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BEYOND THE CLASSROOM:

How Engineering Academy strengthens formal and non-formal STEM education in Estonia

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Estonian Education and Youth Board

HARIDUS- JA NOORTEAMET

inseneriakadeemia.ee

THE CORE IDEA: SUCESSFUL STEAM EDUCATION IS AN ECOSYSTEM



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STRONG HOBBY EDUCATION

849
HOBBY SCHOOLS IN ESTONIA ALL TOGETHER

2946
NON-FORMAL EDUCATION CURRICULA*

1840
NON-FORMAL EDUCATION CURRICULA LONGER THAN 3 YEARS

114 075
CHILDREN AGED 0-19 IN HOBBY EDUCATION

Different picture for technical hobby education...

27
STEM HOBBY SCHOOLS

114
TNON-FORMAL EDUCATION CURRICULA

21
STEM NON-FORMAL EDUCATION CURRICULA THAT ARE LONGER THAN 3 YEARS

5979
CHILDREN AGED 0-19 IN HOBBY EDUCATION

EHIS 2024/2025

WHAT WORKS WELL?



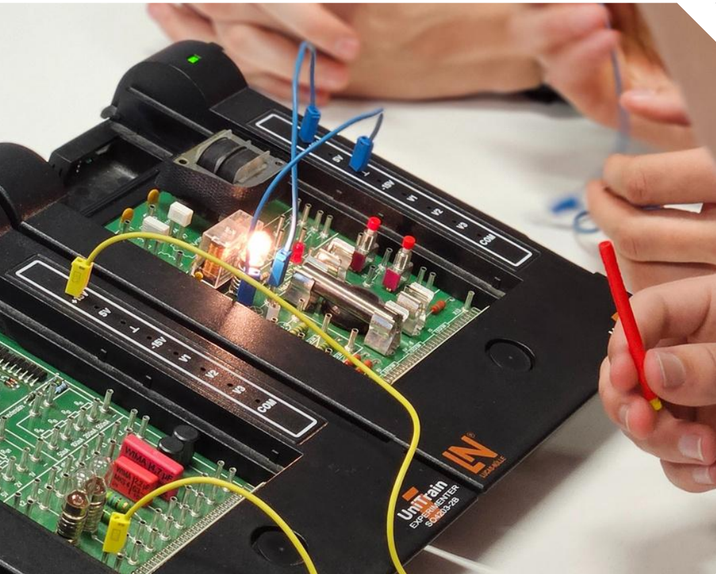
- STEM hobby education is mobile
- Every one can be an extracurricular activity instructor (Unicorn squad, Kolm põrsakest)
- Selective courses in schools are provided by hobby education provides
- Competitions to challenge yourself (FLL, Roboolypics, DeltaX, etc.)
- STEAM union is an strategic partner for the goverment.
- Goverment supports formal-and non-formal education integration
- IT- education (inc. informatics) is part of a formal education



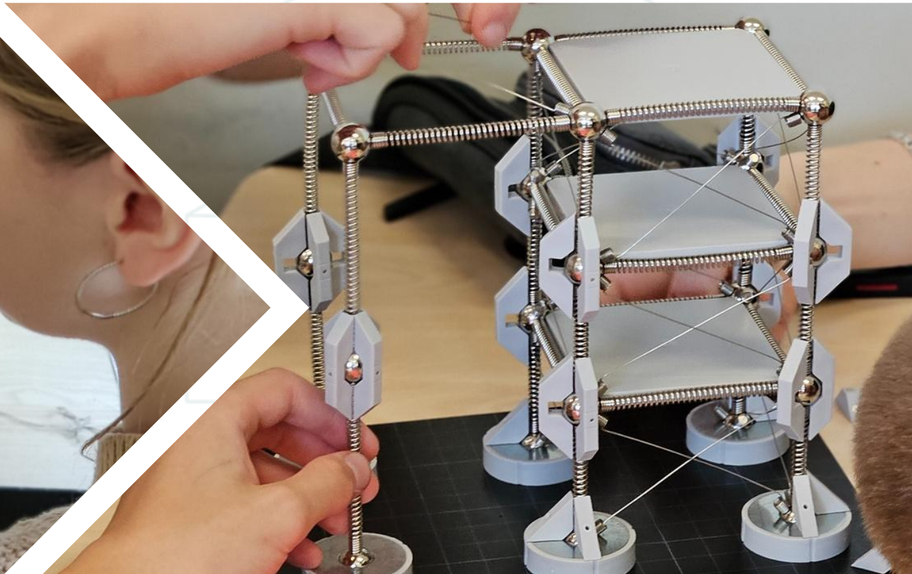


WHAT CAN BE IMPROVED?

