NTNU

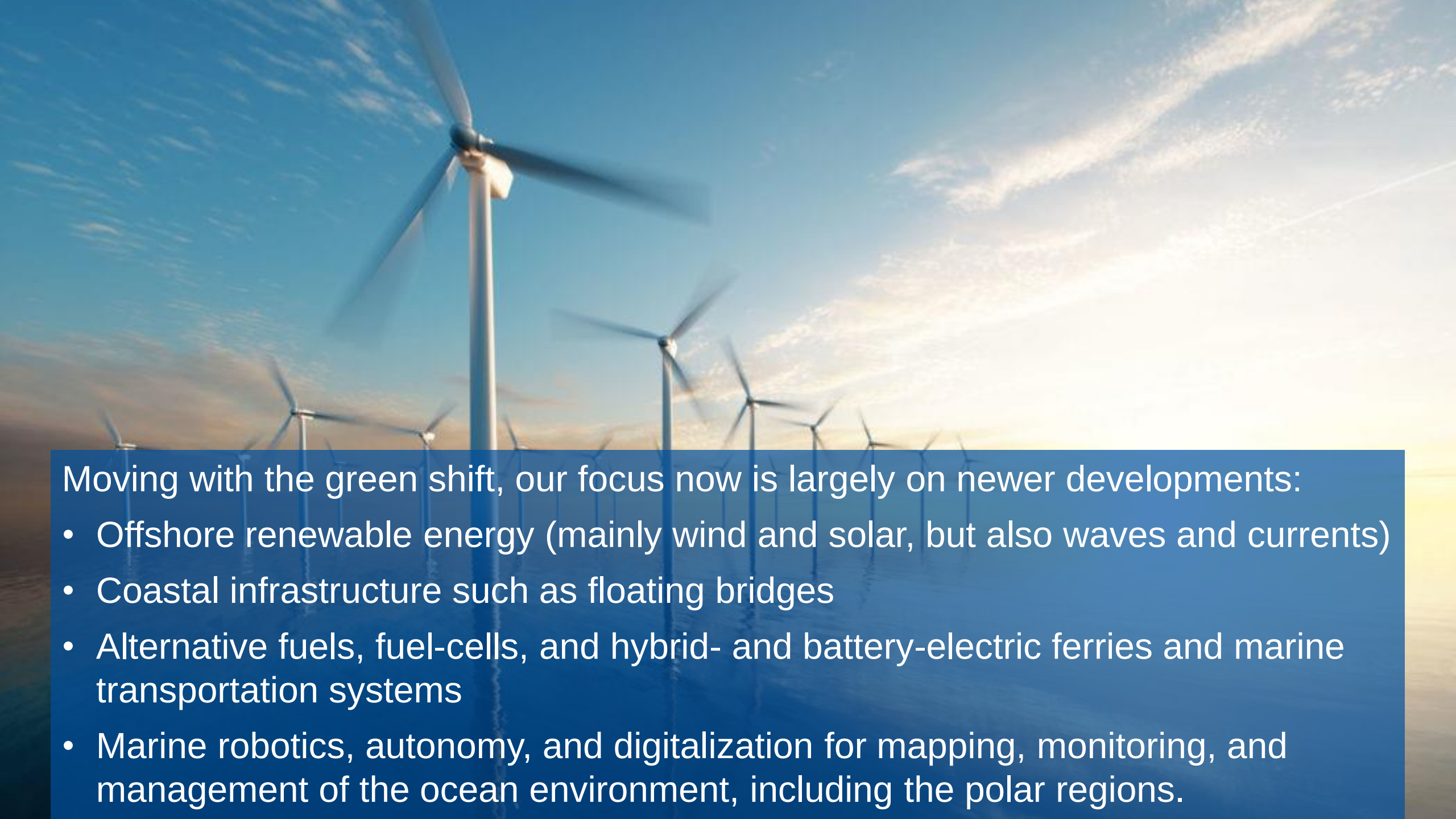
Department of Marine Technology

NTNU

- Main profile in science and technology
- Academic breadth: engineering, humanities, social sciences, medicine, health sciences, science of education, architecture, fine arts and performing arts
- Headquarters in Trondheim with campuses in Gjøvik and Ålesund

The Department of Marine Technology specialize in methods and techniques which facilitate the assessment, development, and sustainable operation of Norway's largest established export industries:

- Ocean energy industries – oil and gas.
- Ship technology with corresponding equipment industry.
- Fisheries technology and aquaculture technology.



Moving with the green shift, our focus now is largely on newer developments:

- Offshore renewable energy (mainly wind and solar, but also waves and currents)
- Coastal infrastructure such as floating bridges
- Alternative fuels, fuel-cells, and hybrid- and battery-electric ferries and marine transportation systems
- Marine robotics, autonomy, and digitalization for mapping, monitoring, and management of the ocean environment, including the polar regions.

