



Course code	PHM 4003
Course title (English)	Biotech-based Drug Development
Course title (Chinese)	生物技术制药与实验
Units	2
Language of Instruction	English
Description (English)	This course provides students with an understanding of the main knowledge and technology in biopharmaceuticals. It covers drug design, synthesis and production, screening and evaluation, and applications involved in the biotech-based drug development process, and includes rational drug delivery of novel biopharmaceutical technologies, as well as representative experiments related to biopharmaceuticals. The course will introduce cases of representative biotechnologies and experiments used in biopharmaceuticals, from which students will learn the current status of biotech-based pharmaceutical research and related technical operations.
Description (Chinese)	本课程让学生了解药学研究中的当前生物制药的关键知识和技术。它涵盖了生物技术制药过程中涉及的药物设计、合成与生产、筛选与评价及应用，并且包括新兴生物制药技术合理药物递送方式、部分生物技术制药相关实验等。本课程将介绍不同生物技术与实验用于制药的案例，学生将在其中了解生物技术制药研究现状及相关技术操作。

Learning Outcomes

By the end of this course, each student should be able to describe and discuss:

- Historical background, current development and future trends of biotech-based pharmaceuticals
- Major engineering techniques, applications and differences between biopharmaceuticals and traditional chemical pharmaceuticals
- Classification, characteristics and general rules of emerging biotech-based drug development
- Basic principles, applications and cases of emerging biotech-based pharmaceuticals
- The latest development trends and technological advances in biotech-based drug development
- Biotech-based drug development process, including design, synthesis, screening and evaluation, and rational drug delivery methods and technologies
- Typical biopharmaceutical experimental steps, operations, precautions and data analysis



Indicative Teaching Plan

Week	Lectures / Topics
1	Biotech-based Drug Development: Biotechnology and Biopharmaceuticals
2	Genetic Engineering for Biotech-based Drug Development
3	Cell Engineering: Animal Cells and Plant Cells
4	Enzyme and Antibody Engineering for Biotech-based Drug Development
5	Biotech-based Drug Development: Antibody Engineering
6	Delivery Systems for Biotech-based Drugs
7	Case Study-Representative Clinical Development of Biotech-based drugs
8	Experiment: Cell/Probiotics fermentation and viability determination 1
9	Experiment: Cell/Probiotics fermentation and viability determination 2
10	Experiment: Concentration Determination of Cellular drugs and Protein Drugs 1
11	Experiment: Concentration Determination of Cellular drugs and Protein Drugs 2
12	Review and Final Exam