the information compiled on 482 Master programmes in the EMBRC Marine Training Portal (MarineTraining.eu), there are only 15 marine and maritime Joint Master programmes across Europe, of which nine are in the marine natural sciences area. None of these, however, cover the interdisciplinary area covered by IMBRSea. Furthermore, none of the five specializations that will be offered in the IMBRSea programme are clearly covered by any existing joint Master programme.

National needs analyses based on marine policy documents of different countries show that each country has its own national and even regional priorities/needs. For example the Regional Strategy for Research and Innovation of Intelligent Specialization for the Algarve region in Portugal (RIS3 - ALGARVE 2014-2020) aims to promote research and development (R&D) in marine sciences to increase our understanding of the sea, while (i) adding value to the economy of the sea, and (ii) better managing the natural resources associated to the sea. Blue bio-economy opportunities linked to the extension of the Portuguese continental platform to approximately 4,000,000 $km^2$ are identified, namely biotechnology and biomedical applications of marine living resources. On the other hand, the Portuguese national marine policy documents identify gaps and threats, especially in terms of lack of knowledge and training of qualified personnel for the development of the blue bio-economy. This point is also highlighted in feedback from industry. For example, in Norway, the seafood industry board has declared that there is a lack of students/graduates with multidisciplinary studies, and also a lack of students who have spent any time in a commercial setting. They worry that the next generation is not ready for joining the industry.

Furthermore, many problems facing the marine environment (e.g. climate change) are on a global scale, requiring a pan-European large-scale geographic approach. IMBRSea covers the four Marine Regions of the Marine Strategy Framework Directive: the Baltic Sea, the Black Sea, the Mediterranean Sea and the North-East Atlantic Ocean (including the Barents Sea and sub-Arctic) and the waters surrounding the Azores, Madeira and the Canary Islands. The diversity of ecosystems, problems and needs of these marine regions requires different approaches and solutions. Thus there is a need for flexible, adaptable, integrative students who have experienced a number of different learning environments, exposure to different ecosystems, cultures and languages.

From sources for job opportunities (see Annex 4) consulted in January 2016, 30 job vacancies in relevant marine sciences were attributed to the five Specialization Tracks that IMBRSea will offer. Marine food production covers 27% of the vacancies, Management of living marine resources 7%, Applied marine ecology and conservation 36%, Marine environment health 23% and Global ocean change 7% (see Figure 3). It is worth noting that all the five thematic specializations defined in the proposal are actively looking for job positions, highlighting the relevance of the training strategy of the project.

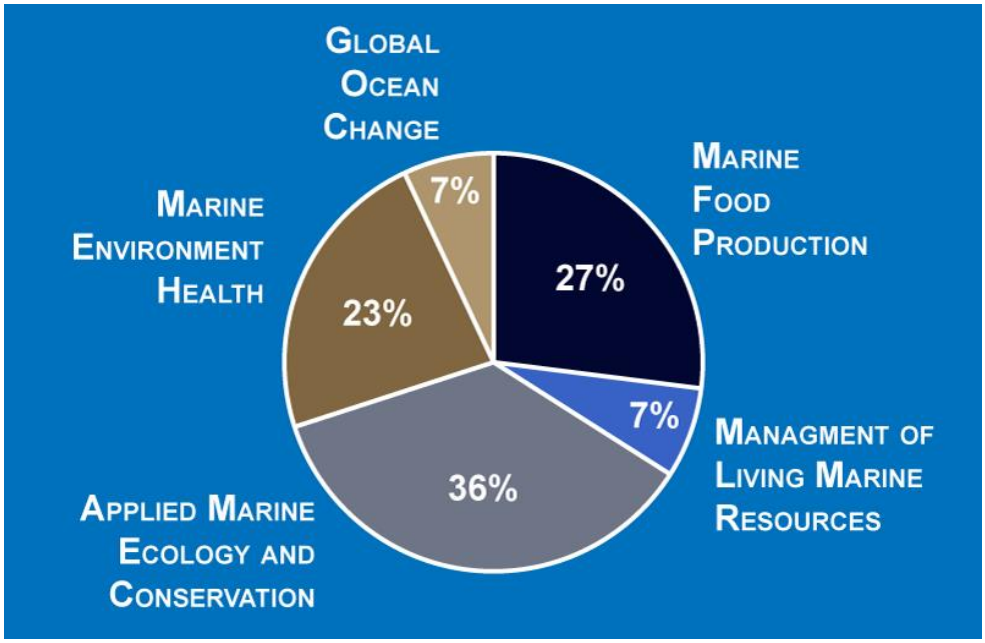


Figure 3: Relevant job opportunities for different Specialization tracks

An added value of the joint IMBRSea programme is the involvement of a broad network of key research institutes and universities. Five of the current EMBC+ universities (UGent (coordinator); UAlg, UPMC, UniOvi, GMIT) which have already proven their excellence in the highly successful EMBC/EMBC+ programme, will be joined by UiB, UNIPVM and UPV/EHU in the current consortium. The IMBRSea programme, however, will introduce the students to a considerably broader international network through its embeddedness in EMBRC, leading to Professional Practices and Thesis work in a variety of environments. The IMBRSea programme will continue with the involvement of external lecturers (scholars), as well as with the exchange of IMBRSea lecturers. This possibility, supported by the Erasmus Mundus funding, enables the programme to invite the best lecturers and researchers from around the globe to teach particular aspects of the programme. National Master programmes in similar topics are running simultaneously in each of the universities of the eight main Partners. However, students who are looking for innovative methods in

teaching and challenging issues related to multidisciplinary approaches, are attracted not only by the mobility within the IMBRSea joint programme, but also by the clearly indicated interdisciplinary challenge. In other comparable, but local Master programmes there are also possibilities to spend a period of the study programme in another country by means of bilateral agreements and regular Erasmus Mobility grants. However, this mobility depends on the students' initiative, and well-structured tracks and support are lacking which often results in problems regarding the recognition of the obtained credits in the mobility university or insufficient integration pathways.

IMBRSea will provide essential components to acquire scientific knowledge, legal certainty and security in the blue bio-economy, primarily in regard to marine knowledge, maritime spatial planning and integrated marine surveillance (environmental data, monitoring, fisheries, pollution). It will train people to contribute to creating a common framework for maritime spatial planning and in the key sectors which have a high potential for sustainable jobs and growth including aquaculture and fisheries, applied ecology and ecotoxicology, and marine biotechnology. The new programme meets the recommendations and needs of the EMB WG Future Science Brief by developing active partnerships between academia, policy makers and industry. It will promote best practice exchanges and co-design of training programmes between sectors through internships, work experience, practical training and guest lectures. Policy, governance and industrial components will be included in the curricula. IMBRSea will offer innovative training, including compulsory transferable skills such as language training, boat handling and scientific diving. Through the EMBRC and IMBRSea consortia there will be creation of networks, opportunities to exchange learning/teaching practices, skills, quality assurance, and standardization of training. The link with EMBRC offers access to research vessels and mobile platforms/marine stations to provide multidisciplinary sea-going practical training which is essential for marine scientists.

Ecosystem-based management and assessment will become more important in meeting the climate goals Europe has signed up to. Oceans deliver multiple resources for renewable energy (e.g. tide and wave generators, algal biomass, space for wind-turbines). The planning and environmental assessment needed to transition to a C-neutral Europe depends on highly qualified marine graduates with integrated skills, cross-disciplinary knowledge, and applied real-world experience. IMBRSea addresses the main policy drivers identified by EMBRC as being of national and pan-European importance, based on documents in the public domain. The programme covers research themes that have been identified as currently being supported by EMBRC Partners, and which are considered to be important national and pan-European strategic research priorities in marine biology including biodiversity and ecosystem function, biogeochemistry and global change, marine products and resources.

The programme will enable students to acquire and advance their scientific knowledge and training through this active, modern and effective learning environment. This experience will enable them (during and after) to participate in actions such as the Good Environmental Status (GES) asked by the Marine Strategy Framework Directive (MSFD) and the objectives of other international and national strategies and policies, such as Water Framework Directive, EU Biodiversity Strategy to 2020, Integrated Maritime Policy, Common Fisheries Policy, Habitats Directive and OSPAR convention.

The IMBRSea programme will be attractive for students looking for university excellence, innovation and competitiveness. This is clearly manifested in the standing of the universities involved. UGent, for instance, now ranks within the top-100 worldwide based on indicators measuring research productivity and quality. The Shanghai Ranking as well has recognized UGent's research profile as the best in Belgium. The university was placed within the top 10 by the readers of The Scientist in their most recent list of best places to work in academia outside the US (http://www.ugent.be/en/ghentuniv/presentation/rankings.htm). Many non-European and European students will be attracted by the IMBRSea programme because of the integration of university excellence into a well-structured and ambitious EMJMD programme. According to their description and objectives, most of the identified Master programmes relevant to marine sciences are well established and offer a high quality education. We believe, however, that expanding the study experience to different institutions, each with their specific approach, offers a substantial added value, compared with regular national programmes. A survey carried out among the alumni of the EMBC/EMBC+ programme showed that 94% of the respondents consider studying at several universities as 'very important', an opinion that is shared by 60% of their current employers.

We envisage that EU financial support for this EMJMD will reinforce the attractiveness of the European Higher Education Area (EHEA) through the following innovative and challenging elements:

1) increasing the number of Partner Country students (via Erasmus Mundus scholarships);
2) enabling students to get training in areas of great relevance and importance for their national economies, development, health and well-being and developing a network of graduate ambassadors who can in turn promote the interest of new students from their home countries;
3) organizing long-term sea-going training activities across European (crucial for skills training and community building), providing the ideal format for "team science approach" in order to promote collaborative and cross-disciplinary approaches;
4) integrate students into the wider EMBRC network;
5) involving, in a more structural way, both Programme and Partner Country institutes and industry through internships and thesis research placements;
6) opening our knowledge and skills to a wider audience by providing online educational tools for marine sciences;
7) developing a clear strategy to communicate outcomes of the programme, and;
8) integrating international students within local communities.

Finally, EU financial support of this joint Masters programme is justified by the need for greater employability of graduates. In Norway for example, the seafood industry board has declared that there is a lack of students/graduates with multidisciplinary studies, and of students who have spent any time in a commercial setting. There is a clear need to improve quality and renew the training of future marine resources scientists. A crucial part of that is taking the aligned learning outcome approach to improve student learning, and improve the professionalism of our science teaching. The innovative structure and approach of the IMBRSea programme, involving different Specialization Tracks, student and teacher mobility, practical experience in industry during Professional Practices, and joint activities will produce graduates who will be better trained and more attractive to employers, helping to unlock the potential of marine living resources and contributing to biological and socio-economic sustainability.

### A.1.4 The proposal defines the academic programme and learning outcomes of the EMJMD aiming to increase the attractiveness of the European Higher Education Area, and to foster excellence, innovation and competitiveness in terms of academic fields/subjects targeted.

*What precisely are the main academic subjects on which the EMJMD proposal has been built? How relevant are they in the context of the academic discipline(s)/field(s)? What are the learning outcomes that the Master aims to achieve? What is new and innovative in your EMJMD proposal, and how does this contribute to university excellence and competitiveness in the targeted academic subjects/field(s)? How relevant are the expected project results in terms of strengthening innovation and excellence not only of the HEIs involved, but also of the European higher education in general vis-à-vis other regions and competitors in the education field? In which way does the proposal contribute to increasing the attractiveness and internationalisation of the European Higher Education Area?*

Based on the objectives of the EMBRC consortium, IMBRSea covers a wide, yet consistent, range of subjects within the marine sciences and biological resources. With an emphasis on marine biological and ecological processes, the programme links biology of marine organisms and environmental studies with subjects in marine policy and planning. The subjects are covered through Thematic Modules in Specialization Tracks to prepare the next generation of scientists who need to understand the marine ecosystem functioning and conservation of biodiversity to work in biological resources exploitation and management. IMBRSea offers a unique combination of Courses, Annual Symposia, Professional Practices and Thesis subjects in an integrated program to learn how to develop blue biotechnologies in a sustainable way (see Annex 1 for a detailed view on the course offerings in each module).

Marine biological systems are complex, and understanding the processes and functioning for sustainable management requires a learning programme that crosses several academic disciplines. The Specialization Tracks through the Thematic Modules enable the students to work at the interface of biology, chemistry and physics, and to apply their knowledge to problems that have the societal dimension. By including multi-disciplinary aspects such as Marine policy and governance and spatial planning, the students will be prepared for the changing role of scientists in building Europe's blue society. These academic subjects are at the confluence of a wide range of disciplines, both theoretical and applied, that must be integrated in order to provide students systematic understanding of how sciences can contribute to a better rational exploitation and protection of living resources within the evolving marine biosphere. This challenge is far beyond the possibilities of one particular university, and only a consortium of universities, already specialized in various fields of marine sciences, and collaborating to one unified formation can address this challenge.

The learning outcomes of the IMBRSea programme are defined consistent with the goals of the EMBRC consortium and aligned with the EMJMD objectives to offer an educational opportunity leading to a comprehensive understanding of the structure and dynamics of marine systems, integrating biological, physical and chemical components at different scales of organization. It includes a critical awareness of the factors affecting structure and functioning of marine systems in which living resources are studied, and a critical awareness on how scientific knowledge is applied to marine resources exploitation and management. The programme-level learning outcomes (LOs) are defined as below:

- LO.1 The graduated student possesses a broad knowledge at an advanced level in all basic aspects of marine sciences and can access, analyze and interpret scientific information;
- LO.2 The graduated student has acquired a scientific problem solving capacity to formulate and test hypotheses, to design research protocols, and to collect, analyze and interpret data;
- LO.3 The graduated student is able to apply appropriate theoretical and practical concepts in a professional context and, when required, identify and utilize opportunities for continuous professional development in response to emerging techniques, knowledge and challenges in the field of marine sciences;
- LO.4 The graduated student demonstrates an ability to integrate with, or lead multidisciplinary teams reflecting the breadth of the field of marine sciences and variety of professional roles;
- LO.5 The graduated student is able to communicate with peers, with various stakeholders in marine sciences, and with a general public concerning scientific concepts and research;
- LO.6 The graduated student is able to examine societal, environmental and policy concerns and consequently to apply the scientific method to match these demands with scientific challenges and opportunities.

These learning outcomes arise from the programme-wide activities; specifically on completion of the Fundamentals Module, the Professional Practice, the Joint School and Annual Symposia, and the development and completion of the Thesis preparation and research. Students follow individual Pathways through the Specialization Tracks, choosing among the different Thematic Modules containing individual Courses. Courses within the Modules have defined learning outcomes, but for clarity learning outcomes are defined for each Track below together with the associated opportunities for Professional Practices facilitating these LOs and further career options.

