

# RheinMain University of Applied Sciences - Faculty of Engineering

Courses taught in English and bilingually or with limited English support\*

\* Please check the column "Language of Instruction"

Regarding your course selection, please note the following:

With your application at RheinMain University of Applied Sciences you enroll in a specific degree program. At the Faculty of Engineering you are allowed to choose courses from all degree programs offered. A selection of courses from other faculties is not possible.

To learn more about the course offerings for your semester at RheinMain University of Applied Sciences, please take a look at the list of courses taught in English/bilingually/with English support below or contact the respective [departmental international coordinator](#) for your degree program.

Please be informed that this course list may be subject to change.

According to your level of German you may also choose courses taught entirely in German. Please visit the faculty website to see the course offerings for the program of study you are enrolled in: <https://www.hs-rm.de/en/faculties/>.

Please note: Courses from the Faculty of Engineering will be taught at the campus "Am Brückweg" in Rüsselsheim.

Core Skill and Language Courses		
Course Title	Credit Points (= ECTS)	Semester Offered
Core Skill Courses Open to All Exchange Students offered by the Competence & Career Center ( <a href="#">Website</a> )		
International Week: Future Leaders (August 07 - 11, 2023)	3 ECTS	In Summer Only, as a block course
Language Courses Open to All Exchange Students ( <i>Examples</i> ; for current course offer visit the <a href="#">Language Center Website</a> )		
<b>German as a Foreign Language</b>		
German Intensive Course (various levels*; duration: 2 weeks, prior to start of exchange semester)	4 ECTS	Every Semester
* Our intensive course is primarily aimed at existing A- to B1-levels. Students with a level B2 and up in German <i>may</i> be asked to choose a semester-long course if they are interested in taking a German language class, depending on the overall results of the placement tests prior to the Intensive Course.		

German as a Foreign Language (various A2-B2 levels)	2 ECTS	Every Semester
Hallo Deutschland: Geschichte, Kultur, Politik & Wirtschaft (German B2)	2 ECTS	Every Semester
<b>English as a Foreign Language</b>		
1261 Remedial English 1 (A2/B1)	2 ECTS for exchange students	Every Semester
1313 English at Work: Writing Business Letters and E-Mails (B1)	2 ECTS	In Summer Only
1315 English at Work: Giving Presentations (B1)	2 ECTS	In Winter Only
1292 Improve Your English Accuracy (B1/B2)	2 ECTS	Every Semester (but sometimes compact in the semester break)
1155 Intercultural Communication in Practice (Blended Learning)	2 ECTS	In Winter Only
1115 Advanced Technical English 1 (B2)	2 ECTS	In Summer Only
1125 Advanced Technical English 2 (B2)	2 ECTS	In Winter Only
Additional English and German intensive courses and workshops are also offered during the semester breaks – contact the Language Center for information		
<b>“English for Specific Purposes” Courses (focus varies depending on degree program)</b>		
English for Specific Purposes (B2) (Interdisc. Engineering; Applied Physics)	4 ECTS	Every Semester
Business English (B2) (Electrical Engineering; Media Engineering)	3 ECTS	Every Semester
Technical English (B2) (Electrical Engineering; Media Engineering)	3 ECTS	Every Semester
Technical English (B2) (KIS Electrical Engineering)	3 ECTS	In Winter Only
Technical English (B1/B2) (BIS Electrical Engineering)	2 ECTS	In Winter Only
ICAO 4 English (B2 (Electrical & Aeronautical Engineering)	2 ECTS	Every Semester
Technical English for Mechanical Engineering (B2)	4 ECTS	Every Semester
Technical English (B1/B2) - BIS Mechanical Engineering	2 ECTS	In Summer Only
Technical English (B1/B2) – (KIS Mechatronics)	3 ECTS	In Winter Only
Business English (B1/B2) – (KIS Mechatronics)	3 ECTS	Generally Every Semester
English for Environmental Engineering (B2)	4 ECTS	Every Semester
Technical English (B1/B2) (BIS Industrial Engineering)	3 ECTS	Every Semester
Business English 1 (A2/B1) (Industrial Engineering)	3 ECTS	In Winter Only

Business English 2 (A2/B1) – (Industrial Engineering)	2 ECTS	In Summer Only
Business English 1 (B2) (Industrial Engineering & International Management)	3 ECTS	In Winter Only
Business English 2 (B2) (Industrial Engineering & International Management)	2 ECTS	In Summer Only
Business English 3 (B2/C1) - (Industrial Engineering & International Management)	2 ECTS	In Winter Only
Intercultural Competence (B2/C1) (Industrial Engineering & International Management)	4 ECTS	In Summer Only