Systemic approach and support (non-formal and formal)







ENGINEERING ACADEMY IS A COLLABORATIVE INITIATIVE

between Estonian government, educational institutions, companies and professional associations to improve the quality of education in the field of engineering, ensure the next generation of engineers and increase the popularity of the field.



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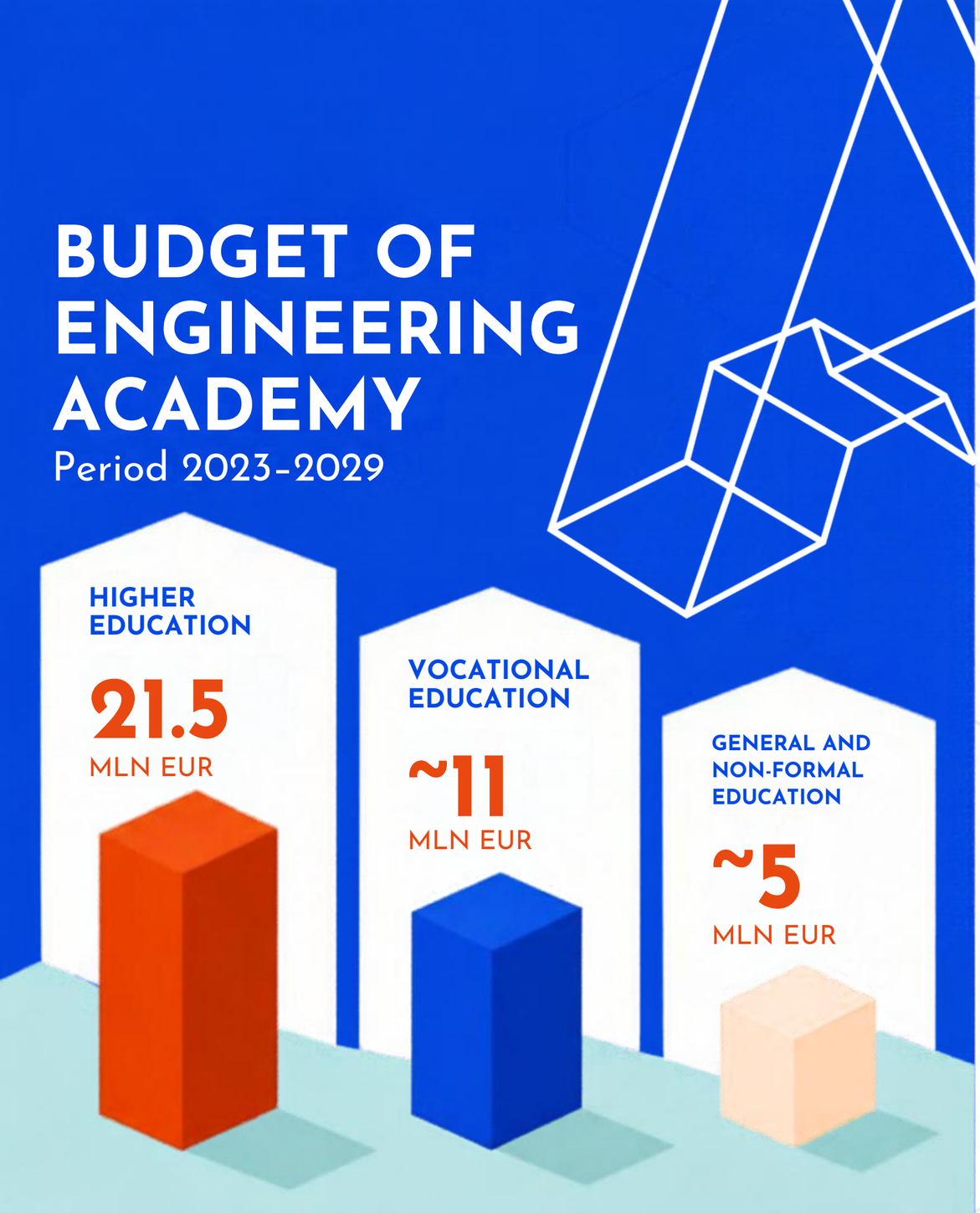
BUDGET OF ENGINEERING ACADEMY

