

Faculty of Mathematics and Natural Sciences

Department of Technology Systems

Welcome to Cybernetics and Autonomous Systems



UNIVERSITY
OF OSLO



Agenda

Who are you?

Programme
structure

Courses

The master
project

Available
resources

Expectations and
deadlines

Lunch!

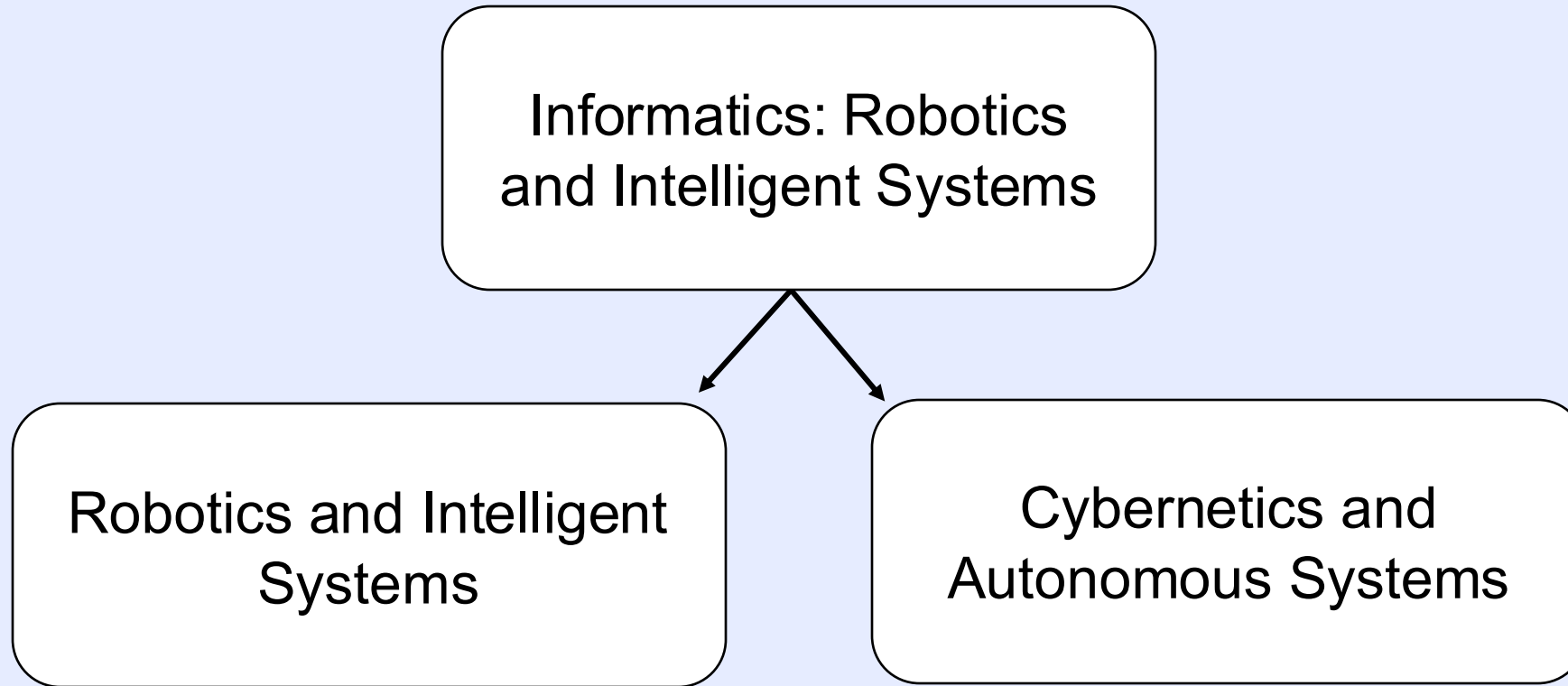
Who are you?