The Marine Technology Centre did house the Department of Marine Technology as well as SINTEF Ocean. Now, a new era is about to start!

Norwegian Ocean Technology Centre

The center will be placed at Tyholt, and will provide both NTNU and SINTEF with cutting edge ocean technology laboratories for research and education.

Who am I?

- NTNU, Faculty of Engineering
- Department of Marine Technology
- Professor in control engineering within specialization of *Marine Cybernetics*
- Deputy Head of Department for Research
- Research group: Marine Energy Systems and Autonomics (MESA)
- Courses:
  - TMR4243 Marine Control Systems II
  - TMR4290 – Marine electric power and propulsion systems (earlier)
  - MR8500 PhD topics in marine control and hybrid power systems
- PhD students: 15 (8 graduated)
- Post-docs: 4

Typical research areas:

- Control systems for ships and marine vessels:
  - Dynamic Positioning (DP) systems
  - Autopilot and maneuvering control
  - Power and thruster control
- Autonomous ships and Green ships:
  - Power Management Systems (PMS) and Energy and Emission Management Systems (EEMS)
  - Safeguarding guidance and control
  - Autonomous passenger vessels
  - Hybrid-electric and battery-electric high-speed passenger vessels
- Marine operations:
  - Offshore wind installation and maintenance/repair
  - Forecasting wave spectrum (sea state), real-time phase-resolved wave elevation and wave loads
  - Simulation models, decision support tools, digital twins
- Arctic marine operations:
  - Sea ice digitalization/surveillance/decision support
  - Ice Management and ice transit operations

NTNU AMOS

Centre for Autonomous Marine Operations and Systems

Web: https://www.ntnu.edu/amos

Norwegian Centre of Excellence

2013-2023

Partners: NTNU, SINTEF Ocean, SINTEF Digital, Equinor, DNV and Research Council of Norway

SFI AUTOSHIP

Autonomous ships

Kunnskap for en bedre verden

Developing autonomy that manage complex environments

WP1: AutoRemote

Optimizing communication for safety, robustness and security

WP2: Digital Infrastructure

Design and operation from shore with people in new roles

WP3: ROC and Human Factors

Ensuring sustainability of total transport solution

WP5: Sustainable operations

WP6: Use Cases **Use cases**

Grieg Star

NCL

Torghatten

Equinor

Management of risk, safety demonstration, and maritime law

WP4: Safety and assurance

WP 7 – Fostering and transfer of results and knowledge

WP7: Innovation and commercialization

Illustration/photos: 1,2,4: Kongsberg, 3: Torghatten

Small autonomous ferry innovations leading to urban mobility solutions

milliAmpere1

milliAmpere2

Shore Control Lab

NTNU
Department of Marine Technology

Business Norway Beta

Menu

Green urban mobility with Zeabuz autonomous electric ferries

The Zeabuz ferry opens up a new world of waterborne urban transport, reducing congestion and emissions while promoting pedestrianism and biking.

The Maritime Executive
INTELLECTUAL CAPITAL FOR LEADERS

TOP STORIES

Port of NY & NJ Approves Takeover of Two Prime Container Terminals

Hanwha Ocean Sells Shares to Fund Maritime Defense Plans in U.S., EU

UK's NCA Charges Former Nigerian Oil Minister With Bribery

Air Lubrication LNG Carrier Seg

MORE TOP STORIES

- World's Largest Floating Offshore Wind Farm Officially Opened
- Study to Explore Low Pressure/Temperature for Commercial Scale CO2 Shipping
- Korean Shipbuilding Orders Reach 12-Year High Adding to Country's Exports
- SoCal Ports Volume Continues to Fall as Other U.S. Ports Rebound

EDITORIALS TOP STORIES

- Ports Without the Right Infrastructure Need a New Shore Power Solution
- Has the War in Ukraine Changed the Odds of a Cross-Strait Conflict?
- Rotor Sail Demand on the Rise as Vessel Efficiency Needs Hit New Heights
- The Philippine Base at Second Thomas Shoal Will Have to Be Replaced
- Carbon-Free Propulsion Using Articulated Tug and Barge Technology

3386 Views 23 Shares

First Commercial Self-Navigating Electric Ferry Launching in Stockholm

Zeam ferry an electric ferry designed to self-navigate in Stockholm harbor (Zeabuz)

