EIT Manufacturing pilot course on Metal Cutting (PATHFINDER)

This international short course for working professionals covers a selection of practical aspects concerning machining operations such as turning and milling. Participants will gain insight into various approaches aiding process optimization. The topics covered are parameter selection, use of digital tools for process simulation and analysis of process data. In addition, the role of traditional and future technologies concerning metalworking fluids are discussed.
This pilot course is part of an European initiative to develop and optimizing hybrid learning paths for professional education in manufacturing industry. Leading experts in manufacturing technology from universities in Spain, Czech Republic, Austria, Slovenia, Finland, and Sweden are involved in this effort to combine the benefits of online learning with those of contact learning.

Course contents

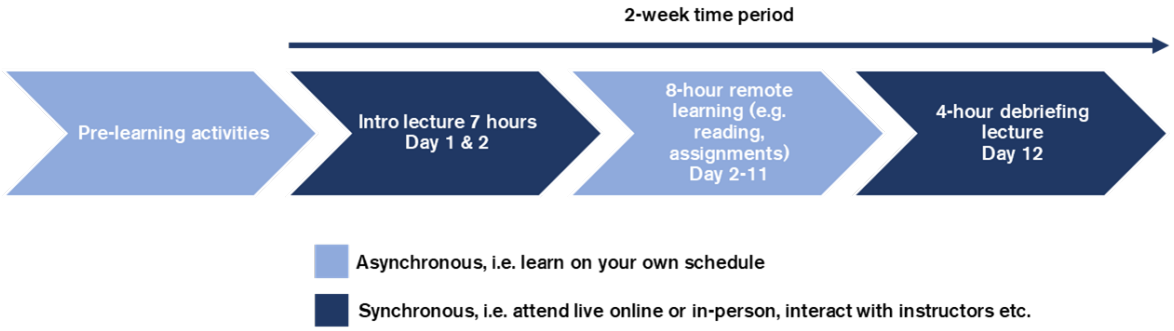
This eight-week course is divided into four modules, each covering a specific area:

Module 1: **Industrial data in machining** *(TU Wien)* • General aspects in data exploration • Data management, data storage and data mining • Artificial Intelligence (AI) • Application of AI in machining	Module 2: **Parameter selection in machining** (*Mondragon University*) • Parameter selection methodology • Dynamic stability in cutting process • Coupled Tool Material (CTM) standards • Other aspects to consider from machine tool (e.g. power, torque), cutting tools (e.g. tool life) and workpiece (e.g. surface integrity)
Module 3: **Simulation-based machining** *(Czech Technical University in Prague)* • Machining KPIs • Digital-twin in machining simulation • Validation of digital twin using measured machining data • Simulation-based machining strategy selection	Module 4: **Metalworking fluids in machining** *(Chalmers & University of Ljubljana)* • Cooling and lubrication • Types & delivery of metalworking fluids in machining • Monitoring of metalworking fluids • Sustainability aspects • High-pressure cooling, MQL and cryogenic machining

Organization and schedule

The course is offered in an online-format with the option of participating in-person. The course contains four modules which are organized into two-week periods. Prior to each module, pre-learning activities such as short videos and/or learning nuggets help the trainees to get acquainted with the module's topic (flipped classroom). The module then starts with two half-days of lectures followed by a remote learning segment, during which the participants are divided into small groups to work on case-studies, assignments and accompanied learning tasks. Course instructors from industry and academia facilitate the group activities in an online learning management system. The modules end with half-day reflection, feedback and debriefing.

An individual module pathway follows the structure illustrated in the example below.



Course completion is based on a series of assignments and assessments in Skills.Move platform.

From whom you will learn

Experts in manufacturing technology from universities from all over Europe are leading the modules together with additional teachers and industry professionals. Get in touch with the module responsibles if you have questions:

Module1
Fazel Ansari,
TU Wien (Austria)

Expertise: Industry 4.0, Knowledge based systems, Human-centered CPPS, Maintenance

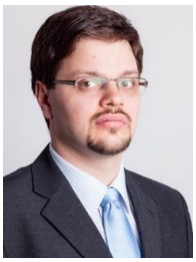
fazel.ansari@tuwien.ac.at

Module 2
Pedro-José Arrazola,
Mondragon University (Spain)

Expertise: Parameter selection, Dynamic stability in cutting, CTM standards

pjarrazola@mondragon.edu

Module 3
Vojtěch Matyska, Czech Technical University in Prague (Czech Republic)



Expertise: Drive design and simulation, Machine tool dynamic behavior, Digital twin

V.Matyska@rcmt.cvut.cz

Module 4
Peter Krajnik, Chalmers University of Technology (Sweden)

Expertise: Machining processes, Grinding technology, Cryogenics

peter.krajnik@chalmers.se

Module 4
Franci Pušavec, University of Ljubljana (Slovenia)

Expertise: Machining processes, Sustainability, Cryogenics, Modeling, Innovation

Franci.Pusavec@fs.uni-lj.si

Course language

The course is offered in English.

Price & enrollment

~~The regular price of registration is 480 €.~~

The course is funded by eit Manufacturing and we can therefore offer it free of charge in 2022. Free enrollment can be done via the registration link.

Further questions?

For questions related to practicalities, organization of the course, registration, etc. please contact Philipp Hoier (hoierp@chalmers.se)

WHO SHOULD TAKE THIS COURSE

This course is designed for engineers and practitioners with production responsibilities – to understand, effectively analyze, design and apply key technologies in their work and that of their teams and organizations.

Working professionals: engineers (mechanical, manufacturing and materials) and practitioners (production technicians, process planners and machine operators).

CHALMERS UNIVERSITY OF TECHNOLOGY

Aalto University

UNIVERSITY OF TURKU

University of Ljubljana

Mondragon Unibertsitatea
Faculty of Engineering

CZECH TECHNICAL UNIVERSITY IN PRAGUE

TU WIEN
TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

eit Manufacturing

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