Course Title	Course Code	Course Description	Credit Points (= ECTS)	Language of Instruction	Module offered
<b>Advanced Media Technology (M.Eng.)</b>					
Video Compression Technologies	AMT02	Digital video signals and their characteristics Fundamentals of information theory Fundamentals of source coding Predictive coding Transform coding Subband coding Quantization Rate distortion theory Hybrid coding of video signals Video coding standards, e.g. JPEG, JPEG2000, MPEG-2, MPEG-4 AVC, HEVC Highly topical developments, e.g. for future video coding standards	5	Please check before application, if teaching in English is possible	In Winter Only
Color Science & Color Management	AMT03	Human Visual System Visual Acuity Dynamic Range Photometric Quantities, Lightness Spatio-temporal sampling model Colorimetry, tristimulus values, color components, luminance and luma Color spaces, perceptually uniform color spaces, device independent color spaces Color appearance models, metrics for assessing color differences Three-dimensional color representation, high dynamic range Quantization and non-linear pre-processing of color components, integer and floating point representation Color space conversion	5	Please check before application, if teaching in English is possible	In Winter Only

		Gamut mapping Applications: Digital Cinema, UHDTV HDR, ACES workflows			
Scientific Project 1	AMT06	<p>The scientific project is related to various research and development activities carried out within the department of information technology and electrical engineering. Typical subjects are e.g. "mobile multimedia applications", "digital cinema", "stereoscopic video technology", "professional audio systems", "wireless communications", "signal processing", "multiple antenna system design and optimization". The project work is carried out in groups of 2-4 students. The progress of the projects is controlled by regular meetings and interim reports. Projects typically include:</p> <ul style="list-style-type: none"> <li>- solving technical questions by performing literature studies, analyzing different solutions and coming to a practicable</li> <li>- solution,</li> <li>- accomplishment of an analysis and measurements on a system,</li> <li>- development of a new practical exercise (e.g. video coding),</li> <li>- integration of a new technical system (to be used at HSRM or in cooperation</li> </ul>	8	Please check before application, if teaching in English is possible	In Winter Only
Multimedia Networking	AMT09	<p>Short repetition of TCP/IP protocols with in-depth treatment of multicast, congestion situations and caching strategies (CDN)</p> <p>Introduction to network simulation</p> <p>Media formats (different components of compressed media data, container formats, embedded functions to enhance robustness against packet loss)</p>	5	Please check before application, if teaching in English is possible	In Winter Only

		<p>Media streaming in best effort IP networks (RTP/RTCP, SDP, RTSP, Adaptive HTTP Live Streaming)</p> <p>Quality of Service principles and methods</p> <p>Connection oriented networks (e.g. MPLS, Software Defined Networking with Openflow, Opendaylight and REST API)</p> <p>Multimedia networking systems (e.g. VoIP, IPTV)</p>			
Audio Coding, Storage and Transmission	AMT07	<p>Lossless audio coding</p> <p>Psychoacoustic principles and perceptual audio coding</p> <p>Subband and transformation coding</p> <p>Audio coding standards (e.g. MPEG based and proprietary)</p> <p>Storage media for audio content (e.g. CD, DVD, BD)</p> <p>Audio file formats</p> <p>Digital audio broadcasting and sound transmission in DVB</p> <p>Audio in IP based networks</p> <p>Laboratory:</p> <ul style="list-style-type: none"> <li>- Implementation and evaluation of audio coding algorithms for audio storage and transmission</li> <li>- Analysis of data and file formats</li> </ul>	5	Please check before application, if teaching in English is possible	In Summer Only
Advanced TV Technologies	AMT08	<p>Virtual reality and Augmented reality</p> <ul style="list-style-type: none"> <li>- Camera and camera models</li> <li>- Features and feature tracking</li> <li>- Epipolar geometry</li> <li>- Camera calibration</li> <li>- Stereo vision</li> <li>- Structure from motion</li> <li>- TV applications</li> <li>- HDR and 360° Video</li> <li>- Processing chains</li> <li>- Signal representations</li> <li>- Coding</li> </ul>	5	Please check before application, if teaching in English is possible	In Summer Only

