Politechnika Świętokrzyska
Kielce University of Technology

Blended Intensive Program (BIP)

3M – Model Manufacturing Methods

Advanced Manufacturing Technologies,

Additive Manufacturing & Reverse Engineering

Term

On-site program: **May 25, 2026 – May 29, 2026**
Virtual program: **June 8, 2026 – June 9, 2026**

Brief program description

An introduction to modern manufacturing technologies, such as advanced CNC machining techniques, CAD/CAM design, 3D printing, and reverse engineering, forms the foundation of the modern manufacturing industry.

The Blended Intensive Program "Advanced Manufacturing Technologies: CNC, Additive Manufacturing & Reverse Engineering" enables participants to acquire theoretical knowledge and practical skills in the design and manufacture of machine components using modern production technologies.

The program is implemented in a blended format, combining a virtual component with intensive physical mobility. It includes specialized lectures, laboratory exercises, and practical sessions related to CNC programming, CAM system operation, preparing models for 3D printing, and the basics of scanning and geometry reconstruction. An integral part of the program is a visit to a production facility with advanced CNC machinery – the Kielce Pump Factory.

al. Tysiąclecia Państwa Polskiego 7, 25-314 Kielce, Poland
+48 41 34 24 773
erasmus@tu.kielce.pl

Politechnika Świętokrzyska
Kielce University of Technology

Program Structure

Virtual Component - Online Lectures

- Introduction to CNC Programming,
- Additive Manufacturing and Reverse Engineering,

Onsite Component

- Intensive laboratory and practical classes,
- Demonstration classes in a CNC machine tool laboratory,
- Preparation and implementation of 3D prints,
- Basics of 3D scanning and geometry reconstruction,
- Study visit to a production facility,
- Implementation and presentation of a design project.

Topic Coverage

- Machining technologies on CNC machine tools,
- Programming numerically controlled machine tools using CAM systems,
- Designing and preparing models for 3D printing,
- Implementation of additive printing,
- Basics of reverse engineering and 3D scanning.

Program Objectives

- Gaining knowledge of innovative manufacturing technologies,
- Acquiring practical skills in operating and programming CNC machine tools,
- Preparing 3D models and machining technologies in CAD/CAM systems,
- Familiarizing yourself with 3D printing technologies,
- Applying reverse engineering in industrial practice.

al. Tysiąclecia Państwa Polskiego 7, 25-314 Kielce, Poland
+48 41 34 24 773
erasmus@tu.kielce.pl

Learning Outcomes

After completing the program, the participant will:

- Know basic and advanced CNC machining and 3D printing technologies,
- is able to prepare a 3D model for CNC machining or additive manufacturing,
- is able to use CAD/CAM systems in production processes,
- understands the basics of reverse engineering and geometry digitization,
- is able to work on an engineering project in a design team.

Teaching & Learning Methods

- specialized lectures,
- laboratory exercises,
- practical exercises on CNC machine tools,
- design work in teams,
- visit to an industrial plant.

Assessment Methods

- active participation in classes,
- completion of a design task,
- presentation of design results.

Passing all elements is the basis for awarding ECTS credits.

Practical Elements

The program includes:

- laboratories on the operation of CAM systems,
- demonstrations and exercises on CNC machine tools,
- 3D printing and 3D scanning.

al. Tysiąclecia Państwa Polskiego 7, 25-314 Kielce, Poland
+48 41 34 24 773
erasmus@tu.kielce.pl

Politechnika Świętokrzyska
Kielce University of Technology

Keynote speakers

Planned external speakers in the field of CNC technology and 3D printing will be confirmed.

Target group

- undergraduate students,
- graduate students,
- PhD students,
- young scientists.

Minimum English language level: B2

Organizational information

- Number of participants: minimum 10 (maximum number to be determined later),
- Number of ECTS credits: 3,
- Workload: 40 hours,
- Field trip / production plant: Kielecka Fabryka Pomp (KFP),
- Contact person:
  - **Erasmus+ coordinator at the Faculty of Mechatronics and Mechanical Engineering**
    Mr dr inż. Sebastian Lipiec: slipiec@tu.kielce.pl
  - **BIP coordinator at the faculty**
    Mr dr hab inż. Sławomir Błasiak: sblasiak@tu.kielce.pl
  - **Erasmus+ Institutional Coordinator**
    Mrs mgr Anna Kasztelewicz: erasmus@tu.kielce.pl; akasztelewicz@tu.kielce.pl;
  - **IRO administrative staff**
    Mrs mgr Michalina Mikołajczyk: erasmus@tu.kielce.pl; mmikolajczyk@tu.kielce.pl

al. Tysiąclecia Państwa Polskiego 7, 25-314 Kielce, Poland
+48 41 34 24 773
erasmus@tu.kielce.pl