



Welcome to

ARCADA UNIVERSITY
OF APPLIED SCIENCES

Arcada University of Applied Sciences



Welcome to the

Mechanical and Sustainable
Engineering
(MSE)

and Materialteknik och
hållbarhet (MTH)

arcada.fi

Teachers



Rene Herrmann
Senior Lecturer in Natural Sciences and Composite Materials



Paula Linderbäck
Principal Lecturer in Circular Economy



Silas Gebrehiwot
Senior Lecturer in Mechanical Engineering
Material testing



Stewart Makkonen-Craig
Senior Lecturer in Material Sciences



Rizwan Ullah
Senior Lecturer in Digital technologies



Mathew Vihtonen
Senior Lecturer in Mechanical Engineering Design



Kim Roos
• Senior Lecturer in Energy Technology; EM programme director



Carl Gustaf Sahlberg
Senior Senior Lecturer in Technology



Sofie Sundström
Study Counsellor, Mechanical and Sustainable Engineering



Rasmus Björkvall
Laboratory engineer with project tasks



Harri Anukka
Laboratory engineer



Kim Skön
• Senior Lecturer in Natural Sciences and Energy Technology

Swedish courses



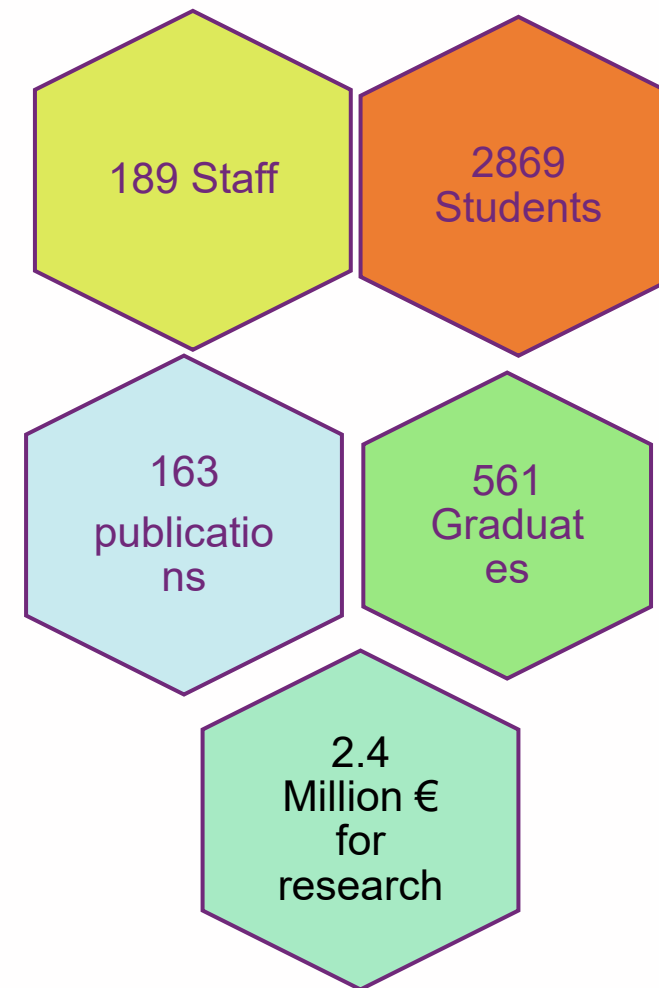


16 bachelor programmes

- I. Mechanical and sustainable Engineering
- II. International Business
- III. Materialteknik och hållbarhet
- IV. Culture Mangement
- V. Energy and Environmental Engineering
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Masters programmes

- I. Machine Intelligence and Data Science (MIND)
- II. Media Management
- III. Leadership for Nordic Healthcare



Source: Annual report 2025

Engineering

“the study of **using scientific principles** to design and build machines, structures, and other things, including bridges, roads, vehicles, and buildings” [Cambridge]

“the application of **science and mathematics** by which the properties of matter and the sources of energy in nature are made **useful to people**” [Merriam Webster]

Difference between Science and Engineering?

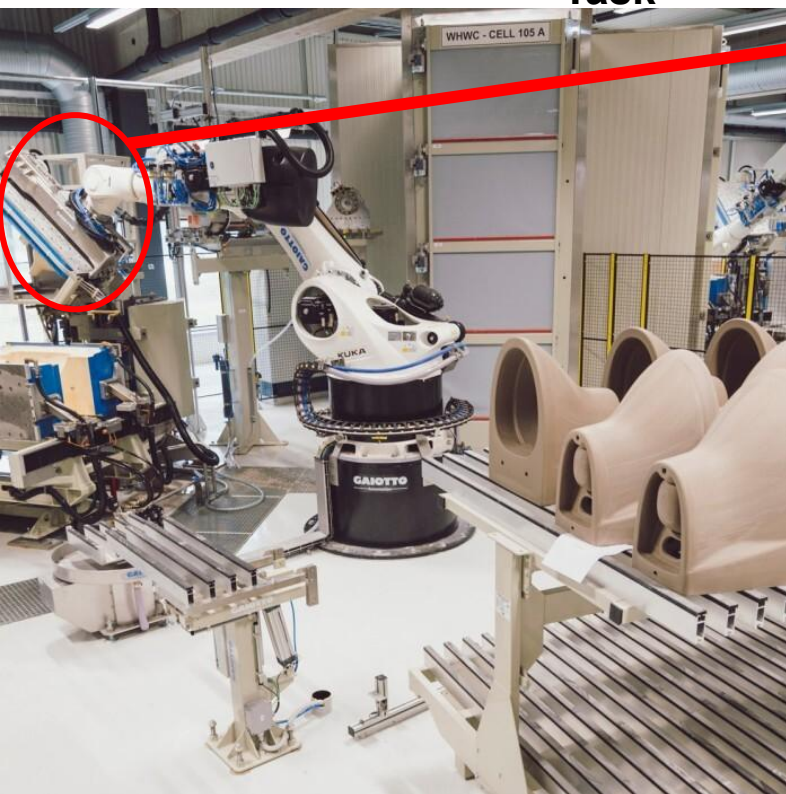
“Science is the process of understanding what is.