Njord

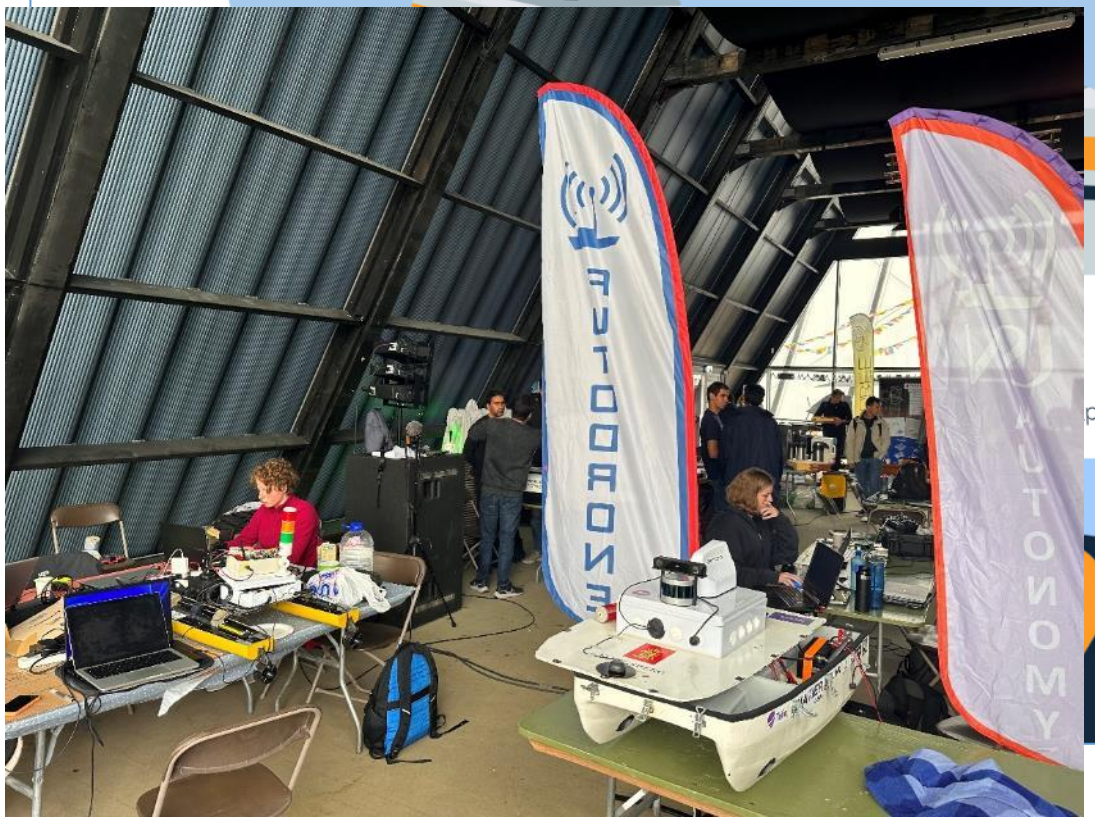
Home | The Competition | About Us | Organisation | Join us | Sponsors | News

We are currently recruiting new members!

Welcome to Njord!

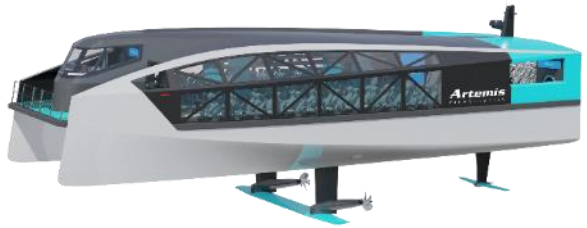
The Autonon
Ship Challen

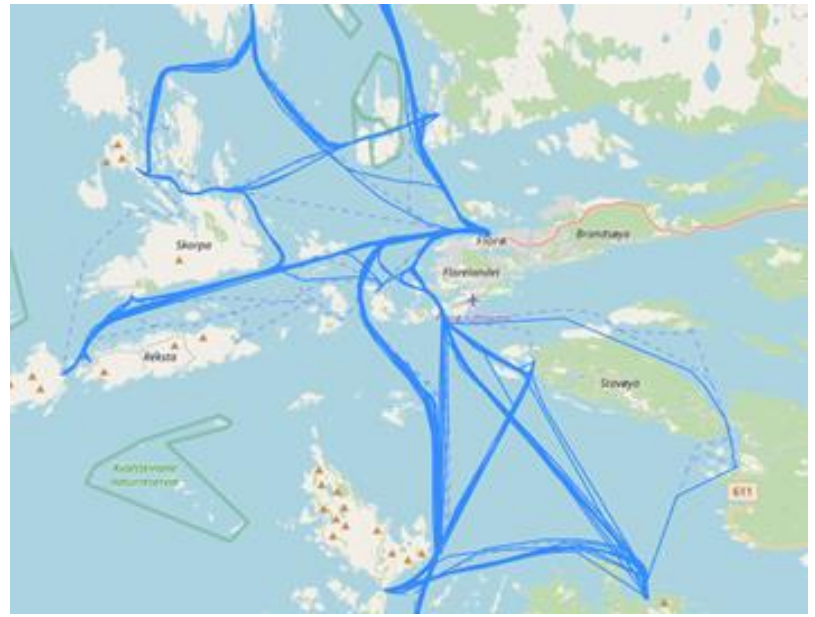
plore



Det tyrkiske laget, ITU Autobee, gjorde det best i dei ulike oppgåvene og vart kåra som vinnarar torsdag kveld. Foto: Magnus Vattekar Sandvoll.