		Highly topical developments			
Scientific Project 2	AMT11	<p>The scientific project is related to various research and development activities carried out within the department of information technology and electrical engineering. Typical subjects are e.g. "mobile multimedia applications", "digital cinema", "stereoscopic video technology", "professional audio systems", "wireless communications", "signal processing", "multiple antenna system design and optimization". The project work is carried out in groups of 2-4 students. The progress of the projects is controlled by regular meetings and interim reports.</p> <p>Projects typically include:</p> <ul style="list-style-type: none"> <li>- solving technical questions by performing literature studies, analyzing different solutions and coming to a practicable solution,</li> <li>- accomplishment of an analysis and measurements on a system,</li> <li>- development of a new practical exercise (e.g. video coding),</li> <li>- integration of a new technical system (to be used at HSRM or in cooperation with industry),</li> <li>- development of scientific software solutions for given problems.</li> </ul>	8	Please check before application, if teaching in English is possible	In Summer Only
<b>Applied Physics (M.Sc.)</b>					
Laser Applications	Las	<p>Basics of lasers, properties of laser radiation, types of lasers</p> <p>Properties of spectra and spectral lines</p> <p>Spectroscopic methods (IR and Raman spectroscopy, Doppler-free spectroscopy)</p> <p>Time-of-flight methods (laser Doppler velocimetry, OTDR, LIDAR)</p>	3	Please check before application, if teaching in English is possible: Bernd.Schweizer@hs-rm.de	Every Semester

		Interference methods (interferometry and interference microscopy, FTIR spectrometry, holography for material inspection, Applications of holographic gratings, laser gyroscope/Sagnac effect) Generation and detection of short laser pulses Interaction of laser radiation with matter, especially tissue Applications of the laser in medicine			
Quantum Electronics	1202	Laser radiation: Gaussian beams and their transformation by optical components, Ultra-short light pulses, generation, properties, dispersion management, optical solitons Effect of dispersion of different orders on light pulses Linear optics: absorption and dispersion, Non-linear optics: SHG, Kerr effect, FWM, Optical tweezers, laser beam cooling	3	Taught in English on request	Every Semester
<b>Biological and Environmental Technology (M.Eng.)</b>					
Laboratory Course Analytical Chemistry	5151	Experiments using different analytical methods Comparison of two different analytical methods Sum parameters and clues of particular matters Analysis of results and evaluation of results Writing of scientific report	1	Taught in English	In Winter only
Biological Waste Gas Treatment	5202	Process engineering and bio process engineering (process of mass transfer and enzyme catalyzed reactions) and processes of biological waste gas treatment Bio filter Bio washer Bio trickling filter Ascertainment of bounding conditions and comparative description of different waste gas treatment methods	4	Taught in English	In Summer only



		Complex waste gas treatment systems and integrated waste gas management Planning and realization of large scale facilities			
Biomass for Industrial Energy and Renewable Compounds	5270	Reasons for the necessity to substitute fossil energy sources by renewable ones Present share and future impact of biomass use in comparison to other renewable energy sources (e.g. solar energy, wind power, hydroelectric energy) and their possible combination (e.g. Power to Gas) Availability of renewable energy sources from biomass (wood, sugar cane and sugar beet, cereals, oil seeds and oil trees, micro algae): Presentation of fundamental processes of extraction and possible chemical modification (e.g. Biodiesel-FAME), fermentation (biogas, bioethanol, bio butanol – including downstream processing) and pyrolysis (e.g. BTL- biomass to liquid, hydrogen technologies) Perspectives for second generation biomass use (cellulose extraction, pyrolysis processes, jatropha oil) Material use of biomass to obtain platform chemicals ("bricks" for chemical synthesis in the range of 2 to 6 carbon atoms), specialty chemicals and biopolymers Pointing out the problem of land use competition (food and feed production)	5	Taught in English	In Summer Only
<b>Environmental Engineering (B.Eng.)</b>					
Enzyme Technology	5020	Structure of proteins and enzymes Enzyme classes Enzyme kinetics according to Michaelis-Menten Recognition of important inhibitor types with Lineweaver-Burk plot Methods for the preparation of enzyme assays Basics of isolation and purification of enzymes	2	Taught in German, teaching material in English available	Every Semester