Period 2023–2029



+ Non-Profit OrganisationNs/Professional Associations, (Tat 3): €3 Million

GENERAL AND NON-FORMAL EDUCATION FUNDS

- € 1 million to develop non-formal STEAM education system
- € 2,3 million to develop formal STEAM education system
- € 1,4 million for formal and non-formal STEAM education intecration

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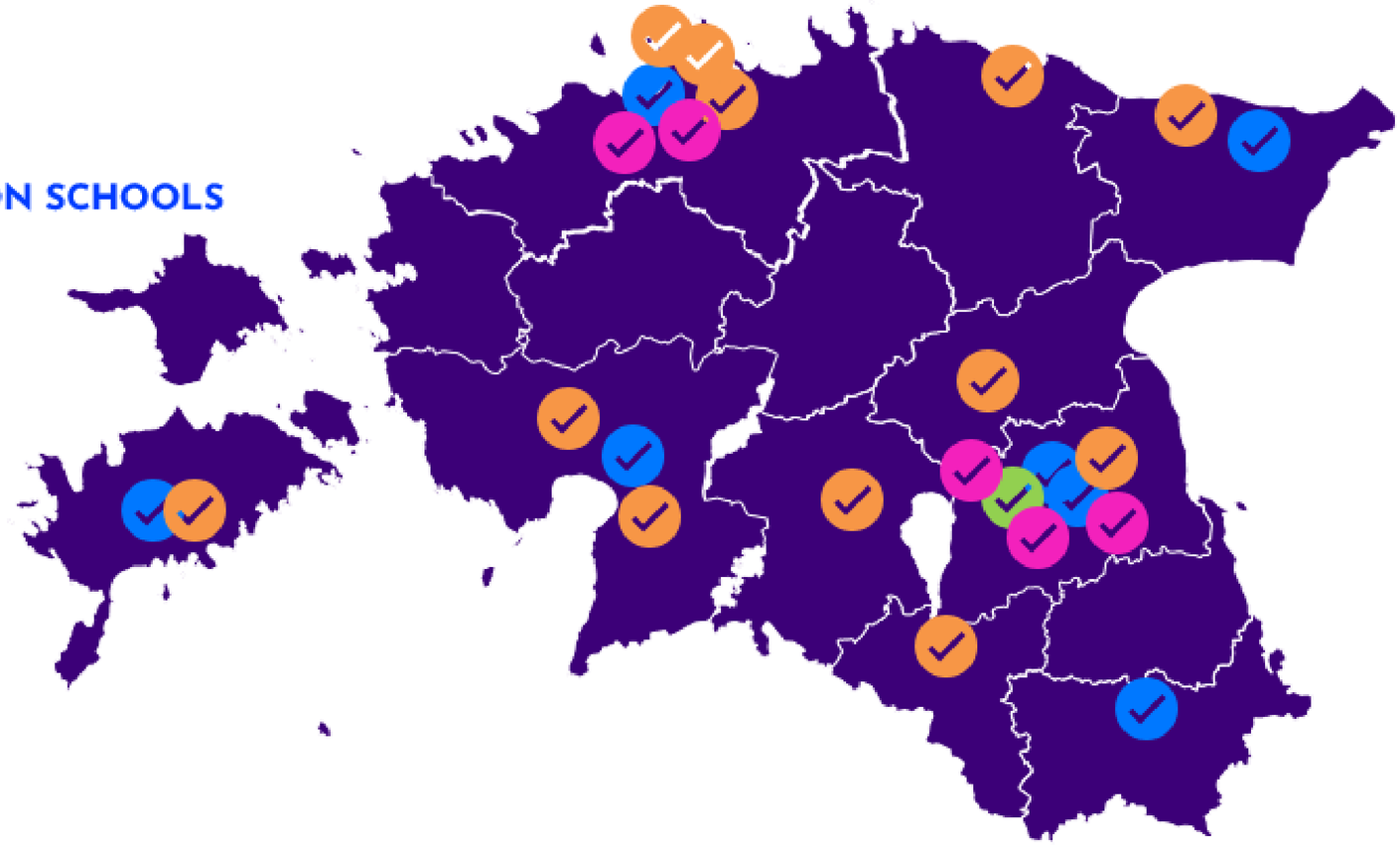
ENINEERING ACADEMY VET AND GENERAL EDUCATION PARTNERS