***Marine food production***

- LO.#Production.1 The graduated student understands biological principles of culturing marine organisms for food or products;
- LO.#Production.2 The graduated student understands vectors of disease/parasites and principles of managing marine animal health in culture;
- LO.#Production.3 The graduated student understands challenges and societal conflicts arising from increased production of food and products from the marine environment.

Professional Practice opportunities: national and international aquaculture enterprises in Norway, Chile, UK, Ireland, France, Spain, Greece, Portugal, Canada, Iceland, USA, China, South-East Asia; aquaculture disease management research and development (R&D) companies; seafood processing and technology sector; feed companies; regional planning offices (language dependent); non-governmental organizations (NGOs) working on certification for example Marine Stewardship Council (MSC), Aquaculture Stewardship Council (ASC).
Potential employment sectors: Graduates with this Specialization Track will be competitive applicants and attractive to employers for jobs in the aquaculture sector as employee or self-employed in production, managerial, sales or technical roles; in the seafood processing and technology sector; in national or regional planning offices (evaluation of site licenses); in animal feed/pharmaceutical and aquamedicine companies; for further veterinary training; with NGOs for food security, food safety and authenticity.

***Management of living marine resources***

- LO.#Management.1 The graduated student understands and is able to apply quantitative methods of population assessment, including survey methods, data collection, analysis, and assessment models;
- LO.#Management.2 The graduated student understands the ecological principles governing variability in marine resource availability and its sustainable exploitation;
- LO.#Management.3 The graduated student is able to identify the major stakeholders and the conflicts arising from exploitation of marine resources in Europe.

Professional Practice opportunities: national fisheries directorate/ministry, for example Food and Agriculture Organization (FAO), International Council for the Exploration of the Sea (ICES), secretariat or working and expert

groups; research laboratories (especially with EMBRC partners); national and international assessment and management agencies; trade associations; producer's organizations; NGOs and conservation lobbies.
Potential employment sectors: Graduates with this Specialization Track will be competitive applicants and attractive to employers for jobs in fisheries research (as scientist or technician) at national and international fisheries institutes; regional fisheries management boards; advising bodies to commercial fishing companies and associations; consultancy companies (e.g. development of fisheries management plans); environmental impact assessment; climate change effects, as database manager; fisheries monitoring; conservation; fisheries advisory bodies (at NGO or government ministry level); regional planning offices (coastal zone planning); mineral and oil exploitation companies; NGOs for food security, food safety and labeling, and authenticity; lobbying.

***Applied marine ecology and conservation***

- LO.#Conservation.1 The graduated student understands the principles of ecological interactions and how they shape the marine communities and their response to environmental pressures;
- LO.#Conservation.2 The graduated student is able to evaluate and assess anthropogenic impacts on marine ecosystems, services and resources, and to identify mitigation and remediation measures that can be taken on short and long terms;
- LO.#Conservation.3 The graduated student is able to implement restoration and conservation initiatives, together with the design and analysis of environmental monitoring schemes.

Professional Practice opportunities: national and international environmental consultancy companies (e.g. RPS Group, Fugro); offshore oil and gas sector (e.g. Shell, Statoil, Aqip); offshore marine renewable energy sector; NGOs; public sector; regulatory/statutory authorities.
Potential employment sectors: Graduates with this Specialization Track will be competitive applicants and attractive to employers for jobs in compliance/observer activities for offshore oil and gas companies, marine construction, dredging and pipe/cable laying; marine renewable energy sectors; NGOs; lobbying; marine spatial management/planning.

***Marine environment health***

- LO.#Environment.1 The graduated student knows the sources and response pathways of pollutant exposure for marine organisms;
- LO.#Environment.2 The graduated student can design and implement testing programmes with appropriate methodology for monitoring marine ecosystem health within the regulatory frameworks;
- LO.#Environment.3 The graduated student is able to apply molecular biology and biotechnology techniques to problems in ecotoxicology, water quality and to find remediation solutions.

Professional Practice opportunities: environmental consulting firms on impact assessment; research institutes working on ecotoxicology projects; regional water quality offices.
Potential employment sectors: Graduates with this Specialization Track will be competitive applicants and attractive to employers for jobs in environmental biotechnology; environmental monitoring; aquatic (eco)toxicology; environmental research; environmental consulting; environmental compliance inspections; governmental research institutions.

***Global ocean changes***

- LO.#Futureseas.1 The graduated student understands basic physical, geochemical ocean system dynamics;
- LO.#Futureseas.2 The graduated student is able to identify processes involved in local and regional changes for zones that are particularly affected by climate change, such as the Arctic Ocean and the Mediterranean-Atlantic biogeographical transition zone;
- LO.#Futureseas.3 The graduated student understands the main drivers affecting at all scales the marine biodiversity, and is able to tackle the key challenges to diminish threats on evolving marine species and communities.

Professional Practice opportunities: participating in research cruises with government research institutions; environmental departments of international ports; climate study foundations/institutes (e.g. Nansen Environmental and Remote Sensing Centre, British Antarctic Survey); environmental consultancy companies; international organizations (e.g. World Health Organization (WHO), ICES, FAO) and bodies promoting global ocean studies (e.g. UNESCOs Intergovernmental Oceanographic Commission (IOC)).
Potential employment sectors: Graduates with this Specialization Track will be competitive applicants and attractive to employers for jobs in modelling in environmental consultancy companies and government research institutions;

data management in research projects; scientific or technical roles in geophysics and climate related institutions (e.g. IOC, ICES).

Additional opportunities to enhance the graduate's employment profile are built into the programme. The Joint School and Annual Symposium will be utilized to host special Courses for students to train for specific skills and accreditation which will increase their attractiveness for potential employers. Such Courses include the training leading to Federation of European Laboratory Animal Science Associations (FELASA) certification for working with animals in laboratory and field experiments, scientific diving, blue biotechnologies and business opportunities, or advanced quantitative methods. This last course consists of activities enabling students to understand, compute and implement advanced methods used for statistical data analyses, including large datasets and modelling of marine systems. In the first preparatory and promotion/awareness-raising year, EMBRC will reach its implementation phase, which will lead to a concrete and extensive list of Professional Practice and Thesis research opportunities.

IMBRSea merges two fields of sciences traditionally separated, marine biology from genes to population levels, and marine environmental sciences within a single programme, emphasizing the link between what occurs at the molecular level and the physical world. The objective is to form new specialists who can realize the potential of a sustainable blue bio-economy. One of the major additions is the capacity of the consortium to incorporate evolutionary sciences in the field of biological oceanography, understanding the role of the marine environment in the diversification and selection of life forms in the oceans. Furthermore, IMBRSea will integrate academia, industry and societal stakeholders to produce graduates that will have an extensive understanding of the potential of marine resources. For Europe to deliver on Blue Growth and to realize the potential of a sustainable blue bio-economy, skilled marine graduates are required with a specialized knowledge on marine systems. This required an increased involvement of non-educational actors (both in academic and non-academic research and application).

To the knowledge of the consortium, there is no equivalent Master programme in the world. Even the largest formation in the academic field of marine sciences, the Massachusetts Institute of Technology / Woods Hole Oceanographic Institution joint graduate programme in oceanography, applied ocean science and engineering (http://mit.whoi.edu/), does not offer such a large spectrum of Courses, skills and knowledge. In addition, based upon EMBRC, the IMBRSea programme challenges students in high tech research, and offers unique access to the major marine research centers across Europe, and thus to a very wide range of marine organisms, ecosystems and biotopes in all latitudes of the Northern hemisphere. Because of its implementation in both EU spaces of education and research, IMBRSea emphasizes the international aspects of marine sciences challenges in the most concrete manner. It offers, through the EMBRC network of partners, opportunities for students to interact with industrial partners and stakeholders, in all fields of marine sciences.

Since 2008, the EMBC/EMBC+ programme has attracted more than 370 Master students from 53 different nationalities, of which 23% came from outside EU countries. EMBC/EMBC+ has therefore proved the attractiveness of the scientific fields and prior consortium within the more narrow field of marine biodiversity and conservation. The IMBRSea programme should even have an increased global attractiveness by encompassing a wider variety of thematic areas embedded in EMBRC, with strong links with non-academic partners. To support and enhance attractiveness, taking advantage of the different EU platforms attached to it, IMBRSea will also set an increased advertising capacity.

### A.1.5 The proposed EMJMD consortium is highly relevant with regard to internationalisation in higher education and has been designed to maximise the benefits of student and staff mobility.

*How will the EMJMD support in concrete terms the internationalisation of European higher education? How will the EMJMD bring positive and long-lasting effects on the participants involved? How will students and staff improve their learning performance and competences linked to their professional profiles? In which way will the EMJMD enhance e.g. intercultural awareness, foreign language competences, and other horizontal skills?*

The IMBRSea programme holds concrete structures that support internationalization of European higher education. IMBRSea follows the successful first generation Erasmus Mundus Master courses (EMMCs), where institutional cooperation proved successful in promoting the international dimension in the participating HEIs. The best achievements resulted from approaches that included a joint programme design and the inclusion of non-academic organizations in the programme design, management and implementation (EACEA synthesis report 2013 cite as EU, EACEA 2013 DOI: 10.2797/26992). IMBRSea is a new programme benefiting from the experience gained in delivering the EMBC/EMBC+ programme, specifically designed to take a multidisciplinary approach in marine

education. The new programme will enhance internationalization, and improve learning and employment outcomes through the support mechanisms already in place at the participating institutions.

Firstly, internationalization is achieved through the institutional cooperation that makes it possible to award a joint degree diploma, accredited in all the Partner university countries. The programme requires that the students study in at least two different European countries, following a balanced integrated programme based on the European Credit Transfer System (ECTS), which leads to a diploma signed by all Partners. The programme requires at least two study periods in two different HEIs in two different countries. However, it can support more mobility if the Pathway chosen by the students according to their professional project requires it. Secondly, benefiting from the EMBRC distributed infrastructure, multiple opportunities for student mobility between Partners and Associate Partners are offered. Professional Practices in Associated Partner institutes or linked industries are a significant part of the IMBRSea programme, and further support internationalization, including at the employability level. The costs associated with Professional Practices will be regulated within the consortium agreement, providing equal opportunities for mobility.

The consortium will convene a Programme board to ensure quality and consistency of learning outcomes and achievements across all the Partners, increasing the confidence of participants in the fairness of treatment and (perceived) value of the experience. The IMBRSea programme is focused on bringing positive and long lasting effects for participants, both students and (Associate) Partners, both academic and non-academic. Participation in the programme increases the exposure both for students and staff, and hosts to new experiences and cultures. The programme level activities of IMBRSea will help students to build a large international peer network, supported by scientific innovation and research, which has a strong potential to have positive and long-lasting effect on their immediate employability and future career. EMJMD alumni show higher participation in professional networks and face lower unemployment (EU 2014, DOI: 10.2766/75468, https://esn.org/erasmus-impact-study).

The programme will make use of the extensive online training platform MarineTraining.eu, hosted by EMBRC. This platform aims at becoming one of the major international accesses to marine educational components, hence increasing visibility and collaboration opportunities. In this sense, it will also support a database and a forum platform for the IMBRSea alumni, where surveys and follow-up of career development can be tracked. Alumni can use this opportunity to build a network including non-educational and non-academic Associate Partners to enhance employability across Europe and worldwide.

IMBRSea Partners are committed to delivering improved and effective teaching and learning practices. The programme is structured to enable students and consortium staff to improve their learning performance and competences linked to their professional profiles. Compulsory mobility is instrumental to the learning outcomes and to the success of the programme. Tremendous added value accrues since these learning outcomes are gained in Specialization Tracks at Partner universities of excellent expertise and where, through mobility, students gain different skills reflecting the geographic and socio-economic environment of their host universities. Both new and experienced lecturers will benefit from working in teams to develop the programme-level learning outcomes, learning activities, and aligned assessment methods, especially for the Fundamentals Module. This professional development will contribute to improvement in personal competence and teaching and learning quality. Through the adoption of newer educational practices, including active learning modes such as problem-solving exercises, journal clubs and team-based learning, which have been shown to improve student learning and knowledge retention. The Partners cooperating in the development and delivery of the programme will improve their teaching practices, enhance performance and competence, and will contribute to improving higher education across Europe.

Students who complete the IMBRSea programme will benefit in more than purely academic measures. The programme encourages enhanced intercultural awareness, which comes as a direct result of the mobility requirement - moving to another country and interacting with the general population. The network of different Partners links all of Europe from South to North, cutting across cultures to provide a diversity of experiences. Upon completing the programme, the students will have experienced a learning environment of multiple cultures and languages in the background. English is the language of science, science communication, and science policy. The ability to work professionally in English is needed for European competiveness at a global scale. Students are immersed in English through active learning methods which include reading, writing, and oral presentations. They gain competences and confidence using English in a scientific and professional setting during the Professional Practices, Joint Schools, Thesis preparations and Annual Symposia. Within the curriculum there is an emphasis on critical reading, quantitative assessments, writing and other presentation skills, researching information and evaluating literature sources. There is also an opportunity for students to gain foreign language competences within a formal course setting.

**Glossary**

Annual Symposium: Common series of events, marking the end of each academic year, particularly hosting Thesis defense sessions for 2nd year IMBRSea students who have completed their Master Thesis and hosting a professional fair and training to enhance employability.

Associate Partner: Academic or non-academic Partner of the IMBRSea consortium that contributes to the programme next to the eight Partners.

Blue growth: Blue Growth is the long term strategy to support sustainable growth in the marine and maritime sectors as a whole to achieve the goals of the Europe2020 strategy for smart, sustainable and inclusive growth.

Coordination office: Secretariat at the coordinating Partner supporting administrative matters concerning IMBRSea.

Course: A set of comprehensive classes about a particular topic as a unit of delivery of content, awarded by a number of credits (ECTS) after successfully completing the Course.

Examination board: A board of representatives of multiple Partners responsible for the assessment and evaluation of IMBRSea students and advising to the Programme board.

External advisory committee: A committee of external stakeholders advising to the Programme board on various matter concerning IMBRSea.

Fundamentals Module: Set of common core Courses providing the fundamental prerequisites to the Thematic Modules, it is delivered in the first semester by core Partners of the programme.

Joint degree: The diploma of the programme graduate is recognized and signed by all involved Partner universities of the programme.

Joint School: A set of practical Courses taking place in one of the EMBRC marine stations and being attended by all students of the programme.

Local secretariat: Local secretariat at each of the eight Partners supporting local administrative matters concerning IMBRSea.

Partner: One of the eight Partner universities of the IMBRSea consortium (UGent, UAlg, GMIT, UniOvi, UPMC, UiB, UNIVPM, UPV/EHU).

Partner Country: These countries can take part in certain Actions of the Programme, subject to specific criteria or conditions.