“Engineering is the process of creating what hasn't been.” MIT

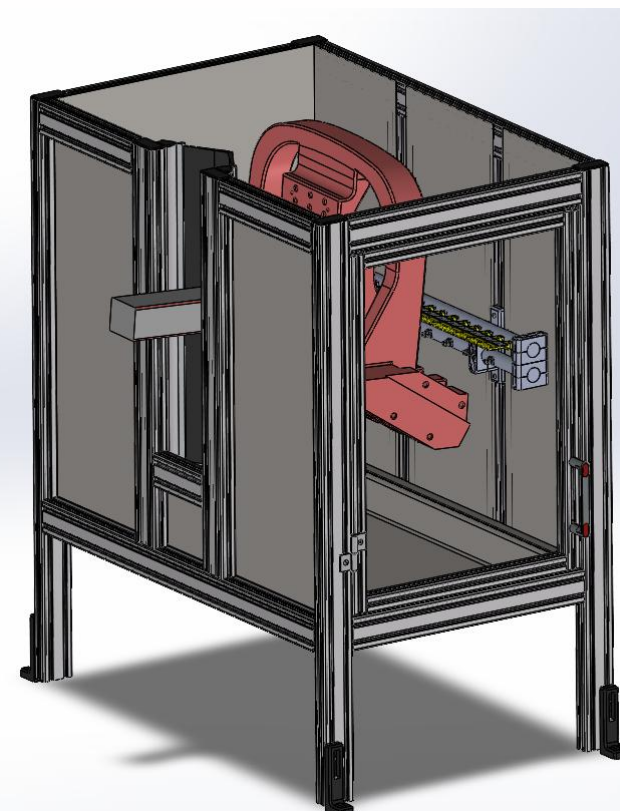
Simply put: Engineering is practical application of science, mathematics, and knowledge to **solve real-world problems** and providing cheaper and sustainable solutions.

Challenge: (theses work)

Task



3D Design/Model



Ready to install



Other thesis work

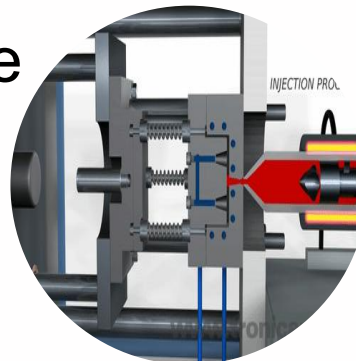
(read abstracts to get inspired)

- Analys av den polära fractionen av algen Ulva med LC-MS: En studie om algens kemiska sammansättning <https://urn.fi/URN:NBN:fi:amk-2025121938660>
- Machine learning-driven waste sorting with robotic arms <https://urn.fi/URN:NBN:fi:amk-202601281934>
- Design and Structural Evaluation of an Innovative Six-Segment Collapsible Wheel for Compact Mobility Applications
<https://urn.fi/URN:NBN:fi:amk-2026060119821>
- Experimental Study of the Cooling Efficiency of a Heat Sink under Different Fan Configurations: Effects of Fan Speed, Fan–Heat-Sink Spacing, and Fan Orientation
<https://urn.fi/URN:NBN:fi:amk-202602253360>
- Jute-Reinforced PLA Composites: Fabrication Process and Mechanical Properties
<https://urn.fi/URN:NBN:fi:amk-2026060220766>