ZEVS - enabling Zero Emission passenger Vessel Services

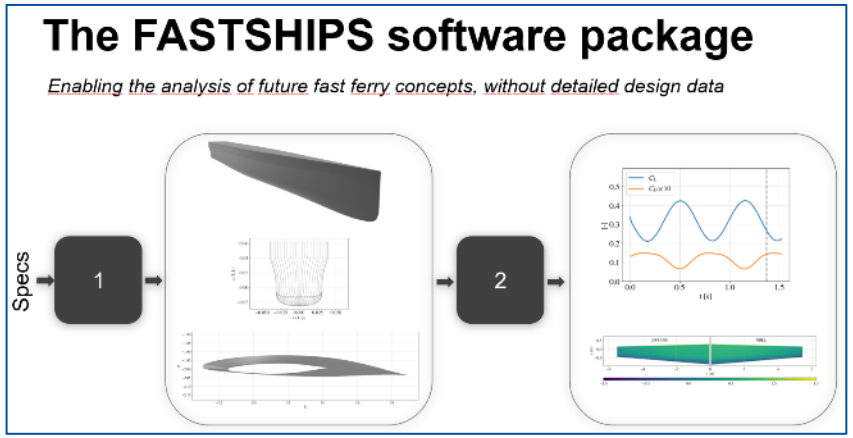


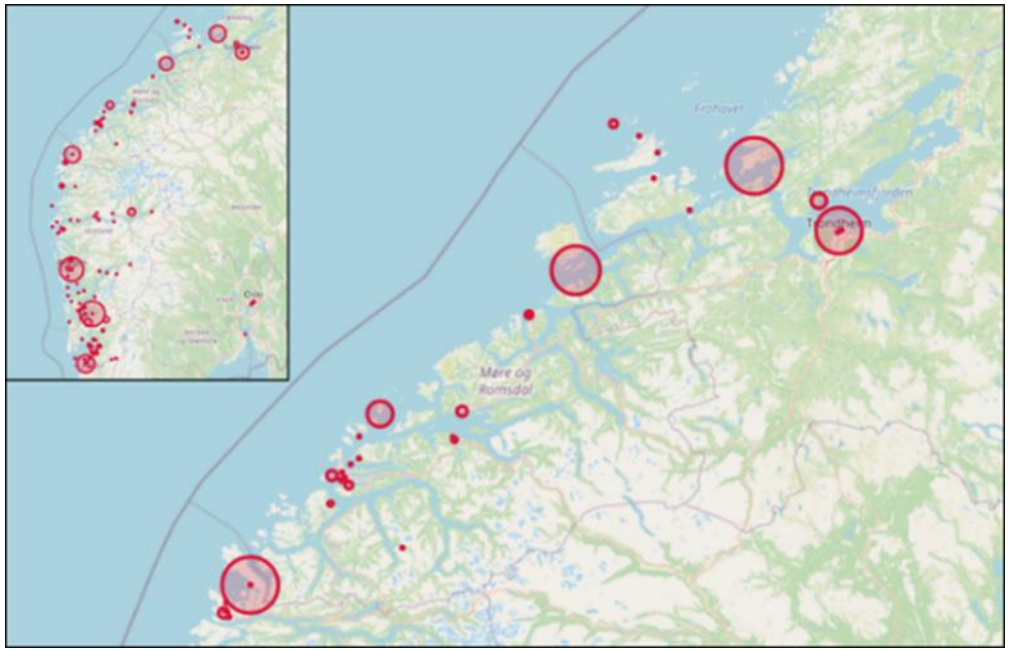


Project owner:

