

## ■ CORE TEAM



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## ■ APPLICATION:

Please send the following documents to [furthereducation@cuas.at](mailto:furthereducation@cuas.at):

- application form
- curriculum vitae
- evidence of relevant educational degrees

## ■ INFORMATION & CONTACT

**CARINTHIA UNIVERSITY OF APPLIED SCIENCES**  
Center for Further Education

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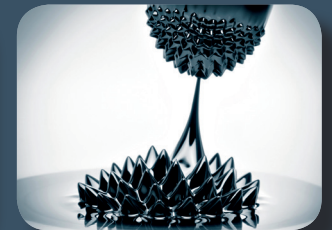
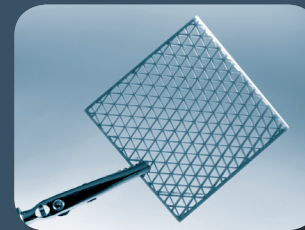
[www.fh-kaernten.at/wbz](http://www.fh-kaernten.at/wbz)



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# CiSMAT

Carinthia Institute for Smart Materials  
and Manufacturing Technologies



Certificate course

# SMART MATERIALS

Supported by



Kärntner  
Wirtschaftsförderungs  
Fonds



**TREIBACHER**  
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VILLACH

**HIRSCH** Porozell



**PMS**  
Elektro- und Automationstechnik GmbH

**HARATECH**  
PLASTICS ENGINEERING & SOLUTIONS

**TDK**

## GOALS

The goal of this course is to provide students with the **knowledge and skills** that will allow them to solve new challenging technical problems, **using a combination of smart materials and advanced 3D-printing techniques.**



After completion of the course, interested students will be able to expand their knowledge on one or several areas by taking further courses at the Carinthia University of Applied Sciences (e.g. 3D Printing, Mechanical and Lightweight Engineering etc.).

## CONDITIONS FOR COURSE REGISTRATION

Potential participants are **employees of industrial companies who are familiar with and confronted to Research and Development as well as Innovation, Engineering and Design problematics**, and want to get further education in the fields of smart materials and production techniques.

**A technical background and technical understanding is required.** Ideally, a degree from a higher technical institution in the fields of mechanical engineering, electrical engineering, chemical engineering, mechatronics, production techniques, material sciences or similar.

## MODULE 1 – Materials and 3D Printing, Basics (24h, 2 ECTS)

Polymers, Metals, Ceramics

3D Printing: state-of-the-art and perspectives

When, where and why 3D Printing?

Laboratory Work @ FH Labs, Smart Labs and/or GPS (3D Printing)

## MODULE 2 – High-performance Materials (24h, 2 ECTS)

Composite materials, State-of-the-Art

Carbon- and Bio-Fiber-Reinforced Composites (CFRP/BRFP)

3D Printing of Fiber-Reinforced Composite Materials

Innovation-enabling high-performance Materials

Laboratory work @ CiSMAT (3D-Printing of CFRP and LFRP parts)

## MODULE 3 – Smart Materials (24h, 2 ECTS)

Shape-memory and superelastic materials, non-Newtonian fluids, selfhealing materials, thermo-, photo- and piezo-chromic polymers, piezo-polymers, metal foams, super-hydrophobic materials, aerogels, Meta-Materials.

Practical Work: Smart Materials-based solutions to challenging problems

## MODULE 4 – 3D and 4D Printing of Smart Materials (24h, 2 ECTS)

3D/4D-printing techniques, 3D/4D-printed Smart Products (smart-made materials with embedded 3D-printed sensors & flexible electronics, self-folding and self-assembling structures, adaptive structures, soft robots, smart textiles)

Exposé on one 3D/4D Printing topic of particular interest.

Laboratory work @ CiSMAT and FH Labs / Smart Labs

## THE CERTIFICATE COURSE AT A GLANCE:

TEACHING LANGUAGE:	English/German
DURATION AND COSTS:	1 semester (4 modules, 24h each), € 3500.-
SCHEDULE:	<a href="http://www.fh-kaernten.at/smartmaterials">www.fh-kaernten.at/smartmaterials</a>
LOCATION:	CUAS, Campus Villach, Europastraße 4, 9500 Villach, Austria
ACHIEVED QUALIFICATION:	Certificate and 8 ECTS

ORGANISATION: In order to facilitate the participation of employees from the industrial sector and/or from regions outside Carinthia, the modules are offered in 2-day sessions and take place on Thursdays and Fridays.