Arcada Sustainability and Tech Lab



Injection molding machine



CNC Milling machine



Arcada Sustainability and Tech Lab



Coordinate measuring machine



Testing in chemistry lab

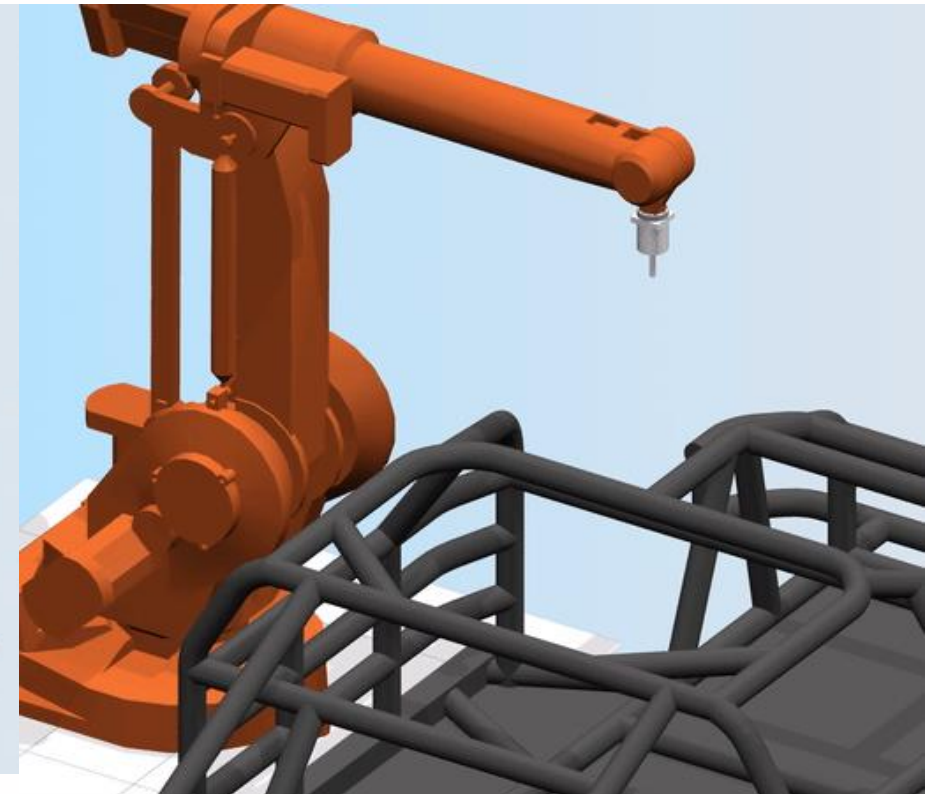
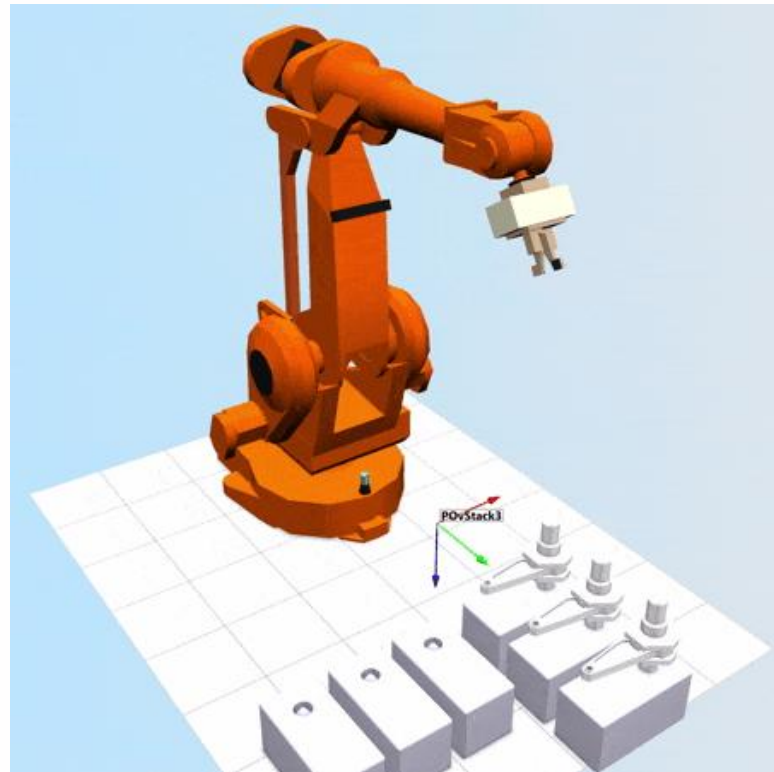
Virtual simulation experience

