Course Description for Postgraduates, School of <u>Basic Medicine</u>

Course Title: Application Examples and Guide of Bioinformatics	**Course Code:** 510.535

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: written examination (close or open book exam)

Teaching Method: special lecture topics	**Applicable Educational Level:** Master ■ Doctor □

The Beginning of the Term: The second semester	**Total Hours/Teaching Hours**: 36 ∕ 36	**Credits**: 2

Applicable Specialty: medical and pharmaceutical

Name of the Teachers of the Course Group	Professional Title	Major	Age	Academic Direction
Jun Tian	Associate Professor	Biochemistry and molecular biology	43	Biochemistry and molecular biology
Juan Chen	Professor	Biochemistry and molecular biology	43	Biochemistry and molecular biology
Fengchao Jiang	Professor	Pharmacy	57	Medicinal chemistry and computer aided drug design
Zheng Tan	Lecturer	Immunology	39	Structure simulation and prediction of biological macromolecules
Jie Zhou	Associate Professor	Biochemistry and molecular biology	35	Biochemistry and molecular biology

Course Outline:
Aim of the Course

Bioinformatics is an interdisciplinary field of science that was born in the era of HGP, and developed in the post-genome era. Over the past few decades, bioinformatics has

become increasingly important not only in data acquisition, data analysis, data interpretation, but also in determining the experimental design. It's quite challenging for a researcher to accomplish high-quality scientific papers or even continue in-depth studies without basic knowledge about bioinformatics.

This course will be focused on the practical aspects of bioinformatics to train the students of the most commonly used databases and search techniques. The teachers will during the lectures give the students inspiration to- and demonstrations of data handling to learn a basic understanding of the search algorithms and the flexibility of application.

Meanwhile this course will include more examples of how informatics solve problems and being instructive combined with the hot areas of scientific research in domestic and overseas, to make students realize the close relationship between their research subject and informatics. This course will be given both in lectures and computer practice to make students truly understand.

Teaching syllabus:

This course consists of three parts.

The first part provides the examples of scientific research, and guides the students to learn how to apply bioinformatics in practical scientific research; The second part includes the introduction and retrieval of commonly used databases, focusing on the techniques. For instance, the classification and characteristics of molecular bioinformatics database, the query and retrieval from a database (homology comparison of protein and nucleic acid; primer design; optimization of interference RNA; structure analysis of protein and nucleic acid; promoter analysis, etc.). The third part involves the application of some high level software，for example the image processing of genomics and proteomics as well as its theory and application.

Course Outline:

Guide to bioinformatics applications	8h
Introduction and practical application of commonly used database	12h
The theory, method and application of protein structure prediction	12h
Application of image analysis software for proteomics	4h

Teaching methods:

A combination of lecture teaching and practice teaching, the students will truly grasp the knowledge from the practical demonstration and operation.

Guide Books:

Application examples and guide of bioinformatics, self-edition.

Main Reference Books:

Bioinformatics methods and applications