- 7 VET PARTNERS
- 12 GENERAL EDUCATION SCHOOLS
- 1 NON-FORMAL EDUCATION PARTNER
- 5 HIGHER EDUCATION PARTNERS



2025-2029 MAIN FOCUS AREAS OF THE ENGINEERING ACADEMY'S STEAM ACTIVITIES

2025–2026 CREATING NEW STEAM MODULES

- Creating and piloting the curriculum and learning materials for interdistsiplinary STEAM-modules.
- Modernising laboratories
- Developing a STEAM framework curriculum for non-formal education

2027–2029 CREATING A COMPREHENSIVE STEAM SYSTEM

- Mapping the current baseline for implementing nationwide STEAM education
- Training for the implementation of the created STEAM modules and STEAM framework
- Creating a STEAM handbook: a guide to implementing STEAM education
- STEAM pedagogy seminars for teachers and school leaders

EXAMPLES OF STEAM MODULES BEING CREATED

DESIGN AND MODELLING (3x35)
7th-9th grade

URBAN PLANNING (35)

SMART GREENHOUSE (2 x 35)

For upper secondary school

ENGINEERING AND ARTIFICIAL INTELLIGENCE (8x35)

For upper secondary school

EXPERIMENTS TO DEVELOP CREATIVITY AND INNOVATION (35)

7th-9th grade

SMART HOUSE SYSTEMS (3x35)

SMART INDUSTRY SYSTEMS (3x35)

DATA SATELITE (3x35)