Pathway: A specific Pathway of Courses chosen by a student at the beginning of her/his curriculum. The choice is assisted by an online Pathway selection tool. Pathways are based on defined Thematic Modules in Specialisation Tracks but allow students to emphasize certain skills according to their Professional Practice, Thesis research project and career plans.

Programme board: A board of representatives of all Partners responsible for all programme matters of IMBRSea.

Programme Country: These countries can fully take part in all the Actions of the Erasmus+ Programme. In the case of this proposal, the Programme Countries are Belgium, France, Portugal, Spain, Ireland, Italy and Norway.

Professional Practice: A six weeks work placement or internship in a non-academic Associate Partner institute or industry.

Selection committee: A committee of representatives of multiple Partners responsible for the selection of students applying for the IMBRSea programme and advising to the Programme board.

Specialization Track: A logical organization of Thematic Modules leading to a career/subject/educational specialization. Each Specialization Track achieves specific learning outcomes in the IMBRSea programme.

Student board: A board of representatives of the IMBRSea students advising to the Programme board.

Thematic Module: A set of Courses delivered by one Partner university on one specific field of marine sciences.

Thesis: The formal report of the research performed by each student in the end of her/his curriculum, evaluated by a jury in order to complete the formation and obtain the diploma of the International Master in Marine Biological Resources.

Track: See Specialization Track.

**List of abbreviations**

| | |
|---|---|
| AB | External Advisory Board |
| ASC | Aquaculture Stewardship Council |
| CO | Coordination Office |
| EACEA | Education, Audio-visual and Culture Executive Agency |
| EB | Examination Board |
| ECTS | European Credit Transfer System |
| EHEA | European Higher Education Area |
| EMB | European Marine Board |
| EMBC/EMBC+ | International Master in Marine Biodiversity and Conservation |
| EMBRC | European Marine Biological Resource Centre |
| EMJMD | Erasmus Mundus joint Master Degree |
| EMMC | Erasmus Mundus Master Course |
| ERVO | European Research Vessels Operators |
| ESFRI | European Strategy Forum for Research Infrastructure |
| EU | European Union |
| FAO | Food and Agriculture Organization of the United Nations |
| FELASA | Federation of European Laboratory Animal Science Associations |
| FSB | Future Science Brief |
| GES | Good Environmental Status |
| GMIT | Galway-Mayo Institute of Technology, Ireland |
| HEI | Higher Education Institute |
| ICES | International Council for the Exploration of the Sea |
| IMBRSea | International Master in Marine Biological Resources |
| IOC | Intergovernmental Oceanographic Commission |
| LO | Learning Outcome |
| LS | Local Secretariat |
| MSC | Marine Stewardship Council |
| MSFD | Marine Strategy Framework Directive |
| NOKUT | Norwegian Agency for Quality Assurance in Education |
| Non-HEI | Non higher Education Institute |
| PB | Programme Board |
| SB | Student Board |
| SC | Selection Committee |
| UAlg | University of the Algarve, Portugal |
| UGent | Ghent University, Belgium |
| UiB | University of Bergen, Norway |
| UNESO | United Nations Educational, Scientific and Cultural Organization |
| UniOvi | University of Oviedo, Spain |
| UNIVPM | Polytechnic University of Marche, Ancona, Italy |
| UPMC | University of Pierre and Marie Curie, Paris, France |
| UPV/EHU | University of the Basque Country, Plentzia, Spain |
| WG | Working Group |
| WHO | World Health Organization |

Brussels, 13. 07. 2016
EACEA/A3/KH/ (2016) 574482

Professor Anne De Paepe
UNIVERSITEIT GENT
SINT PIETERSNIEUWSTRAAT 25
BE - 9000 GENT
Belgium

**Subject:** **Erasmus+: Key Action 1 – Erasmus Mundus Joint Master Degrees (EMJMDs) Call for proposals 2016 (EAC/A04/2015)**

**Title:** **International Master in Marine Biological Resources**
**Ref.:** **574482-EPP-1-2016-1-BE-EPPKA1-JMD-MOB**
*(Please quote this number in all correspondence)*

Dear Professor Anne De Paepe,

You have submitted an application to the Erasmus+ programme, 2016 call for proposals for the Action specified above. The call for proposals closed on 18 February 2016. The Education, Audiovisual and Culture Executive Agency (EACEA) received **89** eligible applications for this call.

I am writing to inform you about the selection decision taken by the Head of Department of the Executive Agency, acting in her capacity as authorising officer, based on the recommendations of an Evaluation Committee assisted by external experts, who had assessed your application against the award criteria specified in the call for proposals. The selection decision is based on the quality of the proposal, its relative position in comparison with the other proposals submitted and the budget available. Applications were assessed on a scale from 0 to 100 points and were ranked according to merit.

As a result, given the available budget, the funding threshold has been set at **78/100 points**.

I am pleased to inform you that your application has been selected for EU co-funding. It received **84,5/100 points**. For your information, out of the 89 eligible applications, **27** have been selected for funding, and **3** have been placed in a reserve list.

The list of all selected projects will be published on the following website of the Executive Agency when all applicants have been notified about the selection results:
http://eacea.ec.europa.eu/erasmus-plus/selection-results_en

Attached to this letter you will find an evaluation report based on the opinion of the external experts. Please take into account that most of the evaluation reports were written by non-native speakers. The Executive Agency will not elaborate further on these assessments.

The maximum amount of funding to be awarded to your project is **2.858.000 EUR**.

Please note that taking into account the total number of scholarship requests received and the budget available, the number of scholarships you have applied for has been revised and corresponds to **45 Heading 1 EMJMD scholarships (11 Programme Country + 34 Partner Country), 10 Heading 4 EMJMD scholarships** and **3 EDF EMJMD scholarships**.

The process of awarding a grant can only be finalised once the Executive Agency has received and validated the **Bank Account File (BAF)** as requested in Annex 2. The BAF must be submitted within a period of 10 working days from the date of receipt of this letter and be sent to the functional mailbox:
EACEA-EPLUS-EMJMD@ec.europa.eu

In addition, your organisation's data and your **Participant Identification Code (PIC)** need to be validated before the Executive Agency can grant you EU-funding (see Annex 3). In case your organisation holds a validated PIC, the PIC validation process is not relevant for your organisation.

Furthermore, it is very important that you provide us with the link to your EMJMD project website as soon as this is available, so that this link can also be published on the Executive Agency's website. If you have amendments to make to the project description after publication, please let us know via the above-mentioned EMJMD functional mailbox.

The Executive Agency organises a kick-off meeting for newly selected projects every year. We would like to inform you about the organisation of the 2016 EMJMDs Coordinators' meeting, which will take place in Brussels during two consecutive days around mid-November. Your travel and accommodation costs should be covered from the project management lump-sum, subject to the signature of the Grant Agreement. Please note that for organisational reasons we cannot allow the participation of more than two representatives of your project. A full programme of the event and practical information will follow in due time.

This letter does not represent a financial or legal commitment of the Executive Agency. The offer of an award is confirmed only when the legal representative of the Executive Agency signs the Grant Agreement associated with this application.

Please do not hesitate to contact us should you have any further questions.

Yours sincerely,

Klaus HAUPT
Head of Unit

Annexes:

Annex 1: Evaluation report – Comments from the external experts who assessed your proposal

Annex 2: Bank Account file: Financial Identification Form (FIF)

Annex 3: Information for applicants about PIC validation process (if relevant)

Cc: **(by email) Dr. Tim Deprez**
tim.deprez@ugent.be

Education, Audiovisual & Culture Executive Agency

# Erasmus+: KA1 – Erasmus Mundus Joint Master Degrees

# Evaluation Report

| | |
|---|---|
| Proposal number: | 574482-EPP-1-2016-1-BE-EPPKA1-JMD-MOB574482-EPP-1-2016-1-BE-EPPKA1-JMD-MOB |
| Proposal title: | International Master in Marine Biological Resources |
| Applicant organisation: | UNIVERSITEIT GENT |
| Contact person: | Tim Deprez |

| **Award Criteria** | ***Score:*** | ***84,5/100*** |
|---|---|---|

**A.1 Relevance of the project**

The proposed EMJMD is a follow up of an existing international master of science in marine biodiversity (running since 2008) which has been upgraded and newly oriented following the EU Blue Growth strategy. The proposed training program in the thematic field of Marine Biological Resources is organized in an integrated way, offering a balanced curriculum combining jointly developed education modules. This well-prepared, thorough proposal comes from a consortium of eight Universities, five of which have a substantial history of cooperation in marine research and education, so there is confidence in their successful interaction. There is a formidable array of potential associated companies, agencies and organisations which all belong in European Marine Biological Resource Centre network (EMBRC), who's support letter is included.

The program they put forward is very comprehensive, multidisciplinary and intersectoral. The principal objectives are highly pertinent to the overall policies of the EU in this field, as reflected in five central themes from which the students can choose their particular area of interest. It is intended that the final output will be personnel with appropriate knowledge and related skills and with the appreciation of other complementary fields.

The program has a high degree of integration in the overall design and structure both from the academic and administrative point of view. The selection and the evaluation of the students are done via standardized procedures agreed with all the participant universities. All the activities, course construction and delivery, student recruitment, quality control and management in its various manifestations are joint actions. The proposal promotes mobility of students offering study paths via eight European HEIs. Students can undertake projects and internships at associated partners and industry. The commitment and the roles of actors are clearly presented. The proposed managing scheme and the role of the partner institutions are adequate for the effective implementation of the joint program.

Several fundamental components of the master are jointly implemented by full and associated partners, whilst specialisation occurs at the leading-edge institution recognized for their added value in the specific area. Support structures are embedded to support successful integration. Set against this, there is concern that the structure and necessary organisation is complex and would be challenging. Some of the interactions with associated partners seem unrealistic. The students would spend significant amounts of time with at least four partners and associated partners: the year cohort would be fragmented, only coming together in a few joint schools.

The curriculum has been jointly built by the consortium and it would be merged in the degree catalogues of partners since it is based and supported by accredited national master programs presently running in the partners' institutions. In addition to the national masters, the IMBRSea is also based and supported by a previously funded international master of science in marine biodiversity.

It is not made sufficiently clear what the award will be: The application states that the program would result in an Erasmus Mundus Joint Master Degree: "International Master in Marine Biological Resources" which is not yet accredited. Also accredited national Master degrees are mentioned in the Application form. However, the legal governmental regulations of the countries involved in the program allow the award of a joint degree, therefore the consortium is confident that a joint degree would be delivered to successful students enrolled in the program.

The importance of marine science is of long standing in the EU. Proper conservation of this environment is critical for a number of major economic and environmental reasons. An in depth needs analysis has been conducted based on the EU and national marine policy directives and legislation. Investigations have also been made towards companies in the field. A gap does exist in the training of qualified personnel for example in the development of blue bio-economy. The seafood industry in particular, has a need for students having also a commercial background. In order to address the various identified needs, the program includes 5 specialisations responding comprehensively to those needs. Across Europe and indeed throughout the world, there are many courses at various levels dealing with the marine environment in some way. This partnership has carried out a thorough analysis of this provision in the context of several international reports on the future personnel requirements in numbers and skills.

The attractiveness of the new EMJMD is based on the previous EMMC and the cooperation with EMBRC. Also an improved marketing plan showing how the new students are reached is provided.
The academic program has several elements that would certainly increase EHEA attractiveness. The cross-disciplinary approach, the structural link with relevant stakeholders from the public and private sectors as well as the implementation of on-line educational tools would raise the competitiveness of the program. Also, in terms of employability, the five thematic specialisations proposed within the program are indeed the ones for which employers are seeking candidates. An accurate examination of the outcome of the previous international program in term of graduates origin and employability would have helped to gain insight into the real perspectives of this new program
The proposed EMJMD complies with the demand for highly qualified personnel in the blue biotechnologies in order to boost innovation and foster scientific excellence in the EU and in the thematic field. This is strengthened with the international associate partners of EMBRC consortium and diverse facilities. The learning outcomes are very well articulated, divided first into the very impressive general competences that the student is expected to acquire and then sub-divided into the more specific skills and knowledge that might be acquired through the different thematic areas. The consortium is so large and well connected that, so long as the individual student needs are attended to, there is every likelihood that the environment would challenge and foster innovation, and through this, be both attractive and competitive. The scale of this organisation should be attractive from a non-European perspective.
The competitiveness of this EMJMD program is presented against several corresponding study paths. There are, according to the Application, already 15 marine/maritime JMDs in Europe, some of them partly overlapping with this application, but none of them have the interdisciplinary approach offered by IMBRSea covering the focused specialisations domains. However, looked at from the perspective of the individual student, they cannot avail of all the options. The content does capture, however, all the skills and competences required for career development in this field. Further, the contacts, which this consortium has established with the main organisations operating in the area, do constitute an advantage for the student.

The consortium is very well connected in Europe, although it is questionable how realistic active interactions are with up to 80 institutions. Surprisingly, no non-European organisations are included. There is also a long list of potential guest lectures/visitors, including scientists from the Antipodes and North America. The program is truly international in terms of institutional cooperation and diploma awarded. In addition, the extensive use of an online training platform could increase visibility and opportunities for collaboration of both students enrolled in the program and teachers.
Since the consortium has a good European orientation in terms of student selection and associated partners, the aspects of cultural awareness and linguistic performance has been taken into account; language modules give credits. Students could benefit from a mobility scheme, which would develop their intercultural awareness by experiencing different learning environments. The teaching language would be English but local language courses are available at the host institutions. A stronger language policy should be however adopted by the consortium.
The student mobility is a core issue and well described in this application. Staff involved in the program would take advantage of the common events like the Joint School and the Annual Symposium to discuss new educational paths and strengthen links with stakeholders, in particular from the private sector. The clear mobility plan for scholars is included in the Consortium Agreement draft, which is very positive. Thus, there is likelihood of a meaningful mobility and international exposure, certainly by the students and staff in the context of training, and hopefully, in research collaboration.

**B.1 Quality of the project design and implementation**

This Masters program offers an impressively wide selection of specialities based on a comprehensive initial series of fundamental modules. The offering of the academic content is described in the application in a very clear and sufficient way. The topics and their execution are relevant to the program. The program is also impressive in using a variety of pedagogical approaches; a particular focus is made on problem-based learning. This wide range of teaching and learning approaches, both passive/traditional and student-centred, would maximize student participation and optimize their talents. "Learning by doing" approach can be intimidating at first but does eventually produce a more skilled and versatile product. The assessment mechanisms are also interestingly varied (continuous assessment, terminal examination, reflecting personal and professional development portfolio…) and give the students the best opportunity to display their skills.

The consortium has already built a convincing internal quality assurance cycle, which clearly describes the thorough and continuous evaluation methods for monitoring the quality of the program. It also provides a framework for improving and upgrading actions with a schedule allowing early implementation of any changes, which is very positive.