Institute of Transport Economics

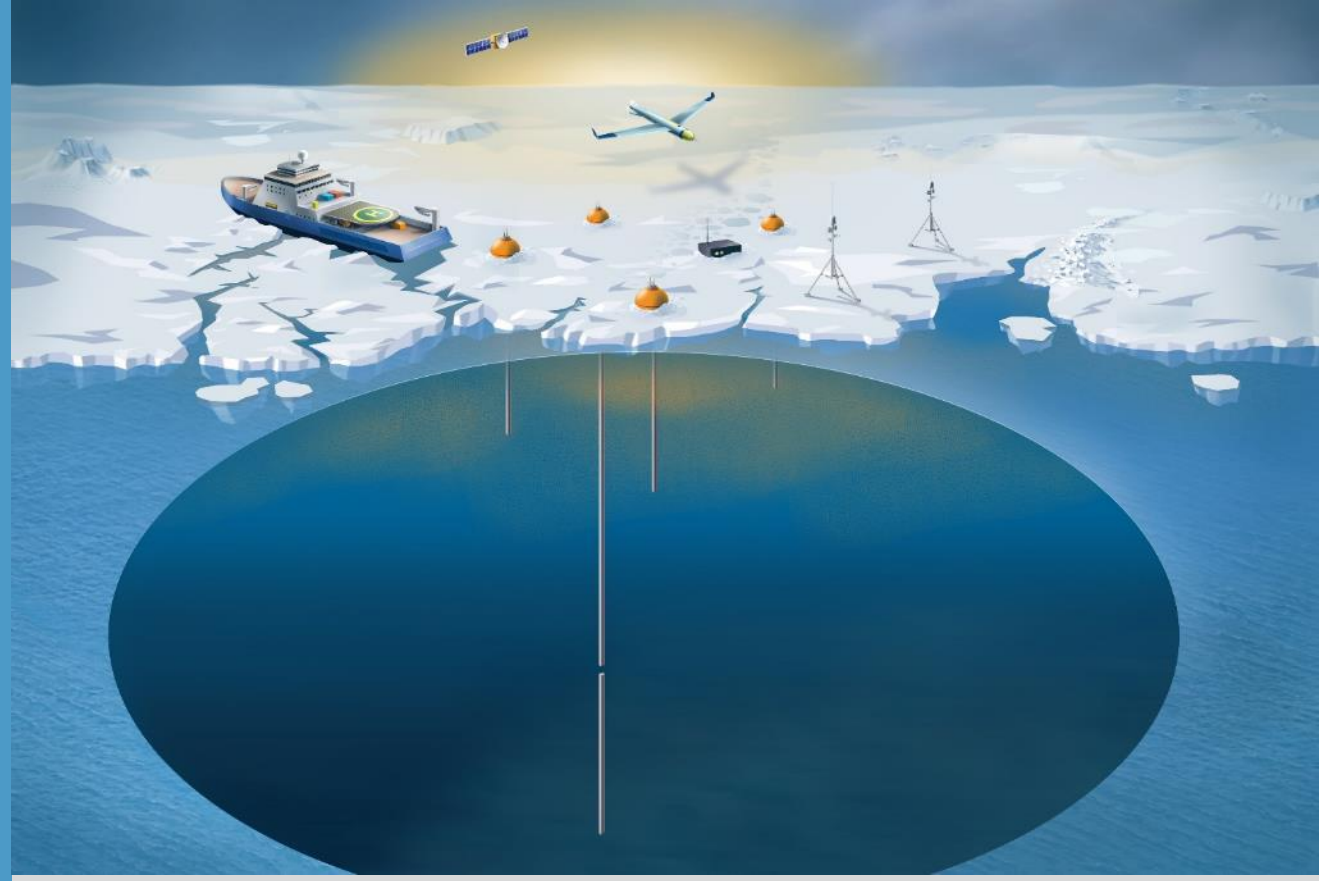
NTNU responsible for WP2 on modeling/optimization of vessel systems





NTNU | Norwegian University of Science and Technology

DigitalSeaIce: Multi-scale integration and digitalization of Arctic sea ice observations and prediction models



Background: The Arctic region plays a key role in regulating the world's climate and is the region most affected by the ongoing climate change. Multiscale approach to modelling natural phenomena is a powerful technique to analyze, visualize, and forecast what is happening in the Arctic. There is a potential of AI-infused multiscale modelling of Arctic sea ice to supplement traditional remote sensing and climate models in the polar regions.

Goal: To build a multiscale digital method and system that integrates regional sea ice forecasting models and local ice-ice/ice-structure numerical models with in-situ, shipboard, and regional Arctic sea ice and environmental observations. The aim is to enable improved spatial and temporal resolution to achieve more precise forecasting of ice conditions in the Arctic – including better understanding of long-term variations in polar ice cover.

A common methodology to achieve this is the use of AI-based analytics of SAR and optical imagery from satellites, marine radars, and visual and infrared cameras.