		Soluble enzyme systems with calculation of space time yield Fundamentals of enzyme immobilisation and its application Basics of immobilisation of microorganisms and their application Special applications of enzymes			
Cleaner Production	5090	Development of environmental protection techniques Sustainable product development Recycling-friendly design Environmentally sound manufacturing techniques References to precautionary waste management and sustainable use concepts	3	Taught in German, teaching material in English available	Every Semester
Waste Water Treatment	4060	Basics of municipal wastewater treatment: - Wastewater constituents - Water law - Mechanical and biological wastewater treatment, - Sludge treatment Carrying out simple process engineering calculations Drawing block diagrams of a sewage treatment plant Activated sludge analysis Phosphate precipitation Excursion to a municipal sewage treatment plant	3	Taught in German, teaching material in English available	Every Semester
Waste Management	4060	Introduction to the basics of European waste management, Basics of the treatment of waste and possibilities of waste prevention.	2	Taught in German, teaching material in English available	Every Semester
Chemistry 1	1010	Stoichiometry: mass balance of reaction equations, calculation of concentrations, stoichiometric calculation Yield calculations and limiting factor in reactions Calculations for elementary analysis Atomic structure: elementary particles, structure of the atomic shell, periodicity of properties, Electron and valence electron configurations	4	Taught in German, teaching material in English available	Every Semester

		<p>Chemical bonding, ionic bonding, atomic bonding, metal bonding, coordinative bonding, intermolecular interactions</p> <p>Molecular structures, hybrid orbitals, VSEPR model, Fundamentals of aqueous solution chemistry and solubility.</p> <p>Redox reactions: Oxidation, reduction, oxidation numbers, setting up redox reactions.</p> <p>Acid-base reactions: pH value, acids and bases, simple pH calculations for strong acids and bases</p> <p>Chemistry of selected compounds and elements</p> <p>Wet chemical detection of simple inorganic compounds</p>			
Chemistry 2	2010	<p>Structure of organic compounds</p> <p>Concepts in organic chemistry: functional groups, inductive and mesomeric effects, isomers, chirality, classification of organic chemical reactions.</p> <p>Important compound classes with nomenclature, properties, important reactions, occurrence and use</p> <p>Basic reaction mechanisms in organic chemistry</p> <p>Selected natural products and environmentally relevant substances</p> <p>Learning general laboratory techniques</p> <p>Precipitation and detection reactions</p> <p>Solubilities of inorganic and organic compounds</p> <p>pH-value and indicators</p> <p>Titrations</p> <p>Aspirin synthesis</p>	5	Taught in German, teaching material in English available	Every Semester
<b>Industrial Engineering and International Management (B.Eng.)</b>					
Business Game "General Airline Management Systems" (GAMS)	6416	Students will develop an entrepreneurial, managerial and operational understanding of managing an airline within a competitive landscape. Despite the respective industry, they will also strengthen their general management skills, such as analytical thinking, a	4	Taught in English on request	In Winter Only

		structured way of working, target-oriented problem solving, or rationale decision-making based on typical data reports, e.g. covering market or financial topics. Moreover, students will improve their teamwork and communication skills.			
<b>Medical Engineering (M.Sc.)</b>					
Irradiation Device Technology	2202	Accelerator equipment for optimising patient positioning. Technical solutions for patient movement management. Modern forms of radiation (e.g. arc therapy, integrated MR linac). Role of multimodal images in therapy planning. Therapy planning: algorithms and tools	3	Taught in English	In Winter Only
Laser Applications	Las	Basics of lasers, properties of laser radiation, types of lasers Properties of spectra and spectral lines Spectroscopic methods (IR and Raman spectroscopy, Doppler-free spectroscopy) Time-of-flight methods (laser Doppler velocimetry, OTDR, LIDAR) Interference methods (interferometry and interference microscopy, FTIR spectrometry, holography for material inspection, Applications of holographic gratings, laser gyroscope/Sagnac effect) Generation and detection of short laser pulses Interaction of laser radiation with matter, especially tissue Applications of the laser in medicine	3	Please check before application, if teaching in English is possible: Bernd.Schweizer@hs-rm.de	In Summer Only
<b>Mechanical Engineering (B.Eng.)</b>					
Vehicle Development	6016	Vehicle Development will give an overview of the whole Process of Engineering cars, including: - Advanced Engineering, - Technology Management,	2	Taught in English	Every Semester

		<ul style="list-style-type: none"> <li>- Vehicle Architecture &amp; Package,</li> <li>- Performance Integration &amp; Tuning,</li> <li>- Validation,</li> <li>- Quality Engineering.</li> </ul> <p>Interfaces to Design, Purchasing, Marketing &amp; Manufacturing will be discussed.</p>			
Electrical Propulsion System	6071	Getting to know the different types of electric drive trains and their components in vehicles and machines (conducted, non-conducted, hybrid drive systems) through research and preparation of technical data in a team and presentation and consolidation of the information in seminar workshops.	2	Flipped Classroom – individual research, presentation can be held in English	Every Semester