Programming robots - Learn to program robot (3rd year)

```

[ABB2400_16] ..\Programs\PickAndPlaceABB.IRL
7
8 PROGRAM PickAndPlaceABB;
9
10 IMPORT DATALIST '..\Position Lists\PickAndPlaceABB.PSL';
11 VAR
12     TEACH ROBTARGET      :      POvStor;
13     TEACH ROBTARGET      :      PStor;
14     TEACH ROBTARGET      :      POvStack;
15     TEACH ROBTARGET      :      PStack;
16
17 VAR
18     OUTPUT BOOL          :      HCLOSE AT 0;
19
20 BEGIN
21     {*** position above storage (PTP)}
22     MOVE PTP POvStor;
23     {*** position at storage (linear)}
24     MOVE LIN PStor;
25     {*** grip crankshaft}
26     HCLOSE := TRUE;
27     {*** position above storage (linear)}
28     MOVE LIN POvStor;
29     {*** position above stacking (linear)}
30     MOVE LIN POvStack;
31     { *** position at stacking (linear)}
32     MOVE LIN PStack;
33     {*** release crankshaft}
34     HCLOSE := FALSE;
35     { *** position above stacking (linear)}
36     MOVE LIN POvStack;
37     { *** done!!!}
38 ENDPROGRAM;
39

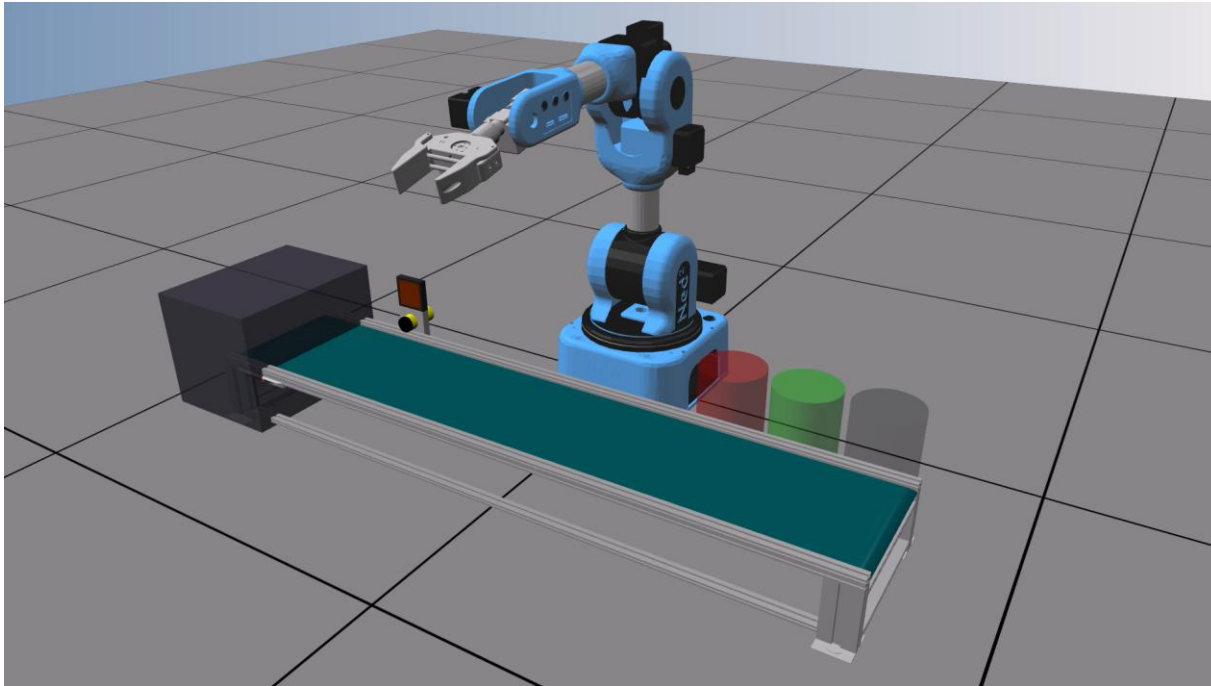
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Arcada Sustainability and Tech Lab