Project owner: NTNU, Project manager Roger Skjetne (roger.skjetne@ntnu.no)

Partners: Jiangsu University of Science and Technology, Dalian University of Technology, and Norwegian Meteorological Institute

Project period: 01.01.2022 – 31.12.2025

Type: International Project

Public funding: 10 mill. kroner

Web page: https://www.ntnu.edu/digitalseaice

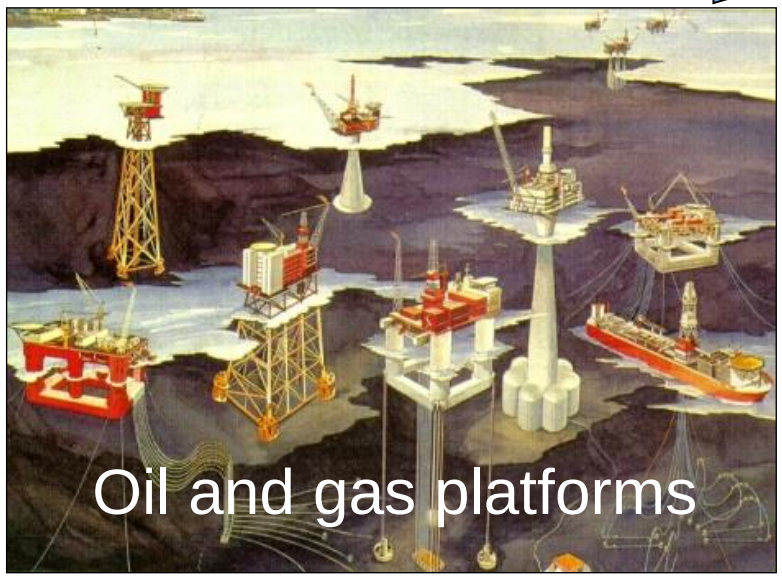
Project no.: 328960

NTNU
Norwegian University of Science and Technology

Norwegian Meteorological Institute

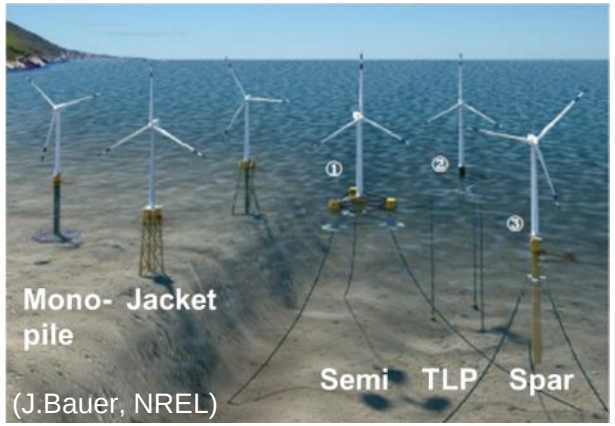
NTNU's Faculty of Engineering is building up a Norwegian competence centre on offshore wind

Integrated knowledge

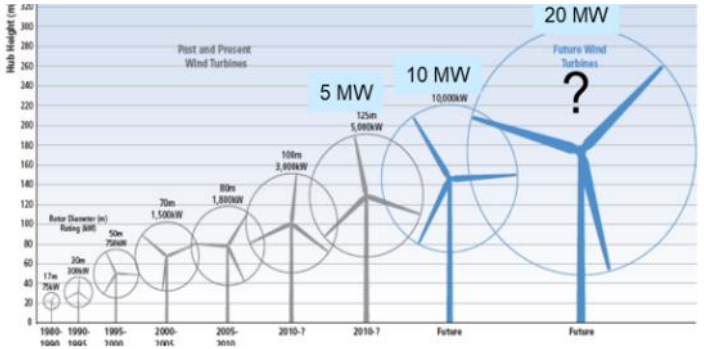


Aerospace (composites, comp.manufact.)
Automotive (turbine – drive train)