<https://www.menti.com/alofskjmrac3>

or code 7737 7809



Programme structure



Programme structure

Robotics and intelligent systems (foundational research and AI)

- Engages in **fundamental research** in machine learning and optimization algorithms for robotics.
- Aims to enhance the **intelligence** and **adaptability** of robotics, sensors, and embedded systems.
- Targets areas in **music and movement, assistive robots**

Cybernetics and autonomous systems (practical applications and mobile robots)

- Emphasizes **practical applications** and **holistic system development**.
- Focuses on the **design, deployment, and control** of **robots**, including autonomous vehicles, aircraft, underwater vessels, and space systems.
- Targets application areas in **health technology, energy, space systems, and cybersecurity**.

Structure for long thesis (60 credits)

3 semester
master project

4. semester	Master thesis	Master thesis	Master thesis
3. semester	Master thesis	Master thesis	Master course
2. semester	Master thesis	Master course	Master course
1. semester	Master course	Master course	Master course
	10 credits	10 credits	10 credits

2 semester
master project

4. semester	Master thesis	Master thesis	Master thesis
3. semester	Master thesis	Master thesis	Master thesis
2. semester	Master course	Master course	Master course
1. semester	Master course	Master course	Master course
	10 credits	10 credits	10 credits

Structure for short thesis (30 credits)

Final semester
master project

4. semester	Master thesis	Master thesis	Master thesis
3. semester	Master course	Master course	Master course
2. semester	Master course	Master course	Master course
1. semester	Master course	Master course	Master course
	10 credits	10 credits	10 credits

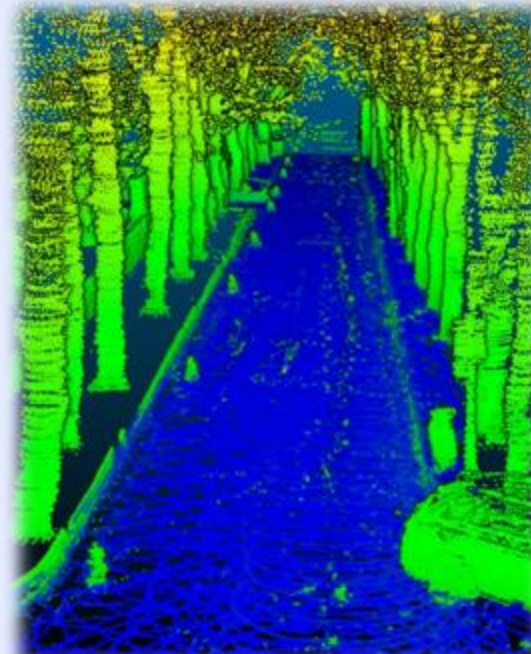
The 4 specialisations



Autonomous
systems



Control and
cybernetics



Detection and
sensing



Medical
technology

Core courses

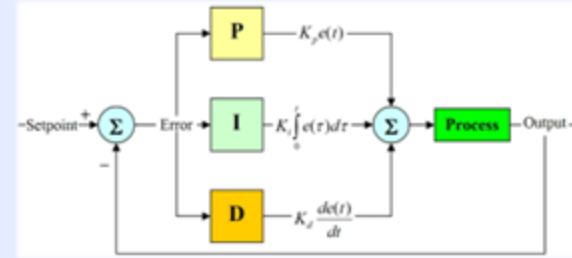
(need to make up at least 50% of the plan)



TEK4030: Control of Manipulators and Mobile Robots

$$\begin{aligned}\frac{\partial x_1}{\partial t} &= T_{\theta_1}(s)(1 - x_1) - px_1 \\ \frac{\partial x_2}{\partial t} &= T_{\theta_2}(s)(1 - x_2) - px_2 \\ \frac{\partial s}{\partial t} &= \delta - \frac{\alpha}{N}(N_1 + N_2)\end{aligned}$$