In particular external evaluation would be performed every two years by an external Advisory Board that has access to these internal evaluations. However, there is limited information on what data is to be used as the basis for these evaluations. It is unclear whether this Advisory Board has independent external membership which would ensure optimal analysis of the program and appropriate implementation of necessary change. The members of such a board should have been indicated for a better understanding of the overall evaluation process.

Compared to this multilevel internal monitoring, the genuine external evaluation is disappointing: "program would be reviewed periodically every 6 years by an EQAR-registered accreditation agency leading to a published decision" without any clear plan for corrective actions.

The organisation of the student mobility is well defined and its importance to the course objectives is clearly presented. It also allows students to have different degrees of mobility as befits their interests; they have the opportunity to perform their studies in at least two partner universities and to visit up to four additional locations where common activities (annual symposium, joint school) or professional training take place. However, there is a significant danger that the cohort could lack collegiality, and with it a degree of mutual support and stimulus. The whole cohort is splintered, coming together relatively infrequently and for short periods: not even a common initial induction phase for the whole group is apparent. This seems to run counter to the need to establish good future networking between professionals in the field.

The effective involvement of the guest lectures from industry and academic world is an essential part in the application; e.g. there is given 20 named international experts to select for one teaching module in Annex 6. There are also budget costs of 12 000€ related to guest lecture mobility, which is very positive. Because of the structure and joint nature of some modules, the opportunity for staff mobility and interaction is optimal. However since the student group is together for only short periods, this scholars' program could be compromised by time- flexibility, and exposure to these scholars might be variable.

The proposal explains in detail all relevant information provided to all students and academic staff prior to course enrolment via the extensive information package of IMBRSea program. The services offered in terms of support for accommodation, language training (Portuguese, Basque language, Italian, Spanish, Dutch, German, Irish, French, Norwegian, and English.), administrative formalities, and insurance (Annex 12) are also presented comprehensively. However, it is not made clear if students have access to a travel insurance covering their mobility during their studies. There is no centralised introduction session, but each partner university is committed to provide services and information to incoming students and lecturers through its specific support services, and that might differ between partner institutions. Thus it is constructive that a central coordinating officer attends each of the inductions at the different HEIs to demonstrate consistency across the partners.

The draft of EMJMD IMBRSea Student Agreement presented in Annex 8 covers fully the aspects of student's rights and obligations. It describes program regulation, including the management of the scholarship and is signed by each student. Also during the academic induction a representative of the coordinating office meets all the students and explains their rights and obligations from the academic, administrative and financial point. Each HEI is responsible for assessing its own courses but there is a general framework agreement which ensures there is consistency across the program. Thus the application gives outlines of the course rules and presents grading conversion table, which again states

clearly, that the students are following the local procedures. There is a very full compendium of activities designed to integrate the students not only into their local cultural milieu but also into their professional environment. This not only includes guest lecturers from local institutions and professional bodies but also site visits e.g. to the marine stations and participation in job fairs. Internships (12 ECTS) would also be available in a variety of non-academic institutions. The proposal outlines convincingly the several interaction levels and occasions between the proposed EMJMD and non-educational actors in course planning, implementation and evaluation. This is a positive aspect. The non-educational sector is to also participate actively in other joint activities and offer internships and thus be more closely integrated into the program. This would allow students to develop a professional portfolio which would be beneficial for their future employment.

**B.2 Quality of the project team and the cooperation arrangements**

The proposal addresses a wide field at many relevant and interacting aspects. The consortium represents well the various components of the area and therefore there is a good complementarity across the program, together with a constructive amount of overlap. This has been instrumental for the construction of the 5 program tracks proposed. Five of the applicants have a strong common history of several Erasmus projects. The IMBRSea is now enhanced with three new participants and fourteen associate partners covering all the regional Seas of Europe. This allows for a well-rounded acquisition of knowledge, and competences such that the students whilst becoming experts in certain disciplines are alerted to consequences in others. A single institution cannot deliver this degree of coverage.

The proposal describes adequately the institutional commitment of full partner organisations by signed mandates and substantial support for the program. The application specifies their roles and tasks in the EMJMD implementation well, and outlines convincingly the administrative rules and regulations as well as working mechanisms of the governing bodies and management tools. The program's working mechanisms are thus well defined. However the role of the non-educational associated partners (11) is small and limited to offering guest lectures, field trips and internships. They are participating only in the Program Board via two invited members. Offering more management duties to these participants would make their input more beneficial to the program. Also, the external advisory board would benefit from some knowledgeable members of the field but who are independent of the consortium. It is not clear why this board should only meet once a year - it might be too late to introduce any corrective measures.

The proposal describes comprehensively appropriate actions and requirements in terms of the joint criteria for student application, selection and admission with good elements such as a single online application tool and single Selection Committee. A program board and an examination board have defined a joint framework for examination and student evaluation. All the regulations are indicated in the student's agreement at the beginning of the study program. Overall an equal treatment of students would be achieved among partners. Each institution is responsible for assessing the modules it manages, so the student examination and performance evaluation is done by joint criteria only in two occasions during the study path: the reports of the Joint School and the Thesis. It would be useful for external members from one partner to attend the examination committees in another. This would ensure consistency in the evaluation of performance. The consortium has utilised their experience and the figures provided are based on actual costs of activities organized in previous years in the context of the EMBC+ program. However the students' participation costs are not clearly indicated.

Annex 11 provides a good description on how the financial resources are to be mobilised, allocated and managed within the partnership, but the final overall budget is not completely described.

Potential complementary funding and its distribution are discussed in a very limited fashion, which does not benefit the application.

**B.3 Impact and dissemination**

The proposal explains how the structure and activities have changed to reflect the current level of income. Some of the restrictions such as staff mobility are not positive. The proposal poorly addresses a mid/long-term development/sustainability strategy based on branding the program on the shoulders of former EMBC and EMBC+ programs. The opportunity of a substantial contribution to the project sustainability from the socio-economic world is not adequately explored. The application describes organisational visions for reaching self-paying students and reward grants but without the necessary accuracy and concrete actions for mobilising other funding sources like corporate scholarships. In addition, the opportunity of offering several courses within the program as continued professional training, as an additional funding source, is not foreseen. So there is limited information or projections

as to how the program would operate in the absence of EU funding. Having a long history of international cooperation, the applicants provide a convincing review of the very positive measureable as well as immaterial impacts of the proposed program at institutional and international levels. More interestingly, continuation of the program is extremely important for the visibility of European Marine Sciences higher education. The consortium is willing to continue its activities and increase its strategy by participating in the design of the roadmap for marine education in Europe both at the level of graduate and continued professional training. The partner HEIs offer relevant training for developing the sense of initiative of the graduates and the curriculum contains several courses and events for improving student's competencies and skills for future entrepreneurship. The consortium is well aware of the necessity of training students for competition in the job market. Some of the activities planned with the non-academic associated partners such as the joint school which contains formal training in entrepreneurship as well as the professional practice module would provide students with a first approach to the marine scientific and professional world. The involvement of the non-academic partners in the design and implementation of the program are positive attempts to introduce a business mind-set in the students.

The promotion/dissemination methods and awareness-raising strategy of the program via the networks of the partner organisations towards target groups is described adequately. All the partners are involved in this activity and a guideline on how to present news and outcomes from IMBRSea is to be developed. There is a comprehensive collection of methods put forward by which the activities and outputs of the consortium would be disseminated. All the partners are encouraged to participate in various appropriate ways but there is no clear allocation of specific tasks or activities. The appointment of a specific communications manager is constructive. The application presents this strategy as a marketing tool for attracting excellent students worldwide. Also promoting this strategy to best available technique (BAT) status, is a positive goal.

However the strategy to address the industrial stakeholders is not adequately developed.

The IMBRSea program plans to encompass the principle of Open Access and Open Science which are an essential part of knowledge creation and sharing and support the need for greater impact and optimum dissemination of research. The application gives several positive concrete actions toward this goal.

**C. Relevance of the project in the targeted region(s)**

Since the marine environment is a global issue the consortium well argues the interest –and almost the necessity- of setting up cooperation with HEIs or other bodies from the targeted regions. The consortium has already a wide and solid network in the targeted area via their previous cooperation projects with relevant research and monitoring stations throughout the world. The programme has received applications from and allocated support to students from a wide variety of countries.

These associations would promote the circulation of information about the programme and facilitate applications from appropriate students. They can also be the source of information about applicant qualifications; in particular the IRBSea alumni would be instrumental to attract students from those regions and they would help to disseminate the programme.

The important added value for the consortium is the access to marine biological resources, which would not be accessible without cooperation agreements. So, the cooperation with participating organisations in targeted areas is described adequately in concrete task and collaboration level. Although the interest and need towards marine biology in the areas is well covered, the methods and actions to attract students are vaguely described.

**Overall comments**

This proposal covers most aspects of marine resources, an area of traditional importance to the EU, and is aimed at increasing the visibility of European Marine Science internationally. The Masters curriculum would certainly provide good intersectoral interactions and appropriately- trained human resources to meet future challenges in the field. A need analysis has been performed clearly, indicating on the one hand the lack of qualified personnel in specific areas, and on the other hand the existence of several European master degrees in the field that do not respond to the market need. This program is therefore intended to fit this gap. The proposed program consortium has a wide and functional network, involving more than 20 stakeholders from all over Europe. As this proposal is the follow up of a previous European master program it would have been interesting to present the outcome of the previous experience in terms of number of graduates, origin and actual career development.

The quality of the consortium composition and management is good and their geographic distribution

allows the implementation of training activities on all European Seas. There is a very high degree of "jointness" in the design and delivery of the courses and in the many aspects of management from recruitment to joint degree. However, the organisation of the joint modules does not make for a cohesive, collegial cohort of students since they are splintered throughout the consortium.
The program is to be properly monitored by internal and external evaluation bodies, with an expected improvement over time. Despite the unquestionable competence of the participants, the limited participation of industrial partners in management is detrimental. An international outlook for the program is essential to making the additional award relevant. Collaboration with institutions from the target regions has a meaningful added value for the consortium training and research activities. Students from those regions are already attracted by the European education in the marine field and by this action. However, internationality outside of Europe is limited to a few guest lecturers/visitors, which may limit student contact due to the high degree of mobility the cohort may undergo.
The program includes a variety of pedagogical approaches including student centred learning and practical exercises that guarantee networking with the socio-economic marine environment. This allows the full expression of student talents and competences whilst preparing them for the challenges of the working environment. The involvement of the non-academic sector in teaching is good and there are positive steps towards instilling entrepreneurship and a business mind-set.
The partnership should put more emphasis on addressing the financial and sustainability issues of the program by setting specific arrangements with companies in the field. The future sustainability of the program in the absence of EU funding has not received the required attention.

| Partner number | ***P6*** |
|---|---|
| Organisation name | ***999865234 UNIVERSIDAD DEL PAIS VASCO / EUSKAL HERRIKO UNIBERTSITATEA*** |

*Please provide a summary of relevant skills and experience of the key staff directly involved in the project, including where relevant a list of recent publications related to the domain of the project. At least one (1) person must be identified for each consortium member with a maximum of three (3). Please adapt the table according to the number of key staff per organisation. (maximum 750 characters for each person)*

| 1) Name of staff member | ***Ionan MARIGOMEZ*** |
|---|---|

(H-index: 31; UPV/EHU Prof Cell Biol; Researcher in the CBET CRG) Director of PiE-UPV/EHU since its creation in 2012. He was head of the Dpt of Zoology and Animal Cell Biology (00-03 and 06-09). Active in research formation, he has been coordinator of UPV/EHU of Erasmus/Socrates network on "Environmental Science and Education" (89-), Director of Doctoral Programmes Biologia Ambiental y calidad vida (98-present); Contaminación y Toxicología Ambientales (05-12), and Marine Environment and Resources (09-). He was Coordinator MSc Contaminación y Toxicología Ambientales (05-12) and European MSc Marine Environmental Resources (Quality Award MEC, Mundus Master since 2013 - International Coordinator-).

| 2) Name of staff member | ***Manu SOTO*** |
|---|---|

(H-Index: 21; UPV/EHU Professor Cell Biol; Researcher in the CBET CRG). Deputy Director of PiE-UPV/EHU since its creation in 2012. He was Vice-dean for Students & International Relationships in the Faculty of Science & Technology of UPV/EHU (05-12). Coordinator of the official masters degree in European MSc Marine Environmental Resources in UPV/EHU. Academic Board Member of Doctoral Programmes Contaminación y Toxicología Ambientales (since 2013), and Marine Environment and Resources (since 2013). Member of the Ethics Comittee of the UPV/EHU (08-13).

| 3) Name of staff member | ***Ibon CANCIO*** |
|---|---|

(H-Index: 18; UPV/EHU Associate Prof Cell Biol; Researcher in the CBET CRG). He is coordinator of the official masters degree in Environmental Contamination and Toxicology in UPV/EHU. Academic Board Member of Doctoral Programme Contaminación y Toxicología Ambientales (since 2013). Coordinator of the Spanish Node of the European Research Infrastructure EMBRC (www.embrc.eu, European Marine Biology Resource Center) within the ESFRI roadmap, and Spanish representative in its implementation board and Responsible of the Plentzia Marine Station (PiE-UPV/EHU) Node Unit. Member of the Advisory Board for Aquaculture Strategy of the Basque Government.

| Partner number | ***P7*** |
|---|---|
| Organisation name | ***999866689 UNIVERSITA POLITECNICA DELLE MARCHE*** |

*Please provide a summary of relevant skills and experience of the key staff directly involved in the project, including where relevant a list of recent publications related to the domain of the project. At least one (1) person must be identified for each consortium member with a maximum of three (3). Please adapt the table according to the number of key staff per organisation. (maximum 750 characters for each person)*

| 1) Name of staff member | ***Prof. Roberto Danovaro*** |
|---|---|

Full professor of Ecology, Former President of the Italian Soc. of Ecology (SItE) and of the Italian Assoc. of Oceanography and Limnology (AIOL), President of the Zoological Station in Naples, Expert in Marine Ecology. He has been a participant in several EU financed programmes (eg CINCS, BENGAL, MATER, ADIOS, INTERPOL, MEDVEG, COORALZOO, MAP, REFREES, HERMES, SESAME, HERMIONE, DEVOTES, MIDAS). He is coordinating the H2020 project MERCES, focused on restoration of marine habitats. Editor in Chief of the International journal Chemistry & Ecology (Taylor and Francis Group). Author of 3 books and 232 papers in ISI journals (H: 53 and about 7500 citations; SCOPUS).

