Course description for Postgraduates, School of Basic Medicine

Course Title: Advanced Techniques in Diagnostic Microbiology				**Course Code:** 510.540
Course category: □High-level course □International course □Advanced international courses ■Common course				
Course Type: □1st-level discipline basic courses □2nd-level discipline basic courses ■Optional professional courses				
The methods of Assessment: Test in English				
Teaching Method: lecture in English			**Applicable Educational Level:** ■ Master □Doctor	
The Beginning of the Term: the first term	**Total Hours/Teaching Hours:** 36h		**Credits**: 2	
Applicable Specialty: All of medical students				
Name of the Teachers of the Course Group	**Professional Title**	**Major**	**Age**	**Academic Direction**
Fan Xionglin	Prof.	Microbiology	43	Molecular bacteriology
Yang Hongmei	Prof.	Microbiology	48	Molecular virology
Ye Siying	Prof.	Microbiology	59	Molecular bacteriology
Yu Bing	Assoc. Prof.	Microbiology	45	Molecular virology
Xu Yang	Assoc. Prof.	Microbiology	40	Molecular virology
Shi Chunwei	Assoc. Prof.	Microbiology	39	Molecular bacteriology

Course Outline:

Clinical microbiologists are engaged in the field of diagnostic microbiology to determine whether pathogenic microorganisms are present in clinical specimens collected from patients with suspected infections. If microorganisms are found, these are identified and susceptibility profiles, when indicated, are determined. During the past two decades, technical advances in the field of diagnostic microbiology have made constant and enormous progress in various areas, including bacteriology, mycology, mycobacteriology, parasitology, and virology. The diagnostic capabilities of modern clinical microbiology laboratories have improved rapidly and have expanded greatly due to a technological revolution in molecular aspects of

microbiology and immunology. In particular, rapid techniques for nucleic acid amplification and characterization combined with automation and user-friendly software have significantly broadened the diagnostic arsenal for the clinical microbiologist. The conventional diagnostic model for clinical microbiology has been labor-intensive and frequently required days to weeks before test results were available. Moreover, due to the complexity and length of such testing, this service was usually directed at the hospitalized patient population. The physical structure of laboratories, staffing patterns, workflow, and turn-around time all have been influenced profoundly by these technical advances. Such changes will undoubtedly continue and lead the field of diagnostic microbiology inevitably to a truly modern discipline.

Advanced Techniques in Diagnostic Microbiology provides a comprehensive and up-to-date description of advanced methods that have evolved for the diagnosis of infectious diseases in the routine clinical microbiology laboratory. The book covers the principles and characteristics of techniques ranging from rapid antigen testing, to advanced antibody detection, to in vitro nucleic acid amplification techniques, to nucleic acid microarray and mass spectrometry. Sufficient space is assigned to cover different nucleic acid amplification formats that are currently being used widely in the diagnostic microbiology field. Within each technique, examples are given regarding its application in the diagnostic field. Commercial product information, if available, is introduced with commentary in each chapter. If several test formats are available for a technique, objective comparisons are given to illustrate the contrasts of their advantages and disadvantages. Moreover, this book also provides practical examples of application of these advanced techniques in several “hot spots” in the diagnostic field.

Contents:

15 Microarray-Based Microbial Identification and Characterization
16 Diagnostic Microbiology Using Real-Time PCR Based on FRET Technology
17 Bacterial Identification Based on 16S Ribosomal RNA Gene
Sequence Analysis
18 Molecular Techniques for Blood and Blood Product Screening.
19 Review of Molecular Techniques for Sexually Transmitted
Diseases Diagnosis
20 Advances in the Diagnosis of Mycobacterium tuberculosis and Detection of Drug Resistance

Guide Books:

Advanced Techniques in Diagnostic Microbiology. 2006. Springer Science + Business Media, LLC.

Main ReferenceBooks:

Molecular Cellular Microbiology. Volume 3, Academic press, 2002.