TEK4040: Mathematical Modelling of Dynamic Systems

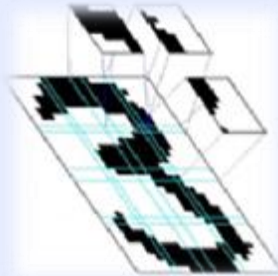


TEK4090: Modern control Systems and Cybernetics

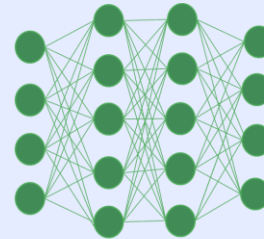
Autumn courses



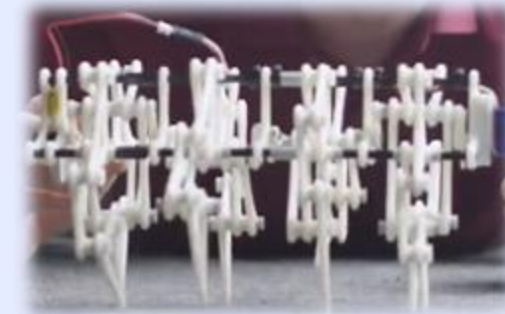
TEK5010: Multi-Agent Systems



TEK5020: Pattern Recognition



TEK5040: Deep Learning for Autonomous Systems

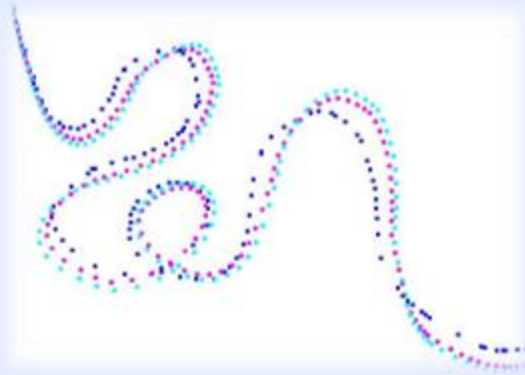


IN5590: Rapid Prototyping of Robotic Systems

Core courses

(need to make up at least 50% of the plan)

Spring courses



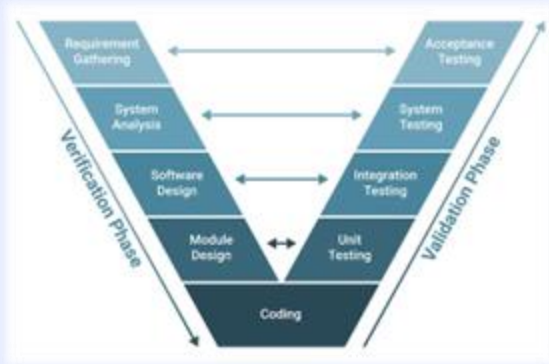
TEK4050: Stochastic Systems



TEK5030: Computer Vision

Electives

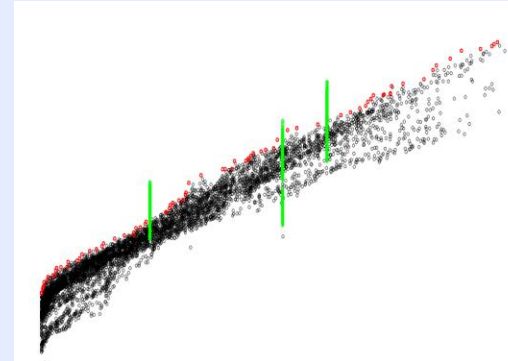
(and many more)



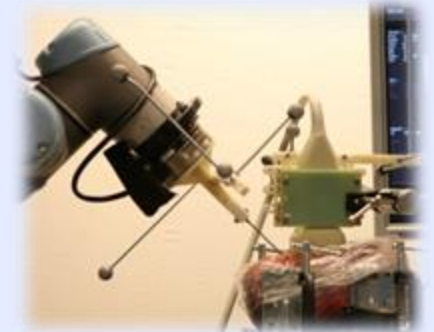
TEK4000 – Systems Engineering



TEK4010 – Optics and Light



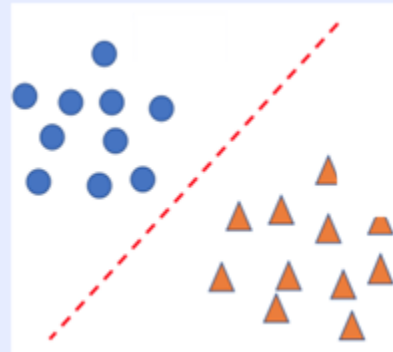
TEK5600 – Visualization of Scientific Data