| 2) Name of staff member | ***Prof. Francesco Regoli*** |
|---|---|

Professor in Ecotoxicology and Biological & Ecological Risk Assessment. Expert in marine organisms as bioindicators of chemical pollution & environmental disturbance, with emphasis on molecular & cellular responses, emerging pollutants, trophic transfer of chemicals, oil & chemical spills, vulnerability of polar areas, impact of dredging & off-shore activities, models of ecological risk assessment. Coordinated the ecotoxicological impact of the Costa Concordia & numerous international projects. *Editor-In-Chief* of Marine Environmental Research, member of the Editorial Board of Aquatic Toxicol, Chemistry & Ecology, J. of the Brazilian Soc. of Ecotoxicology. Has over 150 publications in international journals (H: 43, ~5600 citations, SCOPUS).

| 3) Name of staff member | ***Prof. Carlo Cerrano*** |
|---|---|

Professor in Zoology and in Scientific Diving Methodologies, working in the fields of the autoecology and taxonomy of the zoobenthos (in particular Porifera and Cnidaria). He is involved in several international programmes and he is the Coordinator of the following EU Marie Curie Actions projects www.mmmpa.eu (FP7) and www.greenbubbles.eu (H2020). He is authors of 153 papers in ISI journals (H: 23 and about 2200 citations; SCOPUS). Publications include Sweet, M., Bulling, M., & Cerrano, C. (2015). A novel sponge disease caused by a consortium of micro-organisms. *Coral Reefs*, 1-13, Di Camillo CG, Cerrano C (2015) Mass Mortality Events in the NW Adriatic Sea: Phase Shift from Slow- to Fast-Growing Organisms. *PLoS ONE* 10(5): e0126689.

| Partner number | ***P8*** |
|---|---|
| Organisation name | ***PIC*** 999974456 ***University of Bergen (UiB)*** |

*Please provide a summary of relevant skills and experience of the key staff directly involved in the project, including where relevant a list of recent publications related to the domain of the project. At least one (1) person must be identified for each consortium member with a maximum of three (3). Please adapt the table according to the number of key staff per organisation. (maximum 750 characters for each person)*

| 1) Name of staff member | ***Audrey J. Geffen, PhD*** |
|---|---|

Professor in the Department of Biology, in the Fisheries Ecology & Aquaculture Group. She specializes in Marine Juvenile Production & headed the Aquaculture Biology Study Programme 2003-2015. Her research involves environmental effects on larval and juvenile fish growth, and theoretical and applied research on the growth and formation of fish otoliths as recorders of life history. She has broad experience in EU cooperative research projects and training networks. She is active on international steering committees and evaluation panels, and served on several journal editorial boards. Her course list includes Environmental Effects of Aquaculture, Early life history of fish, Ocean Science, Aquatic Food Production, Marine community ecology.

# IMBRSea Consortium Agreement

**Consortium Agreement concerning an interuniversity programme titled "International Master of Science in Marine Biological Resources (IMBRSea)" organised within the Framework of the Erasmus Mundus Master Joint Masters Degrees**

***Partners in this agreement:***

1. Universiteit Gent, Belgium
2. Université Pierre et Marie Curie – Paris 6, France
3. Universidade do Algarve, Portugal
4. Universidad de Oviedo, Spain
5. Galway-Mayo Institute of Technology, Ireland
6. University of the Basque Country, Leioa, Spain
7. Polytechnic university of Marche, Ancona, Italy
8. University of Bergen, Norway
9. Université de Bretagne Occidentale, France

The institutes 1 to 9 are further called "Main Partners" or "Partner Universities". Jointly they are called "Consortium".

In addition to Main Partners, Associate Partners are also active within IMBRSea. Annex 1 to this agreement provides a list of these Associate Partners.

Legal Representatives of the Main Partner universities will sign this Consortium Agreement. Associated partners are obliged to subscribe to this agreement by a formal letter of support.

This interuniversity agreement is drafted within the framework of the action entitled: "International Master in Marine Biological Resources"[1] (IMBRSea in short hereafter).

***Article 1: Scope***

**1.1. Background**

Industry and society face significant challenges to achieve growth and to further develop the blue bio-economy (all economic activities that depend on the sea) in Europe, in harmony with the EU's Blue Growth strategy. The international, interdisciplinary and inter-sectoral nature of these challenges demands a similarly integrated approach to train the marine scientists who will be able to tackle them tomorrow. The proposed International Master in Marine Biological Resources (IMBRSea) is designed in such a way that students will graduate this program with both core and specialist competences and skills required by employers in key themes of the blue bio-economy, including fisheries and aquaculture; nature conservation; sustainability; ecosystem based management; blue biotechnology and global change.

**1.2. Objectives of IMBRSea**

The IMBRSea - programme aims to qualify students to a level of excellence in the field of Marine Biological Resources.

**The objectives** of the International Master in Marine Biological Resources (IMBRSea) are the following:

- Discipline oriented objectives:
    - Qualifying Master students to evaluate and understand how marine biodiversity varies across spatial and temporal scales, and between levels of biological organisation, in order to develop methods to detect significant changes in the marine environment.

[1] defined as "International Master in Marine *Sciences and* Biological Resources" in UPMC

    - Qualifying Master students to understand theory, models and statistical tests to investigate the relationship between marine biodiversity (assessed at different levels of organisation: genetic, species, functional groups and communities) and ecosystems functioning through the integration of conceptualization and modelling exercises, comparative analyses and carefully-designed experiments.
    - Qualifying Master students to understand the value of marine biodiversity and resources, and hence are able to develop the research base required to support the sustainable management of marine biodiversity and resources, including, for example, the monitoring of the health of marine ecosystems, marine aquaculture, the conservation of marine biodiversity and the commercial and recreational use of marine resources and ecosystems.
- Transferable Skills Objectives:
    - Qualifying Master students to apply the necessary communication and research skills for integrated team work.
    - Qualifying Master students to develop decision supporting systems for community policy.
    - Qualifying Master students to create an interface between researchers and stakeholders.

Students will be trained in at least two institutions in two different European countries within the IMBRSea consortium which consists of9 partner universities from 7 European countries and associated partners from all over the world.

The IMBRSea consortium members are connected to the EMBRC network, and have been able to work jointly to identify what is needed to enable improvements in European marine biological resources education and training. The European Marine Biological Resource Centre (EMBRC) is a distributed European research infrastructure consortium that was added to the roadmap of the European Strategy Forum for Research Infrastructures (ESFRI) in 2008 as a research infrastructure of pan-European interest. The consortium builds on its experience and will extend its coverage to meet the challenges of producing the marine scientists of the next generation. IMBRSea will be an integrated flagship programme that capitalizes on the operational, research and academic strengths of its members, to provide the best possible opportunities for employability and career development of programme graduates.

***Article 2: Structure and content of the programme***

**2.1. Structure of the programme**

The IMBRSea master programme is spread over two academic years of study (4 semesters – 120 credits). The common language of instruction of the programme is English.

The full IMBRSea study programme is divided in nine blocks that run over two academic years. Each academic year commences in September/October (depending on the University and decided on a yearly basis) and finishes in June/August (depending on the thesis work progress). Students are distributed according to their chosen study pathway across several universities for the Fundamentals course package, and the Thematic course packages. Joint activities for the full cohort of students, co-organized by all partners, are identified as the Joint school and the Annual symposium.

Annex 2 provides an overview of the educational responsibilities of each partner university.

Annex 3 provides an overview of the full IMBRSea course programme described below.

In the first semester (30 ECTS), the Fundamentals Module, delivering basic knowledge and skills required by all programme graduates, will be taught at some of the partner universities (see Annex 2). This module contains six jointly developed courses covering the following themes: Marine policy and governance, Marine genomics, Quantitative methods in marine science, Oceanography, Marine ecology, Marine GIS and spatial planning. In addition to these six courses, students have also the opportunity to take one transferable skills Course (for example language training, scientific diving, scientific communication).

During the second semester (30 ECTS) and the third semester (30 ECTS), the students follow two Thematic Course Modules, leading to one of the five Specialization Tracks. Students are highly recommended to take two course modules within the same specialization track. Only motivated by their professional project, and upon

positive advice of the IMBRSea Educational board, students may be allowed to change specialization track during their programme. All mobilities (including changes in mobility) shall be approved by the Programme board.

The following five specialization tracks will be on offer:

1. Marine food production (#Production)
2. Management of living marine resources (#Management)
3. Applied marine ecology and conservation (#Conservation)
4. Marine environment health (#Environment)
5. Global ocean change (#FutureSeas)

The curriculum in each track is offered by at least two Partner universities with the best expertise in the field of the Track.

In the second half of the second semester, students will gain authentic experience in the work field during six weeks of Professional Practice offered by potential future employers relevant to IMBRSea. During these internships Mentor's guidance of students will be integrated with support provided by academic supervisors from the Partner universities. Professional practice guidelines are provided in Annex 4.

Two activities have been identified that aim to prepare students for aspects related to the Master thesis research: a joint school organized at the beginning of semester 3 and a jointly developed course dedicated to the preparation of the MSc Thesis offered at the end of semester 3.

> The first part of this preparation is a Joint School which will bring all students from the same cohort together for programme-wide training on multi-disciplinary topics. The Joint School is an integrated activity, organized and delivered by teachers representing each Partner university. Evaluations of student performance during the Joint School are also integrated: assessment criteria are common for all students and students are jointly assessed by representatives of the full consortium, based on similar evaluation criteria that are used for the Thesis.
>
> At the end of the third semester, the students follow a jointly developed course on practical and transferable skills related to the way they will have to carrying out a research project. Topics included will be: project management, data management, research proposal writing and scientific communication.

During the 4th semester students carry out their thesis research. It can be done at any main or associate partner, or other institution providing a support for the targeted topic. Thesis research work will lead to a written report following the agreed thesis guidelines (see Annex 5). During the Annual Symposium organized at the end of the 2nd and 4th semester the thesis work will be defended by an oral presentation. A jury composed of representatives of all main partners institutions will evaluate each Thesis and examine each student according to jointly developed thesis evaluation criteria that conform to the requirements of each main Partner institutions.

***Article 3: Organisational structures and responsibilities***

Several governance bodies will be installed within the programme. For each governance body the responsibility and roles of the coordinator, partner universities and associate members is specified and may be further clarified during the first meetings of each of these.

The IMBRSea Master is governed by the following management structures:

## 3.1 Coordination Office:

This office, located at Ghent University, is supervised by the IMBRSea coordinator. This office is in charge of the overall coordination of the master programme. The following tasks are allocated to this office: application procedure, follow-up of applicants and students, outreach, collection and management of all course administration related issues (grades, changes in curriculum), financial management, contact with scholars, organisation of Annual Symposia, contact and reporting with EACEA, professional practice and thesis work follow-up, contact

with associates, organisation of board meetings, contacts with International Relations Offices (IRO) of participating HEIs.

## 3.2 Programme Board:

The Programme Board comprises one representative per full partner, two associate partner representatives and two student representatives. IMBRSea's coordinator represents the coordination office on this board. A chair of this board is elected from one of the full partner representatives on a 3-year basis. The board oversees the general working of the master programme (financial decisions, approval of the selections, overall organisation), is in charge of curriculum review, the MSc Thesis topic evaluation and development and educational quality assurance. The board meets at least four times per year (end of August before the start of the academic year, early October, early February and physically during the annual symposium). The programme board is advised by the examination board, the selection committee, the student board and the external advisory committee.

Decisions are where possible taken by consensus. In cases where a consensus cannot be achieved, decisions will be taken following the majority plus 1 rule.

## 3.3 Selection committee:

This committee consists of four representatives elected from the members of the Programme Board (excluding students) and is chaired by a full partner representative (different from the Programme Board chair and elected on a 2-year basis). All partner universities shall for the total duration of this consortium agreement take an equal share in the selection tasks. The Selection committee is in charge of establishing a selection of students applying for grants offered by the programme through the Erasmus+ framework, or through other funding schemes. The Selection committee meets once each year early April and reports the selection list to the Programme Board before the deadline for reporting to EACEA (around mid-April). The Coordination office shall assist in the administrative follow-up of the selection and is also in charge of checking the eligibility of all applicants (self-funding and grant-requesting) following the regulations as set in 5.1. Eligibility of all students as well as awarding grants needs approval from the Programme Board.

## 3.4 Examination Board:

This board consists of all the teachers of the programme. All teachers are invited to the deliberation meeting at the end of each academic year (end of June). Due to the international make-up of the programme, most teachers will however be excused from attending this meeting and will pass their evaluations via a representative (belonging to the same university). A second meeting will be organised electronically at the end of the second exam period (September). The examination board takes minutes of the scores given by the responsible teachers to each of the students. A full overview of the scores is generated within the central exam database of Ghent University (http://oasis.ugent.be). This board will also issue special awards, grades and prizes.

## 3.5 Student Board:

This board consists of six members elected from the student population (year 1 and year 2) and one IMBRSea alumnus. The aim of this board is to provide students with a structural involvement in the organization of the programme. Their task is to organize communication and information flow between year 1 and year 2 students, communication of student related issues to the Programme Board. The Student Board will delegate 2 of its members to communicate with the Programme Board about opinions, ideas and suggestions made by all students when needed. The Student Board meets physically once a year during the annual event.

*Article 4: Educational responsibilities*

**4.1. The role of the partner universities in education:**

Since the IMBRSea is a specialized master based on many scientific disciplines, and since the student cohorts who enter the course will be diverse, we have to ensure that the basic knowledge relevant for the thematic course modules in each specialization track will be offered in the first semester (independent of the chosen starting university).

Universities offering the fundamentals package in first semester are responsible for offering each course unit as such that the jointly agreed final competences for each course are met. In cases where no sufficient competence is present at a partner university, this will be solved via teacher mobility. Teacher mobility will be allowed by each University, as a part of their teaching load.

Partner universities delivering thematic course modules in semester 3 and 4 have to ensure that the content of the courses fits to the knowledge gained during the first semester and meets with the final competences set for each specialization track. To ensure this, for each track an academic will be appointed by the Programme Board. This person will be in charge of supervising the educational aspects and communication of these aspects with the Programme Board. Universities involved in each track should interact at a regular basis and should adapt where needed specific content of each course. On the annual basis, at the start of the second semester, it will be possible to implement these changes upon approval of the Programme Board. Administrative follow-up of this will be organized by the coordination office.

At the start of the third semester, a Joint school (6 credits) is organized. Lecturers from the nine partner universities, together with associated (non-academic) partners, are jointly responsible for the Joint school. To allow the joint responsibility to be taken, the teaching load for participating teachers will be recognized at each partner university.

During the second semester students will carry out a professional practice. For this, they will be preferably active in a non-academic structure, under the framework of a work placement. During the fourth semester students will carry out thesis research. For this they will be active in a main or associate partner. For both activities an academic mentor will be appointed. This mentor is in charge of ensuring that the work carried out is compliant with the professional practice and thesis guidelines respectively. The coordinating institution concludes the agreement for the professional practice and the thesis research between the student, the coordinating institution and the host institution of the professional practice or thesis work of the concerned student. (Annex 4 & 5).