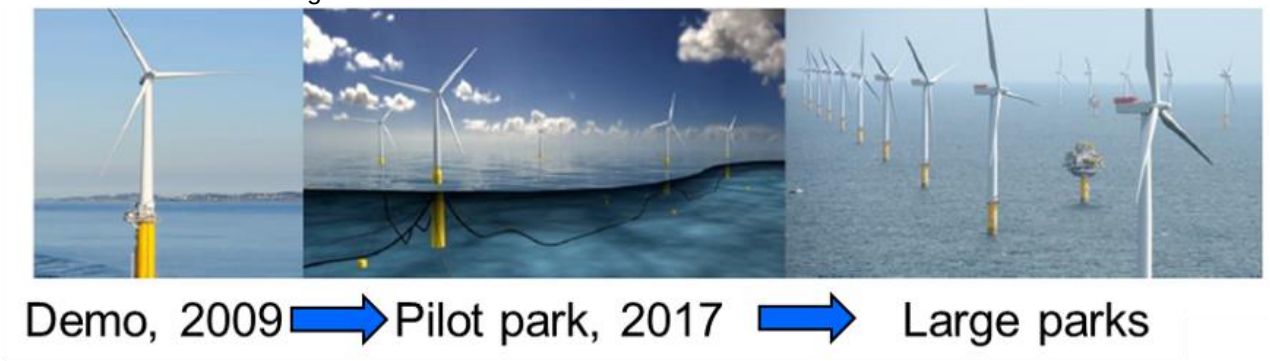
Consepts and standardization



LCOE based on scaling in size

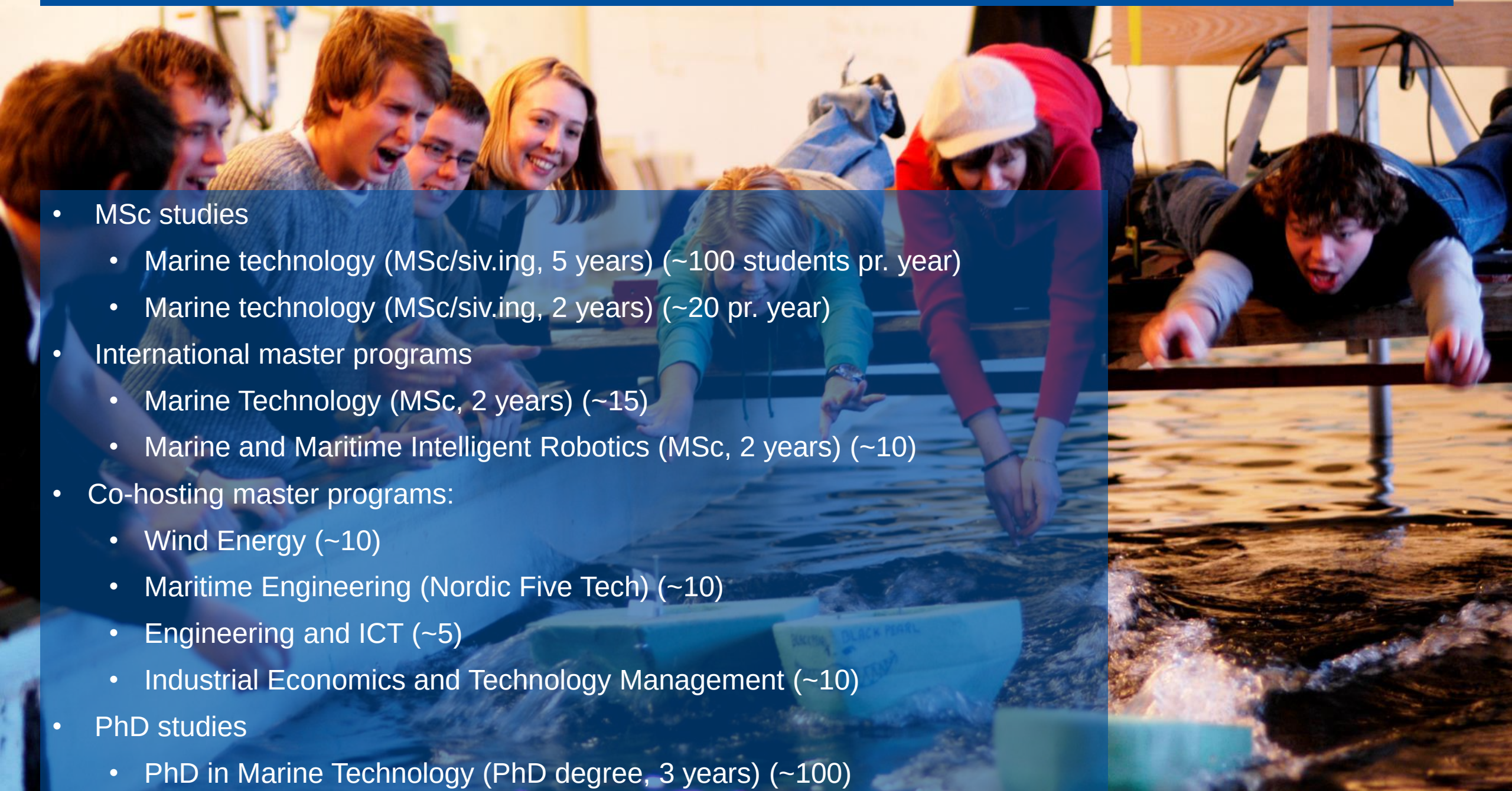


LCOE based on scaling in numbers



- Offshore wind (should be) developed based on experiences from land-based wind energy and O&G sectors, where we must recognize the differences between the sectors (safety and availability, environmental footprint, economic margins).