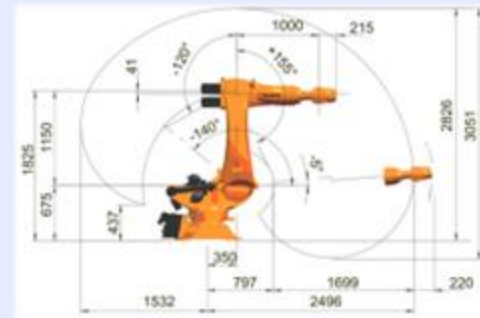
FYS4250 – Biomedical Instrumentation



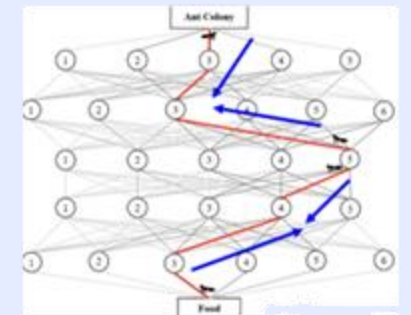
IN4015 – Ultrasound Imaging



IN4050 – Introduction to Artificial Intelligence and Machine Learning



IN4140 – Introduction to Robotics



IN5490 – Advanced Topics in Artificial Intelligence for Intelligent Systems

Exchange opportunities



University of British Columbia,
Vancouver and Okanagan



University of California,
San Diego

ETH Zurich



What is a master project?

A master project is an independent, academic research project culminating in a master's thesis.

It is designed to develop your skills and give you scientific writing and research experience.

Can be theoretical or empirical, foundational or applied.

The topic of your thesis

You should already be thinking about what you want to work on and find a supervisor

Tips to figure out what you want to do:

- Look at the [project proposals](#) on the webpage
- Look at the courses available and who teaches them
- Look at what previous students have written
- Talk to potential supervisors
- Most important: do something you think is interesting!

Popular topics will be taken quickly, so be early!