**4.2. Teacher mobility and involvement of teachers (scholars) external to the consortium:**

The IMBRSea programme stimulates both involvement of teachers external to the consortium (so called scholars) and teacher mobility within the consortium. Both types of teacher mobility require formal approval by the Programme Board and will at each partner university also be formally recognized as such. Teacher mobility within the consortium will be regulated according to the Erasmus Mobility framework. All main partners will engage in bilateral Erasmus exchange agreements for this.

Where no alternative funding is available for teacher mobility for scholars external to the consortium, it will be funded at an IMBRSea central level. Funding for this kind of mobility will require approval of the Programme Board and will be in line with the IMBRSea financial regulations

*Article 5: Administrative organization of IMBRSea*

**5.1. Admission criteria**

A prerequisite for admission is that applicants have a minimum of a Bachelor degree in biology, ecology, environmental sciences, oceanography, marine sciences, geography, geology, biotechnology, veterinary sciences or other equivalent degrees, with a minimum of 180 obtained ECTS.

The number of students who can register within each mobility will depend on the logistic possibilities of the involved partner universities. Logistic possibilities will be reviewed on a yearly basis (early December for the next academic year). The best ranked students (using the same criteria as explained in 5.4) will be firstly admitted to their preferred university in year 1. For the second year, mobility will be organized in accordance to the preference of the students, where needed backed up with the academic performance. Preferences of the students regarding the place of study will be taken into account as far as possible.

Knowledge of the English language is a basic requirement: A proof of sufficient knowledge of the English language is required.

The IMBRSea Programme Board can, at its own discretion waive the requirement for proof of English language skills, if English was the official language of instruction/teaching for at least one year of the previous successful Higher Education studies. Specific requirements for English Language proficiency are detailed in Annex 11 and are subject to review by the Programme Board.

**5.2. Application procedure**

The consortium offers one coherent point of entry as regards the Master's course promotion, information regarding all formalities and application for admission. Applicants will apply to the coordinating university, Ghent University, which is hosting the IMBRSea coordination office. Interested students will find all relevant information on the IMBRSea programme website (http://www.imbrsea.eu): general information, admission criteria, application forms, deadlines for application, course content, information on scholarships and fees, and so on.

The application file must contain the following documents, meeting the requirements set in the Erasmus Mundus Joint Master degree Programme guide:

- a completed application form (online) where information is given about personal data, study data, linguistic skills, professional data, recommendation letters, motivation, country of preference to start with the IMBRSEA master programme
- a copy of the international passport
- at least two completed referee reports
- legal copies of diplomas and an official translation in English, if the original language is not one of the official languages of the coordinators (all languages other than Dutch, French, German, English need to be translated into English) . If the diploma is not yet obtained at the time of application (student is in their last year of Bachelor study), an original proof of enrolment and a most recent transcript of records must be provided.
- copies of diploma supplements stating courses followed and scores obtained per course and, eventually, a translation in English (see further) and official transcript of records
- copies of language tests scores and language certificates

**5.3. Admission of students**

All students fulfilling the diploma requirements and sufficient knowledge of English language, can be admitted by the Programme Board. Partner Universities are not allowed to have additional conflicting admission conditions for students admitted to the programme. The students will get an official letter of admission signed by the Registrar of Ghent University where the Coordination Office is located. A copy of this letter will be sent to the department responsible for enrolment of the institute receiving the student during his Study Pathway (first and second year). Enrolment is only official after paying the tuition fee by the student to the coordinator and after having performed all formalities (not conflicting with the joint programme regulations) for joining the first

hosting partner. The coordinating university will share the final list of students with the partner universities. The coordinating university will transfer the agreed budget for covering enrollment costs to the partner university account where the student is enrolled.

### 5.4. Selection procedure for ERASMUS MUNDUS scholarships

The selection of scholarship recipients is done by the selection committee (see 3.3) making use of the following selection criteria: academic scores (30%), reputation of the school or institute were the student has previously studied[2] (10%), language skills (eligible or not eligible), referee letters (15%), Curriculum Vitae (15%), and motivation (30%). Based upon these criteria an overall ranking will be made and scholarships will be proposed according to the geographic regulations set for Erasmus Mundus scholarships. Students that are not selected but that are still academically eligible for the programme will be put on a reserve list for scholarships. Upon approval of the programme board, via an electronic meeting, a list of selected students and the reserve list will be forwarded to the EU. The IMBRSea coordinator will contact selected students to commence the registration procedures and mobility arrangements (invitation letters to obtain visas).

### 5.5. Selection procedure for other scholarships

On a yearly basis the programme board may allocate extra scholarships obtained from alternative financial sources. The same selection procedure is used as described in 5.4

### 5.6. Enrolment of students in the partner universities

The coordinator will inform the partner universities about the students who choose to attend their courses in the following academic year by early May for all non-EU students and all EU students that applied by the end of the scholarship application deadline and by the end of June for EU students that applied on a self-funding basis. All students are enrolled in the coordinating university (only students that follow courses in the coordinating university have to pay the enrolment fees of the coordinating university; all other students will be enrolled as 'pro-forma' students in the coordinating university) and at least on a semester basis in the university where they perform their studies. They might as well all be enrolled at the other partner universities in a similar status as at the coordinating universities, if this is required to issue the joint diploma. In this case no additional funding will be foreseen for this additional enrollment. .

### 5.7. IMBRSEA programme fees

The programme fees for European students are set at 4500 euro per academic year (9000 euro for the full programme 120 ECTS).

Due to the complex nature of the administrative procedures for non-European students and to the severe assessment of the applications the IMBRSea programme fee for non-European students is set at 9000 euro per academic year (18000 euros for the full programme 120 ECTS).

The programme board decides on a yearly basis before opening the application forms on the possibility to reduce programme fees for non-scholarship holding students (partitial fee waivers). A corrected participation fee (according with these waivers) will be advertised as well on the website.

Scholarships (Erasmus Mundus scholarships) of all students are paid on a separate sub account at Ghent University reserved for the functioning of the IMBRSea programme. Except for the IMBRSea programme fees, scholarships are transferred according to the scheme and rules agreed in the student agreement (see Annex 6) to the accounts of the students concerned.

The coordinator of the Consortium will transfer the agreed institutional participation fees to the accounts indicated by the respective universities upon issuing of an invoice or certificate. Joint programme elements (coordination, joint school, annual symposium, …) will be financed by the central coordination budget. On a yearly basis a budget plan will be agreed in accordance with the IMBRSea financial rules described in Annex 7.

[2] Reputation of school is checked using university rankings, and previous mobility experiences maintained in a central database at the coordinating university

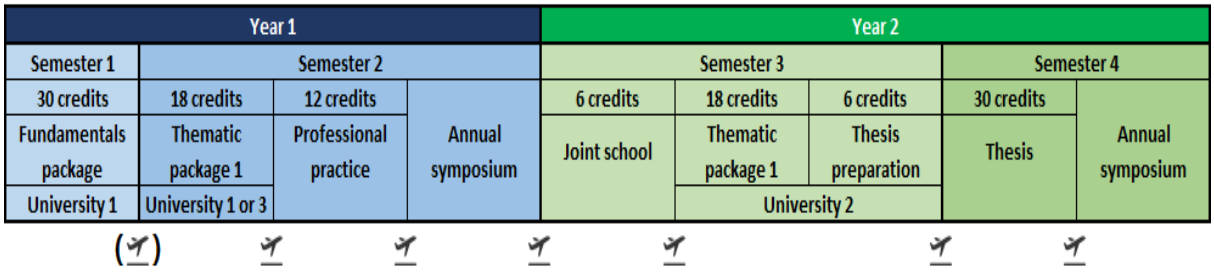
Students who do not complete the study program by the end of the timeframe defined in the student agreement (two years), may upon approval of the programme board still enroll for a third year. Tuition fees for this extension will be calculated on a semester basis following the normal IMBRSea participation fee paid by the student for participation in previous academic years (as documented in the student agreement). In case a student does not complete the programme after an additional third year, this student will no longer be allowed to participate in the programme. In this case the student will receive an official transcript listing the courses for which he/she has obtained credits.

### 5.8. Education

All institutes are responsible for providing appropriate education, teaching and examination within the framework of articles 2 and 4 in this agreement.

### 5.9. Mobility

Student mobility is an integral aspect of the IMBRSea programme. Partner universities engage to make practical arrangements for their incoming students before and during the mobility. This includes, if applicable, instructions on visa procedures, providing a local admission letter, housing and other services for international students. Students are required to undertake a mobility period of at least one semester (30 ECTS) but can, depending on their interests, maximize their mobility opportunities. The full IMBRSea study programme is divided into nine blocks run over two academic years, as seen in the figure below. Each academic year commences in September/October and finishes in June/August (depending on the starting university and thesis defense period). Students are distributed across several universities for the Fundamentals package, and Thematic packages. Joint activities for the full cohort of students are organized during the Joint school and Annual symposium. For the thesis work, students can choose between research groups of the nine universities or associated institute. In all cases, the promotor of the thesis is one of the lecturers of the IMBRSea programme.




### 5.10. Transfer of credits

The IMBRSea curriculum is based on the ECTS. The procedure for transfer of credits, if applicable, is as follows:

- The institute where the student effectively studied, sends the obtained marks of the student to the IMBRSea coordination office (for first semester courses before March 15th, and for second semester courses before July 8th or September, 20th). For each course, the locally obtained grade per student, the total number of students following the course and the ECTS grade (or the place of the student in the ranking of all students (not only IMBRSea students) who followed that course) will be communicated.
- The IMBRSea coordination office converts the local grades to a 20 point scale according to an agreed conversion table (see Annex 8) for each participating institute. This is done to facilitate the final awarding of the degree. After approval by the programme board, converted scores will be entered in the study management platform at Ghent University.
- At the end of each academic year the secretariats of the partner universities will produce an official transcript of records per semester with an overview of already obtained credits. These transcripts of records will be made available to the students.
- When a student has obtained all necessary credits and successfully defended their master dissertation, the official diploma is issued accompanied by the diploma supplement. Students are awarded a joint degree of the consortium.

### 5.11. Passing exams

The partner university offering courses and hosting the students will organize the examination component (for each course) according to the local regulations. The students are bound to the examination regulations and criteria of the university where they follow the courses. At the start of each teaching period partner universities provide all students with the local examination regulations. The IMBRSea Programme Board will define and issue a common framework for examination for the programme's joint elements.

If students fail a course, at least one resit per course will be allowed. This resit will preferably take place in the partner university where the course was taught, but may also be possible in another partner university depending on the mobility of the student. Students resitting a course remain bound to the examination regulations and criteria of the university where they followed the course. At the end of each academic year the examination board will review the study performance status of each student and advises on continuation of the programme in accordance with the regulations at each university.

Students with very weak study performance (decided by the examination and programme board) may lose their scholarship or may be advised to end their study. Students who quit the IMBRSea programme early but have successfully completed courses will get a certificate stating the courses for which they have earned credits.

For the master thesis, a common evaluation procedure is developed. Dissertations (even those performed outside one of the awarding universities) are defended at the Annual Symposium (see Annex 9). Common standards are used and the thesis is defended before an examination commission[3] appointed by the Programme Board and consisting of at least three academics (including the promoter) of which one belongs to another institute awarding the degree. The dissertation can only be defended when all other requirements (passing of all courses, fulfilling the mobility and participation in joint programme activities) to obtain the degree are fulfilled so that the examination commission can decide on behalf of the Programme Board on awarding the degree or not. In case of doubts, the decision can be postponed and discussed at the yearly coordination meetings of the Programme Board.

The final grade of the diploma, if applicable, is decided by the Examination Board, and communicated to the coordinating university who will prepare the joint diploma, accompanied by the diploma supplement.

### 5.12. Awarding the degree and the diploma

After successful completion of the IMBRSEA academic Programme, graduates shall receive a Joint Masters degree by the nine Consortium Universities. The Diploma is fully based on the ECTS system and will be accompanied by a Diploma Supplement that lists all the courses and the title of the thesis with their accompanying ECTS credit points and grades with specification of training hours, language of instruction, institution delivering the course and all other relevant details such as the ECTS system.

The Diploma will be materially issued by Ghent University, jointly with and also signed by the respective partner Universities, according to the European regulations.

The Diploma supplement will be issued according to the European regulations, following the model developed by the European Commission, the Council of Europe and UNESCO/CEPES. The Supplement provides sufficient independent data to ensure the international transparency and fair academic and professional recognition of qualification (diplomas, degrees, etc.). The Supplement will provide a description of the nature, level, content, context and status of studies pursued and successfully completed by the student.

A model of the joint diploma is provided in annex 12.

[3] The thesis Examination Committee consists of three members, containing two members belonging to one of the nine IMBRSea partner institutes :

1. Reader 1 : (co-)promoter and supervisor give 1 score together (cf. evaluation form) (in case of a problem, the IMBRSea Programme Board will negotiate)
2. Reader 2 : external to the host research group
3. Reader 3 : from the IMBRSea consortium (8 universities) but external to the host institute

### 5.13. Joint school organisation

The joint school is organized every year between semester 2 and 3, as a part of the third semester. The organizational costs (including accommodation costs) are covered from the central coordination budget according to the regulations outlined in Annex 7.

### 5.14. Quality Assurance

Quality assurance will be considered both at a European level for the programme as a whole and the joint programme elements and, on a local level. The local quality assurance is done by each partner university individually and typically fits in national quality assurance programmes. A quality assurance committee will monitor the program. They can monitor the added value offered by the Erasmus Mundus programme (as compared to local non-joint programs at the different partners), be involved in the comparison of the core programs at different partners, advise on industrial relevance, knowledge and skill levels required by policy makers, etc.

An External Advisory Board will be installed consisting of a representative from the EMBRC network, per specialization track one representative from the non-academic sector and one alumnus. The Board has access to the results of the internal evaluations and will be able to meet with the representatives of all full and associate partners, students and alumni. The Advisory Board meets once every two years and advises the Programme Board on issues related to the overall content and aim of IMBRSea.

In function of accreditation reviews, a programme portfolio will be created and maintained at Ghent University. The portfolio includes a description of the context of the joint programme, includes the key quality features of the programme based on the NVAO Quality Code Flanders 2015-2017, includes a 'Quality Improvement Plan' outlining the major actions that are needed in the future to ensure or increase the quality of the international joint programme, and finally includes a compilation of attachments that are available for the international study program and that address the key quality features in more detail.

Depending on the accreditation regulations for each main partner, the Brogramme board will ensure that the progamme remains accredited in each partner and may as such decide on accreditation review procedures (joint or nationally).

