

Course name:	<b>Surface Engineering &amp; Coatings Technology</b>
Lecturer:	Prof. Dr.-Ing. habil. A. Dorner-Reisel
Aims:	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 tribological 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 carbon-based films/materials.
Content:	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.
Teaching lessons:	lectures (2 SWS), exercise (1 SWS), case study (1 SWS)
Exam:	written test (120 min), attestation of exercise participation is pre-conditional for participation on the written test (exercise attendance certificate)
Requirements:	basic knowledge of material science and chemistry
Applicability:	general disciplines of engineering and natural sciences (i.e. environmental, mechanical, industrial or electrical engineering)
Availability:	annual during the winter semester, maximum participants: 8 students
Effort:	presence 50 h + self-study 90 h = 150 hours = 5 ECTS credit points
Literature:	<p>Mang, T., K. Bobzin, T. Bartels, Industrial Tribology: Tribosystems, Friction, Wear and Surface Engineering, Lubrication, WILEY-VCH Verlag GmbH &amp; Co. KGaA, Weinheim, 2011</p> <p>Kawai, Y., H. Ikegami, S. Noriyoshi, A. Matsuda, K. Uchino, M. Kuzuya, A. Mizuno, Industrial Plasma Technology: Applications from Environmental to Energy Technologies, WILEY-VCH Verlag GmbH &amp; Co. KGaA, Weinheim, 2010</p> <p>Wilson, M., K. Kannagara, G. Smith, M. Simmons, B. Raguse, Nanotechnology: Basic science and emerging technologies, Chapman &amp; Hall/CRC, London, 2002</p>