Learn to program robot!

Digital world (Festo)



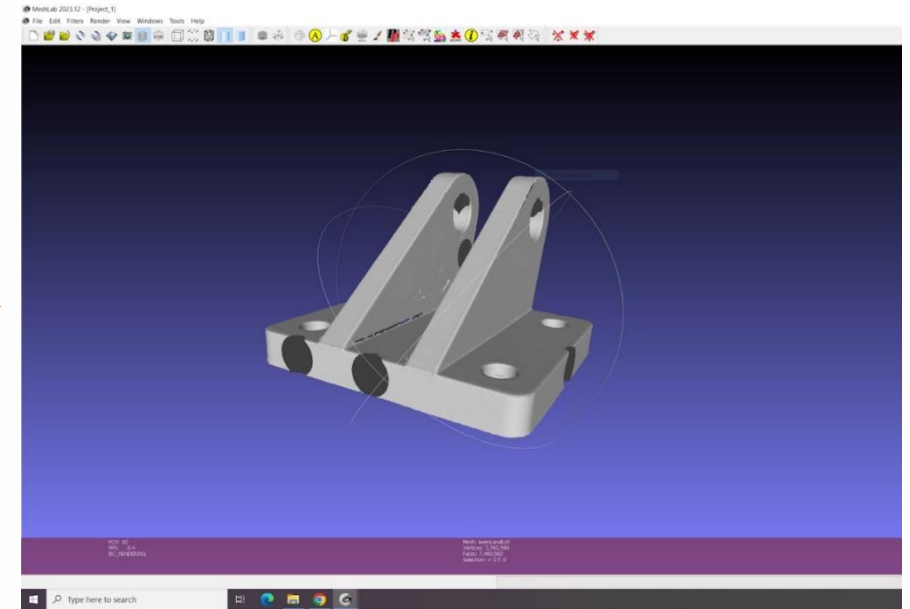
Physical world



Arcada Sustainability and Tech Lab



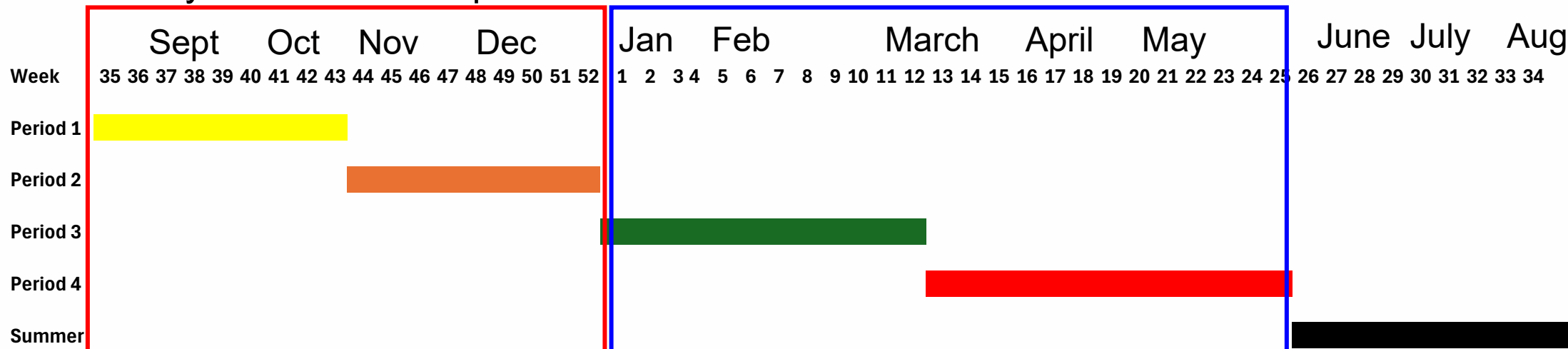
3D Printed part / physical object



3D scanning: creating 3D design from physical object

Academic year

Academic year divided in 4 periods



Period 1: 1 August 2026- 25 October 2026 (tuition starts on 27 or 31 August 2026*)

Period 2: 26 October–31 December 2026

Winter break: 19 December 2026–6 January 2027 (no tuition)

Period 3: 1 January–21 March 2027

Period 4: 22 March–31 July 2027 (regular tuition ends on 28 May 2027 at the latest)

Competence-based Study Plan

Mechanical and Sustainable Engineering/ Materialteknik och hållbarhet

Year 1

60 ECTS

Year 2

60 ECTS

Year 3

60 ECTS

Year 4

60 ECTS

1 Course = 5 ECTS
12 courses / year

P1 P2 P3 P4

P1 P2 P3 P4

P1 P2 P3 P4

P1 15 ECTS P2 15 ECTS P3 15 ECTS P4 15 ECTS

Material

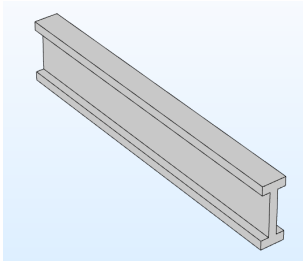


Metal powder

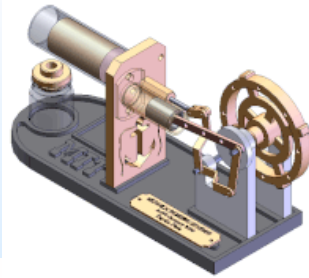


Raw form

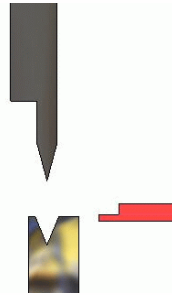
