Course Description for Postgraduates, School of Basic Medicine

Course Title: Medical Genetics		**Course Code: 510.506**
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: closed-book exam		
Teaching Method: lectures	**Applicable Educational Level:** Master■ Doctor□	
The Beginning of the Term: 1st semester	**Total Hours/Teaching Hours**: 32	**Credits**: 2
Applicable Specialty: Genetics, physiology, pharmacology, pathophysiology and clinics (esp. cardiology neurology)		

Name of the Teachers of the Course Group	Professional Title	Major	Age	Academic Direction
Guo Zheng	Professor	Medical Genetics	37	The study on multiple differentiation of intestinal stem cells
Tang Yanping	Associate professor	Medical Genetics	55	Phosphorylation-related signal transduction
Tian Hong	Associate professor	Medical Genetics	55	Tissue Engineering Bladder
Wang Hui	Associate Professor	Medical Genetics	41	Roles, functions and mechanism of non-coding RNAs
Liu Dan	Associate Professor	Medical Genetics	32	Epigenetics in neuropsychiatric disorders

Course Outline:

This course will provide a framework for understanding the field of medical genetics while giving students a basis on which to establish a program of continuing education in this area. This course focus on single-gene inheritance, chromosomal diseases, disorders with complex inheritance, molecular disease as well as treatment of genetic disease. This course will provide new understanding of some disease or to offer new views on some new diagnosis and therapies for clinical diseases.

Outlines:

Chapter 1 Introduction

§1.1 Genetics and Genomics in medicine

§1.2 Onward

Chapter 2 The human genome: Gene structure and function

§2.1 Information content of the human genome

§2.2 The central DOGMA

§2.3 Gene organization and structure

§2.4 Fundamentals of gene expression

§2.5 Gene regulation and changes in activity of the genome

§2.6 Variation in gene expression and its relevance to medicine

Chapter 3 Principal of Clinical Cytogenetics

§3.1 Introduction to cytogenetics

§3.2 Chromosome abnormalities

§3.3 Studies of chromosomes in human meiosis

Chapter 4 Clinical Cytogenetics: Disorders of the Autosomes and the Sex Chromosomes

§4.1 Autosomal disorders

§4.2 The sex chromosomes and their abnormalities

§4.3 Disorders of gonadal and sexual development

Chapter 5 Patterns of Single-Gene Inheritance

§5.1 Mendelian inheritance

§5.2 Factors affecting pedigree patterns

§5.3 Patterns of Mendelian inheritance

Chapter 6 Genetics of Common Disorders with Complex Inheritance

§6.1 Qualitative and quantitative traits

§6.2 Genetic and environmental modifiers of single-gene disorders

§6.3 Examples of multifactorial traits for which genetic and environmental factors

Chapter 7 Principal of Molecular Disease

§7.1 The effect of mutation on protein function

§7.2 How mutations disrupt the formation of biologically normal proteins

§7.3 The hemoglobin

§7.4 The hemoglobinopathies

Chapter8 The molecular, biochemical, and cellular basis of genetic disease

§8.1 Disease due to mutations in different classes of proteins

§8.2 Disease involving enzymes

§8.3 Defects in receptor proteins

§8.4 Disorders of structure proteins

Chapter 9 Treatment of Genetics Disease

§9.1 The current state of treatment of genetic disease

§9.2 Treatment strategies

§9.3 The molecular treatment of disease

Chapter 10 Cancer Genetics and Genomics

§10.1 Genetic basis of cancer

§10.2 Oncogenes

§10.3 Tumor-suppressor genes

§10.4 Tumor progression

Guide Books:

self-edited

Main ReferenceBooks:

Medical Genetics Edited by Xianning Zhang, Ji Zuo and Ming Qi

The Mouse in Biomedical Research Edited by James G.

Thompson & Thompson Genetics in Medicine Edited by Nussbaum McInnes and Willard