

Course Description – Winter 2024/2025

Title	Surface Engineering & Coatings Technology
Faculty	Mechanical Engineering
Professor	Prof. Dr.-Ing. habil Annett Dorner-Reisel
ECTS	5
Level	Bachelor
Requirements	-
Add. Information	https://www.hs-schmalkalden.de/hochschule/fakultaeten/fakultaet-maschinenbau/internationales/englische-kurse.html
Content	<p>Surfaces engineering and coatings technology is essential for almost every technology. Motion of industrial parts, like production machines, powertrain components in automotive or airplane applications, environmental or energy technologies causes wear. The student should understand classical phenomena of tribology. Aspects of science and friction, wear and lubrications are explained. Basics about tribological systems and the latest development in reduction of wear and energy consumption can be explained after the course. Mechanical and tribo-logical properties as well as functional behaviour (catalytic effects, energy consumption, signal sending) are essential for surface and coating selection and development. The smaller a device, the bigger the importance of the surface. Bio-devices, MEMS (microelectromechanical systems) catalytic surfaces, surfaces interacting with living matter like cells or self assembling monolayers are already on their way to practical application. Students can recommend methods for surface engineering by treatments and coatings with thin or thick films according the practical demands. Great emphasis is placed on micro- and nanostructure of special coatings as well as on trends in technology development, thermally sprayed coatings and carbonbased films/materials. Tribology and coatings for adjusted applications are explained. The software Cambridge Engineering Selector CES (company GRANTA DESIGN Ltd., Cambridge U.K.) is available. (Hybride synthesizer) for designing coatings or other hybride materials is explored.</p>