

Criteria necessary for accreditation of the subject ``Hygiene, Microbiology and Virology``

- 1) Mandatory classes:
 - Lab class microbiology, virology, hygiene, 5th semester, Mon. and Tue. 2-5 pm
- 2) Concordant class
 - Lecture ``hygiene, microbiology, virology``, 5th semester, Mon. 8-10am, Tue.-Thurs. 9-10 am
- 3) Record of achievement:
 - Oral Exam at the end of the 5th semester on microbiology and virology
 - Multiple Choice exam at the end of the 5th semester on hygiene
 - The results of the oral exam make up 2/3, hygiene 1/3 of the total grade
 - In case of failure of one the two exam components, separate repetition is possible
- 4) Learning objective:
 - Objective catalog for hygiene, microbiology and virology
 1. General study of infection
 - Definition of infection, infectious diseases and pathogenic agents; physiological flora of skin, mouth, intestines and genital tract
 - Etiology of infectious diseases (bacteria, fungi, parasites, viruses, prions)
 - Pathogenicity and virulence, pathomechanisms (colonization, invasion, tropism, toxicity, bypassing immune defenses)
 - Immune defenses, natural immunity (defensins, lysozymes, CRP, complement system, cytokines, phagocytosis), acquired immunity (antibodies, t-lymphocytes, TH1/TH2 response, Toll-like-receptors)
 - Epidemiology of infectious diseases (pandemics, epidemics, endemics outbreaks), causes for the spread of infectious diseases, pathogenic reservoir (humans, animals, plants, food, water) and modes of transmission (smear infection, droplet contact, dust, aerosols, mucosa contact, bite wounds, food), protection against infection, monitoring systems
 - Diagnostics of infectious diseases (clinical diagnosis, microbiological diagnosis)
 2. General bacteriology
 - Structure and morphology of bacteria (cell wall, cell membrane, cell attachments, special forms)
 - Diagnostics usable characteristics in bacteria (proliferation, metabolism, antigenicity, colorability, genotypes)

-Bacterial genetics (chromosomal characteristics, plasmids, transformation, conjugation, transduction, transposons, pathogenicity islands)

3. Diagnostics of bacterial infectious diseases

-Material collection (blood culture, liquor, stool, urine, swab, secrete, biopsies, serum) and transport (transport mediums)

-Evidence of pathogenic agent (significance of microscopic technique, coloring technique, culture, nucleic acid amplification)

-Differentiation between bacteria (morphological, biochemical, serological, genetical)

-Indication and interpretation of antibody tests in diagnostics, sensitivity and specificity of various verification techniques (Widal's agglutination reaction, complement binding reaction, ELISA, immunoblot)

4. Specific bacteriology

-Morphologic and cultural pathogen characteristics, typical illnesses and symptoms, microbiologic diagnostics, treatment, epidemiology and prevention in infections with

- Staphylococci (*S. aureus*, MRSA, coagulase-negative Staphylococci)
- Streptococci (*S. pyogenes*, *S. agalactiae*, oral Streptococci, Pneumococci,

Enterococci, Peptostreptococci)

- - Neisseria (*N. gonorrhoea*, *N. meningitidis*)
- - Salmonellen (*S. Typhi*, *S. Enteritidis*)
- - Shigellen
- - Escherichia coli
- - Yersinia (*Y. pestis*, *Y. enterocolitica*, *Y. pseudotuberculosis*)
- - other Enterobacteriaceae
- - Pseudomonas aeruginosa
- - Brucella
- - Legionella pneumophila
- - Haemophilus (*H. influenzae*, *H. ducreyi*)
- - Bordetella pertussis
- - Vibrio cholerae
- - Campylobacter jejuni
- - Helicobacter pylori
- - Corynebacterium diphtheriae
- - Listeria monocytogenes
- - Bacillus anthracis
- - Bacillus cereus
- - Clostridien (*C. tetani*, *C. botulinum*, *C. perfringens*, *C. difficile*)
- - Mycobacterium tuberculosis Komplex

- - Mycobacterium leprae
- - other Mycobacteria
- - Actinomycetes
- - Nocardia
- - Leptospira
- - Treponema pallidum
- - Borrelia burgdorferi
- - Mycoplasma (M. hominis, M. pneumoniae, U. urealyticum)
- - Chlamydia (C. trachomatis, C. pneumoniae, C. psittaci)
- - Rickettsia, Coxiella, Ehrlichia

- - Bartonella henselae
- - Anaerobics (Bacteroides, Fusobacterium)

5. Mycology

-Pathogenesis, clinic, microbiological diagnostics, treatment of infections with dermatophytes, yeasts, mold fungus (*Aspergillus fumigatus*), *Pneumocystis carinii*

6. Parasitology

-Epidemiology, transmission, pathogenesis, clinic, diagnosis, treatment, prophylaxis in infections with

- - Plasmodium (*P. vivax*, *P. ovale*, *P. malariae*, *P. falciparum*)
- - Toxoplasma gondii
- - Leishmania
- - Trypanosoma brucei
- - Trypanosoma cruzi
- - Giardia lamblia
- - Entamoeba histolytica
- - Cryptosporidium
- - Schistosoma (*S. mansoni*, *S. haematobium*, *S. japonicum*)
- - Taenia (*T. saginata*, *T. solium*)
- - Echinococcus (*E. granulosus*, *E. multilocularis*)
- - Enterobius vermicularis
- - Ascaris lumbricoides
- - Trichinella spiralis
- - Ancylostoma duodenale
- - Filarioidea (*Wuchereria bancrofti*, *Loa loa*, *Brugia malayi*, *Onchocerca volvulus*)

7. Antimicrobial treatment

- Basic terms (antibiotics, antituberculotics, antimycotics, anthelmintics, antiprotozoals; bactericide, bacteriostasis, minimal inhibitory concentration)
 - Mechanism and spectrum of penicillin, cephalosporins, monobactams, penems, β -Lactamase inhibitors, aminoglycosides, quinolones, tetracyclines, macrolides, lincosamides, streptogramins, glycopeptides, chloramphenicol, sulfonamides
 - Evaluating resistances, methods (agar diffusion, MIC), definition of sensitivity and resistance
 - Treatment principals (initial therapy, calculated therapy, treatment after pathogen finding), combination therapy, synergism, antagonism
 - Resistance and mechanisms of resistance, resistance development, cross-resistance
 - Definition and principals of multidrug-resistant gram-negative pathogen classification according to the recommendation of the commission for hospital hygiene and infection prevention of the Robert-Koch Institute
 - Side effects
 - Antibiotic prophylaxis
 - Indications for the use of penicillin, cephalosporins, monobactams, penems, β -Lactamase inhibitors, aminoglycosides, quinolones, tetracyclines, macrolides, lincosamides, streptogramins, glycopeptides, chloramphenicol, sulfonamides
-
- - Principles of application, mechanism and resistance mechanism of antituberculotics (Isoniazid, Rifampicin, Ethambutol, Streptomycin, Pyrazinamid) und Antimycotiks (Polyene, Azole, Flucytosin)
 - Substances and their usage for the treatment and prophylaxis of malaria