### 5.15. Publicity material

No publicity material will be designed and distributed by any partner without prior approval of the Programme Board.

### 5.16. Other responsibilities

Each hosting partner university is responsible for receiving students and arranging its programme. This includes, if applicable, instructions on visa procedures, providing a local admission letter, housing and other services for international students. Each partner university further agrees to give at least to the students registered at their university, access to facilities at the same conditions as regular students enrolled at the university.

## *Article 6: Costs and financing*

Financial and administrative coordination of the master course will be done by the coordinating institution (Ghent University) according to financial management guidelines (Annex 7) and upon decisions made by the Programme Board.

The financial arrangements will be as follows:

The coordinating university receives all incoming money (scholarship grant from EU, scholarships and tuition fees of students without scholarship) on a central account. Scholarships (monthly allowances, and mobility flat amounts) for grant-holding students will be kept on a separate sub-account. With the exception of the IMBRSea tuition fees, scholarships are transferred according to the scheme and rules agreed in the student agreement (see Annex 6) to the accounts of the students concerned. The currency of the consortium will be Euros.

From the incoming money generated from tuition fees the following costs will be covered:

- Tuition costs and course participation costs at each university where the student is following courses at: the coordinating institution will reimburse to each partner university the rate of 1500 euro per semester per student.
- All costs of jointly organized activities such as the joint school and the annual symposium (both excluding transport).
- Costs for scholar mobility in cases where no alternative funding can be found.
- The administrative costs programme (coordination costs, meetings of the board, …).

A special account will be opened for the IMBRSea programme at each participating partner university under the control of the respective financial services. The Erasmus Mundus budget will be managed according the specific European rules but will in addition also follow the general financial regulations of Ghent University as public institution. Financial transactions are clearly earmarked, registered and saved. Proof has to be collected. By law furthermore, the finances of public universities in Flanders are supervised by a Commissioner of the Flemish Community, continuously following up the activities. The coordination office is responsible for an open accounting system to the partners allowing full transparency of money flows and internal and external control.

Detailed guidelines on the financial management are outlined in Annex 7.

***Article 7: Intellectual property rights***

Each partner shall make the student aware of the intellectual property rights management provisions of this agreement and those in place at the University where he or she in enrolled. Such information shall include ownership rights and royalty sharing arrangements.

Results are owned by the Party that generates them. In case of results generated from work carried out jointly by two or more Parties, those results shall be jointly owned.

The joint owners shall agree in a joint ownership agreement on the allocation and terms of exercise of their joint ownership, in compliance with their obligations under this Agreement. The joint owners of results will decide whether patent applications are to be submitted for such results, and will appoint from among them the Party which will be tasked with carrying out the formalities of filing, extension and maintenance of new joint patent(s) on such results in their joint names

In case of joint ownership of results, ownership of each of the joint owners shall be determined in good faith, taking into account each owner's relative intellectual and financial contribution to the joint results.

Where no joint ownership agreement has yet been concluded:

- each of the joint owners shall be entitled to use their jointly owned results for research purposes (including sponsored research and research in cooperation with academic third parties) without commercial aim, and teaching on a royalty-free basis, and without requiring the prior consent of the other joint owner(s), and
- each of the joint owners shall be entitled to use their jointly owned results by way of direct exploitation and to grant non-exclusive licenses to third parties, without any right to sub-license, subject to the following conditions:
    - at least 45 days prior notice must be given to the other joint owner(s); and
    - compensation under fair and reasonable conditions to be discussed, must be provided to the other joint owner(s).

In any case where, in the opinion of the student and their supervisor(s), novel intellectual property has been created this must be documented as soon as possible after its creation in accordance with each Partner's invention disclosure procedures.

***Article 8: Confidentiality - Dissertation and Examination***

Most universities will have policies with regards to confidentiality and it is recognized that some of the information may be confidential or be required to be kept confidential. Each partner shall make the student aware of the provisions of this agreement and those in place at the Partner University he or she has matriculated. Where confidentiality of results of any work is an issue the Supervisor of the student should make their institution aware and arrange to put in place a confidentiality agreement. This need may extend to the external examination of the dissertations arising from this programme.

All information in whatever form or mode of transmission, which is disclosed by a Party (the "Disclosing Party") to any other Party (the "Recipient") in connection with the IMBRSea programme during its implementation and which has been explicitly marked as "confidential", or when disclosed orally, has been identified as confidential at the time of disclosure and has been confirmed and designated in writing within 15 days from oral disclosure at the latest as confidential information by the Disclosing Party, is "Confidential Information".

The Recipients hereby undertake for a period of 5 years after the end of the IMBRSea programme:

- not to use Confidential Information otherwise than for the purpose for which it was disclosed;
- not to disclose Confidential Information to any third party without the prior written consent by the Disclosing Party;
- to ensure that internal distribution of Confidential Information by a Recipient shall take place on a strict need-to-know basis; and
- to return to the Disclosing Party on demand all Confidential Information which has been supplied to or acquired by the Recipients including all copies thereof and to delete all information stored in a machine readable form. If needed for the recording of ongoing obligations, the Recipients may however request to keep a copy for archival purposes only.

The above shall not apply for disclosure or use of Confidential Information, if and in so far as the Recipient can show that:

- the Confidential Information becomes publicly available by means other than a breach of the Recipient's confidentiality obligations;
- the Disclosing Party subsequently informs the Recipient that the Confidential Information is no longer confidential;
- the Confidential Information is communicated to the Recipient without any obligation of confidence by a third party who is in lawful possession thereof and under no obligation of confidence to the Disclosing Party;
- the Confidential Information, at any time, was developed by the Recipient completely independently of any such disclosure by the Disclosing Party; or
- the Confidential Information was already known to the Recipient prior to disclosure or
- the Recipient is required to disclose the Confidential Information in order to comply with applicable laws or regulations or with a court or administrative order.

The Recipient shall apply the same degree of care with regard to the Confidential Information disclosed within the scope of the Project as with its own confidential and/or proprietary information, but in no case less than reasonable care.

Each Party shall promptly advise the other Party in writing of any unauthorised disclosure, misappropriation or misuse of Confidential Information after it becomes aware of such unauthorised disclosure, misappropriation or misuse.

If any Party becomes aware that it will be required, or is likely to be required, to disclose Confidential Information in order to comply with applicable laws or regulations or with a court or administrative order, it shall, to the extent it is lawfully able to do so, prior to any such disclosure

- notify the Disclosing Party, and

- comply with the Disclosing Party's reasonable instructions to protect the confidentiality of the information.

Plagiarism of information included in thesis reports or any other reports will not be allowed and may lead to exclusion from the programme. Proper references need to be given in all documents used.

***Article 9: Liability***

9.1. Each partner shall be solely liable for any loss incurred by, or damage or injury to, third partners, resulting from its own actions in the execution of this agreement.

9.2. Each partner shall be fully responsible for the performance of any part of its share of the agreement and for the requirements of Insurance and Social Security for its personnel, involved herein.

9.3. With respect to any injury to any person or any damage to any property of any person occurring at any establishment of any of the partners in the course or arising out of the execution of this agreement, the partner at whose establishment the injury or damage occurs, shall be solely responsible for the payment of compensation to such extent as this partner shall be under a legal liability in respect of such injury or damage. This article shall not apply with respect to any such injury or damage, the causing of which is attributable to any act of a servant or agent of any of the partners, committed with the intention of causing harm to any person or property or with reckless disregard for the consequences of his act.

***Article 10: Entry into force and termination***

This agreement shall come into force as of the date of its signature (referred to as T0 no later than 30 June 2017) by all the partners and shall continue until the end of the agreements between the European Community and the Universiteit Gent within the framework of the action entitled: 'Master in Marine Biological Resources', based on the framework partnership agreement (2016-2280/001-001 – see annex 12) between the European Community and the Universiteit Gent and possible other specific agreements signed on behalf of the Consortium.

This consortium agreement is valid as long as contracts with the EU are binding the consortium partners (until 31-08-2021, for an intake of three cohorts of students (2017, 2018 and 2019)). If this is not the case anymore, the consortium partners will decide in mutual agreement to continue this agreement or not.

If a partner university wants wishes to leave the agreement before the end of the EU agreement, this partner will discuss this with the Consortium and will have to follow the rules stipulated in the EU contract. This is not the case if the partner institute should leave by force majeure.

The cooperation might be prolonged after 31-08-2021. In this case a new agreement will be designed.

***Article 11: Applicable law and Competent Court***

This agreement shall in all respects be construed and operate as an agreement made in Belgium and in compliance with Belgian law. The settlement of any difference or conflict arising from or in connection with this agreement shall be attempted by an amicable effort from the partners.

However, due to the international nature of this agreement, only the International Chambers of Commerce in Geneva are competent to decide on the disputes, which would remain unresolved.

Students receiving an Erasmus Mundus grant are bound to the rules and regulations from the institute at which s/he is enrolled and to the individual student contract between coordinator and each student. Students shall be informed of these rules and regulations prior to physical arrival at the partner.

***Article 12: Amendments***

The IMBRSea Programme Board has the mandate to add or change amendments or annexes to this agreement when necessary. For all things not stipulated in this agreement the Programme Board can decide, if applicable upon approval by the official bodies of the signing institutes and/or the European Commission.

## Approved by

| |
|---|
| 1. Date:<br><br>Prof. dr. Anne De Paepe, Rector<br>Universiteit Gent, Ghent, Belgium |

| |
|---|
| 2. Date:<br><br>Rector of the Universidade do Algarve |

| |
|---|
| 3. Date:<br><br>Rector of the Universidad de Oviedo |

| |
|---|
| 4. Date:<br><br>President of the Université Pierre et Marie Curie, Paris VI |

| |
|---|
| 5. Date:<br><br>President of the Institiúid Teicneolaíochta Na Gaillimhe-Maigh Eo |

| |
|---|
| 6. Date:<br><br>Rector of the Universidad del País Vasco |

| |
|---|
| 7. Date:<br><br>Rector of the Università Politecnica Delle Marche |

| |
|---|
| 8. Date:<br><br>Rector of the Universitetet I Bergen |

| |
|---|
| 9. Date:<br><br>Rector of the Université de Bretagne Occidentale |

**Masteropptak høsten 2018**
**Søkertall i det norske opptaket (per 20. april 2018)**

| *Søkeralternativer - høst 2018* | *1. prioritet* | *2. + 3. prioritet* | *alle søknader* |
|---|---|---|---|
| BIOLOGI: Biologi - Biodiversitet, evolusjon og økologi | 33 | 32 | 65 |
| BIOLOGI: Biologi - Mikrobiologi | 29 | 48 | 77 |
| BIOLOGI: Biologi - Miljøtoksikologi | 20 | 39 | 59 |
| BIOLOGI: Biologi - Utviklingsbiologi og fysiologi | 7 | 35 | 42 |
| BIOLOGI: Biologi - Fiskeribiologi og forvaltning | 12 | 45 | 57 |
| BIOLOGI: Biologi - Havbruksbiologi | 11 | 36 | 47 |
| BIOLOGI: Biologi - Marinbiologi | 37 | 49 | 86 |
| MOLEKYLÆRBIOLOGI: Molekylærbiologi | 65 | 24 | 89 |
| **Institutt for biologi** | **214** | **308** | **522** |
| ENERGI: Energi | 149 | 82 | 231 |
| METEOROLOGI OG OSEANOGRAFI: Fysisk oseanografi | 5 | 9 | 14 |
| METEOROLOGI OG OSEANOGRAFI: Marin biogeokjemi | 1 | 7 | 8 |
| METEOROLOGI OG OSEANOGRAFI: Klimadynamikk | 6 | 9 | 15 |
| METEOROLOGI OG OSEANOGRAFI: Meteorologi | 2 | 16 | 18 |
| **Geofysisk institutt** | **163** | **123** | **286** |
| FYSIKK: Akustikk | 3 | 4 | 7 |
| FYSIKK: Måleteknologi og instrumentering | 6 | 20 | 26 |
| FYSIKK: Kjernefysikk | 3 | 15 | 18 |
| FYSIKK: Medisinsk fysikk og teknologi | 11 | 11 | 22 |
| FYSIKK: Mikroelektronikk | 16 | 11 | 27 |
| FYSIKK: Optikk og atomfysikk | 2 | 4 | 6 |
| FYSIKK: Partikkelfysikk | 7 | 10 | 17 |
| FYSIKK: Romfysikk | 5 | 15 | 20 |
| Havteknologi | 97 | 36 | 133 |
| PETROLEUMSTEKNOLOGI: Reservoarfysikk | 15 | 20 | 35 |
| PETROLEUMSTEKNOLOGI: Reservoargeologi | 11 | 33 | 44 |
| PETROLEUMSTEKNOLOGI: Reservoarkjemi | 5 | 16 | 21 |
| PETROLEUMSTEKNOLOGI: Reservoarmekanikk | 7 | 21 | 28 |
| PROSESSTEKNOLOGI: Flerfasesystem | 12 | 32 | 44 |
| PROSESSTEKNOLOGI: Kjemometri | 10 | 10 | 20 |
| PROSESSTEKNOLOGI: Separasjon | 10 | 19 | 29 |
| PROSESSTEKNOLOGI: Sikkerhetsteknologi | 12 | 43 | 55 |
| **Institutt for fysikk og teknologi** | **232** | **320** | **552** |

| | | | |
|---|---|---|---|
| GEOVITENSKAP: Geovitenskap | 98 | 12 | 110 |
| **Institutt for geovitenskap** | **98** | **12** | **110** |
| INFORMATIKK: Algoritmer | 22 | 51 | 73 |
| INFORMATIKK: Bioinformatikk | 15 | 19 | 34 |
| INFORMATIKK: Optimering | 11 | 38 | 49 |
| INFORMATIKK: Sikker kommunikasjon | 28 | 36 | 64 |
| INFORMATIKK: Visualisering | 10 | 33 | 43 |
| PROGRAMUTVIKLING: Programutvikling | 72 | 20 | 92 |
| **Institutt for informatikk** | **158** | **197** | **355** |
| KJEMI: Kjemi | 41 | 14 | 55 |
| NANOVITENSKAP: Nanovitenskap | 13 | 12 | 25 |
| **Kjemisk institutt** | **54** | **26** | **80** |
| MATEMATIKK: Anvendt og beregningsorientert | 19 | 26 | 45 |
| MATEMATIKK: Algebra | 3 | 8 | 11 |
| MATEMATIKK: Algebraisk geometri | 2 | 4 | 6 |
| MATEMATIKK: Matematisk analyse | 4 | 23 | 27 |
| MATEMATIKK: Statistikk - dataanalyse | 18 | 19 | 37 |
| MATEMATIKK: Statistikk - finansteori og | 11 | 16 | 27 |
| MATEMATIKK: Statistikk - matematisk statistikk | 4 | 19 | 23 |
| MATEMATIKK: Topologi | 3 | 2 | 5 |
| Erfaringsbasert master i undervisning fordypning i | 35 | 1 | 36 |
| **Matematisk institutt** | **99** | **118** | **217** |
| **Totalt** | **1018** | **1104** | **2122** |