Engineering design



3D modeling

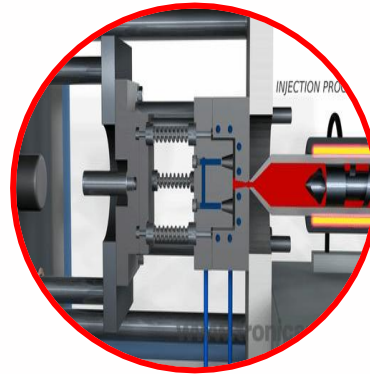


Dynamics
(motion/forces)



Prediction of behavior
simulation with
software (FEA)

Processing



Injection molding



Machining (material
removal)

Testing



Tensile testing

Life cycle assessment



Chemical, thermal, mechanical properties

Applied mathematics, physics

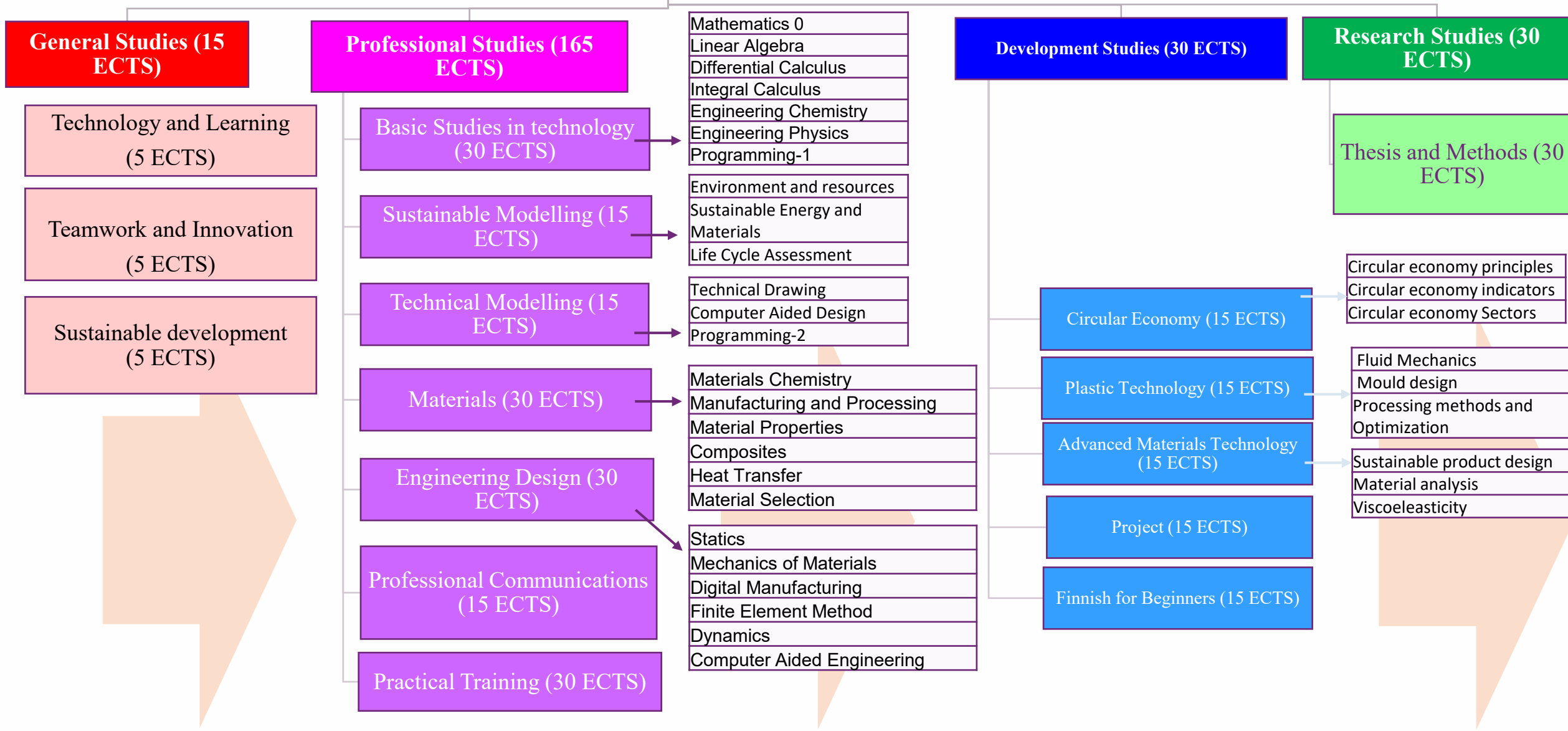
Basic science (physics, chemistry) and mathematics

Sustainability

MSE / MTH 3-4 Years



Study in-depth later after this session!



- You will study principles of mechanical design and analysis

Modelling

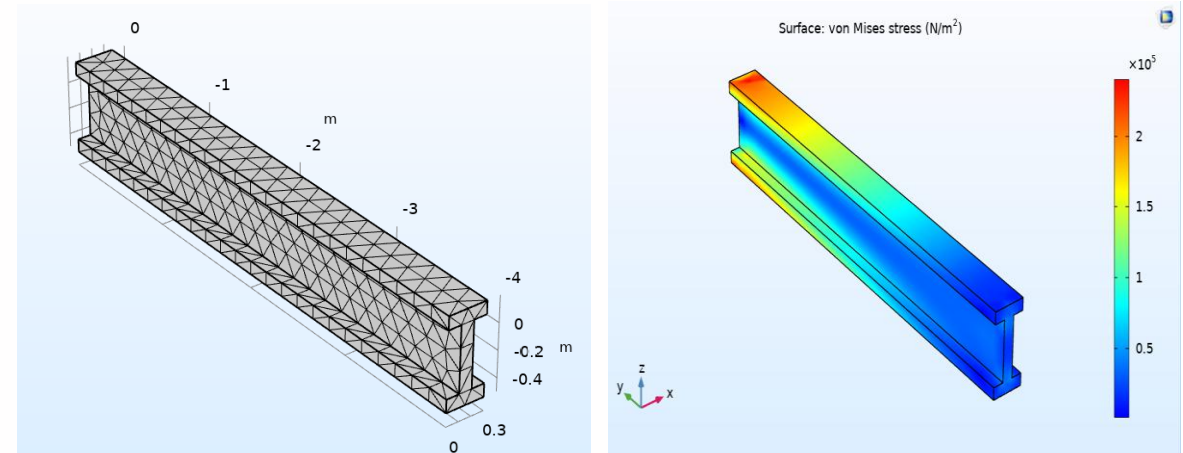
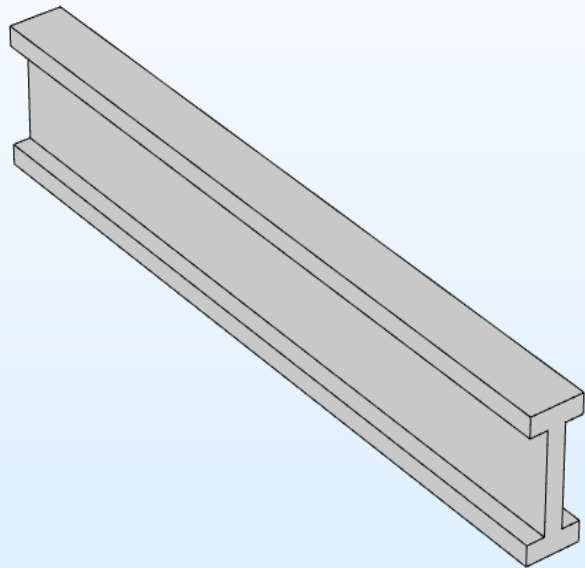
Analyses

Theoretical Method

$$\frac{\partial \sigma_{ij}}{\partial x_i} + F_i = 0$$

$$\sigma_{ij} = ?$$

Finite Element Method



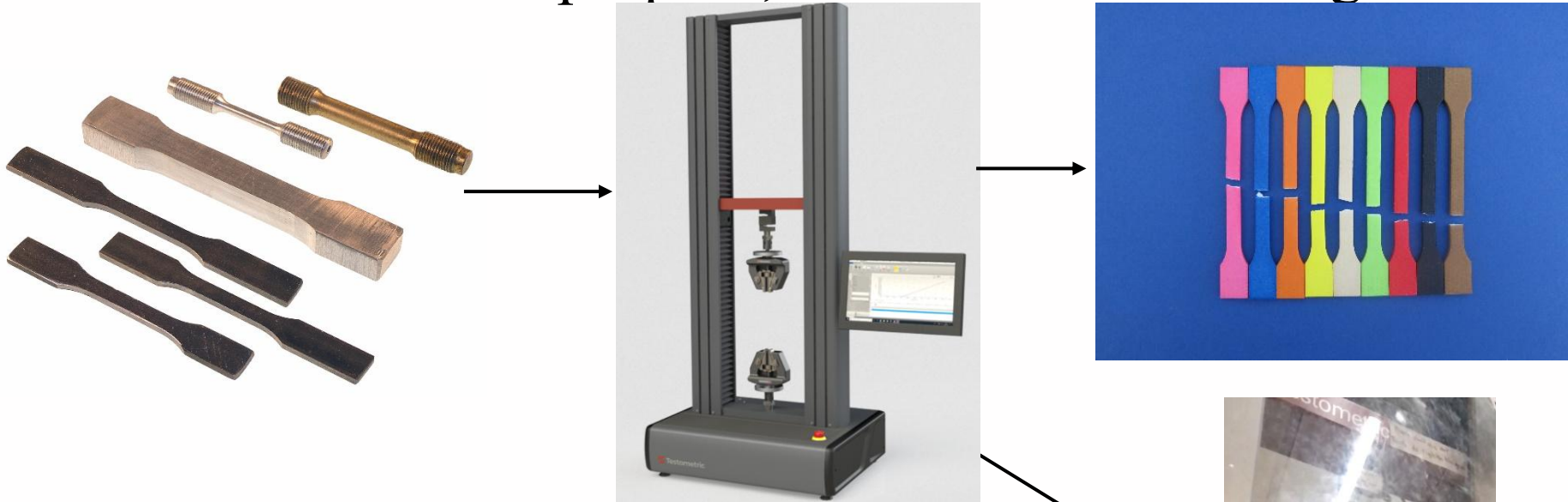
Comsol Multiphysics

Material Testing

Sustainable product development involves understanding materials that requires aggressive testing and analyses before products join markets.

Sometime we break stuff on purpose, to find out how strong it is.