For upper secondary school

13 modules and 30+ new courses with free digital learning materials

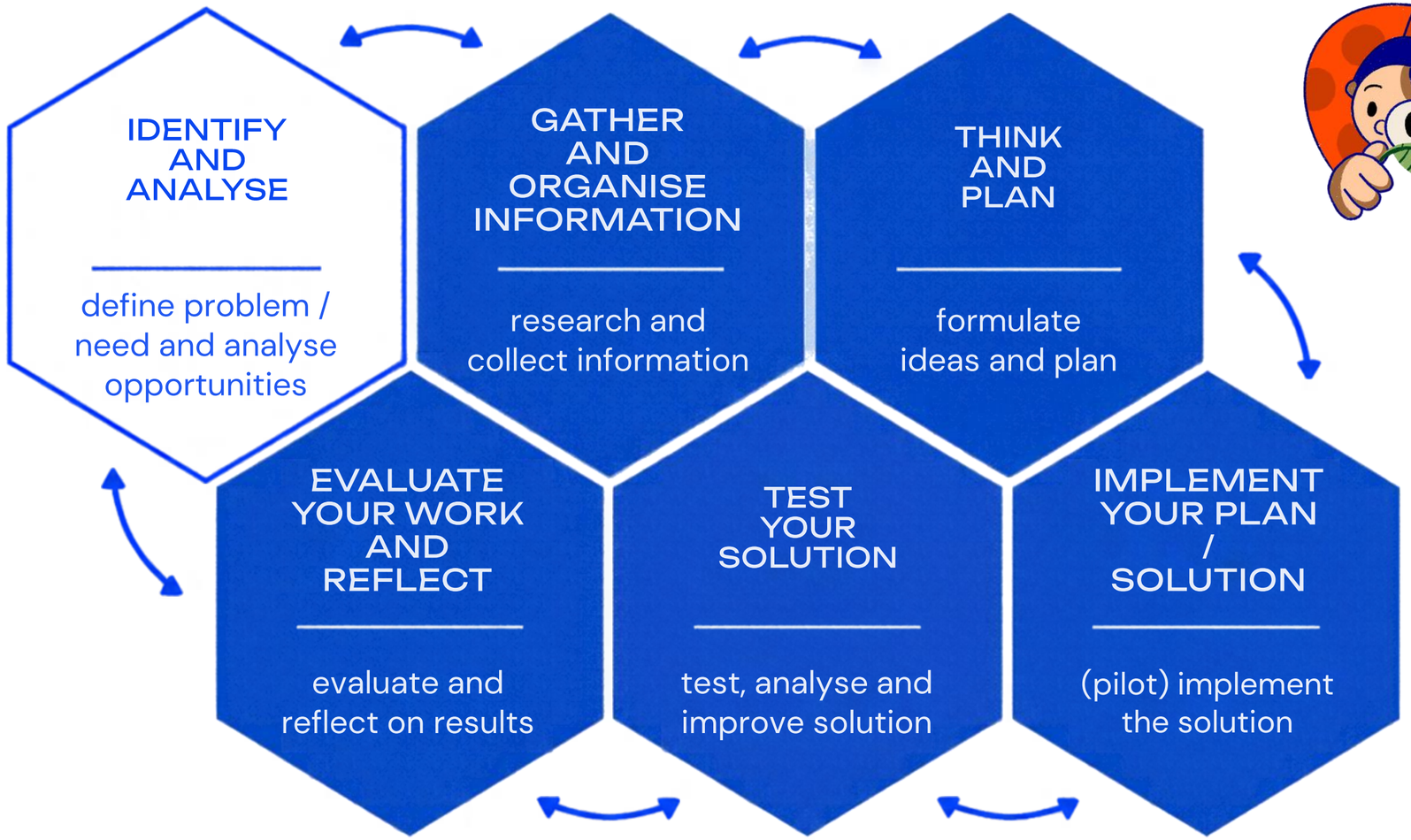


Figure 2. MATIK training model

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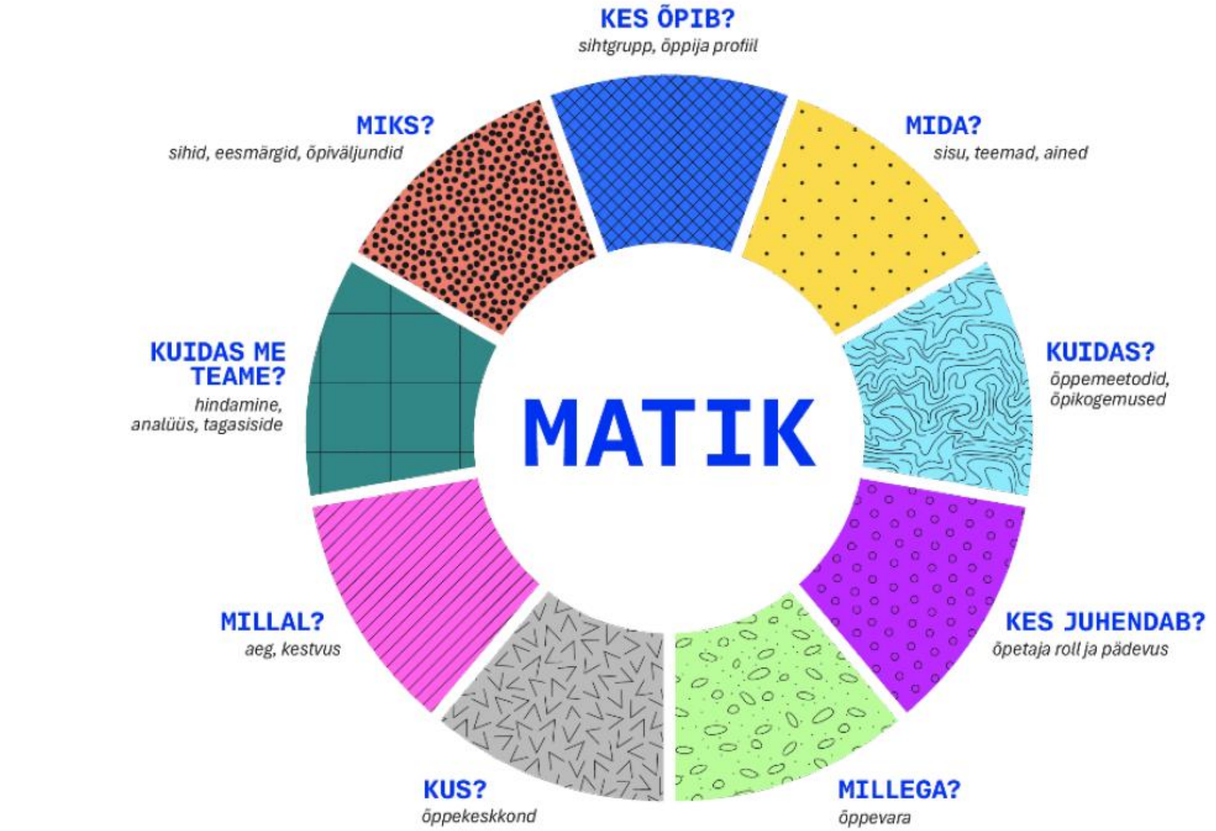
STEAM-FRAMEWORK FOR NON-FORMAL EDUCATION

