1st part of the course
(1st – 2nd Semester)

Microbiology

Description				
Objective	Students will gain an insight into the field of microbiology. An overview of the components of prokaryotic cells and aspects of bacterial genetics and microbial ecology is included. An introduction to the diversity of microorganisms including bacteria and viruses is provided. The lecture is held in English.			
Prerequisites	None (Skills in A-level English)			
Content	1. Introduction to microbiology, historical roots, the impact of microorganisms on humans: microbial diseases, food industry, ecology, biomining, biotechnology 2. Microbial evolution, the phylogenetic tree, microfossils, stromatolites, the three domains of life, prokaryotes, eukaryotes 3. The prokaryotic cell: Size, shape, membrane and transport 4. Composition of cell walls, peptidoglycan, the Gram stain, teichoic acids, archaea, the cell wall as a target: lysozyme, penicillin 5. The outer membrane, chemistry of lipopolysaccharides, endotoxin, porins, periplasm, capsules, pili and flagella, motility 6. Cell inclusions: Gas vesicles, endospores, carboxysomes, magnetosomes, inclusion bodies, storage materials 7. Cell growth of cells and bacterial populations: Cell division, binary fission, divisome, cytoskeleton, cell division and peptidoglycan biosynthesis, the growth cycle 8. Prokaryotic diversity: Proteobacteria: *Pseudomonas*, acetic acid bacteria, enteric bacteria, *Helicobacter*, myxobacteria 9. Prokaryotic diversity: gram-positive bacteria, *Staphylococcus*, lactic acid bacteria, endospore-forming bacteria, *Mycoplasma*, *Streptomyces.* Phylum Cyanobacteria and Spirochetes 10. Essentials of Virology: General features and virus replication, Baltimore classification 11. Bacterial genetics: Genome, nucleoid, chromosome, plasmids, cloning, transformation, transduction, conjugation 12. Bacteria and the environment: Habitats, extremophiles, industrial potential, compatible solutes 13. Fermentation, lactic acid, alcohol			
Course material	– Lecture script – G. Fuchs und H. Schlegel: Allgemeine Mikrobiologie, ISBN 3-13-444608-1 (ISBN 978-3-13-444608-1) – Brock: Biology of Microorganisms, ISBN-13: 978-0-13-196893-6			
Language	German	☐	English	☒
Media	Presentation	☒	Blackboard	☐
Time schedule	Weekly	☒	Block schedule	☐
Cycle	Each semester	☒	Annually	☐
Status	Compulsory subject	☒	Optional subject	☐
Last modified	01.10.2013			