# Orientering om samordna opptak 2018/2019

Tabellen under viser søkertall til samordna opptak for 2018 sammenlignet med søkertallene for 2017 og endringen i antall søkere. Dette er førsteprioritetssøkere.

| Programnavn | 2018 | 2017 | Endring |
|---|---|---|---|
| **Aktuarfag** | 7 | 18 | -11 |
| **Bioinformatikk** | 13 | 21 | -8 |
| **Biologi** | 163 | 143 | 20 |
| **Datasikkerhet** | 59 | 58 | 1 |
| **Datateknologi** | 114 | 145 | -31 |
| **Datavitenskap** | 71 | 59 | 12 |
| **Energi** | 43 | 66 | -23 |
| **Fiskehelse** | 88 | 86 | 2 |
| **Fysikk** | 42 | 49 | -7 |
| **Geovitenskap, retning geofysikk** | 10 | 11 | -1 |
| **Geovitenskap, retning geologi** | 30 | 46 | -16 |
| **Havbruk og sjømat** | 38 | 40 | -2 |
| **Havteknologi** | 42 | 35 | 7 |
| **Informatikk-matematikk-økonomi** | 33 | 32 | 1 |
| **Kjemi** | 23 | 21 | 2 |
| **Klima-, atmosfære- og havfysikk** | 35 | 37 | -2 |
| **Lektor, 8.-13. trinn, naturvit. eller matematikk** | 68 | 69 | -1 |
| **Matematikk** | 23 | 26 | -3 |
| **Matematikk for industri og teknologi** | 16 | 11 | 5 |
| **Medisinsk teknologi** | 76 | 84 | -8 |
| **Molekylærbiologi** | 67 | 68 | -1 |
| **Nanoteknologi** | 23 | 38 | -15 |
| **Naturvitenskapelige fag** | 138 | 183 | -45 |
| **Petroleums- og prosessteknologi** | 21 | 22 | -1 |
| **Statistikk** | 11 | 14 | -3 |
| | 1254 | 1382 | -128 |

Det er 128 færre søkere i 2018 enn i 2017. Nedgangen i søkertall skyldes primært innføringen av et skjerpet matematikkrav som trer i kraft fra og med høsten 2018. For studieåret 2018/2019 innføres krav om matematikk på høyeste nivå fra videregående skole (R2) for et flertall av bachelorprogrammene med MNFA, i tillegg til årsstudiet og lektorprogrammet i naturvitenskapelige fag. Det skjerpede kravet er en forsøksordning i perioden 2018-2022 som gjennomføres sammen med UiO og UiT. Fra opptaket 2019/2020 vil ordningen utvides til også å omfatte biologiske fag, og vil da gjelde for alle bachelorprogrammene ved MNFA.

# Samordna opptak – videre prosess

## Hovedopptaket

Hovedopptaket er den viktigste runden av opptaket. Denne avvikles i år 15. juli. Resultatet av hovedopptaket blir gjort kjent for lærestedene ca. klokken 09.00 påfølgende dag, og offentliggjøres for søkerne i løpet av 18. juli.

Det grunnleggende prinsippet for hovedopptaket er at søkerne kun får ett tilbud, på det høyest prioriterte studieønsket de er kvalifisert til, og der de har nok konkurransepoeng i rangering til å få tilbud. Dersom søkeren oppnår tilbud på et av sine studieønsker, bortfaller lavere prioriterte studieønsker. Det er derimot mulig å stå på venteliste for eventuelle studier på høyere prioritet enn det man har fått tilbud på.

Alle tilbud som gis i hovedopptaket, vil ha svarfrist 24. juli.

## Nøkkeldatoer og milepæler i det Samordnede opptaket 2018

| **Når** | **Hva** | **Ansvarlig** |
|---|---|---|
| Mai/juni | SA innkaller til møte med representanter fra fakultetene om den praktiske gjennomføringen av opptaket, inkludert prosessen for fastsetting av tilbudstall, samt viktige datoer i opptaket.<br><br>Dialog og fastsetting av retningslinjer for vurdering av søkere som ikke kan rangeres (særskilt vurdering, realkompetanse, andre grupper) | SA |
| Mandag 3. juli | Oppstart av forkurs for søkere til lærerutdanning som ikke dekker nytt karakterkrav i matematikk.<br><br>Kontroll om hvorvidt påmeldte faktisk er kvalifisert for å delta | HVL<br><br>SA |
| Mandag 9. juli 12:00 | Siste frist for å melde inn tilbudstall ønsket til første prøveopptak. | Fakultetene |
| Tirsdag 10. juli ca. 10:00 | Første prøveopptak gjennomføres | Samordna opptak |
| Onsdag 11. juli 15:00 | Siste frist for å melde inn tilbudstall ønsket til andre prøveopptak. | Fakultetene |
| Torsdag 12. juli ca. 10:00 | Andre prøveopptak gjennomføres | Samordna opptak |
| Lørdag 14. juli 12:00 | Siste frist for å melde inn tilbudstall ønsket til hovedopptak. | Fakultetene |
| Søndag 15. juli ca. 16:00-20:00 | Hovedopptak ferdig | Samordna opptak |
| Tirsdag 17. juli | SA mottar resultat av hovedopptaket, bearbeider tall, og sender disse ut til fakultetene og KA | SA |
| Onsdag 18. juli «21:00» | Søkerne får svar på søknad om opptak | SA |
| Torsdag 19. juli 11:00 | Tilbudstall offentliggjøres fra Samordna opptak<br>Sperrefrist utløper<br>Pressemelding fra UiB | Samordna opptak<br>SA/KA |

| | | |
|---|---|---|
| Tirsdag 24. juli | Svarfrist hovedopptak. | SA |
| Torsdag 26. juli | SA sender tilbudstall til fakultetene | SA |
| Fredag 27. juli 09:00 | Siste frist for å melde inn tilbudstall til suppleringsopptaket | Fakultetene |
| Fredag 27. juli 12:00 | Suppleringsopptak | Samordna opptak |
| Mandag 31. juli | Felles prøve – forkurs for lærerutdanningene | HVL/SO |
| Onsdag 1. august | Svarfrist suppleringsopptak | SA |
| Torsdag 2. august | Frist for å melde inn eventuelle tilbud ønsket i etterfyllingsopptak. | Fakultetene |
| Torsdag 2. august | Første etterfyllingsopptak kjøres – deretter kjøres så mange som nøvendig (tirsdag/torsdag hver uke). | Samordna opptak |
| Fredag 3. august | SA melder tilbake til fakultetene om nye tilbud gitt i etterfyllingsopptaket | SA |
| Fredag 27. juli | SA oppretter søkere som studenter. | SA |
| Ca. 14.-18. August | Resultater fra forkurs for lærerutdanningene klar. Inndragning av studierett/«tilbakefall» til andre studier for kandidater som ikke består forkurs, men har fått betinget opptak til lærerutdanning. | SO/ SA |
| 19. august | Frist for å oversende saker til første møte i Nasjonal klagenemnd (12. – 13. september) | SA |
| 24. august | Eventuell utsatt prøve forkurs lærerutdanninger (Sykdom, klage) | |
| 23. september | Frist for å oversende saker til andre møte i Nasjonal klagenemnd (19. oktober) | SA |
| 15. oktober | Frist kontroll og godkjenning av møttregistrering | SA |

# Søkertall (1. prioritet) til 2-årige masterprogram for høsten 2018

| **Lokalt (norsk) opptak** | ***Søkertall*** |
|---|---|
| Anvendt og beregning. matematikk | 19 |
| Biologi | 149 |
| Energi | 149 |
| Erfaringsbasert master i undervisning | 35 |
| Fysikk | 53 |
| Geovitenskap | 98 |
| Havteknologi | 97 |
| Informatikk | 86 |
| Kjemi | 41 |
| Matematikk | 12 |
| Meteorologi og oseanografi | 14 |
| Molekylærbiology | 65 |
| Nanovitenskap | 13 |
| Petroleumsteknologi | 38 |
| Programutvikling | 72 |
| Prosessteknologi | 44 |
| Statistikk | 33 |
| **Sum** | **1018** |

Det er en liten økning fra høst 2017 hvor det var 1007 søknader.

| **EU-opptak** | ***Søkertall*** | ***Tilbud*** | ***Ja-svar*** |
|---|---|---|---|
| Applied and Computational Mathematics | 5 | 1 | 1 |
| Biology | 59 | 8 | 4 |
| Chemistry | 4 | 3 | 3 |
| Earth Science | 9 | 2 | 0 |
| Mathematics | 7 | 2 | 1 |
| Meteorology and Oceanography | 16 | 3 | 1 |
| Molecular Biology | 7 | 1 | 1 |
| Physics | 12 | 3 | 1 |
| PTEK | 3 | 1 | 0 |
| Ikke søkbare program | 2 | 0 | 0 |
| ***Sum*** | ***124*** | ***23*** | ***12*** |
| | | *18,5 %* | *9,7 %* |

| **INTGRAD-opptak (land utenfor EU/EØS/Sveits)** | ***Søkertall*** | ***Tilbud*** | ***Ja-svar*** |
|---|---|---|---|
| Applied and Computational Mathematics | 98 | 2 | 1 |
| Biology | 136 | 6 | 2 |
| Earth Science | 101 | 2 | 2 |
| Mathematics | 53 | 2 | 1 |
| Meteorology and Oceanography | 48 | 11 | 5 |
| Molecular Biology | 106 | 8 | 5 |
| Physics | 71 | 4 | 1 |
| ***Sum*** | ***613*** | ***35*** | ***17*** |
| | | *5,7 %* | *2,7 %* |

2018 er første gang at det er et eget EU-opptak, og det er første gang at informatikk ikke er med.
I 2017 ble det sendt 37 tilbud (*pluss 25 til informatikk*) og 18 takket Ja (*pluss 5 til informatikk*).
I 2018 ble det sendt 56 tilbud og 29 takket Ja.

UNIVERSITETET I BERGEN
*Det matematisk-naturvitenskapelige fakultet*

Institutt for biovitenskap
Institutt for informatikk
Matematisk institutt
Geofysisk institutt
Institutt for fysikk og teknologi
Institutt for geovitenskap
Kjemisk institutt

Referanse
2018/3795-BIG

Dato
15.05.2018

***Til instituttledelsen***

# Sensurfrist og forsinket sensur - vedtak i Studiestyret og videre oppfølging ved fakultetet

Studiestyret diskuterte i møtet 4. april 2018 sensurfrist og forsinket sensur ved fakultetet. Saken har vært drøftet både i Utdanningsutvalget og Studentparlamentet ved UiB. Fakultetet har en del emner med forsinket sensur, og det har også vært ulik forståelse av hvordan sensurfristen skal beregnes.

Studiestyret vedtok at dersom situasjonen på fakultetet rundt forsinket sensur ikke bedres vesentlig ved vårens sensur og UiB ikke innfører dagbøter sentralt, anbefaler Studiestyret at fakultetet ensidig innfører bøter ved forsinket sensur fra og med høsten 2018. Det ble også vedtatt at emner med sen eksamen må følge sensurfristen 30. juni i vårsemesteret og 10. januar i høstsemesteret, selv om dette er mindre enn tre uker etter eksamensdato. Grunnen til denne tidlige sensurfristen er at studenter som skal søke opptak til master eller emner i undervisningsopptaket må ha sensuren på emnene klar.

**Sensurfrist vår 2018**
Vi ber alle institutter om å formidle sensurfristen til emneansvarlige og sensorer, slik at denne blir publisert innenfor den lovbestemte fristen. Fakultetet har utarbeidet en **oversikt over sensurfrist for alle emner med skriftlig eksamen vår 2018**. Datoen som er oppført i oversikten er datoen sensuren skal være publisert til studentene. Det betyr at instituttet må trekke fra de nødvendige dagene for å få resultatet registrert og publisert, før datoen formidles til sensorer og emneansvarlige. Merk at noen emner har sen eksamen, slik at sensurfristen blir kortere enn 3 uker for å rekke den interne fristen 30. juni. For 2018 er denne fristen 29. juni fordi den 30. faller på en lørdag.



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Saksbehandler
Birthe Gjerdevik
55583488

**Bakgrunn for saken**

Utdanningsutvalget ved UiB har hatt fokus på forsinkelser ved sensur over flere år, og i møtet i Utdanningsutvalget 16. november 2017 ble det gjennomført en votering vedrørende innføring av dagbøter ved forsinket sensur. Flertallet stemte for å utsette innføring av dagbøter, og at dette ville bli innført fra og med sensuren for høstsemesteret 2018 dersom situasjonen ikke har bedret seg. En statusrapport for forsinket sensur høsten 2017 var på sakskartet til Utdanningsutvalget som drøftingssak til møtet 20. mars 2018, men saken ble utsatt til neste møte. Det ble i saksforelegget slått fast at antall emner med forsinket sensur ved Det matematisk-naturvitenskapelige fakultet fortsatt er forholdsvis høyt. Fakultetet mente derfor at det var nødvendig å diskutere hvilke tiltak som kan bidra til å unngå forsinket sensur i fremtiden.

**Hvordan beregnes sensurfristen**

I arbeidet med å lage oversikt over emner med forsinket sensur ble det tydelig at det var ulik oppfatning av hvordan man beregner sensurfrist.  Dette ble dermed presisert i saksforlegget.

Ifølge Universitets- og høgskoleloven § 3-9 (4) skal sensur skal foreligge innen tre uker.
I tillegg blir det i UiB sin studieforskrift §**7.2.1 Sensurfrist** presisert:
*(1) Når helligdager faller på en ukedag, forlenges sensurfristen tilsvarende.*
Dette innebærer at dersom fristen for sensur faller på en helligdag, kan fristen forlenges til nærmeste virkedag. Dersom sensurfrist faller på en lørdag eller søndag, forlenges den til påfølgende mandag. Sensurfristen forlenges ikke dersom det er lørdag/helligdager/røde dager i sensurperioden (mellomliggende dager).

**Sensurfrist for emner med sen eksamen**

Fakultetet vil ta inn i sine utfyllende regler at emner med sen eksamen må følge sensurfristen 30. juni i vårsemesteret og 10. januar i høstsemesteret, selv om dette er mindre enn tre uker etter eksamensdato. Fra og med høst 2018 blir dette tatt hensyn til i eksamensplanleggingen, slik at det vurderes hvilke emner som skal ha eksamen sent.

Studiestyrets vedtak og sensurfrist for emner vår 18 er lagt ved brevet.

Vennlig hilsen

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