Mechanical Testing



Surface Roughness Analyses



Materials

- You will investigate broadly the thermal, chemical and mechanical properties of materials, and apply the knowledge to design and processing methods.

**Company
excursions**

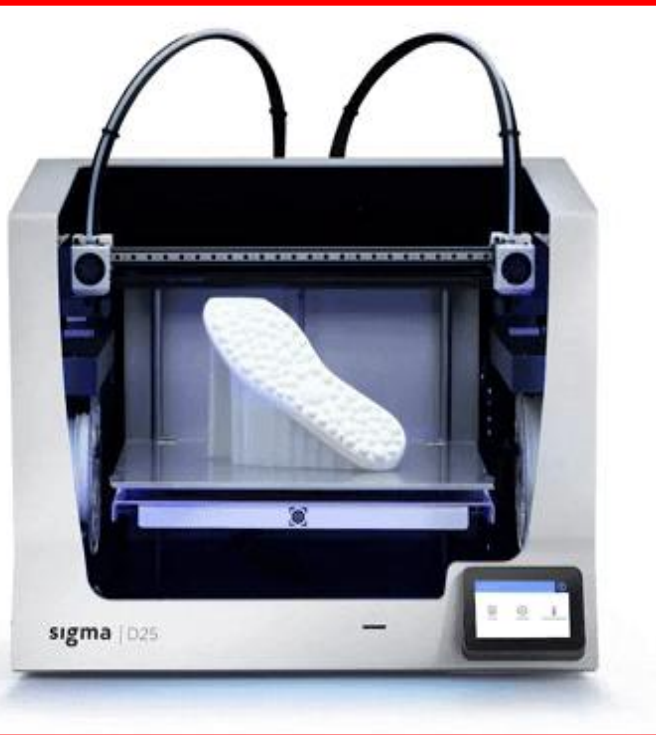


**Material
Analyses at Our
Chemistry Lab.**



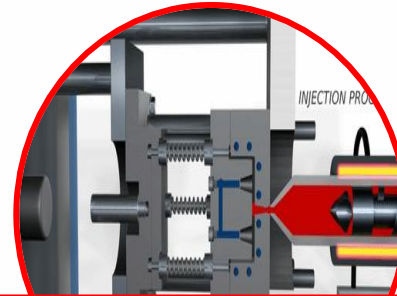
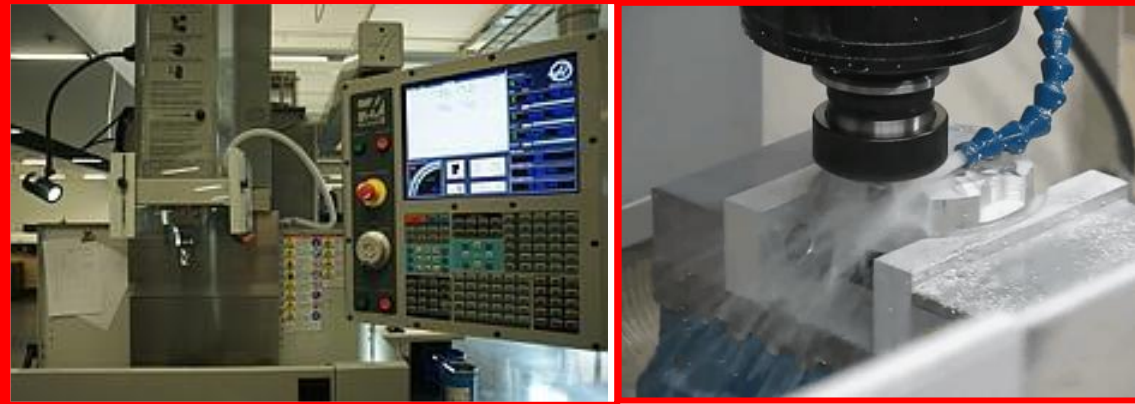
Material Processing

- We teach the science behind the conventional and the state-of-the-art technologies



Additive Manufacturing Technologies

Subtractive
CNC Milling



Numerically controlled injection Moulding and extrusion

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Alumni



- **Thumula Patabendige**
Alumnus

Mechanical Engineer at ReOrbit
2024

reorbit



- **Niccolo Adriano**
Alumnus, Mechanical Design Engineer at
ABB

2024

ABB

Raffay Sultan
Research and Design
Engineer at Woodio Oy

Madushan Chathuranga Liyanage
Mechatronics Trainee Hyperion
Robotics

Franz Irjala
Plastoco Oy Ab

plastoco

Eero Wallenius
Production Specialist at
Woodio Oy

woodio

Madelen Joro, 2024