Potential supervisors



Tønnes Nygaard
Practical robotics



Mathias Hudoba de Badyn
Control and cybernetics



Ulysse Teller Masao Côté-Allard
Medical technology



Kim Mathiassen
Mobile robots



Trym Haavardsholm
Machine vision

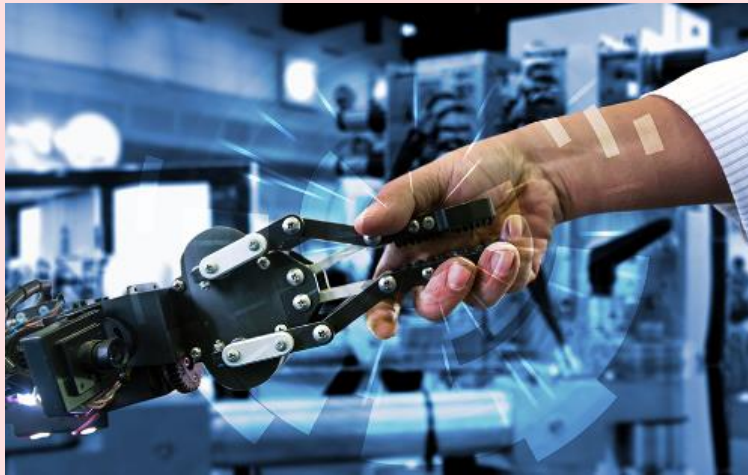


Narada Dilp Warakagoda
Deep learning



Torbjørn Skauli
Optics and imaging

Supervisors across sections



**Cybernetics and
Autonomous Systems**

Security in CYBER-PHYSICAL SYSTEMS



**Security in Cyber-
Physical Systems**



**Renewable
Energy
Systems**



Space Systems

Kjeller Science Park, Lillestrøm



Example of master thesis topics

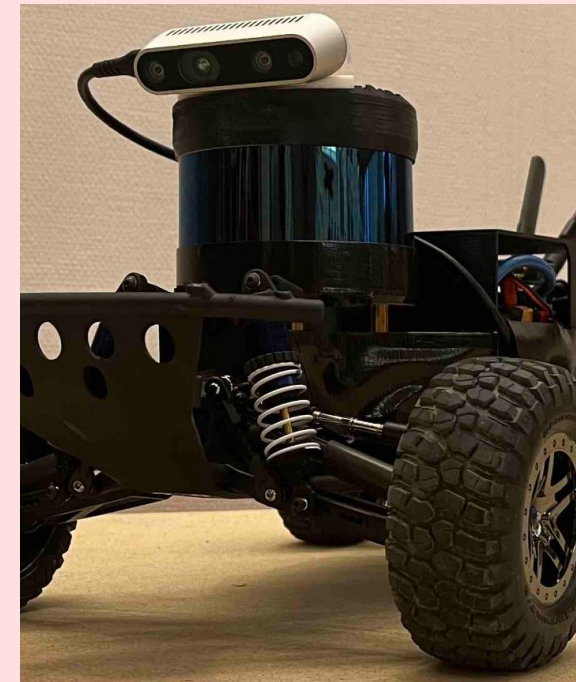
Search and Rescue Robotics in Forest Environments (2025)



Binary and Multi-Class Sleep Stage Classification Using Body-Worn Accelerometers and Biosignals (2025)



Taking F1TENTH off-road (2024)



Resources



Places to read and work



Student lounge with arcade machine, board games and switch



Gym and saunas



Ping pong and shuffleboard

Infrastructure



3d printer room



Laser cutter and CNC

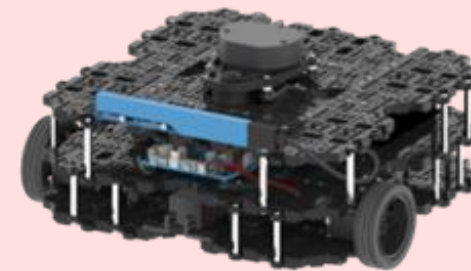
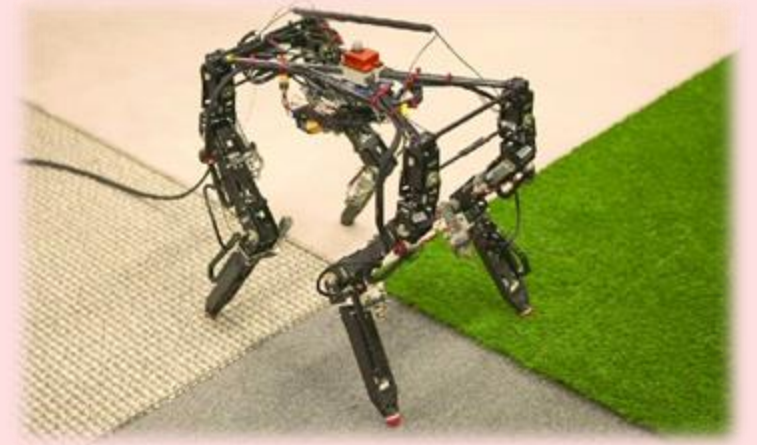


Makerspace



Robotics lab

Robots



Expectations and responsibilities

- You are responsible for your own learning and development
 - You set your own goals and work on achieving them
 - You manage your own time and effort
-
- Let us know if you need help, and how we can do it best
 - Contribute positively to the student community
 - Avoid plagiarism, excessive use of AI and cheating

Who to talk to

**Administrative
question**



Kaja
Administrative head of studies



Matylida
Head of education

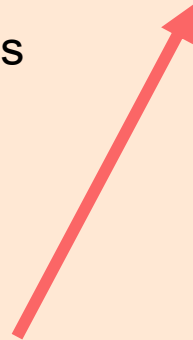


Cecilie
Head of department

**Academic
question**



Tønnes
Programme coordinator



Important deadlines:



14th of August (tomorrow!): Course registration



1st of September: Paying semester fee and applying for accommodations



1st of December: Handing in completed study plan agreement

Individual talks

- We are offering individual talks to get help choosing courses, ask questions you might have, or just say hi:
 - Tomorrow at IFI
 - Friday at ITS

Book time here: <http://bit.ly/casmeeting>



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Questions!



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