Study programs at Department of Marine Technology



- MSc studies
  - Marine technology (MSc/siv.ing, 5 years) (~100 students pr. year)
  - Marine technology (MSc/siv.ing, 2 years) (~20 pr. year)
- International master programs
  - Marine Technology (MSc, 2 years) (~15)
  - Marine and Maritime Intelligent Robotics (MSc, 2 years) (~10)
- Co-hosting master programs:
  - Wind Energy (~10)
  - Maritime Engineering (Nordic Five Tech) (~10)
  - Engineering and ICT (~5)
  - Industrial Economics and Technology Management (~10)
- PhD studies
  - PhD in Marine Technology (PhD degree, 3 years) (~100)

Specialisations – all programs

- Marine structures
- Marine hydrodynamics
- Marine cybernetics
- Marine machinery
- Marine systems design

All 2-year master programs conform to a specialisation of the 5-year program.

5-year program structure/courses

Year	Sem	7.5 ECTS	7.5 ECTS	7.5 ECTS	7.5 ECTS
5	10	Master thesis (20 weeks)			
	9	Non-tech elective	Specialisation project	Specialisation course	Tech elective
4	8	Experts in team	Engineering course	Engineering course	Engineering-elective
	7	Non-tech elective	Specialisation course	Specialisation course	Specialisation course elective
3	6	Specialisation course elective	Specialisation course	Specialisation course	Marine technolgoy basic courses - Naval Architecture - Marine machinery - Marine structures - Marine hydrodynamics
	5	Math 4	Technology management	Marine dynamics	
2	4	Statistics	Thermodynamics	Material technology	
	3	Math 3	Physics	Fluid mechanics	
1	2	Math 2	Chemistry	Mechanics 2	
	1	Math 1	Non-tech elective	Mechanics 1	

Future technology study (FTS) programs – a strategic program development project at NTNU – 2020/22

Focus on:

- Comprehensive and professional competence
- Interdisciplinary thinking and interaction
- Contextual learning
- Student active learning, relevant assessment and a good learning culture
- Competency development among lecturers
- Holistic thinking in the study program and study portfolio
- Continuous improvement and quality culture
- International cooperation on educational quality
- Infrastructure for learning, health and well-being

Vision

NTNU's technology studies train world-class creative candidates - who can and will contribute to a better world and a sustainable future

Competence profile

		5-årig integrert master
...ps-...ntet	K1	Vise fagkunnskaper og faglig fundert perspektiv
	K2	Analysere komplekse problemstillinger under usikkerhet
	K4	Benytte avanserte metoder og verktøy
	K7	Innhente og kritisk vurdere informasjon med vitenskapelig tilnærming
	K3	Designe og implementere bærekraftige løsninger
...s-	K6	Utnytte avansert FoU-kunnskap for å bidra til teknologiske forsknings- og utviklingsprosjekter
	K12	Bidra til nyskaping og vise forretningsforståelse
	K5	Analysere konsekvenser og fremtidsscenarier
Samfunns-rammen	K9	Anvende og reflektere rundt normer for etikk og bærekraft
	K10	Arbeide målrettet, samhandle godt i team, ta initiativ og vise lederskap
	K11	Formidle, føre dialog, og diskutere faglig
Lærings-evnen	K8	Vise evne og vilje til livslang læring

...delines

		Ikon
	...udier skal legge aktivt til rette for at ...aglig fundament, opparbeider ...er bærekraftkompetanse og digital	
	...aktivt til rette for at kandidater fra ...aglig samhandlingskompetanse, og for ...onen får et mangfold i ...lte student oppnår tilstrekkelig	
	...al legges til grunn som ...lUs teknologistudier	
	...d læringskultur: NTNUs ...iserte, studentaktive og engasjerende ...r samstemt med utdanningenes ...d læringskultur, og gir effektiv	
	...U skal stille tydelige forventninger til, ...for undervisningspersonell.	
	...porteføljе: Kvaliteten i NTNUs ...rogramdrevet tilnærming, i ...kling og -forvaltning på tvers av	
	...NTNUs kvalitetsarbeid i ...grammenes ...lasse, ved å fokusere på kontinuerlig ...itetskultur.	
	...olitet: NTNU skal gi høy prioritet til ...rbeid om utvikling av ...rnasjonalt synlig og anerkjent	
...samhandling – nasjonalt og internasjonalt	IX	*Systematisk samhandling med arbeidslivet:* NTNUs teknologistudier skal vektlegge systematisk samhandling med arbeidsliv og samfunn, med mål om å fremme arbeidsrelevans, legge til rette for livslang læring, og sikre at studenter kan opparbeide relevant arbeidslivserfaring gjennom studiene
Fysisk, digitalt og psykososialt læringsmiljø	X	*Infrastruktur for læring, helse og trivsel:* NTNU skal utvikle sitt læringsmiljø, og spesielt sin campus og infrastruktur – både fysisk og digital – i en retning som understøtter de øvrige FTS-prinsippene I-IX og fremmer læring, helse og trivsel blant studenter og ansatte.

Tabell 1: De ti FTS-prinsippene – fordelt på fem kvalitetsområder