- Designed to help create quality curriculums
- Aim is 70 registred curricula for non-formal STEAM education.
- Schooling for how to use the framework in 2027.
- Schooling for hobby education teachers





Joonis 1. MATIK-raamõppekava mudel

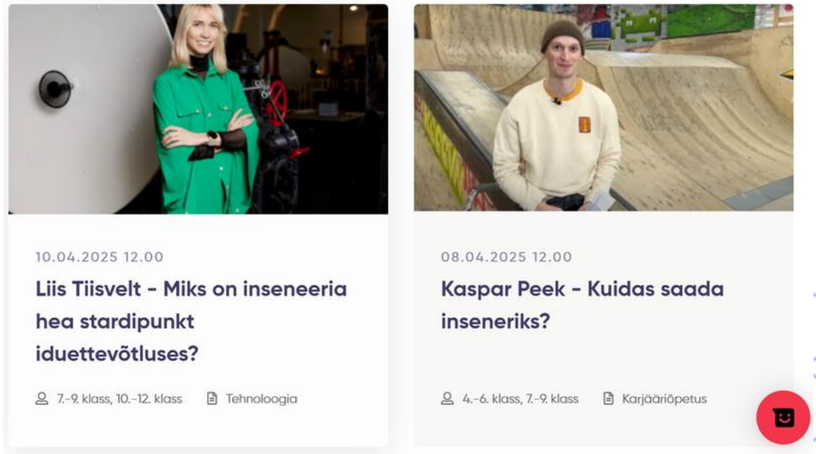




20
engineering ambassadors



15
days a year



Free online lessons



Open **Factory** Days

- 2 days (20.-21.05.2027), free visits
- Includes most industry sectors
- Training for factory guides
- Educational programs developed for schools (pre-lessons, after-lessons.



2025

1 county
13
factories

2026

7 counties
70
factories

2027

10
counties
100
factories

MIKS *inseneeria?*

Inseneeria on kõikjal, spordist kosmoseni! See on loov, uuendusmeelne ja kiirelt arenev eriala, mis muudab maailma. Inseneride järgi on alati nõudlust, nad on hästi tasustatud ja ühiskonnas väärtustatud.

VALDKONNAD JA AMETID

Avasta enda karjäärivalikud

ARHITEKTUUR, GEOMAATIKA, EHITUS JA KINNISVARA

Seotud ametialasid: 6

LOE ROHKEM →



INFOTEHNOLOOGIA JA TELEKOMMUNIKATSIOON

Seotud ametialasid: 8

LOE ROHKEM →



ENERGEETIKA, MÄE- JA KEEMIATÖÖSTUS

Seotud ametialasid: 3

LOE ROHKEM →



TEHNIKA, TOOTMINE JA TÖÖTLEMINE

Seotud ametialasid: 9

LOE ROHKEM →



TRANSPORT JA LOGISTIKA

Seotud ametialasid: 6

LOE ROHKEM →



VÄHEM TUNTUD AMETIALAD

Seotud ametialasid: 3

LOE ROHKEM →



AMETITEST LÄHEMALT

ENGINEERING

TOO COOL TO DO ALONE!

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