Research Engineer

VTT

Robin Ehrsten
Geberit Production

GEBERIT

Career

- Graduating with Bachelor of Engineering in MSE/PM provides you competencies which enable:
 - **Employment Opportunities**
 - Sustainability Engineer
 - Design engineer
 - Material testing
 - Quality control
 - Production planning
 - Product development
 - **Further Studies (Master degree)**



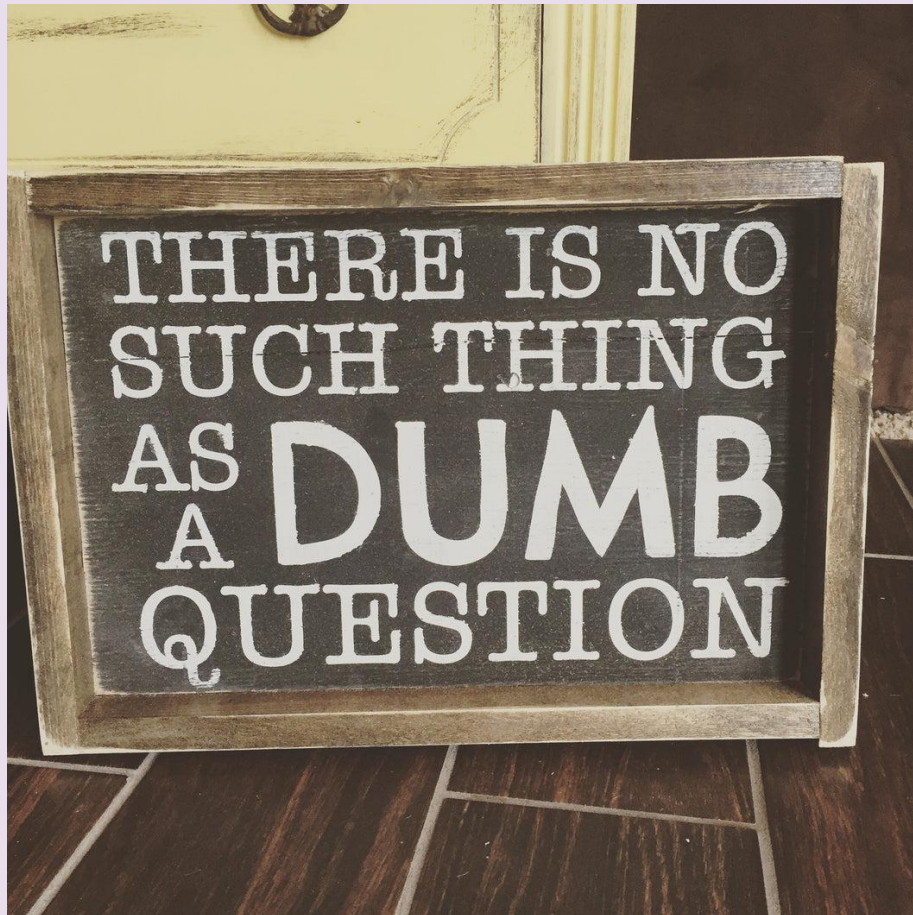
University studies

- Self-discipline
- Active learning / contact teachers
- Use calendar / diaries to make schedule
- Make sure you earn 15 ECTS per period
- Learn to use Arcada digital tools (Itslearning, outlook, Teams)



For questions,

Send email to Rizwan.ullah@arcada.fi



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- Want to volunteer in Slush?

<https://talent.slush.org/slush26/apply>

- Try to visit the Program website for some insights:
- <https://www.arcada.fi/en/study-arcada/bachelors-degree-programmes/mechanical-and-sustainable-engineering>
- <https://www.arcada.fi/sv/studera-pa-arcada/bachelorutbildningar/materialteknik-och-hallbarhet>



Good luck with your studies
ahead!!!